Safety Procedure

HS-702

CONTRACTOR MANAGEMENT

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1. OBJECTIVES

The objective of the HS-702 Safety Procedure is to establish general safety regulations that must be followed by sub-contractors of AMBATOVY. It lays out the principal safety rules as well as safety management obligations.

2. SCOPE

The regulations apply to all of Ambatovy's industrial and administrative sites.

3. DEFINITIONS AND GENERAL INFORMATION

Ambatovy Contact Person

Before the start of each contract, Ambatovy shall designate a Contact Person, who ensures that outside suppliers fully implement all applicable safety measures.

Rules governing individual suppliers

All temporary employees, trainees, consultants, etc. are governed by the same safety management system as the regular employees of Ambatovy. They are entitled to the training required for the tasks they perform, to personal protective equipment and to adequate supervision. They also have the same obligations as Ambatovy employees.

All individual suppliers are subject to the same safety measures as Ambatovy employees (workplace inspections, monthly safety meetings, weekly meetings, tool box meetings, task analysis and risk assessment, etc.).

Rules governing Contractors

(a) Safety performance qualifications

Ambatovy shall maintain a list of Contractors whose safety performance has been deemed satisfactory based on a review of qualifications. Only Contractors appearing on this list can bid on contracts.

(b) Contractor's Prevention Plan

All bids submitted to Ambatovy must include an accident prevention plan that identifies health and safety risks and the measures to be implemented to eliminate or control them.

(c) Safety provisions

Any contract between Ambatovy and a company must include one or more safety clauses. The contract must also include a termination clause in case of failure to meet safety requirements or poor safety performance.

Accident reporting

All accidents (including cases of occupational illness) that occur during the course of work carried out for Ambatovy must be reported immediately to the Ambatovy Contact Person.
All such accidents and cases of occupational illness shall be investigated in accordance with Procedure HS-1301 – Incident Management Procedure.

Statistics and reports

(a) The Contractor must ensure that health and safety statistics are reported monthly by e-mail to the Ambatovy HS Department. This information must be sent by the seventh calendar day of each month and must include the following:

- All work-related accidents or occupational, including first aid, medical care and time-loss injuries
- Suspected occupational illness
- Injury or illness likely related to routine travel to worksites
- Dangerous incidents

(b) Contractors and sub-contractors must submit their hours worked to Ambatovy on a monthly basis.

(c) The injury report must indicate whether the injury is work-related, non-work related or if the cause is unknown.

This document is essentially based on the standards of the CSA, CE, ANSI or SABS.

4. ROLES AND RESPONSIBILITIES

4.1. Vice-Presidents

- Develop a corporate culture where health, safety and hygiene are essential priorities. Ensures that health and safety obligations are integrated in all management systems
- Demonstrate effective and visible leadership by adopting model health, safety and hygiene practices
- Ensure that the systems in place guarantee the health, safety and hygiene of employees, Contractors, visitors and the public
- Provide the human, technological and financial resources necessary to ensure compliance with the health and safety management system
- Approve health and safety policy
- Integrate health, safety and hygiene objectives and targets into the company's action plans
- Ensure that health and safety norms and procedures are implemented at Ambatovy.
- Review all accident investigations with potentially serious implications
- Follow-up audits and action plans

4.2. H&S Management

- Develops, proposes, administers and supports the application of health and safety policy
- Develops a corporate culture where health and safety are essential priorities
- Demonstrates effective and visible leadership by adopting model health, safety and hygiene practices
- Directs and coordinates the health and safety management system for the purpose of eliminating risks at their source
- Ensures that personal protective equipment (PPE) is available and maintained in all work areas
- Develops risk analyses and prepares resulting work procedures
- Monitors the implementation of health and safety norms and procedures

- Implements and maintains the Emergency Evacuation and Rescue Plan and coordinates emergency drills
- Ensures prompt and rigorous analysis of accidents (accidents, near-accidents, incidents) and develops resulting action plans
- Maintains an archive of health and safety documentation, including evidence of compliance, for the health and safety management system
- Conducts health and safety audits to assess compliance with the health and safety management system
- Approves safety procedures

4.3. Area Manager

- Plays a health and safety leadership role for all of the area's employees and Contractors
- Develops a corporate culture where health and safety are essential priorities
- Develops a yearly health and safety action plan for the area
- Ensures that a risk assessment is completed for all projects and purchases in his/her sector
- Implements effective health and safety management for Contractors, visitors and the public
- Ensures that safe work procedures informed by risk analysis are developed, documented and implemented
- Provides for and organizes required training for the department's employees
- Implements the resources necessary to eliminate risks and improve health and safety
- Ensures that work procedures and safety directives are rigorously implemented by the area's employees and supervisors
- Reviews all investigations and instances of audit non-compliance within the area and establishes corrective measures
- Participates in the approval of safety procedures

4.4. Ambatovy Contact Person

Before a contract is awarded, the Ambatovy Field Superintendent must:

- Participate in scheduled inspections
- Ensure that the safety obligations of the Contractor are stipulated in the contract
- Ensure that all bidders on a contract issued by Ambatovy appear on the list of authorized Contractors
- Ensure that all bidders have signed Form HS-F702.1 certifying that they are aware of Ambatovy's safety regulations and directives and agree to comply
- Hold an on-site meeting with the bidders to present the primary risks and hazards associated with the work to be carried out
- Discuss the specific risks and hazards with the bidders during their site visit
- Evaluate the ability of Contractors to implement the safety measures required under the contract

Before the work commences the Contact Person must:

- Help the Contractor's Project Manager identify the risks and develop safety measures to be included in the Prevention Plan
- Ensure that the Contractor's Project Manager communicates the safety measure required by the work to all personnel under his/her supervision and to all sub-contractors

While the work is under way, the Contact Person must:

- Ensure that the work is proceeding as it should and is being carried out safely
- Make regular on-site safety inspections to ensure compliance with all of Ambatovy's safety regulations and the safety measures identified in the Prevention Plan
- Ensure that the safety measures identified in the Prevention Plan are amended as necessary if the nature of the work changes

- Require immediate corrective measures for any hazardous situations or practices that become apparent; if in doubt, the Field Superintendent must contact Ambatovy's Health and Safety Department
- Require that work be stopped in case of non-compliance with safety measures
- Report all work accidents to his/her immediate superior
- Carry out accident investigations in conjunction with the Health and Safety Manager or his/her assistants

4.5. Contractor's Project Manager / Site Manager

- Identifies the Contractor's Health and Safety officer and submits his or her resume to Ambatovy for approval
- Formally presents Ambatovy's safety procedures to all of the Contractor's employees and subcontractors
- Provides all documents required for work to proceed
- Reports all work accidents to the Ambatovy Field Superintendent as soon as he/she becomes aware of them

4.6. Contractor's employees

- Ensure that all decisions and initiatives are taken with health and safety in mind
- Ensure that all accidents are reported to a first-aid worker or supervisor as quickly as possible
- Consult a first-aid worker in all cases where first aid is required
- Ensure that in cases of injury, the injured person is taken directly to one of Ambatovy's clinics
- Participate in accident investigations and resulting action plans
- Regularly discuss safety considerations with co-workers
- Wear the personal protective equipment required for each task
- Participate in risk analysis and development of work procedures

5. RISK ANALYSIS

5.1. Contractor's Prevention Plan

Risk analysis must be carried out by a qualified team with practical knowledge of the work environment. The personnel assigned to carry out the work must participate in the analysis. It is essential that the Contractor's supervisors and employees take part, as they are best acquainted with the work to be carried out.

The Contractor must identify actual and potential risks for each project to be carried out for Ambatovy in a Prevention Plan prepared before the contract commences. This risk analysis must:

- Identify risks and hazards
- Assess injury and illness probabilities and potential severity
- Consider normal operating conditions and anticipate unusual events, such as work stoppages, power outages, emergencies, etc.
- Review all health and safety information relevant to a given risk, including safety data sheets (MSDS)
- Include any documentation that may be useful, such as logs or other documents detailing risk assessment procedures, describing the evaluations carried out or showing how results were obtained
- Describe the safety management structures, obligations and human resources implemented by the company in its day-to-day operations

The Contractor may identify additional risks during the course of the work, in which case it must submit a revised Prevention Plan to the Field Superintendent.

No project or contract may commence until the Field Superintendent has received the Contractor's Prevention Plan.

5.2. Pre-job risk analysis

Pre-job ("Take 5") risk analysis is a proactive system that requires the participation of employees and supervisors to create a framework for eliminating risks and improving the work environment.

This is one of the most important elements of Ambatovy's health and safety management system because it:

- Gives all participants an opportunity to consider the risks associated with the work
- Reminds workers to inspect the approaches to work areas
- Reminds workers to assess their work environment for potential risks and hazards
- Reminds workers to check the condition of their tools and equipment
- Reminds supervisors to inspect approaches to work areas
- Reminds supervisors to carefully inspect the team's work environment
- Allows supervisors to observe the team's work practices
- Reminds workers to comply with safety directives and evacuation instructions
- Gives workers and supervisors an opportunity to discuss safety concerns
- Develops good work habits, thereby reducing accidents
- Contributes to the development of a health and safety culture at jobsites
- Encourages workers to follow the safety rules

Ambatovy provides the following risk analysis tools:

- Safety Procedure HS-301 – Risk Management System
- Risk Analysis Matrix – HS-F301
- Form HS-F302.1 – "Take 5" (Pre-Job) Risk Analysis
- Form HS-F302.2 – JSEA: Job Safety and Environmental Analysis

6. SAFETY PROCEDURES

6.1. Personal protective equipment (PPE)

The sub-contractor is subject to Safety Procedure HS-903.8.

The Contractor must ensure that any person entering a work site wears at all times, as a minimum:

- A hard hat
- Steel-toe safety footwear
- Protective eyewear
- Approved clothing (see 6.1.4)

All PPE must be kept in good condition. Dining areas, office areas, access roads and enclosed vehicles are exempt from this requirement.

Personal protective equipment provided by the Contractor must be checked, inspected and maintained by a qualified individual, in accordance with the manufacturer's specifications.

6.1.1. Standards and certifications

Personal protective equipment must:

- Be certified by a recognized standards organization
- Ensure personal protection against the risks and hazards it is designed for

- Not constitute a hazard in and of itself
- Be worn and adjusted according to manufacturer recommendations

6.1.2. Eye and face protection

- Protective eyewear is mandatory where required by the nature of the work, for example, machine operations or carpentry work, or work carried out in an area where safety glasses or goggles are required. Protective eyewear should be worn in addition to face shields for work which requires this type of protection.
- All eye and face protection should meet minimum impact standards.
- Protective eyewear with side shields must be worn at all times, except when another means of eye protection is being used (welding mask, cutting goggles, etc.).
- Protective eyewear that is tinted must not be worn at night, indoors or in dimly lit environments.
- Contact lenses are prohibited in operating areas and machine shops.
- Personnel working in proximity to welding areas must use eyewear equipped with a filter shade from 1 to 4 to protect against eye injury. Ordinary sunglasses are inadequate, as they do not provide safe levels of filtering.
- Double protection (eyewear and face shield) is mandatory for operations such as cutting and scarfing.
- For oxygen cutting (welding, cutting), workers must wear welding goggles with an appropriate filter shade (4 to 6). For arc welding, workers must wear an approved welding helmet and a welding mask with a filter shade between 10 and 11.
- Goggles designed for gas welding must not be worn for arc welding.

6.1.3. Hearing protection

Workers exposed to a daily noise level ($L_{EX,8h}$) exceeding 85dB(A) or working in an area where a pictogram indicates that hearing protection is mandatory must wear hearing protection (earmuffs or earplugs) meeting the standard.

Hearing protection must be worn whenever necessary.

6.1.4. Work clothing

- The Contractor must ensure that employees wear clothing that is appropriate and allows for safety. Close-fitting shirts or jackets and long pants (free of holes, rips, etc.) must be worn at all times on Ambatovy sites. Shorts and sleeveless tops are prohibited at worksites. Office areas, dining areas and certain other zones identified by Ambatovy are exempt from this policy.
- Wearing of long hair, pendants, jewelry or other objects that could be hazardous to the health and safety of the employee is prohibited on worksites, unless the hair/object is attached, covered or otherwise secured to eliminate risks.
- Work clothing should be made of non-synthetic material if any spark or fire risk exists or when required by the nature of the work.
- Workers exposed to the sun for long periods of time must wear protective clothing.

6.1.5. Requirements for manual handing

The Contractor must ensure that all employees engaged in work involving manual handling of materials or equipment wear, AS A MINIMUM:

- A hard hat
- Protective footwear
- Work gloves
- Safety clothing (trousers and long-sleeved shirt, or coverall)

6.1.6. Specific protective equipment

Any other type of protective equipment necessary (such as floatation devices or devices to protect the hearing, face, airway, or to protect against falls, etc.) must be used when any potential risk is present.

On Ambatovy worksites, areas where the use of special personal protective equipment is mandatory are identified by signs (pictograms or other).

In particular, for production units at the Tamatave site, portable H_2S detectors must be worn (see your contract manager) and escape masks must be available (see section 6.16).

6.2. Housekeeping

To ensure the safety and productivity of workers, the Contractor must recognize the importance of keeping work areas clean and tidy.

The Contractor is responsible for ensuring that the work areas remain clean and tidy. If the Ambatovy Field Superintendent deems it necessary, he may have the Contractor's work area cleaned and charge the Contractor for the cost. The Contractor must ensure that the following conditions are met:

- Floors, walkways and work platforms must be kept free of debris at all times.
- All equipment, tools and materials used in the work areas must be removed and stored in a proper location when work is finished.
- Nails and screws must not be left protruding. They must be hammered down or completely removed.
- Material at height must be secured, especially in windy conditions.
- Areas in proximity to emergency equipment, such as extinguishers and hoses, and emergency personal protective equipment must be kept clear of obstructions and accessible at all times.
- Electrical cords, extension cords, wires and cables must be placed so as not to pose a tripping hazard. They should be elevated whenever possible. Otherwise, they must be covered with protective material (board, plank, pipe, tape, etc.).
- Electrical cords must be kept out of puddles.
- Oil-soaked rags must be kept in metal containers with lids, separate from other waste.
- Hydrocarbons and other chemical products must never be buried underground or released into the sewer system. They must be placed in clearly identified disposal containers.
- Waste, material or tools must never be thrown down from an upper floor. Such objects must be descended in a receptacle using a chute.
- Waste must be discarded as it is produced:
    - Using appropriate containers
    - Via a sloped or vertical chute leading to a receptacle such as a truck bed, a container or an enclosure, access to which is off-limits to workers and strictly reserved for motorized equipment. The receptacle must be large enough to hold all the material to be discarded without overflowing and the chute must:
        - Be covered, if the slope is greater than 45º
        - Be closed at the mouth when not in use
        - Be equipped with a stopper at the mouth to bar wheelbarrows
    - Using a hoist, in the case of large objects
- Material to be discarded must be removed or placed so as not to pose an inconvenience.
- Recovered material such as wood, bricks, blocks, stones or steel must be carefully piled up or arranged in a proper manner.
- At the end of work, all torch valves must be closed and the gauges removed.

6.3. Storage

- Ambatovy agrees to reserve an appropriate area for the Contractor to store tools, materials and equipment.
- The Contractor is responsible at all times for ensuring that its materials, tools and equipment are properly and safety stored in Ambatovy facilities.

- The Contractor is responsible for loading, unloading and handling of materials and maintenance of storage areas.
- The Contractor must provide proper storage containers for equipment or materials that require protection from the environment. Such containers must be watertight and dust/pest-proof.

6.4. Work permits

The sub-contractor is subject to Safety Procedure HS-903.1

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A work permit is prepared and issued by authorized personnel for the execution of a specific job during a certain period of time in a certain area. Any high-risk job carried out by a Contractor must be duly authorized by a work permit.

The work permit is issued by a person certified by Ambatovy to serve as the Permit Coordinator. Once the work is complete, the Permit Coordinator verifies that the work was completed in accordance with the contract and signs the permit, thus closing it.

The work permit serves to establish, communicate and document the agreement between the personnel responsible for carrying out the work and the personnel in charge of the work area.

Each work permit must state any risks to personnel, equipment or property along with the safety measures to implement while carrying out the work in question.

A work permit must be issued for any job which, due to its nature or location, entails or could entail a hazard to workers, equipment, the environment, production or construction activities (in particular, “intrusive” work, where workers may be in contact with a hazardous energy source).

6.4.1. Issuing of permits

To obtain a permit, the Contractor or a representative must submit the permit application, along with the corresponding JSEA, to the Ambatovy Field Superintendent 24 hours before work commences.

At minimum, the work permit must:

- Include the time, date of issue and term of the permit
- Identify the operating area where the work is to be carried out and the equipment involved
- Identify any hazardous substances in the work area which could affect worker health and safety
- State that the work area has been prepared and inspected to allow for the work to be carried out safely
- Specify all safety measures and material required
- Specify the personal protective equipment to be worn by workers

N.B.: Work must not begin until the JSEA has been approved and the permit issued.

6.4.2. Explanation and posting

Before the work in question commences, the Contractor must explain the conditions stipulated in the permit to the personnel involved. The permit is then posted in the work area.

In Ambatovy parlance, the Contractor or a representative is qualified as “Permit Acceptor.”

6.4.3. Term and cancellation

Work permits are valid only for the term indicated on the permit.

Work permits are automatically cancelled in case of a general alarm and for non-compliance with safety regulations. In cases where one or more permits have been cancelled, new permits must be obtained before work recommences.

6.4.4. After work is complete

At the end of the shift or the work period authorized, the Contractor or representative who requested the permit must sign it and return it to the issuing Field Superintendent. An inspection of the work site by the Contractor or representative may be required, depending on the nature of the work carried out.

Before signing the permit, the Contractor must ensure that the work area has been left in a safe condition and that no other work will be carried out there until another permit has been issued.

6.5. Fire response and training

It is the Contractor's responsibility to ensure that personnel engaged in welding, cutting or scarfing are familiar with fire response procedures and the use of fire extinguishers.

A Contractor's supervisor must remain on duty for one hour after work has stopped.

6.5.1. Extinguishers

Due to their versatility, ABC extinguishers are required as the minimum standard. The type must be dry-chemical or foam.

All extinguishers used by a Contractor must:

- Be numbered
- Be listed in a logbook
- Be inspected once a month by a qualified individual
- Be fully inspected once a year by a certified supplier
- Bear the name of the individual responsible for maintenance and show the last inspection date

6.5.2. Damaged extinguishers

It is imperative that extinguishers that have been damaged or had their seal broken be returned to a certified supplier for repair or refilling.

6.5.3. High-fire-risk areas

Areas where flammable substances or products (fiberglass, polyurethane, rubber, wood, etc.) are found or used must be designated as high-fire-risk areas.

Additional precautions must be taken to ensure strict control of welding, cutting and scarfing operations in these areas. Fire-response personnel and equipment must also be available.

6.6. Hot works

The sub-contractor is subject to Safety Procedure HS-903.3.

6.7. Fleet management

6.7.1. General regulations

- All vehicles used by a Contractor must undergo a specific risk analysis, which must:
  - Involve the vehicle operators and maintenance crew

- Identify all aspects of safe use, including handling, sight lines, break failure, flat tires, entry and exit

- All vehicles must have a mechanical inspection certificate, which is presented to the Ambatovy Field Superintendent before work commences.
- All vehicles used to carry out work on Ambatovy sites must undergo a daily pre-service inspection.
- All vehicles used to carry out work on Ambatovy sites must be equipped with fixed seats and safety belts for each passenger.
- All vehicles used to carry out work on Ambatovy sites must be equipped with an odometer in good working order.
- All vehicles used to carry out work must be equipped with an ABC extinguisher with a minimum capacity of 2 kg as well as a regulation first-aid kit sufficient for the number of passengers.
- All vehicles weighing one ton or more must be equipped with a backing alarm that can be heard over the ambient noise.
- All vehicles must be braced when parked on a steep slope. This requirement does not apply to urban driving.
- Transporting personnel in open-bed trucks not equipped with safety belts is strictly prohibited.

6.7.2. Scheduled vehicle maintenance

- Each vehicle must be subject to a scheduled maintenance program that includes measures to prevent premature wear and tear.
- The scheduled maintenance sheets must be kept in each vehicle's logbook to allow for verification and follow-up.
- Vehicles must undergo periodic inspections by personnel qualified in vehicle maintenance (not the driver), documentation of which is mandatory.

6.7.3. Driving qualifications

All individuals who drive a vehicle as part of an activity carried out for Ambatovy must be properly trained and certified and hold a driver's license valid in the driver's own country and in Madagascar. The qualification held by each driver must include training on the risks associated with the vehicle in question. The driver must also be in good standing with respect to the traffic laws of Madagascar.

6.7.4. Vehicle use

- The driver and all passengers must have their safety belts attached at all times.
- All speed limits and traffic signs on the mining sites and national roads must be respected at all times.
- Measures must be taken to ensure that no vehicle comes within 50 m of earthmoving equipment (power shovel, bulldozer, heavy truck, etc.) before a visual or auditory go-ahead has been given by the equipment operator.
- Loading a vehicle beyond its capacity is prohibited.
- No vehicle may be used to pull another vehicle unless it has been designed for this purpose.
- Transporting passengers in a vehicle not equipped with passenger seats is prohibited.
- Driving under the influence of alcohol, drugs or medication that may adversely affect driving ability is expressly prohibited.
- It is prohibited to smoke or use cell phones while driving.
- Drivers must have in their possession their driver's' license, an inspection certificate, the vehicle's registration certificate and proof of valid insurance.

6.8. Safety meetings

The sub-contractor is subject to Safety Procedure HS-801.

6.8.1. Tool Box Meeting

The tool box meeting is a brief meeting conducted by the crew Supervisor at the start of each shift to discuss the work to be carried out during the day. Risks associated with each task and safety procedures to be implemented are discussed.

6.8.2. Site meeting

For contracts longer than two weeks, site meetings must be held weekly. Each site meeting must include, as a minimum, a representative of Ambatovy and a decision-making representative of the company (including all sub-contractors). The meeting must cover the company's safety performance and the action plans to be implemented to correct any inadequacies.

6.8.3. End-of-contract meeting

A formal meeting must be held at the end of every contract for a summative review of the Contractor's performance, including any accidents that occurred on the site and any anomalies observed.

This meeting must be documented and added to the Contractor's file.

6.9. Training

The Contractor must ensure that all employees under its supervision and all the employees of its sub-contractors have the required training for the type of work being carried out, that they hold the required qualifications and certifications and that they are supervised by competent personnel.

The Contractor and all its sub-contractors must hold the certifications and licenses to carry out tasks that require such qualifications (such as crane operation, slinging, erection of scaffolding, welding, etc.).

6.10. Safety induction

Any individual that carries out a task for AMBATOVY must have first attended a safety induction session presenting the risks and hazards found on the site and describing the precautions that must be implemented to carry work out safely.

This session must cover the following:

- Internal safety regulations and directives
- Fire prevention and use of fire extinguishers
- Use and storage of hazardous materials
- Emergency response plan, including emergency evacuation procedures
- Accident reporting procedures
- Location of first-aid kits, clinics and sanitary facilities
- High-risk work areas
- Work permits
- Use of personal protective equipment
- Working at height
- Vehicle safety
- Specific types of personal protective equipment

Permanent and restricted authorization

Employees who successfully complete this safety induction session are granted permanent access authorization, which must be renewed every two years.

Where necessary, a worker may be granted restricted access authorization, which is valid for a maximum of three working days and may only be issued in urgent circumstances. Only the Area manager in question or the Health and Safety Superintendents may issue a restricted authorization.

A worker with restricted authorization may not be assigned to a high-risk area and must be accompanied at all times by an Ambatovy employee or a person who has permanent authorization.

6.11. Working at height

The sub-contractor is subject to Safety Procedure FPS-60.

6.11.1. Fall prevention

A fall-arrest system must be implemented for any work carried out more than 1.8 m from the ground without the protection of a full guard rail as stipulated in this directive. All fall-arrest systems must include:

- An approved safety harness
- A safety lanyard equipped with an approved shock absorber
- Self-locking carabiners
- Safe and adequate anchor points approved by an engineer

Workers erecting or dismantling metal structures or scaffolding must be attached at all times to an independent structure. The use of scaffolding as an anchor point is strictly prohibited.

Fall prevention equipment must be verified before each use and must undergo regular preventive inspection to ensure it is free of cuts, rips, wear and tear, burns or malformations. These inspections must be documented and logged.

6.11.2. Anchor points

- Anchor points should be fixed above the worker's head wherever possible, and never lower than the waist.
- The strength of all permanent and temporary anchor points must be at least 2500 kg.
- Horizontal and vertical lifeline systems and all their components must be handled and used in accordance with the manufacturer's recommendations.
- The manufacturer's recommendations must be kept at the work site and must be accessible to all.
- A horizontal lifeline system must not be used by more than two workers at once, unless it has been designed for this purpose by a qualified engineer.

Acceptable anchor points:

- Main structure of a building (H, I, T, angle iron or double-angle beam)
- Those installed by the manufacturer on aerial platforms, baskets, or lifts
- Temporary anchor points designed by an engineer or anchor points that are certified by a recognized standards organization and installed in accordance with the manufacturer's recommendations
- Horizontal or vertical lifeline systems

Anchor points that are NOT acceptable:

- Ventilation ducts and equipment
- Sprinkler system components
- Roof drains
- Electrical lines
- Lighting system components
- Guard rails
- Pipes (water, steam, etc.)
- Suspension hooks or other such devices

- Cabletroughs
- Horizontal or vertical bracing elements
- Multi-level storage units
- Overly long or slack cables

6.11.3. Guard rails

Guard rails must be designed to resist a concentrated horizontal and vertical force of 100 kg applied at any point on the upper beam.

Guard rails in high-traffic areas or other locations where they may be subjected to unusual loads must be reinforced as necessary.

Precautions must be taken to prevent tools, materials or other objects from falling to a lower level.

Wooden guard rails installed on work platforms or scaffolding must be built to the following specifications:
- The height must be 1 to 1.2 m.
- The upper beam must be at least 40 mm thick and 90 mm wide.
- The risers must be of the same dimensions and spaced no more than 1.8 m apart.
- There must be a midbeam at least 75 mm wide half-way up the risers and fixed solidly between them.

Metal guard rails must be designed, built, installed and maintained so as to ensure that their safety and resistance are equal to or greater than that required for wooden guard rails.

When a guard rail cannot be installed or when work must be carried out outside the guard rail, use of a full fall-arrest system attached to a proper anchor point is mandatory.

6.11.4. Ramps, catwalks and platforms

a) All permanent, temporary or portable work platforms of at least 1.5 m must be equipped with:
- A solid floor
- A proper guard rail
- A rim at least 90 mm high around the entire perimeter
- Safe access and exit points.

b) Work platforms must meet the following specifications:
- Width ≥ 480 mm wide
- Designed, built and maintained to safely support the required loads
- Solidly fixed in place.
- Clearance of at least 2 m above and below, unless the risk is clearly indicated.
- Free of gaps or holes into which a sphere 30 mm in diameter would fit if more than 1.8 m above the floor or ground
- Equipped with struts between the vertical and horizontal support beams for solidity
- Any welded components welded by a properly certified welder
- Guard rails compliant with these directives

6.11.5. Aerial lift platform (bucket)

- Controls must be clearly labelled in French and English.
- Aerial lifts must be operated by trained, qualified and competent personnel.
- All workers in an aerial lift must be attached at all times to a manufacturer-installed anchor point by means of a complete fall-arrest system. Attaching oneself to the guard rail of the bucket is expressly prohibited.
- Mechanisms must be installed to prevent tools and equipment from falling out of the bucket.

- All aerial lifts must have a certification covering design and construction and showing that inspection and maintenance are carried out in accordance with the manufacturer's recommendations.
- Personnel working in an aerial lift must remain inside the bucket with both feet firmly on the floor at all times.
- Each aerial lift must have a plaque indicating the maximum rated load and the maximum number of occupants it can lift.
- The operator must know the safety measures to take if the hydraulic system fails.

6.11.6. Scaffolding

Temporary or permanent scaffolding must be erected, dismantled and repaired in accordance with the manufacturer's specifications or under the supervision of an authorized Contractor (an approved training certificate must be submitted to the Ambatovy Field Superintendent). Workers must not repair or alter scaffolding without supervision. A solid floor, a guard rail and a safety rim must be installed on the top section. A green sign must indicate that one can access a scaffold: "no green / no go".

6.11.6.1. Construction

Scaffolding must:

- Be designed, constructed, strutted, braced and maintained so as to withstand the required usage and loads and resist gusts of wind
- Rest on solid ground or foundations

6.11.6.2. Materials

- Materials used for scaffolding must not have any defects that could reduce their resistance.
- Metal components:
  - Must not have been weakened by rust or corrosives
  - Must not have been weakened by stress from heat or cold (tubular components).

6.11.6.3. Erection and dismantling

- Erection and dismantling of scaffolding must be carried out under the supervision of a qualified individual.
- All the components must be inspected by a qualified individual before being assembled or erected.
- During erection and dismantling, all necessary precautions must be taken to prevent falling objects.
- The appropriate tools for the type of scaffolding in question must be available to workers.
- Fall-arrest systems must be implemented to protect workers erecting or dismantling scaffolding.
- The scaffolding must be leveled on a solid foundation (base or screw jacks).
- Gudgeon pins with ring fittings must be installed at the top of the tubes.
- Scaffolding with three or more sections must be solidly anchored at vertical intervals not exceeding three times the dimension of the base.
- Scaffolding in the process of being erected or dismantled must never be left in a hazardous state.

6.11.6.4. Mobile scaffolding

All mobile scaffolding shall:

- Be equipped with a locking mechanism to keep it from moving
- Be locked into position at all times when in use
- Be rigid and stable
- Not be moved when a worker is on it, unless:
  - The worker is warned ahead of time.
  - The smallest dimension of the base of the scaffolding is at least equal to one-third its height.

6.11.6.5. Flooring

The flooring components must be installed in a manner that ensures proper immobilization.

In addition, the flooring of a scaffolding unit or work platform must:

- Have an even surface between two support points
- Be at least 470 mm wide
- If made of timber, be composed of planks that are:
  - Of superior quality (equivalent to category 1 spruce)
  - At least 38 mm high and 235 mm wide
  - Long enough to overhang their support elements by at least 150 mm and no more than 300 mm (if placed end to end, the ends must rest on separate support elements)
  - Placed so that the span between two support elements does not exceed 2.1 m
- Be visually inspected before each use for anything that could compromise their solidity

6.11.7. Ladders

A fall-arrest system must be implemented for work carried out on a ladder at a height greater than 1.8 m. Workers may climb or descend a ladder without a harness provided they are able to do so facing the ladder, using both hands and feet, one rung at a time. Ladders must be secured or immobilized at the base.

Ladders must be:

- Designed, constructed, maintained and used in a manner that does not compromise worker safety
- Used at all times in a manner that does not subject any component to a load exceeding allowable unit stress
- Appropriate for the work being carried out, with respect to type, length and accessories

Any ladder shall:

- Rest on a firm footing with the top propped on its two side rails
- Be held firmly in position by another worker
- Be protected from jolts or sliding which might upset it
- When not fixed permanently in position, inclined such that the horizontal distance between the base of the ladder and the vertical plane of the top support point is approximately 1/4 to 1/3 of the length of the ladder between its supports
- When used as a means of access:
  - Be securely fastened in place
  - Extend at least 900 mm above the upper landing
  - Have a minimum clear space of 150 mm below any rung
  - Have sufficient clearance at the bottom of the ladder
  - Not be lashed end-to-end with another ladder
  - Not be installed in a continuous vertical position, unless permanently installed with hoop protection
  - Have rest platforms with handrails at intervals not exceeding 6 m
  - Be off-centre at each platform to ensure protection for the upper part
  - Not be used near an exposed electrical circuit if the ladder is made of metal or metal reinforced
  - Be long enough to allow work to be carried out without standing on the top two rungs
  - Be lifted and lowered by the user in such a way that he or she faces it
  - Be used in an electrical room only if insulated ladders are allowed

6.11.8. Roof work

The Contractor must ensure that roofs are accessed safely by means of scaffolding, a ladder or other safe means (crane or bucket).

All personnel working on a roof must be attached by means of a safety harness to a proper anchor point or to a horizontal, steel lifeline. The diameter of the line must be appropriate for the number of workers attached to it and for the sag angle.

All roof work is prohibited in heavy rain or when wind speed exceeds 30km/h.

No materials may be stored on a roof when work is not in progress (weekends, holidays, etc.).

6.12. Digging and excavation

The sub-contractor is subject to Safety Procedure HS-903.2.

The Contractor may not undertake any digging or excavation work without having first obtained an excavation permit from the Ambatovy Field Superintendent.

Any excavation or trench must be protected by a fence or barrier at least 900 mm high to prevent falls. Where fixed barriers cannot be installed, portable barriers must be used, and must remain in place until the work is fully completed. The barriers must be 1.2 meters from the edge.

For digging being carried out on a road or path, any holes or trenches that must be left open at night must be marked with lights or reflectors.

One or more flaggers must be present when there is a safety hazard due to any of the following conditions:

- Vehicles need to come to a halt near a work area.
- Traffic needs to be restricted to one lane, in alternating directions.
- The work area is not visible. The flagger must be positioned at a distance where he or she will be able to clearly indicate the presence of the work area.

Any unusual or hazardous conditions, such as the presence of underground power lines, pipelines, sewers or unstable ground, must be reported by the Contractor's personnel to the Ambatovy Field Superintendent. If there is an immediate health or safety risk, work must be completely stopped and the Ambatovy Field Superintendent contacted immediately.

Entry and exits points must be set up at each end of the excavation and every 15 metres.

6.12.1. Shoring

Generally, the Contractor must ensure that the walls of an excavation or trench are firmly shored with high-quality materials, in accordance with engineering plans and specifications.

However, shoring is not necessary when the following apply:

- The trench or excavation is in solid rock or when no workers need to enter it.
- The walls of the trench or excavation are not subject to slides and their slope is less than 45º starting less than 1.2 m from the bottom.
- The walls of the trench or excavation are not subject to slides and when an engineer attests that shoring is unnecessary, given the slope and the ground type and stability. A copy of this attestation must be available on the construction site at all times. The term "solid rock" refers to rock that cannot be excavated without explosives.

It is prohibited to place materials within 1.2 m of the top edge of a trench or excavation, or to drive or park vehicles or machines within 3 m of the top edge, unless the edge has been shored for this purpose.

Shoring must protrude from the edge by 300 mm, with the exception of trenches along public roads that must be covered to allow traffic to circulate during periods when work is not under way.

Shoring must be carried out section by section as work proceeds, unless it can be done before digging begins.

6.12.2. Inspecting excavations and trenches

While work is under way, the Contractor must see to it that the walls are inspected and maintained to ensure that they are free of loose rocks/matter and protrusions.

All trenches and excavations must be regularly and thoroughly inspected.

Inspections must be carried out more frequently in cases where the walls have been subjected to environmental or climatic stress.

6.13. Road work safety

6.13.1. Flaggers

For all work carried out on mine roadways, it is mandatory to have flaggers directing the flow of vehicular and pedestrian traffic. Flaggers must have the following:

- A safety vest with reflective bands
- Protective footwear
- A hardhat and protective eyewear
- A directive mechanism (visual or auditory)

The flagger must be positioned in a location that allows him/her to direct traffic with ease and provide clear and effective directions.

The flagger must stand on the shoulder or in an unobstructed lane, facing traffic.

NOTE: Before taking his/her position, the flagger must identify a spot that could afford protection should a vehicle approach dangerously. The flagger must never attempt to stop a vehicle, but should note as much information as possible (plate number, color, model, etc.) and immediately notify the site supervisor.

At all times, the flagger must:
- Stand so that he/she can be seen by the driver of a heavy vehicle carrying out maneuvers
- Stand to the side and at an adequate distance from a vehicle that is backing up
- Avoid walking along the sides of a vehicle
- Use a flagger's sign or flag to slow or stop traffic approaching a work area
- Be attentive to all movement on the site

The driver of a heavy vehicle must:
- Use vigilance
- Locate the flagger before starting operations
- Sound his/her horn if the flagger enters a danger zone
- Suspend operations whenever the flagger is outside his/her field of vision
- Report any irregularity to the site supervisor

6.14. Noise protection

The contractor is subject to Safety Procedure HS-902.6.

6.14.1. Constant noise

The Contractor's employees must operate their equipment so that the level of daily noise exposure ($L_{EX,8h}$) remains below 85dB(A) under normal operating conditions. The Contractor must establish procedures to reduce noise at the source or to install isolation in any work area where this level is exceed-

ed. If this is impossible, the Contractor must provide workers with hearing protection or limit the duration of noise exposure. The protective equipment provided must muffle noise such that the worker is not exposed to a daily noise level ($L_{EX,8h}$) exceeding 85db(A).

The hearing protection equipment provided must meet the requirements of a recognized standards organization. If the same equipment is used by more than one employee it must be disinfected before use.

6.14.2. Equipment and machinery

No fixed machinery or equipment installed or built by a Contractor may generate noise exceeding 85 db(A) at 1 m in any direction from any part of the equipment/machinery when operated in its usual location and under the noisiest conditions.

Mobile equipment or machinery must never generate noise exceeding 85 db(A) at 15 m in any direction from any part of the equipment/machinery when the motor is operating at maximum.

The noise level inside an operator's cabin must not exceed 85 db(A).

Note: If these norms cannot be met, Ambatovy's HS Superintendent must be advised of the reason.

6.15. Ventilation

Any work area that generates gas, smoke, dust, mist or vapors must be properly ventilated by either natural or mechanical means. Excessive drafts are to be avoided. Ventilation systems and mechanisms must be designed, built and installed in accordance with current practices in the sector at the time of installation.

Oxygen

The oxygen volume in all work areas in a facility must be between 19.5% and 23% at normal atmospheric pressure.

6.16. Respiratory protection

The sub-contractor is subject to Safety Procedure HS-902.4.

6.16.1. Escape mask

Before entering the restricted zone (plant), each person must be provided with an escape mask. The escape mask must not be used while working. Ambatovy has approved three types of escape mask, all of which have ABEKP3 protection:

- Mouthpiece with nose clip
- Face mask with cartridge
- Escape hood

6.16.2. Respiratory protection for work

When a person is exposed to any substance in doses higher than the Ambatovy action level, the Health and Safety Department must be notified and remedial steps taken. If it is not possible to control the risk through engineering, the exposed person must wear a respirator.

The type of respirator and air source (cartridge, etc.) to be used to be used on a job are determined by a risk evaluation and are stipulated in the work procedure. A worker's exposure must be assessed

quantitatively according to the pollutant in order to determine which respirator to use and estimate the useful life of the cartridges.

If the worker's exposure is unknown or above the DIVS value, a SABA or SCBA must be used. The same applies if the atmosphere is low in oxygen (< 19.5%) or high in carbon monoxide (CO), carbon dioxide (CO2) or nitrogen oxides (NOx) as cartridges cannot protect against these gases.

The employer must ensure that the respirator fits the worker's face, that the worker is in good enough health to wear this type of apparatus, and that it is worn properly. The employer must also train the worker in the use and care of the apparatus. If the respirator has a face mask, the worker must be freshly shaven to ensure a proper seal between the mask and the face.

6.17. Lockout procedure

Before undertaking work on a piece of equipment, the Contractor must obtain authorization from the Ambatovy Field Superintendent. It is the Contractor's responsibility to ensure that all power sources implicated by the nature and environment of the work are neutralized. For work on equipment that must be locked out, a work permit and an approved lockout sheet must be obtained by contacting the Ambatovy Field Superintendent of the site or area in question.

All locking out of equipment on Ambatovy operating sites must be done in accordance with Ambatovy's Lockout Procedure HS-903.1.

6.17.1. Training

Any Contractor or Contractor's employee authorized to perform lockout procedures must absolutely have received training on the work permit system. Information on the training required is available from the Ambatovy HS Training Department.

6.17.2. Procedure

- Before locking out a piece of equipment, ensure that equipment has been locked out according to the lockout sheet and that the description of the equipment on the sheet corresponds to the work being carried out.
- Each employee who works on locked-out equipment must install his/her personal lock with a personal identification tag on the lockout box for the work in question.
- For work on equipment that is already locked-out, the worker must install his/her personal lock and tag on the lockout box already in place.
- All power sources must be isolated, blocked, contained, disconnected or controlled such that the power can never be engaged unexpectedly or accidentally. In any doubt, the Ambatovy Field Superintendent must be contacted.

6.17.3. Forgotten locks

If one of a Contractor's employees forgets a lock on a lockout device, the HS-903.1 procedure must be rigorously implemented, and Form HS-F903.1.2 properly filled out.

6.18. Precautions against heat

To protect employees from heatstroke, the Contractor must do the following:

- Prepare an action plan describing the measures to be taken during hot weather and taking into account working conditions (for example, nature of the work, equipment required, clothing, etc.)
- Inform workers and supervisor as to the risks involved, the conditions likely to cause heat stroke, preventive measures, signs and symptoms to watch for, and the care required for workers experiencing discomfort

- Assess the level of risk as needed
- Provide workers with adequate quantities of cold water and ensure that it is readily accessible
- Immediately stop the work of any individual who shows signs or symptoms of heat stroke or heat-induced discomfort, notify the appropriate emergency or medical personnel and reassess the need for preventive measures
- Organize workers in teams and foster cooperation among workers to detect signs and symptoms of heat stroke
- Take gas measurements whenever hot work is done in a limited-access zone

Where necessary due to climatic conditions, the Contractor must also do the following:

- Arrange for short work-rest cycles
- Organize the work so as to reduce the pace
- Reserve more demanding tasks for cooler times of day.

6.19. Explosives

The supply, use, storage and transportation of explosives must be done in full accordance with the regulations in force in Madagascar, or failing this, in Canada, and in accordance with manufacturer recommendations.

All blasting must be carried out under the supervision of qualified and competent personnel.

6.19.1. Permit and planning

- No blasting can be carried out without prior development of a blasting plan, which must include the following:

  (a) Name, address and telephone number of the Company responsible for the blasting
  (b) Name, address and telephone number of the shot-firer in charge along with his/her certificate of competence and its expiry date
  (c) Complete description of the explosives to be used and their MSDSs
  (d) Maximum charge
  (e) Type of detonator and detonation method
  (f) Location and characteristics of the explosives magazine
  (g) Approximate quantity of explosives used and stored
  (h) Procedure for returning unused explosives to storage
  (i) Method for marking the blasting area
  (j) Means of protecting surrounding buildings, if necessary
  (k) Emergency plan
  (l) Work and blasting schedule
  (m) Evacuation procedure

- For open-pit mines, each primary blast must be noted in a log at the workstation and signed for by the shot-firer in charge. This must include the following:

  a) Blasting date, time and location
  b) Location, depth and number of holes shot
  c) The amount of explosives, stemming depth and delays used for each hole
  d) An estimate of the amount of explosives used per ton of rock excavated
  e) Hazards such as misfires and damage from projectiles

6.19.2. Storage of explosives

- An explosives magazine must:

(a) Be used solely to store explosives or blasting accessories
(b) Be locked
(c) Be under the supervision of an authorized individual or one of his/her assistants
(d) Be kept clean on the inside, be coated or covered such that no iron or steel is left uncovered and no particles of iron, steel or a similar substance may become loose or come into contact with the explosives in the magazine
(e) Have a smooth, easy-to-maintain floor
(f) Where contaminated by explosive substances, the shelves and floor should be treated in accordance with manufacturer specifications with a neutralizing product (if nitroglycerine is present)
(g) Be painted white, silver or red, bear the word EXPLOSIVES on all sides and on the roof in letters at least 150 mm high in contrasting color and be located in accordance with the distance table
(h) Be at a distance from an overhead power line that is greater than the distance between the structures supporting the line that are in proximity to the magazine; however, if the distance between the structures is greater than 55 m, the minimum distance between the line and the magazine should be the greater of the following:
    - 55 m
    - The vertical distance from the magazine to the top of the structure closest to the magazine.
(i) Be grounded if made of metal
(j) Be equipped with a lightning rod, if not made of metal
(k) Be situated in a location cleared of wood or other combustible material within a radius of 15 m of the magazine
(l) The safety perimeter must be marked and indicated by appropriate signage (pictograms or other)

- Inside a magazine, the explosives must be kept in their original containers. However, the detonators and detonating relays may be kept in receptacles designed for this purpose, as long as they are labeled with the name and characteristics of the product they contain.
- Flammable substances and products that could cause a fire or explosion must be kept as far as possible from the magazine.
- Detonators and detonating relays must be stored in a separate magazine from that containing explosives or detonating cord.
- The detonating cord must be placed separately from the other explosives, in a locked container.
- The boxes or containers of explosives must be placed so that the opening is always facing up. No box or container may be left open inside a magazine.
- At the end of each shift, the empty containers that contained explosives must be discarded or destroyed so they cannot be used for other purposes.
- MSDSs and an explosives log are mandatory in all magazines.

6.19.3. Transporting explosives

- Only the driver and the personnel charged with handling explosives are authorized to enter a vehicle transporting explosives.
- Vehicles used to transport explosives must be used solely for this purpose and be in excellent working order in every respect. The load carried must not exceed the maximum load recommended by the manufacturer of the vehicle.
- All vehicles transporting explosives must be marked with the word EXPLOSIVES in life-reflective paint in letters at least 150 mm high on a contrasting background, on the front, back and both sides of the vehicle. This lettering must be removed or covered when the vehicle is not transporting explosives.
- The section of the vehicle in which explosives are transported must be a van, tank, compartment or fixed box that is fireproofed, entirely enclosed and locked. When the compartment is not locked, the driver must be accompanied by an assistant who watches over the explosives at all times.
- The interior of the explosives compartment must not contain any iron or steel, unless it is covered with leather, wood, tile or another similar material.

- All vehicles transporting explosives must be equipped with a portable fire extinguisher. The driver of the vehicle must be properly acquainted with the type of extinguisher provided and its method of use.
- The Contractor must ensure that all personnel loading or unloading a vehicle transporting explosives and the driver of such a vehicle take all the necessary precautions to eliminate the risk of fire or explosion. The Contractor must also prevent any unauthorized person from gaining access to explosives.
- Loading and unloading of explosives must never be interrupted, or carried out while the vehicle's motor is running.

6.19.4. Handling explosives

The handling of explosives or blasting accessories must be carried out in accordance with the following conditions:

(a) No explosive, detonator, blasting cap or other blasting accessory may be abandoned or left unattended.
(b) Smoking while handling or transporting explosives or blasting accessories is expressly prohibited.
(c) Carrying explosives at the same time as detonators and similar blasting accessories is prohibited.
(d) Operating a radio transmitter, cell phone, or pager in proximity to explosives or detonators is prohibited.
(e) Personnel not authorized to handle explosives must stay well away from an area where such handling is under way.
(f) Any electrical source that could pose a hazard must be disconnected.
(g) The explosives handling area must be marked off.
(h) The wearing of PPE is mandatory when handling explosives.

6.19.5. Loading explosives

- No fuse shall be capped or cartridge primed wherever explosives are stored.
- The primer cartridge of a blasthole shall be prepared only when priming the hole.
- The safety fuse shall be cut square for insertion in the cap and crimping shall be done with a recommended crimping tool in good working order.
- The safety fuse must be handled with care and shall not be twisted or damaged before or during loading.
- For loading, only a tamping rod and punch made of non-ferrous material may be used.
- All loading operations and connection of electric blasting caps shall be stopped at the first signs of a thunderstorm. If blastholes have already been loaded and primed, the danger zone shall be evacuated and no one is to be allowed therein.
- All personnel not involved in blasting operations must be kept well away from the blasting danger zone.
- The area must be marked off.

6.19.6. Untamping and refiring a blasthole or misfire

- Where dynamite is used, a protective buffer 100 millimeters thick, inserted between the explosive load and the regular tamping, must be put in place when loading the blasthole. Otherwise, untamping of the blasthole is strictly prohibited in all circumstances. The protective buffer may be made either of brightly coloured paper contrasting with the color of the rock, the wrapping of the explosive and the tamping used, or of any other device having the same effectiveness.
- Untamping must be performed by the shot-firer who loaded and fired the blasthole.
- During all operations of untamping, repriming and refiring of a blasthole or misfire, the shot-firer must ensure that the workers have taken shelter.

- The method used for untamping must never produce stress and shock for the protective buffer and the explosive.
- The constituents of the materials used for untamping the blasthole and inserted in it must be made of non-ferrous material.
- Untamping must be stopped as soon as the protective buffer is reached, a primed explosive cartridge is then inserted against the protective buffer, and the blasthole is obturated again by a tamping similar to the previous one.
- Untamping is prohibited when the blasthole is obturated by a self-tapping device.
- Holes loaded with nitrocarbonitrates such as ANFO must be washed completely before repriming them with a new primer cartridge.

6.19.7. Blasting machine

- The blasting machine must be stored in a cool, dry location.
- The blasting machine must be kept in good working order and tested regularly.
- The capacity of the blasting machine shall be clearly marked on each machine and such capacity shall never be exceeded. Only the shot-firer shall have access to the operating components of such apparatus.

6.19.8. Detonating fuse

When using a detonating fuse, the following conditions apply:

- Sections of cord spliced together must not be used in a blasthole.
- The down line shall be cut from the reel after priming. Only a sufficient length of fuse shall be left protruding from the hole to allow for possible settlement of the load prior to making final connections.
- Main fuses shall be connected to detonating fuses at right angles.
- When priming a detonating fuse with a blasting cap or with an electric blasting cap, the end with the explosive charge shall be set in the same direction as the expected shock wave.
- Detonating relays must not be placed in a blasthole.
- When a blasting mat is used, each detonating relay must be carefully covered with about 10 cm of sand or stonedust to prevent accidental shack when the mat is placed.
- The starting point of the detonating fuse must be outside the area covered by the blasting mat.
- The detonator used to start the detonating fuse must only be placed once the covering operations have been completed.

6.19.9. Firing

- All loaded holes must be primed and fired in the same round. Whenever firing cannot be carried out at the end of the loading, the blasting zone must be evacuated and no access shall be permitted until after the firing.
- In any given round, the maximum number of fuses to be lit by a single shot-firer shall depend on the length of the fuses used and the accessibility of adequate shelter. No fuse extending beyond a hole be lit if its length or origin are unknown.
- Lead wires must be connected to the blasting machine after the signal indicating that blasting is imminent. Lead wires must always be disconnected from the blasting machine immediately after the firing or after the attempted blast. Both ends of the lead wires must be short-circuited and insulated to guard against stray currents.
- Firing from a power line or portable dynamo is authorized provided the following apply:
  (a) The voltage does not exceed 220 volts.
  (b) The blasting switch is designed to ensure the following:
    I. The weighted handle of the blasting switch automatically gravitates to the off position and short-circuits the lead wires.

II. The door of the box housing the blasting switch is provided with a device that prevents it from being locked or closed unless the blasting switch is in the off position. The door must be kept locked except when firing and only the shot-firer shall have the key.

(c) A fused switch is installed between the power source and the blasting switch.

(d) The fused switch and the blasting switch are properly placed for firing and spaced 1.5 to 1.8 m apart as a precaution in case of lightning; underground, they should be placed on either side of a gallery or tunnel.

(e) For blasting in the vicinity of a building, railway track, road or power line, the load must be limited and a blasting mat used. The backfill must not contain single particles or conglomerates larger than 5 millimeters. The blasting mat must be deposited but not slid into place.

(f) The firing procedures are as follows:

- Before giving the order to fire, the shot-firer must ensure that the guards are in position and all workers are sheltered.
- Signals strictly reserved for blasting must be sounded as follows:
  I. Immediately before blasting, 12 short warning signals are sounded at one- second intervals.
  II. Thirty seconds must be allowed to elapse between the last warning signal and firing.
  III. After the blast, when the blast area is safe, a continuous all-clear signal lasting 15 seconds must be sounded to indicate that work can resume in the area after the waiting period stipulated in Subsection 6.18.10.

(g) The employer must make sure that workers take shelter before the first warning signal and remain there until the all-clear has sounded.

(h) The blasting signal code must be posted, in letters at least 150 mm high on a contrasting background, on a sign at least 1,200 mm tall and 2,400 mm wide and placed at every entry to the site.

- When using a safety fuse, the shot-firer in charge and his/her assistants must, before each series of blasts, count the exact number of shots loaded and then check it against the number of detonations.
- The Contractor must ensure that a blast log is kept on the site and completed, signed and submitted by the shot-firer.

6.19.10. Waiting period

- The employer shall ensure that after a shot has been fired with a safety fuse, no one returns to the scene before a number of minutes equal to 6 times the number of meters in the longest length of fuse use.
- Following electric firing, the employer must see to it that no one returns to the blast area for 10 or more minutes from the time of the shot, depending on ventilation factors.
- In case of one or more misfires or suspected misfires, or if one or more misfires are followed by a blast, the employer must see to it that no one returns to the blasting area until 30 minutes have elapsed from:
  (a) The last detonation or the expected time of the last detonation, in the case of safety fuse firing
  (b) The time of the shot, in the case of electric firing
- When it is found that a defect in the electrical circuit has prevented the charges from detonating at time of firing, the shot-firer may immediately check over the circuit after having made sure that:
  (a) The ends of the lead wires are disconnected from the power supply and short-circuited.
  (b) The blasting machine is locked or under a worker's surveillance.
  (c) The blasting switch, if any, is locked and in open circuit.

6.19.11. Misfires

- Once the waiting period has elapsed, the shot-firer shall do the following:
  (a) Examine the blasting area
  (b) Look for possible misfires, blowouts and bootlegs

(c) Mark those found
(d) Collect any explosives from the excavated material

- After the prescribed waiting period, the untamping and re-firing of a misfire must be performed in compliance with Section 6.18.6 above.
- It is prohibited to deepen holes remaining intact after blasting

6.20. Compressed air

- Compressed air may be used for cleaning only if the worker has a work permit, the work area is well marked off and no one is nearby.
- The pressure of compressed air used to clean machinery or equipment must be less than 200 kilopascals (30 psi), unless the cleaning takes place in a special blast room with an extraction system.
- It is strictly prohibited to use compressed air to clean your clothing or any part of your body.
- Never direct the airblast against yourself or anyone else, as this can lead to serious injury or death.
- The system must have a locking device to prevent the compressed-air hose from decoupling.
- Never disconnect a compressed-air hose unless you are sure that the supply valve is closed and that there is no more pressure in the hose.
- All compressed-air piping and hosing must be protected against impacts and must be clearly identified as to its content. Compressed-air supply pipes must be located where there is no risk of tripping over them. If need be, install them overhead or cover them adequately.

6.21. Compressed-gas cylinders (oxygen, acetylene, LPG)

The provisions of Safety Procedure FPS-31 apply to the subcontractor.

6.21.1. Cylinder storage

The Contractor must set up an adequate storage area (fenced off, shaded, with a hard surface and properly identified) for storage cylinders of oxygen, acetylene and liquefied petroleum gas (butane, propane, heptane, etc.).

Oxygen, acetylene and LPG must be stored as follows:

- Install clearly visible signs prohibiting smoking or working with an open flame.
- Clearly identify the areas where the cylinders are stored and indicate the nature of the gases they contain.
- Always make sure there is at least 6 m between the acetylene cylinders (combustible) and the oxygen cylinders, unless they are separated by a fire partition at least 1.5 m thick with a resistance of 30 minutes.
- Store oxygen, acetylene and LPG in separate locations.
- Store cylinders on a fire-resistant surface (concrete) in a dry, well-ventilated location.
- Keep cylinders away from all sources of heat exceeding 52^{o}C, such as sunlight, torches, open flames, etc.
- Install an ABC-type dry chemical extinguisher of adequate capacity at all locations where compressed-gas cylinders are kept.
- Attach gas cylinders to the wall with a chain or store them in a special rack at least 1.5 m away from windows, doors and other openings. If this is impossible, please consult the AMBATOVY health, safety and hygiene department.
- Protect the rack with physical barriers such as concrete barricades or 10-cm poles at least 75 cm high, anchored to the floor and spaced 1.4 m apart.
- Do not store compressed-gas cylinders less than one meter from stairs or emergency exits.
- If compressed-gas cylinders are stored outside, they must be on a concrete base or other fire-resistant platform and fenced in.
- Label empty cylinders and store them apart from the full ones. Protective caps must be left on. Do not let empty cylinders accumulate at the work site.

- Make sure any electrical equipment in storage areas is grounded and explosion-proof.
- Do not store cylinders near corrosive products, salt or any source of fire or sparks.
- LPG must be stored outdoors.

If possible, avoid storing and using compressed-gas cylinders in hot areas. If you have to work in a hot area, make sure the cylinders are adequately protected from the heat and store them under moderate temperature as soon as the work is finished.

6.21.2. Cylinder transport

- Always make sure the valve is closed before moving a compressed-gas cylinder.
- Transport cylinders in a trolley or vehicle designed for this purpose and equipped with a minimum 1.5-kg dry chemical extinguisher.
- When transported in a vehicle, cylinders must be placed on a support designed for this purpose.
- The regulator valve must be disconnected and the safety cap affixed prior to transportation.
- Before handling gas cylinders, make sure your hands, gloves and clothing are free of oil or grease.
- A compressed-gas cylinder can be rolled on its base. However, dragging it along the ground is strictly prohibited.
- Never lift a cylinder by its safety cap or collar.
- Never lift a cylinder with chains, metal cables or electromagnets. Only a lifter or basket designed for this purpose may be used to lift compressed-air cylinders.

6.22. Hand tools and equipment

6.22.1. Hand tools

- Blades on cutting tools (hand saws, planes, chisels, retractable knives, machetes, etc.) must be kept well sharpened. Worn or damaged tools must be replaced. This type of tool must always be kept in a protective case to prevent damage.
- The use of fixed-blade knives is prohibited; only retractable knives may be used. The blade must be kept retracted whenever the knife is not in use.
- All chisels must have mushroom handles.
- Using a metal tube or pipe as an extension to increase the force on a wrench is strictly prohibited. If more force is needed, a mechanical tool must be used.
- Hand tools such as shovels, picks, spades, machetes and axes must be commercially made. The use of handmade tools is prohibited.
- Wear suitable safety gloves and safety glasses with side shields when working with hand tools

6.22.2. Power tools

- Grinders, saws, portable drills, etc., must be double-insulated or have a grounding plug.
- Power tool cords must be in good condition and inspected at least once a month.
- Extension cords and connections must be approved, have a minimum rating of 600 volts and be kept in good condition.
- Safety guards installed by the manufacturer must not be removed or altered, and must be used as indicated in the manufacturer's instructions. Power tools must be physically disconnected from the electrical source whenever adjustments or repairs have to be made.
- Never move or dangle a power tool by its cord. Always unplug it by pulling on the plug and not the cord.
- Grinding and trimming accessories such as disks and bits must be of the proper size and capacity for the tool used.

6.22.3. Circular saws

This type of saw must have a safety guard that automatically repositions itself as the saw moves along. It must also have a blade guard with a lever for quick removal in an emergency. The safety guards must be designed so that they cannot be locked open. The saw must have a safety switch that allows the motor to start only when it is open, and there should be a guide and a push stick available.

The Contractor must ensure that the saw is grounded according to the standards in effect. It must be used by a qualified operator.

Operating instructions must be posted near the saw, indicating the operator's name, the hazards, the PPE required, who to contact in an emergency, and the evacuation location.

6.22.4. Table saws

- The table saw must have a hood on the part of the blade protruding above the table.
- It must have an emergency shutoff and a switch to prevent inadvertent starting.
- It must have a chain or a notch that will prevent the saw from moving beyond the end of the bench.
- It must have a functional system that ensures that the saw automatically returns to its position when started up.

6.23. Oxy-acetylene welding and cutting

- Have a fire extinguisher nearby.
- Put up a safety perimeter. If anyone is working within the perimeter, install a safety screen.
- Make sure all welding equipment and materials are approved by a recognized standards body.
- Remove all inflammable material from inside and under the safety perimeter (plastic piping, electrical tape, wood, etc.).
- Make sure all cylinders have been emptied, purged and tested.
- Do not use a cylinder as a working surface. Use a surface designed for this purpose.
- If mechanical and natural ventilation is not adequate, use a respiratory mask. In case of doubt, contact the HS department.
- Wear welder's glasses of the appropriate shade (between 4 and 6) and in good condition.
- Wear work clothes to avoid exposing your body. The collar must be buttoned and trousers must be cuffless. Welding gloves and apron are mandatory.
- Safety hat and shoes are mandatory.
- Protect hoses from contact with sparks and molten metal.
- Regularly check hoses for damage and leakage, and check the condition of connections.
- Install hoses in such a way that there is no risk of tripping over them.
- Where possible, hoses should be installed overhead. If this is not possible, they must be protected by physical means (planks, tape, etc.).
- Do not install extensions on hoses.
- The hose and the valve must be matched to fit, or failing this, a clamping collar must be installed to ensure the connection.
- Avoid working directly on the concrete floor, as the heat from the torch or molten metal could cause the concrete to ignite. Use a backplate or sheet of fire-retardant material.
- Make sure the torch has a check valve and flashback arrestor.

During welding:

- Clean the nozzle regularly.
- Always handle the torch by its base, never by the nozzle.
- Never leave the torch lying on the floor unless it has been completely discharged of gas.
- Never use a match or cigarette lighter to light the torch. Always use the striker.
- Work suspension:

- If work is suspended for a length of time (meals, work stoppage, end of day, etc.), always close the oxygen and acetylene cylinder valves, then open the torch valves to let out the remaining gas. If you are stopping for only a few minutes, you may simply close the torch valves.
- Inspect the work area, paying particular attention to inflammable materials.

- In case of fire:
  - Immediately begin emergency communications.
  - Evacuate the danger zone.
  - Close the cylinder valves, first on the acetylene cylinder and then on the oxygen cylinder. If this is not possible,
    - hose the cylinders abundantly to cool them down, and
    - let the gas burn.

6.23.1. Use of oxygen and acetylene cylinders

- Use gas cylinders for their intended purpose only.
- Before using a compressed-gas cylinder, always check it for leaks. Also inspect all hoses, valves and other fittings before each use.

***N.B.**: Never use a flame to check for leaks. Use glycerine-free soapy water instead.*

- Remove all dirt, debris and dirty water from the valve before opening it.
- Make sure the area is well ventilated.
- Always open the valve slowly while standing to one side of the regulator.
- Always open the valve three quarters of the way, never all the way.
- Do not over-tighten the valve when closing. Close it just enough so that the gas stops flowing.
- Never use a modified wrench as a lever to open a valve.
- Compressed-gas cylinders must be purged before the regulator is installed.
- Never strike an arc on a compressed-gas cylinder.
- Never transfer gas from one cylinder to another.
- Always keep valves closed when gas cylinders are not in use.

6.24. Arc welding

The Contractor must take the necessary steps to ensure that all tasks involved in arc welding are performed safely. A flameproof or non-combustible safety screen must be installed to protect other workers from radiation and molten metal spatter.

6.24.1. Preparation for arc welding

- Make sure the positive and negative wires are separated.
- Make sure you are on a dry surface.
- The welding set must be grounded.
- The electrode holder or welding gun must be kept in good condition.
- Make sure there is a ground return installed as close as possible to the workpiece and running to the welding set so as to loop the circuit.
- Regularly check the condition of the insulating sheath on all the wires. Do not use a wire with damaged sheathing.
- All wires in the welding circuit must be protected from damage.
- Make sure there is a fire extinguisher nearby.

6.24.2. Welding

- Always wear safety gloves.
- Never wear jewelry or carry a lighter.

- Never replace an electrode bare-handed or while wearing damp gloves, and never while the welding set is turned on.
- Always disconnect the electrode holder before immersing it in water to cool it.
- If you need to stop work temporarily, shut off the welding set, de-energize the electrode holder and remove the electrode.
- The electrode holder must be stored in such a way that there is no electrical contact with equipment or persons.
- The ground wire must be connected as close as possible to the workstation (max. 2 m from the work surface).
- Make sure the equipment is in good condition and is used only by qualified personnel.
- Wear leather welder's gloves (40 cm).
- Wear a leather apron.
- Wear a flame-resistant coverall with long sleeves and cuffless trousers.
- Do up wrist and collar openings.
- Wear a welder's mask with appropriate eye protection (protective filter shade between 10 and 14).
- Never wear contact lenses under a welder's mask.
- Fumes should be suctioned out mechanically at the welding point if possible.
- If this is not possible, wear a respiratory mask with adequate protection.
- Remove any coating from the workpiece.
- If work is done outdoors and natural ventilation is not adequate, install a fan to disperse welding fumes.

6.25. Confined spaces

The provisions of Safety Procedure FPS-80 apply to the subcontractor.

6.25.1. Definition

A confined space is an area that is entirely or partially enclosed and is not designed or intended for human occupation, but which may occasionally be occupied for the execution of work. Access and exit are possible only through a restricted opening, which may pose a hazard for the health and safety of anyone entering, due to the following factors:

- Design, construction or location
- Atmosphere or lack of natural or mechanical ventilation
- The materials or substances contained in the space
- Other related hazards

"Confined space entry" means introducing one's head or entire body into the confined space.

6.25.2. Safety measures

- Before a worker enters a confined space, a safety meeting must be held in which all personnel review the procedure.
- A confined-space work permit is required, and all permit conditions must be met prior to entry. Only a specially trained supervisor may issue a confined-space work permit.
- A confined-space attendant must be present whenever a worker is required to be in a confined space. The attendant may not be assigned to any other duties during that time and must maintain constant visual or auditory contact with the worker(s) in the confined space in order to launch emergency procedures immediately if the need arises.
- If new workers are called upon to enter a confined space, they must read the instructions in the permit and identify themselves to the attendant before beginning work.
- It is the Contractor's responsibility to ensure that work in a confined space is done safely. This includes taking all necessary steps to eliminate or control hazards. All the steps in AMBATOVY procedure FPS-80 for confined-space entry must be strictly observed.

- In addition to the usual PPE (helmet, safety shoes and safety glasses), the Contractor must provide all the equipment stipulated in the confined-space work permit for worker safety, such as respiratory masks, safety harnesses and contaminant measuring devices.
- The Contractor must show that all personnel working in a confined space are adequately trained, qualified and competent.

6.25.3. Preparation of confined space

- Before a worker enters a confined space, all energy sources connected to the confined space must be locked out in accordance with AMBATOVY lockout procedure HS-903.1.
- Ventilation must be adequate to prevent the accumulation of toxic contaminants such as inflammable gases and dust, as well as the harmful effects of extreme heat. If natural ventilation is insufficient, mechanical ventilation such as electric fans or fume extractors must be added.
- Ventilation equipment must be positioned so that fumes or vapors from outside cannot enter.
- An emergency procedure must be established beforehand, and all necessary emergency equipment must be readily available.
- An emergency evacuation procedure must be prepared beforehand and must be attached to the JSEA.

6.25.4. Air quality

- Any confined-space entry must be preceded by a test for contaminants. Oxygen (O_2) inside the space must be between 19.5% and 23%. If this is not possible, the worker must wear a complete respiratory mask connected to a breathable air source (autonomous respirator).
- Contaminant concentration within the confined space must not exceed the applicable thresholds or Ambatovy action levels. Failing this, adequate respiratory protection is necessary. If more than two contaminants are present in a confined space, the most stringent of the applicable safety measures must be applied.
- Combustible airborne particles obstructing vision at 1.50 m must be considered as close to the lower inflammation threshold, and entry into the confined space is then prohibited.
- The concentration of inflammable vapors or gases within the confined space must not exceed 5% of the lower explosive limit (LIE/LEL).
- Contaminant concentration must be measured at the time of issue of the confined-space work permit and continuously as long as there are people inside. Contaminant monitoring must be done using a direct probe with an alarm.
- If hot work (welding, cutting, scarfing, grinding, etc.) has to be done in a confined space, the space must first be purged with vapor or inert gas. If inert gas is used, make sure the LEL is not exceeded. The confined space must then be reventilated and another contaminant test conducted before a worker is allowed to enter.

6.25.5. Additional precautions

To prevent fires in confined spaces, the following steps must be taken:

- Purge all air from the space using an inert gas such as nitrogen or carbon dioxide (this creates an atmosphere with potentially insufficient oxygen content).
- Ensure adequate ventilation to keep fuel vapors below the lower explosive limit (5% of LIE/LEL).
- Eliminate all sources of ignition such as open flames, frictional sparks and sparks from exhaust or electrical equipment.
- Electrically connect the tanks and ground them to reduce static electricity.
- If the confined space has to be left unattended for an undetermined length of time (e.g. lunch hour), close the valves on the torch outside the space. Remove all torches and hoses from the confined space when leaving the work area for the night.
- Enforce no-smoking rules in and near a confined space.
- All combustible and inflammable materials must be stored outside the confined space until needed.

- Leave gas cylinders and welding equipment outside the confined space.
- Working alone in a confined space is not recommended; however, if unavoidable, a co-worker must be present at the exit and in constant communication.

To reduce hazards, the following additional steps must be taken:

- If possible, each worker working in a confined space should be equipped with a safety harness attached to a safety line to facilitate rescue operations.
- Provide and maintain adequate access to the entrance/exit.
- Have self-contained breathing apparatus available at the entrance to a confined space in which there may be toxic gases.
- At the entrance to any manhole, tank or receiver, affix signs indicating “Danger: Confined space – DO NOT ENTER”, or an appropriate similar message.

In a confined space, pay particular attention to the following factors:

- Partitions that may create zones with different atmospheres
- Possible vapor pockets maintained by these partitions
- Possible dripping of liquid from overhead compartments or shelves
- Internal coatings that could give off toxic vapors once heated or damaged
- Potential toxic vapors given off by cleaning or welding agents
- Sludge, tartar, scale formation or other deposits that could give off vapors once disturbed
- Mechanical and structural hazards

Never use lights operating higher than 12 V. The log of confined-space entries and exits must be kept up to date.

6.26. Electrical hazards

The provisions of Safety Procedure HS-903.4 apply to the subcontractor.

In addition to strictly enforcing AMBATOVY Safety Procedure HS-903.4, the Contractor must ensure the following:

- All work on electrical installations must be performed in observance of the regulations, codes, design criteria and work safety procedures in effect.
- All personnel working on electrical equipment or electrical systems must have an electrician’s permit recognized by the authorities or by an external firm of experts. This permit must be renewed every two years.
- All electrical equipment and tools used at AMBATOVY work sites must be in good working condition.
- All portable electrical equipment and tools must be double-insulated or have a grounding plug.
- All electrical equipment, portable tools, extension cords, etc., must be inspected every month by a qualified electrician. Inspection details must be kept in a log.
- Extension cords and electrical wires must be suspended high enough to remain out of the way, or else be covered so that they will not be damaged or cause tripping.
- Terminal boxes, distribution panels and electrical outlets must be kept covered and protected from weather.

6.26.1. Work on energized equipment

Electrical work must be done on de-energized equipment whenever possible. However, if repairs or verifications are necessary, they may be done on energized equipment, provided these rules are followed:

- Never work on energized equipment under humid conditions or in the presence of water unless you are sure that the source of the water or humidity is electrically isolated.
- Use electrically insulated tools.
- Wear clean, dry safety gloves in good condition.

- Carefully identify sources of voltage.
- Stand on an appropriate insulating material while working.
- Never touch any nearby metal while you are in contact with energized bare tools or parts. If need be, affix strips of insulating material to metal to insulate yourself from it.
- A work permit is mandatory.

6.26.2. Work near power lines

The Contractor must obtain authorization from the Ambatovy Field Superintendent before its employees or its subcontractors' employees begin work near high-voltage lines.

6.27. Cranes and other hoisting apparatus

The provisions of Safety Procedure FPS-70 apply to the subcontractor.

6.27.1. Training and qualification

All crane and hoist operators must have a trade certificate (or equivalent proof) attesting that they have the knowledge and skills to operate a crane or hoist. Only a person with a crane operator license may operate a hoisting apparatus. Hoisting apparatus must be assembled, maintained and dismantled under the supervision of experienced workers and in accordance with the manufacturer's instructions.

6.27.2. Inspection and log

- The owner of the hoisting apparatus must keep a permanent log of all inspections, tests, repairs, cable replacements and modifications for each apparatus. The log must contain information for at least 12 months prior to first use of the apparatus on an AMBATOVY jobsite and for the entire duration of subsequent use on the site. The log must be available at all times. No crane may be used unless it has such a log.
- The hoisting apparatus must be inspected in accordance with the manufacturer's instructions, and the results recorded in a log or on a form.
- Any crane used on an AMBATOVY jobsite must undergo a lifting test. All structural components, including the boom, the winch and the hook, must be inspected at least once a year by an accredited and recognized inspection firm.
- Any crane used regularly on an AMBATOVY jobsite must have certification attesting that it meets the abovementioned requirements, and the certification must be renewed every six months.
- A crane or other hoisting apparatus that has received a sudden or unusual impact must immediately be removed from service and undergo a full inspection.
- All certifications mentioned in this section must be issued by an engineer with the appropriate qualifications.

6.27.3. Safety equipment

- Any telescoping-boom crane used on AMBATOVY jobsites must be equipped with an anti-two block device or limit switch equipped with an auditory and visual alarm system to prevent two-blocking situations.
- Hydraulic circuits on hoists must have a protective device that immediately stops lifting in the event of an overload.
- Any motorized hoist must have an audible alarm with a distinctive signal that can be heard over construction site noise.
- Motorized hoists must also have a backing alarm with a distinctive signal that is louder than the ambient noise.
- Hoists must have brakes designed and installed so as to automatically stop a load of at least 1.5 times the rated load.
- Hoists must have a protective cab if the worker could be exposed to flying or falling objects.
- Operating controls must:

- Be positioned within reach of the operator while leaving enough room to move
- Be designed so that once released, they return to neutral position
- Be clearly and visibly labeled
- Move in the direction of the function they are controlling

- The hoist controls must be easily accessible by a ladder or a stairway with handles.
- Floors and steps must have an anti-skid surface.
- An approved portable extinguisher in good working condition must be installed in each hoist. The extinguisher must be mounted on a fixed part of the vehicle.

6.27.4. Operation of hoisting apparatus

The crane or hoist operator must:

- Be in good health and not under the influence of alcohol or drugs
- Be familiar with the equipment
- Know the load to be lifted and the rated load of the machinery
- Conduct an inspection before each use, including the electrical, pneumatic, cooling, mechanical and hydraulic systems, structural components, suspension and safety equipment, and record the results on a form
- Check all controls before each use
- Stay within the operating limits of the machinery
- Make sure that no hoisting apparatus (crane, hoist, tackle, gantry, etc.) is loaded beyond its rated load or subjected to violent movement
- Use only manufacturer-specified counterweights
- Install the crane or other hoisting apparatus on a firm, level surface
- Set up the stabilizers according to the manufacturer's instruction and make sure the vehicle is properly chocked
- Make sure the way is clear and no one is in the path of the vehicle. Pay special attention when backing (if need be, request the help of a flagger)
- Prevent anyone from entering, exiting or hanging on to the vehicle while moving
- Using striped tape, mark off the lifting area and all loading and unloading points. These areas must be off-limits to everyone except assigned personnel
- Never leave the controls of a hoisting apparatus when a load is suspended. Before leaving the controls:
  - Always lower the load
  - Make sure the boom is not suspended above a work area
  - Engage the manual brakes and all blocking systems
  - Make sure the machine is stable and will not move
  - Lock the doors
- Immediately inform the Field Superintendent or the Contractor's foreman of any defect observed during operation of the hoisting apparatus. Do not use the apparatus again until the necessary changes or repairs have been made

6.27.5. Load transportation

When moving or lifting a load, the operator must ensure that:

- All cables and slings are well attached to the load and that the lifting operation will not pose any hazard
- The load is lifted vertically
- The load is under control at all times. If movement becomes uncontrolled or the rotating of a lifted load poses a hazard, one or more guide lines must be used. Cable length must be such that the load cannot come into contact with workers
- No worker sits or stands on a load, a hook or a sling attached to a hoisting apparatus
- The hooks attached to the load or to the slings have safety clips
- When the operator's view is blocked, a worker assists as a flagger. The flagger must:

- Stand in clear view of the operator and direct the operator using appropriate visual signals or a telecommunications system
- Keep unauthorized personnel away from the operating radius of the crane or hoist
- Be able to see the entire pathway of the machine or load, while keeping at a safe distance
- Direct the load so that it is never above people

In addition, the flagger must:

- Have adequate experience for the task
- Wear a brightly coloured patch or gloves
- Use the manual signaling system only when sure of being well visible; otherwise, use the telecommunications system

- Particular attention must be paid when a crane or hoist has to travel with a suspended load. In this case, the following precautions must be taken:
  - When moving the machinery, follow the manufacturer's recommendations.
  - Make sure the machinery is not subjected to any structural shock or additional tension. Level the surface or reduce the weight of the load as required.
  - Do not make the machinery go up or down a slope when loaded.
  - To the extent possible, the boom must be directed along the axis along which the machine is moving.
- The load must always be as close to the ground as possible.

6.27.6. Suspended load

Passing underneath a suspended load is prohibited. Workers must avoid standing between a suspended load and a solid surface where they could be trapped if the load swings. Use guide lines to prevent uncontrolled travel or rotating of the load.

The Contractor must ensure that loads never pass above workers and that workers never walk or stand underneath a load or a part of a hoisting apparatus that could fall on them.

Working or walking underneath the boom of a crane or truck is prohibited.

6.27.7. Critical lifts and critical lift plans

A lift is considered critical when:

- The load to lift is over 70% of the Crane Capacity;
- The load weights over 10 tons;
- 2 or more cranes are used for the operation;
- Lifting over process equipment or buildings;
- Lifting using specially fabricated rigging, such as lifting beams;
- Lifting of Man Baskets

If the assessment of the lift shows that the lift is critical, a critical lift plan must be prepared. This plan must be drawn up by the Contractor and presented to the Ambatovy Field Superintendent before the work begins. The plan may be drawn up with the assistance of qualified Ambatovy personnel or of any other specialized expert. However, each plan must be signed and approved by a qualified engineer.

The critical lift plan must include:

- Technical details on the hook, slings and anchor points
- A position drawing showing the hoisting apparatus, existing equipment (including any equipment or foundations that could be removed to facilitate the operation), the load to be lifted, etc.
- A list of all steps involved in the operation

- A data table showing the configuration of the hoisting apparatus, minimum and maximum distances for boom deployment, boom angles, minimum and maximum radius, cable type and gauge, counterweights, etc.)
- A data table with details on the equipment or material to be lifted (dimension, weight, centre of gravity, etc.)
- Access roads for the hoisting apparatus and other vehicles

6.27.8. Slings

Avoid tight angles and cover sharp edges to prevent the sling from being cut, scraped or damaged.

Metal slings must be inspected regularly for damage or corrosion, abrasion or bending. Also check for deformation and broken strands.

Synthetic slings must be inspected for exposure to excessive heat or corrosive agents and for signs of premature wear.

6.27.9. Chains

Do not use chains for lifting unless slings are unavailable. Chains do not usually show signs of wear or stress before breaking, whereas slings lose their properties gradually.

Lifting chains must be inspected regularly for signs of wear, splintering and stretching. They must be made of alloy steel.

6.27.10. Hooks and shackles

All hooks used for lifting must be made of alloyed or carbon steel and must have their rated load indicated on them. They must be equipped with a safety clip designed to prevent slings and other lifting accessories from slipping out. Always make sure the load is not on the safety clip.

A shackle must never be used in such a way that the sling or hook could bend its saddle. The shackle must always be aligned directly with the lifting axis. Never use another piece to replace the bolt on a shackle.

6.27.11. Inspection of rigging equipment

Rigging equipment must be inspected by a qualified person at least monthly, but more frequently (weekly or daily) if used continually. Any damaged or defective equipment must be immediately removed from service and disposed of.

The Contractor must ensure that all rigging equipment used on the jobsite is inspected. Inspections must be recorded in a log and must be accessible at all times.

6.28. Manual lifting

The Contractor must ensure that no employee lifts a load heavy enough to cause injury. If manual lifting of a load presents a hazard, workers must be supplied with mechanical means. The Contractor must inform its employees assigned to manual tasks as to the proper way of lifting and carrying a load.

Any employee who intends to lift or move a load must be wearing safety shoes. Appropriate personal protective equipment must be worn for manual lifting or carrying of objects with sharp edges or dangerous protuberances or for handling of hot, caustic or corrosive materials.

When moving a load up or down a slope, employees must:

- Avoid being on the downhill side of the load
- Use cables, chocks, wedges and other devices to guide the movement of the load

If rollers are used to move the load, tools designed for this type of work must be used. Workers must not use their hands or feet to change the position of moving rollers. Employees working in a team must adjust their movements to clearly understood signals in order to ensure coordination.

6.29. Occupational health and hygiene

6.29.1. Toilets

The Contractor must ensure that toilets are available on the jobsite. There must be at least one toilet for every 25 workers. Except when indicated otherwise, use of Ambatovy toilets is prohibited.

Toilets must be:
- Located in a closed-off compartment that cannot be seen into, with a door that can be locked from inside, toilet paper installed in a distributor, and a clothes hook
- Kept clean and free of odor at all times
- Equipped with a plastic toilet seat
- Equipped with facilities for hand-washing

6.29.2. Drinking water

The Contractor must supply sufficient quantities of drinking water for its employees.

The Contractor must ensure that drinking water is of good quality.

6.29.3. Meal area

If ten or more workers are working for seven consecutive days, the Contractor must provide a reserved meal area. This area must:
- Be adequately ventilated and lit
- Be kept clean at all times
- Have hooks for hanging up clothing
- Have adequate seating and tables for the number of workers who will be eating there at once
- Have a covered garbage container
- Not be used for storage of materials, equipment or tools

6.30. First aids

The Contractor must ensure that first-aid kits are available at all jobsites and kept in a clean, dry place, easily accessible and as close as possible to the work areas. Their locations must be indicated by means of clearly visible pictograms, along with the names of the first responders. First-aid kits are for the exclusive use of employees trained in industrial first aid.

First-aid kits must be kept clean, organized and stocked with (for example):
- Bandage scissors 1
- Tweezers 1
- Safety pins 12
- Sterile adhesive bandages 25
- Sterile gauze pads 25
- Rolls of sterile gauze bandaging 4
- Compression bandages (separately wrapped) 4
- Triangular bandages 6
- Roll of bandage tape 1

- Antiseptic pads (separately wrapped) 25
- Latex gloves 3
- Pocket masks (for CPR) 1

It is strictly prohibited to keep medications of any type (ointments, pills, liquid antiseptics, etc.) in the first-aid kits. The expiry dates of all supplies must be checked regularly and the materials replaced as needed. Any soiled or damaged supplies must be replaced immediately.

The Contractor must ensure the presence of at least one employee trained as industrial first responder for each work crew.

6.31. Hazardous materials

6.31.1. General information

A hazardous material is a material that, by reason of its properties, poses a danger to worker health, safety or well-being.

A controlled product is a material that is included in the classification established by a Regulation or that meets the criteria stated in this classification.

According to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), there are nine categories of controlled products:

Gases under pressure
Flammable substances
Oxidizing substances
Toxic substances
Corrosive substances
Explosives
Carcinogens, mutagens, teratogens (CMT)
Environmentally hazardous substances
Substances hazardous through skin exposure or inhalation

The Contractor must ensure that all hazardous materials or controlled substances brought onto an Ambatovy jobsite are:

- Accompanied by a Material Safety Data Sheet (MSDS) and manufacturer's labels in a format approved by Ambatovy
- Stored in accordance with Ambatovy requirements
- Known of by the Field Superintendent responsible for the contract
- Used and handled according to the manufacturer's recommendations
- Disposed of according to a procedure established and validated by the Environment Department

To ensure proper management of hazardous materials, the Contractor must check the following four items:

6.31.2. Manufacturer's label

Labels are mandatory to warn all employees and sub-contractors of the hazards and precautions for a hazardous material.

6.31.3. Material Safety Data Sheet (MSDS)

This document contains information about the possible effects of exposure on health, fires, reactivity and the environment, as well as on the proper way to work safely with the product. The MSDS is the

starting point for developing a health and safety management program. Ambatovy's MSDSs are available in English and French and kept accessible at storage sites, in the medical clinic and on disk P. The MSDSs of Contractors must be available at all times at the worksite for consultation by Ambatovy personnel as needed.

An MSDS must contain information on the following:
- Product name, name and address of manufacturer and suppliers, and emergency telephone numbers
- Hazardous ingredients
- Physical characteristics
- Fire and explosion hazards
- Reactivity: chemical instability and substances with which it could react
- Toxic properties
- Safety precautions
- First aid
- When and by whom the MSDS was written
- Etc.

An MSDS for a controlled product must not be more than three years old. If a product was purchased more than three years ago and is still in use, its MSDS might not be up to date. The manufacturer or supplier must be contacted and asked to send a new version.

6.31.4. Training and awareness

All personnel must receive instruction on the handling of hazardous materials, including information on product labeling, danger pictograms and MSDSs.

The Contractor is responsible for seeing to the training and awareness of its employees according to the scope of the work. If training is deemed inadequate, incomplete or outdated, Ambatovy reserves the right to see to employee training itself, at the Contractor's expense.

Whenever a hazardous material or controlled product is used for the first time, a review must be conducted with the employees concerned, during which each hazard and precaution is presented.

6.31.5. Documentation

The Contractor must provide all training documentation (course outline, test, syllabus, etc.) for its employees, sub-contractors, consultants or other employees under its responsibility prior to the start of work.

The Contractor must ensure that all MSDSs are kept in a log and made available to its employees.

6.31.6. Storage of hazardous materials

Before hazardous materials are stored, a JSEA must be prepared and submitted to the Ambatovy Field Superintendent.

6.31.6.1. Inflammable or combustible liquids and sprays

The storage procedure presented below applies to inflammable liquids and sprays of no more than 230 liters each in industrial buildings.

- Store inflammable and combustible substances away from locations where there is a risk of fire.
- Storage cabinets must meet standard CAN4-S101 or equivalent.
- Use containers approved by the HS Department for storage of inflammable substances.

- Make sure there is a fire extinguisher 3 to 15 m from the location where inflammable products will be used or stored.
- Prohibit smoking within 5 meters of storage magazines.

6.31.6.2. Other hazardous materials (corrosive, toxic, other)

- Check the MSDS and determine the product's characteristics before storing. If in doubt, consult the HS Department.
- Make sure containers are compatible with the product to be stored.
- Avoid storing incompatible materials close to each other. Keep products apart, for example by storing them in secondary containers and separate cabinets at least 1 meter apart (if the quantity is less than 20 liters).
- Avoid storing corrosive substances at heights of more than 1.2 m.
- Always observe the leak and spill control principles by providing for secondary containment and sewer close-off.
- Make sure absorbent products are on hand for containing and cleaning up small spills.

6.31.7. Main risks associated with hazardous materials

Maintenance operations can involve a multitude of risks as listed below. The Contractor must remain vigilant as to these risks and take the necessary steps to eliminate or control them.

- Lack of oxygen or presence of noxious gases in a confined space
- Exposure to carbon monoxide from exhaust from vehicles or equipment
- Toxic gas emissions from a fuel-burning heating unit (diesel, gasoline, oil, propane, etc.)
- Toxic fumes from the use of solvent-containing products (glue, paint, lubricant, etc.)
- Inhalation of or skin contact with paint or varnish containing urethane or epoxy
- Inhalation of silica dust during sandblasting or drilling
- Exposure to zinc dust from cutting or burning of galvanized steel
- Chemical burns from contact with cement, lime or acidic products
- Poor air quality caused by construction work in a confined space
- Etc.

6.32. Emergency procedures

6.32.1. Alert and evacuation

If an emergency arises in an area where you are working, please follow these steps:

(a) Immediately contact:

- Ambatovy's Field Superintendent

However, the Area Manager must always be called for any emergency.

(b) If you are not in immediate danger, remain calm and stay where you are.

(c) If anyone is injured, try to contact a first responder as quickly as possible and stay with the injured person. If you are in danger, go to a safe place. Take the injured person to the Ambatovy medical clinic.

(d) In case of an alert, stay where you are and wait for instructions from the Field Superintendent.

(e) If you are instructed to leave the area, follow the instructions of your Crew Leader and proceed calmly toward the nearest muster point. Do not run, climb over guardrails or push people. Once at the muster point, remain calm, stay with the others and wait for instructions.

(f) The Contractor's Project Manager must ensure that all crew members are present at the muster point. If anyone is missing, the Project Manager must contact Ambatovy's Field Superintendent and organize a search team.

(g) Make sure the search team takes all necessary precautions for their own safety (self-contained breathing apparatus, fire-resistant suit, PPE, etc.).

(h) Once the situation has returned to normal and the jobsite has been declared safe, only the Area Manager may give the order to return to work.

(i) In the event of a fatality, do not move the body or any object at the scene of the accident. Immediately contact the district medical examiner. See Procedure HS-1010.

6.32.2. Emergency communications

The Area Manager must immediately:
- Organize first aid or the emergency team, as the case may be
- Call the Ambatovy medical emergency team if necessary
- Send someone to the main gate to direct rescue teams (fire truck or ambulance)
- Notify the HS Manager of Ambatovy

The HS Manager of Ambatovy notifies the VPO.

The VPO notifies the President of Ambatovy.

The President of Ambatovy notifies the shareholders.

6.32.3. Fire

If you are the first to see a fire and have the appropriate training, try to contain it with an extinguisher or fire hose. If the fire is too large, warn any nearby co-workers and go to the muster point. Immediately contact the Area Manager or the Contractor's Project Manager.

If there is time, put important documents in a filing cabinet or drawer, or bring as many with you as possible.

6.33. Analysis and report following an incident

The sub-contractor is subject to safety Procedure HS-1301.

7. AUDITING

Contractors of Ambatovy must be audited regularly. This will be managed directly by the HS Department. A minimum of 12 Audits must be carried out per year. The focus will be mainly on regular contractors, notably:

- those operating Ambatovy facilities in the Utilities Department,
- regular contractors of the Maintenance Department,
- contractors present during big shutdowns.

The check-list form HS-F702.2 will be used, and conclusion of the audits will be presented to the Area Managers in charge, but also during the Monthly Safety meeting of the HS Department.

8. APPENDIX 1: TYPICAL PREVENTION PLAN OUTLINE

1. PURPOSE
2. SCOPE OF APPLICATION
3. DEFINITIONS
4. RESPONSIBILITIES
5. PREVENTION PLAN
    a. General remarks
    b. Specific directives for the jobsite
    c. Risk analysis and specific corresponding safety measures
    d. Analysis of potential conflicts with other companies involved
    e. Emergency communications and directives
    f. List of contributors to the Prevention Plan
    g. Distribution

APPENDIX 1 – Any useful drawings
APPENDIX 2 – General information on the company, including HS roles and responsibilities

9. APPENDIX 2: HEALTH AND SAFETY KEY TERMS

N°	Key Term	Main Characteristics	Ambatovy references	Standard
01	Tool Box Meeting	• Mandatory for all workers before taking up their work station.	HS-801 HS-F801	Requirements of Ambatovy H&S procedure
02	Work permit	• Requested 24 h ahead of time with a JSEA, trained and qualified personnel, supervision at all times • Must indicate date, time, work area, equipment and materials to be used, PPE required, exact nature of work to be done, expiration date	HS-903.1 HS-F903.1 HS-F903.1.2 FPS-F50.1 FPS-F50.2 FPS-F50.3 FPS-F50.4	Requirements of Ambatovy H&S procedure.
03	Elevated work	Adequate protection: • Harness ➢ Use of a safety harness and lanyard with shock absorber for work at heights over 1.8 m and where there is no regulation guardrail ➢ Anchor point capable of resisting a force of at least 2500 kg • Guardrail ➢ Must be able to resist a force of over 100 kg ➢ 1 to1.2 m high • Scaffolding ➢ Erected and inspected by qualified personnel	FPS-60 FPS-61	CE, SABS, CSA, ANSI.
04	Excavation	• May not proceed without excavation permit and JSEA • Mark off with a barrier at least 1 m high installed 3 m from the edge • Protect against landslides if the edge slope exceeds 45° or if the excavation depth is over 1.2 m	HS-903.2 HS-F903.2	Requirements of Ambatovy H&S procedure
05	Hot work	• JSEA and work permit mandatory • Fire extinguisher mandatory • Adequate PPE for workers • Site must be monitored for 1 h after end of work	HS-903.3	Requirements of Ambatovy H&S procedure

06	Confined space	• Work permit, JSEA and lockout mandatory • Employee must be qualified. • Oxygen content must be between 19.5 and 23% of LIE /LEL	FPS-80 HS-903.1	Requirements of Ambatovy H&S procedure
07	Electrical work	• Must be done by a qualified employee • Grounding or double insulation • Must be done according to standard (emergency shutdown, safety guard, push stick, safety measures)	HS-903.4	Requirements of Ambatovy H&S procedure
08	Gas detection and measurement	• Can be done continuously in confined spaces	HS-902.1	Requirements of Ambatovy H&S procedure
09	Compressed-gas cylinders and accessories (gas torches)	• Regulation storage ➢ Mandatory signage ➢ At least 6 m away from inflammables ➢ ABC extinguishers of sufficient capacity ➢ Always in vertical position even during transport • Gas torches and hoses ➢ According to regulations and inspected periodically ➢ Flashback arrestor mandatory ➢ Adequate PPE	FPS-31	Requirements of Ambatovy H&S procedure
10	PPE	• Must be kept in good condition • Appropriate for the job • Must not hinder workers in performing their job • In accordance with standards in effect • Must be worn properly	HS-903.8	CE, SABS, CSA, ANSI, or equivalent,
11	Respiratory protection	• Carry an escape mask in production units.	HS-902.4	CE, SABS, CSA, ANSI, or equivalent,
12	Explosives	• Comply with regulations in effect.	FPS-110	Requirements of Ambatovy H&S procedure
13	Incident report	• All incidents must be reported to Ambatovy Field Superintendent as soon as possible	HS-1301	Requirements of Ambatovy H&S procedure

10. APPENDIX 3: LEXICON

CSA: Canadian Standards Association.

ANSI: American National Standards Institute.

Blasthole: a borehole intended to be loaded with explosives.

Blasting accessory: any explosive substance used in firing explosives.

Blasting agent: any explosive which is obtained by mixing any oxidant with any non-explosive carbonate and which cannot be initiated with a single, #8 detonator.

Blasting area: any area where explosives have been loaded into blastholes for blasting.

Blasting danger zone: any space or area where people are potentially at risk due to projectiles, air blasts or any other consequence of a blasting operation.

Blasting mat: covering used to offer protection against stones or other objects that may be projected as a result of firing explosives.

Confined space: a space which is not designed to be occupied by a human being, such as a tank, silo, vessel, caisson, shoring pile, stack or manhole.

Continuous noise: A prolonged noise, including a noise caused by the mechanical impact of solid bodies or by impulsive noise occurring at a frequency higher than one per second.

CSA: Canadian Standards Association

Dynamite: any commercial, nitroglycerine-based explosive.

Embankment: a sloped area around an open-pit mine

Excavation: a piece of land dug out to a depth of at least 1,2 m where the width of the base exceeds the depth.

Explosive: any substance made, manufactured or used to produce an explosion or detonation, including gun powder, propellant, dynamite, slurry, gelatin, blasting agents and blasting accessories.

Front: the most advanced point of work in a given direction in an underground excavation, at a given level.

High-risk maintenance operation:
A jobsite involving:
(a) An excavation site of 6 m or more in depth
(b) A trench 50 m or more in length
(c) Water or sewer work carried out over a length of 50 m or more
(d) Underground work
(e) Work in a hyperbaric environment
(f) Demolition
(g) Work on a building or structure 15 m or more in height
(h) Construction or repair of power transmission lines or support structures
(i) Work at a distance of 3 m or less from a power line of over 750 volts
(j) Civil engineering work above or near a body of water under or within 2-m radius from the work, at a depth of over 1.5 m

(k) Dredging
(l) Work in a confined space
(m) Use or handling of explosives

Hoisting apparatus: a crane, overhead travelling crane, gantry crane, monorail, platform or fork-lift truck, winch, hoist, derrick, jib crane, gin, auxiliary crane, aerial basket, lifting platform and table, levelling apparatus, truck lifting panel, lifting jack and screw jack.

Impact noise: any noise caused by the mechanical impact of solid bodies or by impulsive noise repeated or not at a frequency lower than or equal to one per second.

Loading area: any area where workers are loading blastholes with explosives.

Magazine: a structure or container in which explosives are stored.

Major maintenance: a site where at least 500 workers are employed simultaneously.

Mine: any establishment, with or without a processing plant, where work is under way that involves exploration (other than the digging of an artesian well) or above-ground or under-ground extraction of a mineral substance to obtain a commercial or industrial product.

A mine includes any surface buildings, warehouses, garages or workshops where work is carried out that is related to the exploration or extraction of a mineral substance. This definition covers quarries and sandpits, but excludes peatbogs.

Misfire: blasthole loaded with explosives that did not fire.

Opening: any hole made in the ground, including excavations and trenches.

Protective wall: a partition made of plywood at least 9 mm thick or made of another rigid material of an equivalent or greater resistance, that is at least 1,8 m high and that is installed at not more than 100 mm above the ground.

Rated load: maximum load established by the manufacturer.

Safety factor: the ratio of the ultimate load to the working load.

Self-contained breathing apparatus: any apparatus whose source of breathable air is completely isolated from the user's surroundings.

Trench: a piece of land dug to a depth of at least 1,2 m where the width of the base is equal or less than the depth. The width of the base is measured between the excavated walls or between an excavated wall and a structure.

Tunnel: an underground passage constructed without removing the material forming the vault and whose longitudinal axis forms an angle of 20º or less in relation to the horizontal.

Two-blocking: a situation where the hook block, the hoisting cable counterweight or other accessories attached to the hoisting cable come into contact with the tip of the boom or with the tip of the jib.

Log of change:
Rev 2 (16/02/2011): no need any more of the job description sheet for contractors
Rev 3 (29/12/2011): requirements of auditing of Ambatovy contractors included (chapter 7)
Rev 4 (9/11/2012) : signatures of VPO and VP E&SS

Procedure approved by	Signature	Date
KEVIN MUELLER		13/11/2012
DEAN COMAND		13/11/2012