



Exploration & Production

GENERAL SPECIFICATION

Seismic Acquisition

GS EP GPA 202

Seismic HSE for Land Activities

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Rev.	Date	Notes

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Managing entity: EXPLO/TE/MTG



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1. Scope

1.1 Purpose

The purpose of this Land activities specification is to define the main Company HSES standards to be adhered by the Contractor(s).

These standards, based on IAGC and OGP ones ([OGP Report N°432](#)), concern the HSES Minimum Expectations and the specific requirements for each operation aspect.

1.2 Applicability

The following document is part of the Company Referential. It lays down the Company HSES requirements for seismic acquisition operations.

It is a contractual document in seismic operations and specifies the general standards of HSES exhibit. Thus, this specification is considered by Company as an applicable standard and shall be respected.

1.3 Safety regulations

When working in, and/or around Oil and Gas Field Installations whether belonging to Company or not, Contractor(s) is required to fully comply with all the Safety and Environment Instructions given by the Oil Field Authority and all the related documents and procedures available with the Oil Field Authority Representative and/or with Company Representative.

In this particular situation, Contractor(s) shall observe the following requirements:

- Minimum Safety distances to all installations as defined in the Company's oil and gas safety manual and/or specific requirements such as in situ determination derived from particular methodology ("peak particle velocity").
- Safety inspection and briefing to be conducted before entering or approaching any oil and gas field installations.
- Permanent co-ordination with the Company's oil and gas field Logistics and/or Safety Departments regarding the operations in progress (e.g. with regard to rig moves...).
- Special care and supervision when working close to oil and gas field constructions and pipes.
- The implementation of any equipment on oil or gas field installations shall be considered as an operation in hazardous areas and shall be ruled under the Permit To Work (PTW) system in force on site.
- Operations that involve cutting, welding or burning etc., within the perimeter of any field installations shall not be carried out without obtaining the necessary PTW.
- Personnel H₂S training, dedicated alarms (detectors), protective equipment (masks) and specific procedures when H₂S risk is identified.
- Any other specific training when required.



2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the Contract.

Standards

Reference	Title
ICAO Annex 6 Part I	International Commercial Air Transport - Aeroplanes
ICAO Annex 6 Part II	International General Aviation – Aeroplanes
ICAO Annex 6 Part III	International Operations – Helicopters

Professional Documents

Reference	Title
IAGC Safety Manual	Land Geophysical Safety Manual
OGP Report N°365	Land transportation safety recommended practice
OGP Report N°398	Health aspects of work in extreme climates. A guide for oil and gas industry managers and supervisors, OGP, December 2008
OGP Report N°432	Managing HSE in a geophysical contract

Regulations

Reference	Title
IATA	International Air Transport Association

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	



Total General Specifications

Reference	Title
GS EP MED 061	Medical support for E&P sites
GS EP MED 062	Hygiene in bases and living quarters
GS EP MED 063	Specific risks: clinical and therapeutic elements
GS EP LSO 202	Personnel transfer between watercrafts and between watercrafts and offshore structures
GS EP CIV 403	Temporary construction camps and associated facilities (onshore)
GS EP SAF 221	Safety rules for buildings

3. Personal Protective Equipment

Contractor(s) shall provide all the necessary and appropriate Personal Protective Equipment (PPE) to all personnel (including Company's personnel and visitors) upon their arrival on the survey area. In addition to a minimum of two coveralls for each employee (one for visitor), a full complete set of PPE shall be provided. This includes but not limited to: helmet, goggles, ear protections, gloves and safety shoes.

Visitors' means: Company Representatives, Auditors, Company Personnel from affiliate, Company Personnel from Head Quarters and all Officials.

Positions like mechanics, drillers and any other dealing with hydrocarbons and/or water shall be provided with three coveralls. Bakers, cooks, waiters and all personnel working in the kitchen will receive a minimum of two uniforms.

Hard hats shall be replaced as per expiry date or if any crack is observed on it.

Gloves shall be provided at need, as well as dust mask and ear plugs. Leather gloves and rubber gloves are not recommended for drillers. Safety glasses shall be replaced when worn. Depending on weather and terrain condition, sunglasses and dust masks can be requested by Company Representatives.

A list of PPE and schedule of renovation shall be provided to the Company Supervisor within the first month of operations.

A sufficient stock of PPE(s) shall be present all time on site to avoid any shortage and kept up to date. A log book or a data base shall be available to ease the PPE(s) management. Once a month, a physical inventory shall be done and figures provided to the Company Representative. Contractor(s) is eventually responsible of PPE(s) wearing by all workers regardless of damaged or lost equipment by the employee.

PPE(s) are mandatory where required during work hours, field trips and/or visits.

PPE(s) described as regular PPE(s) needed for specific tasks and worksites are mandatory (see Appendix 1). In some cases some PPE(s) could not be worn because of a specific situation. This shall be approved or not by the Company Representatives on site.

All specific crews or activities not initially planned or not mentioned in (s) PPE(s) table, will be subject to mandatory health and safety hazard analysis to establish list of mandatory PPE(s) together with relevant safe work procedure. Same analysis shall be needed for unusual work

conditions or sudden condition changes. Company Representative has to agree on new PPE(s) assignment or change.

When river(s), lake(s), swamp areas, etc. are present on the survey area, all field personnel shall be swim tested. Specific PPEs (Life jackets) shall be worn at all times when working on or near by these obstacles. River crossing procedures shall be enforced.

4. Occupational Health and Medical Care

Following fields of action shall be addressed by Contractor(s) before operations and means of control and recovery documented and available at worksite:

- **Noise:** Noise analysis shall be performed at each noisy work site and for vibrators and generators. Ambient noise, average noise and peak noise shall be monitored in Db (A) following a noise analysis method. The noise limit shall respect the specifications of the **GS EP SAF 221** (appendix 6).
- **Hot/Cold climate:** as per local occupational health regulation, working temperature indoor must be controlled within comfort range, depending on exposure duration and air moisture (kitchens, workshops, tent based workshops, offices...). Outdoor working temperature cannot be controlled, but must be monitored to adapt work and rest periods and adapted clothing and PPE(s). Prevention and proactive measures shall be proposed by Contractor wherever identified as significant hazard. Rest periods, PPE(s), limitation of exposed people and efficient Medevac plan are main basement. Working in a hot/cold environment shall respect the specifications of **GS EP MED 063**. In addition, please refer to **OGP Report N°398**.
- Stress at work to be taken into account (long work hitches, high expected production, security threat, poor entertainment, work conditions, living conditions...).
- Task monotony and break periods to be assessed.
- Lighting: lighting shall be adapted to activity such as meticulous work (as in cable repair), office work, work on computer, kitchen work...
- Ergonomics: all existing and new worksites shall be designed with due consideration to basic ergonomic parameters such as above mentioned once, and body positions (seats, standing up), repeated movements, loads, handles locations, information location (screen, gauge...), task monotony and break periods, etc.
- Vibration, concerning mainly vibrator drivers. Kidney belt recommended.
- Worked hours: balance between worked hours and rest/sleeping time.
- Rest periods (holidays): duration of work periods on the crew and holidays adapted to local regulation.
- Religion and adapted work planning, dedicated cult places.
- Entertaining and communication to family: entertainment on the crew is recommended. Exercising and TV are recommended. Wherever applicable, Contractor(s) should make easier communication between employees and family.
- Quality, quantity, temperature and variety of food shall be controlled by crew Doctor and catering department (refer to **GS EP MED 062**).

5. Security

5.1 Summary and Security Management Policy

The security organization for seismic operations shall comply with the requirements of the Corporate Security Policies of the Company. It shall remain consistent at all times with these policies and shall be updated as and when necessary by the Company.

The General Manager of the Company subsidiary shall approve the organization and the subsequent plans.

This organization has the following basic goals:

- Help the Company developing a Security Plan to ensure protection of all persons involved in the seismic operations and effectively reduce loss of assets due to criminality and other factors by ensuring the application and “building-in” of all relevant security guidelines and directives at all phases of the operations.
- Develop measures to ensure that the application of security requirements by the Company, the Company personnel, Contractor(s) and Contractor(s) personnel, Sub-Contractor(s) and Sub-Contractor(s) personnel alike are in agreement with the overall seismic operations deliverables within the framework of the General Corporate and seismic operations specific security aspirations and Respect for Human Rights.
- Ensure compliance with all applicable International and National Security Regulations.

These goals are achievable through:

- Identifying all security tasks for all seismic operations phases with clear assignment of responsibilities and time frames in cooperation with the Company,
- Developing early warning systems in concert with E&P security to ensure that seismic operations personnel receives the relevant security advice for all seismic operations locations,
- Increase awareness of all seismic operations personnel for personal security and knowledge of general seismic operations security requirements,

And by:

- Respect of the National laws and regulations and security policies for every seismic operations location,
- Respect of relevant supplementary International Rules and Regulations including as a minimum the Voluntary Principles on Security and Human Rights (VPSHR),
- Ensuring adoption of all relevant Corporate security guidelines and specifications,
- Ensuring that seismic operations security activities are in phase with the subsidiary goals.

The security of personnel and assets on a Contractor(s) worksite is the primary responsibility of the Contractor(s). The Company shall ensure that differences arising from the Company recommendations and Contractor(s) security practices are solved through the issuance of relevant Bridging Documents stating the procedures to address such differences. The Bridging Documents shall clearly outline the definition of responsibilities for security. Such Bridging Documents shall be approved by the General Manager of the Company subsidiary in liaison with Company Security Department.



5.2 Security Management Process

A comprehensive security approach is to be processed throughout the preparation and conduct of seismic operations.

5.2.1 Responsibilities

Three levels of responsibility are considered: Country national authorities, Company, and Contractor(s).

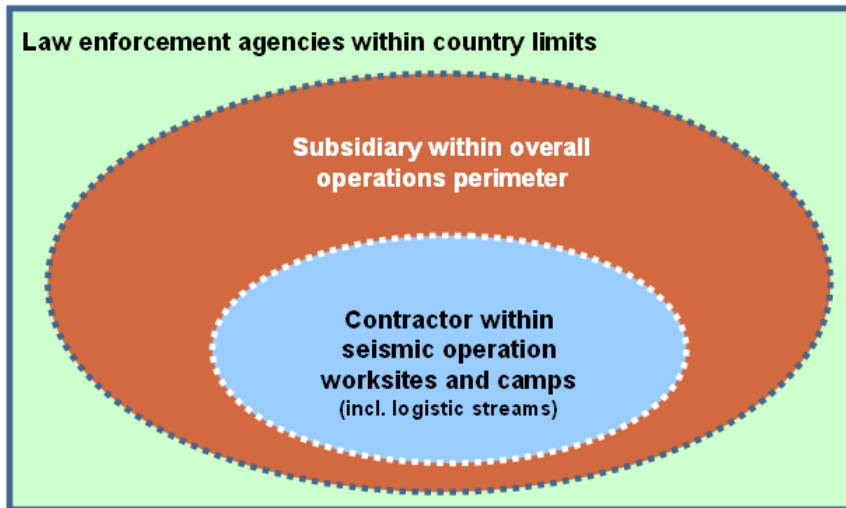
1. **The National Authority** ensures the general security of seismic operations area, thus allowing freedom of work and movement. Conditions of security assistance of national agencies towards the Company are organised and implemented by the Company management. Security policies and procedures are implemented in accordance with the Universal Declaration of Human Rights, with the international and National laws and with the Voluntary Principles on Security and Human Rights.
2. **The Company** overlooks the seismic operations security perimeter with C2i function (control, coordination and information). The Company liaises with the seismic operations supervisor/manager in order to control and supervise the Contractor(s)'s security arrangements and liaises with the National Authority for all issues related with security of the seismic operations.
3. **Contractor(s)** is responsible for the execution of the seismic operations and therefore ensures the development of the Seismic Operations Security Plan, the control, supervision and integration of Sub-Contractor(s) security plans (if applicable) and the development and maintenance of appropriate security measures at all owned or operated locations where Corporate, Company subsidiary or seismic operations personnel have activities or have personnel supervising activities.

Contractor(s) has to organise the security within their perimeter of activity such as camps, yards and transportation between the locations of different sites of work. Contractor(s) has to issue and to implement their security plan taking into account the Company Security Standards. This plan has to be submitted to the Company subsidiary's General Manager.

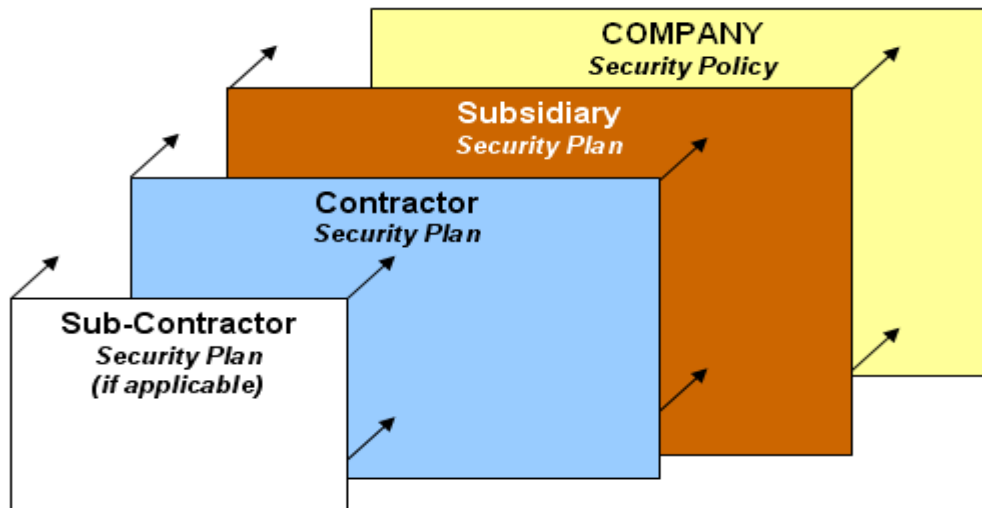
The ability of Contractor(s) to endorse this responsibility should be a primary requirement in the award of contracts.

The organization of seismic operations security is described by a Seismic Operations Security Plan, which is to be integrated in the Company Security Plan.

Perimeters of responsibility



Integration of security plans



5.2.2 Security of employees

The following principle shall be respected: ***"The security and protection of employees must be the overriding priority of all business activity"***.

Throughout the seismic operations, security of personnel shall be a primary goal. Adequate procedures and control measures shall be put in place to achieve this goal.



These shall include the following actions as a minimum:

- Ensure the development and maintenance of adequate personnel protection procedures and measures at all locations where the Company and Contractor(s) will have permanent activities or have Corporate personnel supervising activities,
- Develop and maintain adequate Personnel On Board (POB) databases for all seismic operations locations,
- Ensure the existence of facilities to achieve the Corporate Security recommendations for personnel evacuation,
- Develop and maintain adequate Site Emergency Response and Crisis Management plans.

5.2.2.1 Corporate Owned and/or Operated Sites

For the Company owned and/or operated sites, the Company shall be responsible for taking seismic operations personnel into account in the POB and evacuation procedures and other emergency response measures.

Contractor(s) shall be responsible for ensuring the security of their personnel during transfer from their point of entry into the country to the Corporate operated site.

5.2.2.2 Contractor(s) Operated Sites

Contractor(s) sites shall have and shall maintain an up-to-date personnel security and evacuation plan covering, as well as their own personnel, all Company Corporate and subsidiary personnel. In situations where the Contractor(s) may not be able to manage the required logistics for such an effort, the Contractor(s) has to develop a minimum plan that shall ensure the Security of the personnel until such time as the Company can safely and securely evacuate the personnel from the Contractor(s) site or develop plans that will enable the Contractor(s) to safely and securely deliver the personnel to a pre-identified the Company evacuation point.

Contractor(s) shall provide a dedicated security plan for the Company's Subsidiary approval for all operated sites where personnel are permanently assigned and accommodated or where personnel are present for temporary assignments or short term spot visits. This Contractor(s) security plan shall be developed accordingly and regularly updated and may be audited by the Company at commencement of work on the site.

5.2.3 Respect for Human Rights

The following principle shall be respected: ***"Security policies and procedures must be implemented according to the Universal Declaration of Human Rights, the international and national laws, and the Voluntary Principles on Security and Human Rights. Respect for human dignity is paramount at all times."***

The Company and Contractor(s) subscribe to the *Voluntary Principles on Security and Human Rights (VPSHR)*. Guarantees to ensure that the Human Rights are respected shall be enforced through:

- Developing awareness of VPSHR and requirements for seismic operations personnel and Contractor(s) through the Company organised awareness and Corporate Security Division directives,



- Ensuring that the seismic operations activities are in phase with the Corporate VPSHR implementation action plan,
- Development of conflict management procedures by Contractor(s) and Sub-Contractor(s) (if applicable),
- Inclusion of riots and crowd management procedures in security plans,
- Ensuring that community related issues are captured in global HSE and sustainable development efforts that relate to the seismic operations. This is in realisation of the fact that community related actions/protests generally impact security and human rights issues, ensuring that community issues related to the seismic operations are captured in global HSE and sustainable development efforts.(community actions/protests generally impact security and human rights issues)
- Ensuring clear definitions in the deployment and use of security forces (see below 5.2.4).

All security procedures and practices that are developed during the seismic operations shall ensure that respect for human rights is sustained. The possible impact of all security related seismic operations activities shall be carefully identified and appraised in order to be mitigated as far as possible.

5.2.4 Security Responsibilities

The following principle shall be respected: ***“Line management must be continually aware of and take responsibility for the security aspects of its business activities. Security organisation and resources must reflect this commitment.”***

Contractor(s) and all persons on the seismic operations shall be made aware of and fully understand the individual and group responsibilities to ensure his/her personal security. To ensure this, a Security Induction shall be implemented on the seismic operations. This Security Induction shall include:

Awareness of basic requirements to ensure individual security,

- Security of Corporate and the subsidiary assets and information
- Security implications of his/her action on other Corporate and the Company personnel and image.

This security awareness/induction shall be organised for each seismic operations person already on the operations as well as all new entrants.

5.2.4.1 The Company's Subsidiary General Manager

The Company's Subsidiary General Manager shall ensure the execution of following points:

- Provides the necessary management support to ensure the effective implementation of Security for the seismic operations. He checks and approves Company and Contractor(s) Security plans. He is in charge of the implementation of agreements/arrangements with the National Authority regarding security of the operations, including commitment to VPSHR considerations,
- Appoints a Security Coordinator (recruitment to be approved by Company Corporate Security) to implement the Operations Security Plan,



- With support and assistance of DGEP/HSE/SEC, defines a structure for security organisation, including the different security forces deployed for the seismic operations protection,
- Report any security issues to DGEP/HSE/SEC and Corporate Security Division.

5.2.4.2 Security Coordinator for seismic operations

The Company's Subsidiary Security Coordinator for seismic operations directly manages the Security content of the seismic operations. His principal tasks shall include:

- First line approval of all Security related documents and activities in the seismic operations,
- Ensures coherence of Security requirements with seismic operations security plan,
- Manages interfaces between Security with other operational managers,
- Informs the Company's Subsidiary General Manager of the current local Security levels, status of travel restrictions,
- Provides feedback on other Security issues to the Company's Subsidiary General Manager.

The Company's Subsidiary Security Coordinator for seismic operations shall also provide advice and assistance on Security issues across the complete spectrum of the seismic operations by:

- Issuing and implementing Security Plan for the seismic operations in close coordination with DGEP/HSE/SEC,
- Liaising with DGEP/HSE/SEC for all issues related to Security Plan and procedures,
- Identifying International and National Security requirements that impact the seismic operations,
- Ensuring that the mines and UXO (uneXplosed Ordnance) threat is thoroughly addressed through due assessment and mine-clearing operations,
- Liaising with DGEP/HSE/SEC for follow-up of Corporate Security recommendations,
- Notifying the Company's Subsidiary HSE Manager of any restrictions for travel/missions to seismic operations locations,
- Reporting security issues including incident and near miss to the Company's Subsidiary General Management,
- Controlling the update of the seismic operations personnel-on-board information with Contractor(s),
- Providing seismic operations personnel with specialist security advice and support,
- Providing Contractor(s) with the threat assessments issued by Corporate Security,
- Preparing and reviewing the security aspects of future tender documentation and Contractor(s) selection,
- Auditing and reviewing the security activities of seismic operations Contractor(s),
- Ensuring that where armed security guards are used on the Company or Contractor(s) sites, the National rules of engagement (RoE) are displayed and known by everybody.

These rules must be clear and should not contain any ambiguous instructions for the use of force. RoE must stipulate when and how force can be used. The RoE must:

- Respect human dignity and human rights of all persons,
- Give priority to non-violent means first. Force is used only when necessary,
- Use only the minimum force required that should be proportional to the threat.
- Ensuring that none of the security measures is oppressive towards members of local communities.
- Identifying international and national security requirements that will impact the seismic operations,
- Interfacing between Contractor(s) and National Authorities regarding dedicated protection provided by National Army,
- In case of National Army deployment, making sure that all armed personnel deployed for the seismic operations protection are trained and briefed on their mission, the VPSHR and the RoE,
- Assisting, supporting and controlling Contractor(s) for the implementation of a Seismic Operations Security Plan,
- Coordinating rescue and evacuation plans for the whole seismic operations perimeter of activity,
- In liaison with DGEP/HSE/SEC, providing Contractor(s) with guidance for the design of security and the specification of security equipments throughout the seismic operations different phases,
- Following up the situation where the Contractor(s) activities are carried out and providing threat assessments throughout the different phases of the seismic operations; adjusting the level of alert accordingly and providing recommendations and directions to Contractor(s) regarding security,
- Integrating this Seismic Operations Security Plan in the Company security plan,
- Liaising and coordinating with the Country authorities. It is emphasised that the Company is the only mandated level of coordination for issues related to the overall seismic operations,
- Controlling security organisation and security procedures of Contractor(s),
- Auditing regularly the security organisation of the seismic operations.

5.2.4.3 Seismic Operations Personnel

Seismic Operations personnel shall abide by Security recommendations relating to the seismic operations activities as well as regulations and guidelines guiding Security behaviour while on Corporate official assignment.

5.2.4.4 Contractor's Security Responsibilities

Each Contractor(s) has the responsibility and duty to ensure that all Security aspects/requirements within his area of activity are properly identified, assessed and



implemented in accordance with the Company's Subsidiary Security Plan and requirements. Contractor(s) is also to take responsibility for the actions of their Sub-Contractor(s).

Contractor(s) shall be required to produce and maintain their own Security Plan and dedicated site bridging documents which shall document the Security procedures, processes, studies and activities which shall be undertaken to comply with the requirements of this Security Plan especially for sites where Corporate will have personnel on a permanent basis.

The development of this Security Plan will require that the Contractor(s) nominates/dedicates senior specialist in his organisation to manage the Security resources of the Site and where necessary to seek advice from the Company's Subsidiary Security Coordinator.

Contractor(s) shall ensure its personnel and activities to comply with all Corporate and International recommendations in its area of activity, participate in and abide by recommendations of Security audits.

Regarding the mine and UXO threat, the Contractor(s) shall issue and enforce specific procedures related to vehicle and pedestrian movements on and around the corridor.

5.2.4.5 Control and Coordination with Sub-Contractor(s)

Each Sub-Contractor(s) is liable for making its own security arrangements under the supervision and responsibility of the Contractor(s). The organization of that control and coordination system is part of the Contractor(s) security plan.

5.2.5 Security prevention priority

The following principle shall be respected: ***"Prevention must be the first priority. Threats analysis and risk evaluation should be carried out on a continuous basis."***

One of the primary goals of Security requirements is to ensure that the risks to personnel and assets are as low as reasonably practicable. In order to meet this goal, assessment of Security risks shall be continuously undertaken throughout the design process and shall continue throughout the remaining life of the seismic operations.

In order to meet these goals, Security management tools such as Security studies shall be carried out during the different seismic operations phases. Security risk assessments shall be regularly carried out with input from DGEP/HSE/SEC for the different seismic operations locations especially where Corporate personnel will be based, or where the Corporate will/intends to carry out permanent activities.

5.2.5.1 Security Management Tools

Throughout all seismic operations phases, a number of key Security Management tools are utilised. These shall include:

- The Company's Subsidiary and Contractor(s) Security plans

The Seismic Operations Security Organization is presented herein; a Seismic Operations Security Plan has to be developed accordingly.

Contractor(s) shall maintain a Security plan for any site where Corporate, subsidiary and Contractor(s) personnel are permanently assigned or accommodated. These plans shall be submitted to the Company for comment and approval. Where substantial differences exist between Contractor(s) Security practices and the Company recommendations, these shall be itemised and a bridging document issued to address them.



- Security reporting

Security activities undertaken on each site under the Company recording perimeter shall be reported. Lessons learnt as well as status of implementation of Security action plans shall also be captured.

Serious security related events have to be reported immediately.

- Security audits

The Company shall maintain Security audit tools to measure compliance with recommended preventive actions and where necessary develop remedial action plans to complement the risk assessment action plans.

- Risk Assessment

The Company shall ensure that Security risks for every seismic operations phase are periodically analysed. Where necessary, expert advice on Security assessment models and resources will be sought from Corporate Security Division.

The use of Company and seismic operations personnel in each work location shall be subject to the requirements of the Corporate Security Division recommendation for country level risk analysis. Adequate arrangements shall be implemented to ensure the Security of personnel on missions or permanently present in work locations and accommodations.

5.2.6 Security preparedness

The following principle shall be respected : ***“Preparedness is essential to mitigate incidents rapidly and effectively. Response plans must be developed and tested to deal with assessed risks.”***

5.2.6.1 Seismic Operations General Security Arrangements

Security preparedness involves a deliberate effort to ensure that all security requirements are captured, put in time lines and responsibilities assigned. The global Security Management system is handled by this document.

Security travel advisory services shall be put in place by the Company and be accessible to all Contractor(s) personnel on request. This analyses the security conditions of the locations where the seismic operations are being carried out and apply the proper SG/DSG recommendations.

5.2.6.2 Evacuation and emergency planning

Majority of the work to be carried out on onshore sites shall be on Contractor(s) locations.

Contractor(s) shall develop evacuation or shut-down plans to manage cases of evacuation resulting from security crises in their sites. The Company shall ensure that the Contractor(s) evacuation plans are capable of handling evacuation of both Contractor(s) and Company employees.

Where Contractor(s) and Company personnel are present on Contractor(s) locations and evaluation has shown that the Contractor(s) lacks the resources to provide safe evacuation, the Contractor(s) shall produce a bridging document showing that additional resources and plans are in place to:

- ensure the safety of the Contractor(s) and Company personnel on its site until such time as the local subsidiary is able to safely and securely evacuate the personnel



Or

- safely and securely move the Contractor(s) and Company personnel to a place of safety or a Company location.

This plan shall include a provision to provide on a daily basis, the name and location of any Contractor(s) and Company personnel working or accommodated on site. The information given will depend on the local conditions and area security level.

These evacuation plans shall be approved by the Company.

5.2.6.3 Drills and Exercises

Periodic drills and exercises shall be organised for sites. Drills and exercises shall be organised with the objective to test response of all persons and action groups in emergencies.

Each Contractor(s) shall maintain the details of drills and exercises as well as schedules for the site as part of the general Security Plan.

5.2.7 Validation of security measures

The following principle shall be respected : ***“Security measures and procedures must be submitted to regular inspections, validations and verifications by security specialists so as to maintain high levels of security standards in TOTAL Operations worldwide.”***

5.2.7.1 Inspections and Audits

Security audits shall be carried out for all key areas of the seismic operations. A program of internal Security audits shall be proposed by each Contractor(s) within the Contractor(s)'s Security Plan and submitted to the Company's Subsidiary for review and inclusion into the specific bridging document.

To ensure that the relevant Company recommendations for Security protection of personnel and assets are followed and enforced on the site to generate early warning systems and instigate the necessary remediation measures, Contractor(s) shall develop and maintain an appropriate audit ranking document especially for sites where Contractor(s) or Company will have permanent presence or a number of personnel.

5.2.8 Professionalism, knowledge and staff integrity

The following principle shall be respected: ***“The level of professionalism, knowledge and integrity of staff involved in security matters on behalf of TOTAL must be tightly controlled and exemplary. Appropriate training plans, recruitment and contracting procedures must be established and implemented.”***

Security awareness training shall be vigorously pursued during all seismic operations phases and activities. All persons shall be made aware of the minimum Security requirements relating to individual Security, knowledge of Security regulations and Security of Corporate and Company assets and image.

The Company's Subsidiary Security Coordinator shall develop a Security training content to the seismic operations personnel to impact the required staff knowledge and assure integrity of persons.



General Security information and guidelines shall be developed showing the basic knowledge of Security behaviour for personnel. Relevant country specific advisory in form of pocket booklets may be distributed to Contractor(s) staff.

5.2.9 Incident reporting

The following principle shall be respected: ***“All incidents, including security breaches and irregularities must be reported and recorded. Corrective action should be taken and followed up through the regular verifications to improve the overall security standard.”***

All Security incidents and occurrences relating to seismic operations activities shall be reported.

All incidents involving Security forces shall be both immediately reported and formally documented in the Contractor(s) Incident Report database.

All incidents / actions in violation of this procedure shall be investigated and appropriate sanctions imposed for each defaulter. Where proven cases of abuse exist by a Security agent, the Company's Subsidiary shall take efforts to ensure that the Security agent is removed from the seismic operations.

The Contractor(s) has the responsibility to ensure that appropriate incident reporting forms exist on site. Each reported incident shall be investigated and proper reports forwarded by the responsible Contractor(s) Security person on site to the Company's Subsidiary Security Coordinator.

The Company's Subsidiary reserves the right to carry out its own investigation into incidents or verify the reports received from the site. In this case, the Contractor(s) and its personnel shall fully co-operate and shall provide all facilities and assistance necessary to complete the investigation.

5.2.10 Use of security forces

The following principle shall be respected: ***“Generally security forces used by TOTAL are non-armed guards. However if no other alternative exists to properly manage the risk, armed guards could be used within the scope of legally and governmentally approved practices. Armed guards must be selected carefully, trained regularly and supervised closely”***

The use of Security forces shall be guided by the following basic actions, in accordance with Corporate policies.

5.2.10.1 Define a structure for Security organisation

A structure shall be defined for Security organisation showing the different Security Forces used and the responsibilities for each.

The Security organisation for each Contractor(s) site where Contractor(s) or Company will have permanent personnel shall be defined. This structure will show all the different personnel that make up the Security team and ensure that all Security personnel fully understand their roles and responsibilities, and that such understanding is based on structured rehearsal.

5.2.10.2 Define the process of requesting and deployment of Security Forces

The Security forces to be used at all phases of the seismic operations and for the affected sites should be selected to ensure that individuals with past criminal records are not recruited. Where



Government Security forces are to be used, their activities shall be monitored to ensure that they respect applicable national laws and regulations.

The Company's Subsidiary shall implement control mechanisms and eliminate all actions that may blemish the image/reputation of the Company. The Company's Subsidiary shall ensure that the coordination of Security forces on their site is in line with applicable national regulations. The Company's Subsidiary should ensure too that training programs, induction and bridging instructions shall be developed, updated and administered to security forces at the beginning of their assignment where lapses are found to exist.

5.2.10.3 Define rules of engagement

Where armed Security personnel are used on Company or Contractor(s) sites, the national rules of engagement and site guidance containing clear and unambiguous instructions for the use of force by the security forces must be maintained on the site. This instruction shall stipulate when and how force may be used and that specifically they shall:

- respect human dignity and the human rights of all persons,
- attempt non-violent means first; only use force as a final resort,
- use only the minimum force required, and keep it proportional to the threat,
- operate strictly within the law and the authority given to them to use force,
- minimise damage and injury,
- Be told that they will be accountable for any excessive use of force.

Security forces shall be issued with pocket-sized cards detailing the requirements for the use of force.

5.2.10.4 Use of firearms on the premises

As a general rule, Company and Contractor(s) employees are not allowed to bear firearms while on the Company and Contractor(s) premises or operated sites. The carriage and use of firearms is restricted to law enforcement authorities and armed forces, which will have been issued with the relevant rules of engagement and guidelines on use of force.

5.2.10.5 Security forces operations

While it may not be possible to list every scenario, the basic principle for all phases of the seismic operations and applicable sites is that threat scenarios or situations that arise shall be estimated by combining the aggressors' capability and intent with the possibility that their actions will:

- endanger life,
- damage equipment, shut down operation or cause other financial loss,
- prevent free access or egress of persons and goods,
- Damage the Corporate reputation.

In every case, Contractor(s) shall concentrate the security efforts on protecting Contractor(s) and Company personnel and property and shall ensure that the security forces are acting accordingly. These guards shall be made fully aware of what they are to protect, and the



manner in which they are to protect it, in line with the applicable regulations in particular that force shall be used only when strictly necessary and to an extent proportional to the threat;

Contractor(s) for sites where Company or Contractor(s) will have a permanent presence shall develop and maintain similar instructions as part of their security plan.

5.2.10.6 Impact of security measures on local communities

The following principle shall be respected: ***“Mindful of the need to introduce security measures to protect its employees and local personnel, TOTAL nonetheless makes every effort to minimise the impact of these measures on local communities.”***

The security measures to be adopted for the seismic operations shall have the primary goal of protecting personnel and assets. No security measure shall be implemented with the goal of intimidating or harassing local communities.

Activities of security forces shall be routinely monitored to ensure that this objective is adhered to. Where a security measure is identified to be oppressive to innocent members of local communities, efforts shall be made to modify that security measure and remove the unwanted aspects.

Contractor(s) shall be encouraged to maintain cordial relationships with the local communities and abide by this regulation.

5.3 Information Security

Contractor(s) shall maintain, in separate locations, duplicate files in either hard copy or electronic format of all project correspondence and documents, including electronic data and information. These files shall be maintained in a current state and in a fireproof environment. Contractor(s) shall provide for Company's review its Document and Information Security System.

Contractor(s)'s Procedures shall include the following:

- Identification of areas of exposure,
- Methodology for classifying Confidential Information,
- Methodology for handling, securing, storage, restriction of access, and disposal of confidential information provided by Company, Contractor(s), and third parties,
- Requirement for a written confidentiality agreement between Contractor(s) and third parties prior to release of Confidential Information,
- Methodology for ensuring that all employees having access to Confidential/Restricted information are obliged by an employment contract to honour the confidentiality requirements of the contract,
- Segregation of Company's Confidential/Restricted Information from information belonging to Contractor(s) or received from others by Contractor(s),
- Implementation of computer security controls and protection of electronic information.



5.4 Contractor(s) security quick evaluation questionnaire

Organisation

Does the Contractor(s) have a security policy? Does the Contractor(s) have a Security Manager?

Are site or subsidiary employees familiar with his/her role?

Does the Security Manager report directly to the General Manager?

Is there a written reporting procedure for security events?

Are there any procedures for the selection and the appointment of security firms?

Is there a written reporting procedure for near-misses to help the Contractor(s) anticipate a deteriorating situation and inform the Corporate?

Are the Contractor(s) and its Security Manager familiar with the Group/subsidiary security policy and how to implement it?

Does the Contractor(s) have a business continuity plan (BCP)?

Staff security

Does the Contractor(s) have an emergency response plan (risk assessment, emergency communications, emergency response, stand-fast and evacuation, etc.)?

When these procedures were last tested?

Does the Contractor(s) maintain an up-to-date list of employees including those on business travel and visiting family?

Are there written procedures on the reception of visiting and/or rotational staff?

Are these procedures applied in the field?

Are security inductions organized?

Reputation issues

Does the Contractor(s) use armed guards? If so, is there a procedure for checking what training they have received?

Are the Contractor(s) and its Security Manager familiar with the *Voluntary Principles On Security and Human Rights* and ensure that they are applied?

Does the Contractor(s) have regular contacts with the local authorities?

Has the Contractor(s) established selection procedures for the appointment of security firms?

Has the Contractor(s) set up a monitoring system to anticipate events that could tarnish its Corporate image (communications, legal services, etc.)?

Site Security

Has a plan for protection against hostile acts been drawn up for sensitive sites? At the very least, does it include access control procedures?

Do facilities subject to the ISPS code have a valid certificate of compliance with the provisions of the code?

If the site is responsible for a pipeline, is it covered by a security plan?



Information Security

Does the Contractor(s) have implemented and communicated basic rules for information security (offices) and ensure they are applied? Such as wearing a badge at all times and ensure it is visible, systematically escort visitors to and from reception, and lock all lockers and offices every time you leave even briefly, protect sensitive information by encryption, locked cabinets or double envelope system, shred all sensitive material...)

Is the Contractor(s) management aware of the need for information security?

Are the computers of key personnel equipped with encryption software?

Are the laptops used outside Contractor(s) premises equipped with encryption software? Is data encrypted?

IT security

Industrial computer systems

Is the Contractor(s) familiar with the Industrial Network Security briefing and are the recommendations applied?

Does the Contractor(s) employ a consultant Industrial IT manager who is not a member of staff?

Is the industrial IT network protected by a special barrier?

Are there procedures for managing industrial IT systems?

Intranet Site (if the Contractor(s) has developed an Intranet site)

Are there written procedures for setting up local intranet sites and are they part of detailed specifications that include security and information protection ?

Are there procedures for managing the confidentiality and content of information published on the intranet?

Are there procedures for checking what type of information is accessible on the intranet sites of the Contractor(s) facilities?

Are there procedures for managing the closure of an intranet site with a view to protecting the information published on the site?

6. Environment

Company Environmental Standards and Concerns are of the utmost importance. Contractor(s) must strictly obey to the Local Environmental Laws and Regulations, the IAGC and OGP recommendations and the Contract requirements.

Where required by the local Law and Regulations and/or by the local Environmental Authorities an "Environmental Base Line Study" (EBS) and/or an "Environmental and Societal Impact Assessment" (ESIA) have been preliminary conducted by Company. Copies of the ESIA will be provided to Contractor(s) who shall be required to strictly observe the ESIA recommendations.

In all cases, Company considers environment preservation as first priority before production. Alternative solutions as detours shall be preferred rather than bulldozer use, tree cutting or entering archaeological sites or animal reserves for instance. In that case, a preliminary impact assessment (if not already performed) with limitation and restoration plans shall be submitted to authorities and Company approval.



Refer to preliminary EBS/ESIA conclusions for Environmental Management Plan (EMP) implementation.

The EMP shall address all the EIA requirements, for all operational phases (Seismic survey, Drilling, Facilities Construction and Operation) of the Project and shall cover the following aspects:

- Waste management,
- Chemical management,
- Oil Spill Contingency Plan,
- Training program,
- Environmental monitoring,
- Environmental auditing.

6.1 Waste management

Please refer to **GS EP CIV 403** chapter 15.7.Waste management.

6.2 Water management

Please refer to **GS EP CIV 403** chapters 15.2. to 15.6.

6.3 Fauna and flora – archaeology and history

Based on the EBS a specific assessment-including an on site visit shall be performed and a plan to be set up with the Contractor to ensure proper follow-up of the protected area.

Respect of local resources is mandatory.

Harassing wild life is forbidden.

Hunting or fishing is forbidden.

Feeding wildlife is forbidden.

Pets are not allowed in camp (except chickens for scorpions and snakes hunt).

All kinds of flora are to be respected.

Noise map to be setup for every camp with isolated generator or compressor.

In forest area, trees with a trunk diameter over 15 cm shall be protected from cutting on seismic lines (except for Dropping Zones, Landing Zones, Helipads and pontoon construction).

The use of bulldozer in the tundra is prohibited for camp settlement; snow can be compressed but not removed so as to limit the impact on under-snow flora.

Contractor(s) keeps bulldozing and grading to a minimum. Alternative solutions such as detours shall be preferred rather than using bulldozer(s), cutting tree(s) or entering archaeological sites or animal reserves etc. Bulldozing and grading are not allowed without Company approval which shall not be unreasonably withheld.

In sensitive areas, the Contractor(s) has to show evidences of identification, preservation procedures and reporting ones concerning: preserved sites, protected areas (such as: natural parks, breeding areas) and/or monuments (such as: castle ruins, engraving, etc.) and/or any



particular sites (such as: geological curiosities, fossils, dinosaur remains, etc.) encountered during the operations.

All archaeological sites encountered during the operation shall be reported to the Company responsible.

Every recognized site to be respected by the crew personnel.

6.3.1 Ground

The use of bulldozer in « reg », rocky or mountainous area is submitted to Company approval case by case and reduced to a minimum.

Contaminated soil shall be removed and brought back to camp and included in the waste management.

Hazardous material spills to be reported.

Hazardous material to be isolated from ground and water bodies.

6.3.2 Restoration

Environmental Emergency Response Plan (Oil spill contingency Plan) to be implemented.

Restoration works to be done on all damaged areas.

Restoration plan for camp and field to be approved by the client representative on site before operations.

All survey markers and pegs to be removed from the field at the end of the operation.

All up-hole sites shall be restored.

All helicopter or plane landing area shall be restored.

All camps and storage locations shall be restored.

All restorations to be documented in a report attached to the final report. The various restoration reports shall consist in, but not limited to, coordinates, date of beginning and end of ground occupation, pictures before operation, during operation and picture after site restoration, final impact on environment and comments on restoration activities.

Final camp / field restoration is subject to Company approval.

Access tracks or bulldozer works can be subject to restoration depending on Company, ESIA and local regulations. Agreement shall be decided before operations start. In all cases, the use of bulldozer without Company approval shall always be subject to identical restoration under Contractor(s) full liability.

According to local regulation, reforestation can be mandatory for site restoration.

6.4 Societal issues

Contractor shall pay due regard to the neighboring Communities. He shall act responsibly demonstrating commitment to the health and safety of the neighboring Communities and shall take into consideration the socio-economic impacts of its activities.

Contractor shall preserve the local living conditions, the existing economic activities, the cultural heritage and the accesses to natural resources. Contractor shall adopt a constructive attitude based on open dialogue with the stakeholders.



Contractor shall protect the existing community infrastructures and services. In case of these are affected during operations, Contractor shall repair and/or reinstall them (roads, irrigation canals, agricultural lands, accesses to resources and energy...).

Contractor shall maximize the opportunities for employment, training and capacity building to the benefit of the neighboring communities and shall develop an employment, recruitment and training procedure, in accordance with the Contract.

Contractor shall develop a local supplier and procurement procedure, transparent, public, respecting national legislation. Contractor should contact local provider before the start of operation to maximize opportunities for local suppliers.

7. Land Transport

All drivers shall be required to have at any time a valid and adequate driving license. Contractor(s) shall organize a driving test and a medical examination (view, hearing and reflexes at least) before hire. Off road and defensive driving course shall be given to the drivers by Contractor(s) during the hiring process and prior to job assignment in camp/field.

Only authorized (test passed) drivers shall be allowed to drive. All vehicles shall pass inspection through checklists before approved for field operations.

The test program and results as well as vehicles inspections shall be provided to the Company Supervisor before the survey commencement date. Only authorized vehicles shall be used. Drivers shall only use "hands free" means of communication (radio, mobile phone) while vehicle is in motion.

Vehicles age shall be less than 5 years, unless a complete overhauling has been made and approval from Company given and unless exception is made in advance to Company for specific vehicles/machines such as truck mounted up-hole rigs, recording truck...

Motorcycles, tri-cycles and open quad cycles shall not be used.

On busses, seat belts shall be worn by all passengers.

With the exception of emergency cases and activities in close support of Company approved night operations, latest permitted departure times shall be defined and enforced to avoid night time driving. Any unexpected night driving case shall be reported to the Company supervisor on site.

7.1 All vehicles

Identification plates shall be displayed as per local regulation.

Insurance shall be valid for all vehicles.

Local taxes and licenses shall be paid.

All vehicles shall be tested for safety and atmospheric emissions according to national standards.

Vehicles shall be in good mechanical order with maintenance planning and logs.

Body shall be in good condition.

Brakes shall function.

Hand brake shall function.



Tyres and spare tyre(s) shall be in good condition.

Normal tyre pressure shall be written on the wings.

Windscreen and windows shall be in good condition.

Wind screen shall be clean with no visual obstruction (such as stickers, pictures...).

Wind-screen wipers shall be in good condition and function.

Defroster system shall function.

Rear view interior and side mirrors shall be clean and in good condition.

Steering system shall function and shall be tested regularly.

Exhaust gas shall be controlled regularly.

Roll bars with foam protective pads shall be in good condition.

Set of stickers shall be prominently displayed, mentioning speed limits, seat belt mandatory, no smoking and other safety rules.

Speed recording system shall be in place and operative.

Real time fleet tracking system (using GPS) shall be in place and operative.

Radio VHF fitted shall be operative.

Fitted seat belts shall be operative for each seat.

Head restraint shall be in good condition on each seat.

Air conditioning and heater shall be operative.

Water tank shall be in stainless steel for desert operations.

Water of the water tank shall be changed at least every week.

Fire extinguisher shall be available, numbered and checked.

First aid kit shall be available, numbered and monthly checked.

One spare wheel minimum shall be available.

Basis tools shall be available.

Jack and shaft/spanner for jack, spanner for wheel nut shall be available.

Metal jacking plate for use in soft terrain shall be available.

Wood block shall be available.

Warning triangle or cone shall be available.

Fluorescent jacket shall be available (one minimum).

Waste plastic bags shall be available to bring back waste to the camp.

Reversing alarm and horn shall be available for all vehicles.

All lights shall be operative (high and low beams, 4 ways directors, side lights, stop lights, reversing lights and fog lights...).

Engine monitoring lights shall function (brakes, oil, temperature, diesel ...) – all gauges and speedometers shall function.



Maintenance planning shall be posted and respected (oil, filters ...).

Detailed prospect area map shall be available inside the vehicle, with all key points, clinics, airstrip, camps, main roads, main obstruction/hazards etc.

"Man lost", Medevac plan and driver related procedures (job description, convoy, refuelling...) shall be available in vehicles.

Radio frequency summary, camp phone numbers and emergency phone numbers shall be available on board.

Daily check list system shall be in place. Daily check list to be available in each vehicle with pen.

Towing strap is preferred to winch cable.

Non-Company personnel shall not be transported.

Convoying shall be made as per Contractor(s) convoying procedure.

Convoy shall be planned in advance and a pre-convoy meeting is mandatory.

In addition to the above, following extra standards concern:

7.1.1 Double cabin

Equipment/material (not hazardous) shall be transported in the back side only.

Equipment/material shall be secured if light or higher than vehicle side rails.

Passengers shall not be transported on the back deck.

7.1.2 Pick-up

Equipment/material (not hazardous) shall be transported in the back side only.

Equipment/material shall be secured if light or higher than vehicle side rails.

Passenger shall not be transported in the back together with equipment/hazardous material.

Roof canvas sheet shall be in good condition.

7.1.3 Personnel transport truck

Passengers' compartment fitted with an alarm shall be accessible from front seats (without unfastening belts) to alert driver while driving (alarm button minimum, voice communication system preferred).

Passengers' compartment shall be fitted with traverse seating (longitudinal not accepted for high speed, or on hardtop), with a minimum aisle width of 45 cm.

Seats/benches shall be in good condition with soft material (foam or equivalent, but robust) for passengers comfort.

Minimum standard of 3 point belts for all seats shall be available.

Seats and seat belt attachments shall be strong enough, bolted through truck floor.

Passengers' compartment shall be fitted with proper lighting.

Maximum passengers capacity shall be written at the back of the truck (Passenger Number).



Roll over protection shall at least carry weight of laden truck and not crush/shear on slow roll/tumble.

Sideboard protection shall be at least shoulder high, or higher (as per [IAGC Safety Manual](#)).

Fold away ladder system shall permit to climb and get down the truck back compartment with hand grip.

Vehicle shall have under-run protection (as per [OGP Report N°365](#)). Main body of passenger compartment shall not protrude, neither sideways nor to the rear of the truck

Minimum of two escape routes in passengers' compartment shall be displayed (main at back, secondary through the roof or side opposite to traffic).

Truck shall be fitted with lockable box(es) to store tools and devices.

Sun canvas sheets on truck side shall be displaced to protect workers from sun during rest periods.

Roof shall be in good condition to protect from sun.

Air conditioning shall be operative if truck equipped.

Set of no smoking and seat belt fasten stickers shall be prominently displayed.

Rubbish bin/bags shall be available to collect rubbish.

Locking system or door handles can be manipulated from outside and inside the cabins.

7.1.4 Liaison vehicle

SSB Radio shall be available and operative. Other communication means shall be available in the area (GSM). If there is no SSB full coverage operative between camps locations and destinations, then a satellite based communication system is mandatory. In no case a liaison vehicle shall be out of communication.

Liaison procedure shall be established and respected.

Special journey management form for liaison vehicles shall be available.

Dedicated liaison vehicles shall be available (heavy and light vehicles), with dedicated drivers trained to specific procedure.

Liaison vehicles shall be equipped with speed recording system (mandatory) and fleet tracking system upon request from Company.

Detailed prospect area map shall be available inside the vehicle, with all key points, clinics, airstrip, camps, main roads, main obstruction/hazards, etc. An extra detailed map (if destinations are outside the prospect area) is needed with all authorized roads. Country map shall be available on board.

Liaison trips shall be planned in advance and limited to a minimum with passengers' number and names.

7.1.5 Ambulance

Refer to [GS EP MED 061](#) Chapter 4.1 Land Ambulance.



7.1.6 Explosive transport vehicle

See Chapter 13.2.8.

7.1.7 Fuel truck

Leakage shall be avoided on tank compartments, pipes, outlets, etc.

Absorbing material shall be available on board for at least 200 litres spill.

Outside marking shall be prominently displayed in accordance with local regulation, with at least “no smoking” and “danger – flammable”.

Vehicle shall be fitted with anti-static chain from the chassis to the ground. A safety cable with crocodile clip is used to connect the truck tank with any other vehicle or tank while transferring fuel.

Minimum of 2 fire extinguishers (CO2 and powder) shall be available and easily accessible.

24 volts or pneumatic pumps shall be available.

7.1.8 Water truck

Driver shall be certified as “food handler”.

Leakage from the tanks shall be avoided.

Tanks shall be clean and controlled/bleached regularly.

“Drinkable water” or “non drinkable water” shall be painted on both sides of the tank.

The drinkable water tank truck shall be used only for drinkable water. In no way shall it be used for up-hole or not drinkable water transport.

Water tank shall be compartmented crossway and lengthways to prevent liquid mass moves that can make the vehicle dangerously unstable in curves.

7.1.9 Scouting vehicle

Station wagon vehicle shall be preferred (2 fuel tanks available).

One vehicle minimum shall be equipped with a 12VDC GPS and roof antenna.

EPIRB: emergency beacon or Argos beacon can be available upon request by Company.

A “desert” emergency bag shall be inside the vehicle (survival blankets, food, torch light, batteries, large amount of drinkable water, etc.).

SSB radio or satellite phone shall be available and tested. The scouting shall stop its progress if entering a SSB non coverage zone and satellite phone not serviceable.

7.1.10 Recording truck

CO2 extinguisher shall be inside the recording cabin. ABC powder shall be available outside for diesel generator, different from driver's cabin extinguisher.

Ladder with handrail shall be in good condition.

Soundproof generator with ground pole shall be available.

Hydraulic or pneumatic antennae shall be implemented, that can be operated from the rear deck.



Vehicle shall be equipped with at least 3 VHF radio sets so the observer can communicate with vibrators, camp and line crews / trouble shooters all together.

7.1.11 ATV/Quad

All terrain vehicles shall be 4 wheel light vehicles.

ATV engine shall be controlled to limit max speed. Maximum speed shall be posted on vehicle.

ATV drivers shall be trained and certified for ATV riding (documented). Passengers shall not be carried.

ATV drivers shall wear PPE(s) as full motorcycle helmets, face shield (arctic condition) or goggles, jacket or long sleeved shirt, overall, gloves, boots, high visibility clothing (reflective jacket).

ATV shall be fitted with a system to prevent injury and crash resulting from wire fences.

ATV driver shall carry a VHF radio, or a VHF radio shall be fitted on ATV.

ATV driver shall perform a daily check to control mechanic condition and availability of spare equipment, tools and safety items.

7.1.12 Crane truck

See Chapter 16.1.1 and 16.1.2

7.1.13 Cable truck

See Chapter 16.1.3

7.1.14 Sewage tanker

Leakage from the tank(s) shall be avoided.

“Non drinkable water” or “sewage water” shall be painted on both sides of the tank.

Truck shall have local certificate to transport black waters.

Tank pipes and connections shall be regularly controlled.

Water tank shall be compartmented crossway and length way to prevent liquid mass moves that can make the vehicle dangerously unstable in curves.

7.2 Desert Driving

Sand tyres are mandatory in case of work in dunes.

Extra requirements are (but not limited to):

- Second spare wheel
- Sand plate
- Shovel
- Air pump and air manometer in case of mixed terrain (track gravel, stone, sand, mud...)
- Towing strap (nylon)
- Survival blanket in first aid kit



- Extra water reserve and enough food for 2 days

Vehicle shall be fitted with a sand pole and red flag on top, at least 1m higher than the vehicle.

Pole shall be fixed on the front of the vehicle or on the roof, never at the back.

Reinflate the tires immediately after the sandy area is cleared.

All tires should have valve caps fitted. Spare valve caps should be carried.

The tires should be inspected frequently, and stones and foreign matter removed.

The engine temperature and oil pressure gauges shall be checked frequently.

The fan belt, water pump, radiator, and radiator hoses should be checked frequently.

If the engine overheats [temperature gauge registers over 95°C (200°F)] the driver shall:

- Check for a loose or broken fan belt and adjust or replace it if necessary.
- Position the vehicle to face the prevailing wind with the bonnet up and engine switched off for approximately 20 minutes.
- Check the radiator exterior, and gently remove any accumulated material that may be interfering with the passage of air through the radiator core.

When the engine is cool, check the coolant level and fill, if necessary. If a fuel line vapour lock occurs, pump the accelerator a few times or choke the engine slightly. A wet rag over the fuel pump can clear the vapour lock in a fuel pump.

Oil can spouts shall be clean before topping off the oil, and engine oil and oil filter holes should be clean.

Fill the battery with distilled water if possible. Desert water should be avoided since it usually has a high alkaline content.

Body bolts, springs, spring mountings, and accessories should be checked frequently for looseness or damage.

Oil and air filters should be changed more frequently than normal in desert or rough terrain. A drop of oil from the dipstick rubbed between the fingers will determine the presence of a foreign or gritty substance. If this condition exists, immediately report it to the mechanic.

The filter nozzles and spouts of fuel cans should be clean before refuelling. The fitting of fuel filters shall be checked before entering desert areas.

After driving in sandy or dusty conditions, the air filter should be removed and cleaned. Oil bath air cleaner filters should be dipped in engine oil, allowing the excess oil to drain off before replacing. The frequency of air cleaner servicing will be dictated by the circumstances. If engines are to run during sandstorms, oil-soaked mutton cloth should be used to cover all engine vents.

A light tap on metal parts of the engine (e.g., fuel pipes and carburettor) may dislodge fine dust that may be causing a blockage.



7.3 Cold Weather Driving

7.3.1 Preparation

Always carry a shovel on the vehicle. The removal of snow or ice in front of or behind the wheels may enable a stuck vehicle to clear itself under its own power.

Wear gloves and avoid touching metal in sub-zero temperatures. Tape or wrap the handles of tools that may have to be used with bare hands.

Warm up the engines to operating temperatures before moving off.

Check all instruments, gauges, and warning lights during the warm-up to avoid damage.

Move vehicles slowly and carefully after they have been standing in the cold for a long time to allow the oil to circulate throughout the engine and gear boxes, and for the tires to warm up.

Distribute loads as evenly as possible to equalize traction on wheels. It may be necessary to reduce loads in severe snow.

Shield the lower half of the radiator with shutters, cardboard, or other suitable material to aid in maintaining normal operating temperatures.

Check the tire pressures before moving off. In severe cold conditions, the tire pressure should be increased by approximately 10%.

Caution against fuel being exposed to excessive temperature changes when being transferred - condensation and ice can result. In addition to the vehicle equipment listed in general provisions section, each vehicle should be provided with a personal survival kit which includes the following:

- Candle.
- Waterproofed matches.
- Small mirror (for signalling aircraft).
- Plastic sheet (for shelter, windbreak, ground cover, cape).
- Compass.
- Combined fishing and sewing kit.
- Ball of string.
- Whistle (referee-style).
- Pencil and small notebook.
- Emergency rations.
- Spare engine oil, fuel, and antifreeze.
- Tow chain and, if possible, tire chains.
- Blankets or additional clothing.
- Pick axe and a shovel.
- A map.
- A means of starting a fire.



- Working heater and defroster.

Visibility

Before moving off, clear all snow, ice, and mist from windows. Keep the windows clear at all times.

Keep the inside and outside rearview mirrors clean and properly adjusted.

Keep lights free from snow, sleet, ice, mist, or mud.

Danger

Never leave the engine of a vehicle running when sleeping in the cab.

An engine can be kept running, but a window shall be opened at least two inches if personnel are sitting in the vehicle while it is stationary.

7.3.2 Vehicle Movement

Use four-wheel drive when extra traction is required.

Use brushwood or cloth sacking material under the wheels to aid in moving through deep snow. Use sand or gravel on ice patches.

Maintain the proper distance between vehicles to compensate for the road conditions; stopping distances on ice and snow are greatly increased.

Slow down and engage the correct gear before negotiating bends or hills.

Make turns and stops slowly and steadily.

Exercise care in cross-country driving. Improper operation through or over branches, stumps, and rocks may cause damage to radiators, lights, tires, and vehicle suspension.

Recover vehicles that bog down in mushy ice as quickly as possible before they freeze in.

Inspect the brake lines frequently. Accumulations of slush, ice, and snow should be removed to prevent line breakage.

If uncertain about a difficult stretch of road, stop and inspect the situation before proceeding. A snow-covered road may conceal an icy road surface, and care shall be taken when driving on fresh snow.

One vehicle at a time should cross a hazardous area such as a snow drift or slippery hill, river crossing or frozen lake.

To drive through a difficult spot, place the vehicle into low gear and then keep moving. Stopping to change gear after reaching a bad spot may cause the wheels to spin and dig in, and the vehicle to become bogged down.

Rocking the vehicle backwards and forwards by rapidly changing gears between low and reverse may provide a long enough solid track for the vehicle to gain momentum to get through.

When stopping on any road made slippery by ice or light snow, apply the brakes gently. A severe application may cause a bad skid.

Never depend on brakes when descending a slippery hill. Change into a lower gear at the crest and use the engine for braking on the downward slope.



Chains are effective in snow or mud, but are less effective on ice. Sand or earth spread over an icy gradient provide as much, or more, traction than chains.

Never accelerate quickly on slippery roads as this may cause one wheel to spin while the other remains idle and may result in a skid. If a differential lock is fitted, it should be engaged once skidding is felt and disengaged when traction improves.

To overcome a skid, release the brakes; turn the front wheels in the direction of the skid. The momentum of the vehicle will carry it in a straight line parallel to the original path, and should result in regaining control.

Avoid ruts that may cause a skid or bruise a tire. When halting for some time, chock the wheels and release the hand brake. This prevents the brakes from becoming frozen in a locked position.

Before parking a vehicle, and if conditions permit, apply the brakes several times. This heats the brake shoes and drums, and helps dissipate any water that may have accumulated within the drums.

When crossing on ice over frozen streams, keep the cab doors open. It may need to leave the vehicle in a hurry if it breaks through the ice.

Sleet, snow, or ice melting on the roads may remain frozen on bridges.

When stopping, place the vehicle in a low gear or park. Use a wheel chock on a hill or grade.

If visibility becomes poor, stop and wait for better conditions.

7.3.3 Maintenance

Make complete changes of engine and gear oils when required. Mixing different grades of oil should be avoided.

Keep fuel tanks and containers as full as possible to prevent moisture condensing and freezing in fuel lines. Fuel tank and container caps should be closed tightly to prevent entry of snow, ice, and moisture.

Specially prepared fuel "driers" or a mixture of one liter/quart of alcohol to each 150 liters (39 gal) of fuel should be used as antifreeze to prevent freezing of water deposits in fuel tanks, fuel lines, etc.

Drain fuel filters and sediment bowls frequently.

Use correct antifreeze and do not mix types. Allow for heat expansion of coolant when filling radiators.

Engine oils will require more frequent changing to reduce the possibility of contamination. Synthetic lubricants should be considered in sub-zero conditions.

Remove snow, slush, and ice from wheels, suspension, and braking systems immediately after stopping to prevent freezing.

Park vehicles on brushwood, logs, sand, or other dry surfaces to prevent tires from freezing to the ground.

If tires become frozen to the ground, do not attempt to break the vehicle free by using its own power. Use another vehicle to tow or push the frozen vehicle.

Do not use sharp or pointed tools to free tires frozen to the ground.



Should the radiator antifreeze be lost and a new supply not be available, a light lubricating oil added to the radiator liquid will prevent it from freezing long enough to get the vehicle to a point where antifreeze can be obtained. The radiator shall be flushed thoroughly before replacing the new coolant mixture.

Ensure that the exhaust pipe is clear after being stuck in deep snow.

The air brake reservoir should be emptied if the vehicle is to remain stationary for periods of more than two hours.

7.4 Mountain Driving

7.4.1 Vehicle Movement

Mountain driving requires extreme care at all times because of sharp, blind bends, strong cross winds, roaming animals, slow moving vehicles, and dangerous gradients.

All bends and hilltop approaches shall be taken at a speed that will enable the driver to stop the vehicle in half the road space visible to him.

Gear down when descending hills with a combination of braking and engine power. Neither of these methods should be used alone to drive a vehicle downhill.

Keep to the passenger side of the road when approaching a hilltop. Always expect oncoming traffic coming over the hill.

7.4.2 Maintenance

Proper inspection of the braking system and correct adjustment of the brakes is extremely important.

The emergency brake shall be capable of holding the vehicle on any slope, without the aid of gears or foot brake.

Since the braking power of the engine is normally used when descending steep slopes, it is important that the transmission be properly maintained and in good working condition.

Gradients and other road conditions in the mountains may make it necessary to reduce normal loads in order to avoid overloading the brake system.

Caution against fuel being exposed to excessive temperature changes when being transferred - condensation and ice can result. Windshields are prone to fog over, keep windows clear.

7.5 Jungle Driving

7.5.1 Jungle Driving

Careful observation will often reveal evidence of groundwater (e.g., springs or pools). Whenever possible, swamps bogs, and mud should be avoided by all traffic.

Some areas may have seasonal conditions that raise or lower the water table. Reconnaissance, map study and local knowledge will assist in determining whether the ground is suitable for traffic, or what equipment is needed to improve the route.

Although the surface crust may appear dry and well covered with vegetation, any breakthrough may result in the vehicle becoming bogged down and difficult to recover.



The depth of soft mud below the surface is extremely difficult to determine, and may vary in the same swamp.

When it is necessary to cross such areas, the surface shall be reinforced by mats, brush, logs, rocks, or special flotation materials.

Drivers shall not park or stop vehicles on swampy ground.

Roads and tracks shall be carefully checked to ensure that they are safe, and that bridges and culverts are strong enough to support vehicles.

7.5.2 River Crossing

All river crossings shall be surveyed and approved. When a vehicle reaches a river, it should be brought to a stop and the driver shall verify the water depth of the water and condition of river bed.

The depth should be checked by poling before crossing. Entry into the river requires each person to wear a personal flotation device and a safety line.

If the driver is satisfied that these conditions are met, then a decision may be made by the driver to drive across:

- Four-wheel drive and either first or second gear shall be selected before entering the river bed, and sufficient engine RPMs should be maintained to prevent engine stalling throughout the crossing. A low, steady speed should be maintained that will cause a small bow wave to be formed. The vehicle should travel at the same speed as the bow wave, which will prevent water from being forced into the engine compartment.
- Where frequent river crossings have to be made, the exhaust system should be modified in order to raise it above the level of the engine.
- No assumption should be made that the river depth is the same as it was on the previous crossing, and the depths shall be checked each time a river has to be forded.
- No passengers should be carried if there is any suspicion of possible hazard.
- Check the brakes after crossing water. Dry them out with light pressure on the brake pedal for a short time while driving at a slow speed.

8. Journey Management System

Journey Management shall be applied and enforced for all journeys including air, water and land transport.

Radio room shall be located in a dedicated place, with view on camp main gate and parking lots.

Radio room shall be equipped with each radio type used on the crew for operations (VHF, SSB...) with a minimum of two VHF radio sets. Phone means shall be available if phone line or cellular phone roaming is available on site. Radios and computer (Tracking system) shall be connected on battery or UPS.

Radio operator shall be trained and fluent in English and local language at minimum.

Radio room shall be equipped with log board(s) to record vehicle follow-up.



Log-book shall be displayed to record in real time each vehicle move with minimum following details:

- Vehicle/boat number or ID, vehicle type, driver, number of passenger (including driver), radio and fleet tracking operative, destination, departure time, estimated arrival time, actual arrival time, remark.
- Going from a place A to a place B is considered as one trip, if the vehicle is going to another distant site, the radio operator shall fill a new line (a minimum of 4 calls are compulsory when living the camp, reaching field location, departing from field and arriving back in camp).

Radio operator shall check daily (with driver) that all onboard radios are operatives (SSB, VHF...) and that the fleet tracking unit is on and operative.

Detailed prospect map shall be displayed with roads, tracks, obstructions, vehicles locations and other relevant key points (airstrip, clinics) mentioning distances and travel time.

Contingency procedures shall be posted and translated (Medevac, Man lost, Fire fighting...).

Emergency response form shall be available, readable and translated.

Sufficient lighting shall be provided – emergency light.

CO2 extinguisher shall be available inside the radio room.

For vibroeisis all routes and detours shall be flagged with reflective material, as well as the line stations.

8.1 Fleet tracking system

AVLS (Automatic Vehicle Location System) or VTS (Vehicle Tracking System) or IVMS (Inside Vehicle Monitoring System) shall be mounted on all vehicles approved by Company.

Rented vehicles for less than 3 months shall be allowed without IVMS pending on Company's approval.

The IVMS software shall have automatic reporting capabilities and enable deriving total time spend over set speed limits.

The software shall have automatic reporting capabilities and enable sorting by date, vehicle / driver and display the total time spent over speed limits. It will enable "no go" zones and automatic alarms for speed excess, entering no go or not transmitting device.

A dedicated computer with 17" colour screen minimum shall be installed inside the radio room; the computer and tracking hardware shall be connected on UPS. Radio operators shall be trained to use the fleet tracking computer and software.

The software shall have automatic reporting capabilities and enable sorting by dates; vehicle / driver and display the total time spend over speed limits. The software shall enable "no go" zones and automatic alarms for speed excess, entering no go or not transmitting device

If used as a speed control tool, reports shall be transmitted to Company Representatives on a weekly basis.



8.2 Speed control device

Defined speed limits shall be strictly observed, controlled and monitored. Speed limits shall be approved by Company. Speed limits shall not exceed local regulations and on site road signalization.

All Contractor(s) and Sub-Contractor(s) vehicles shall be fitted with speed control device. The fleet tracking system, if installed, can be used as speed control device if:

- The speed is recorded at least every minute,
- The data are available to user on a daily/weekly basis and sorted by vehicles and date
- The driver has no way to prevent the system from recording (shut down or sabotage of the system including antennae).

One designated person shall be in charge of downloading data. As these equipments are fragile, a minimum of 10% of the needed number of active (mounted) speed control device shall be available on worksite. The 10% extra are considered as spare operative unit shall be available on worksite all time. Vehicle shall not be allowed to be used without operative "Speed control device". The software shall have automatic reporting capabilities and enable sorting by dates; vehicle / driver and display the total time spend over speed limits.

Speed control reports shall be transmitted to Company Representatives on a weekly basis.

9. Camps and Field workshops

9.1 Generalities

9.1.1 HSES Department

One full time Contractor(s)'s HSES Advisor shall be on site with the following equipment:

- dedicated vehicle,
- walky-talky,
- office,
- computer (linked to crew network),
- colour printer,
- laminating machine,
- digital camera,
- GPS device.

For crew composed of more than 200 persons, he shall be assisted by one or more junior HSES Advisor.

9.1.2 Incentive program

Contractor(s) shall have implemented an incentive program based on HSES performance indicators and behaviour. It is advised that this program does not rely only on reactive indicators but also on proactive ones.



The incentive program shall be publicized amongst the survey operation and personnel aware of the related rewards. Rewards should be given in an official manner with the attendance of the entire survey workforce.

The incentive program is personnel and therefore, shall not be linked to the general crew HSES performances. In addition the incentive program shall be extended to the Sub-Contractor(s) personnel mobilized for the survey.

9.1.3 Fire protection

Contractor(s) shall supply all the necessary fire extinguishers and shall maintain the equipment as dictated by legal and industry standards. Inspection dates, equipment repairs and replacements shall be documented. The HSES Advisor shall position all fire-fighting equipment in a readily accessible location in each vehicle, campsite, and trailer unit. An inspection schedule shall be generated to ensure that all units are inspected and replaced as necessary. All personnel shall be trained in the use and care of fire-fighting equipment.

Fire-fighting equipment in good working condition shall be available as per the Contractor(s)'s standards and fire fighting procedures and/or the OGP & IAGC recommendations. A fire Plan shall be described in the "Project HSES Plan". Safe distances between trailers, tents, etc. according to the local conditions (terrain and wind) shall be observed to avoid fire propagation. Fire alarms shall be adequately positioned and maintained in both the senior and the junior camps and in the fly camp(s).

Spare equipment shall be sufficient to allow regular training sessions and mandatory service (if not performed on work site).

Use the following precautions to help prevent fires:

- Use specially manufactured cleaning solvents to clean parts. Gasoline, paint thinners, diesel oil, kerosene, and other fuels should never be used for anything other than what they are intended to. Fuels and other petroleum products can be absorbed through the skin and become health hazards as well as fire hazards. Vapours from petroleum products can be harmful when inhaled, and can be fire hazards when absorbed by clothing. Gasoline is to be used only as a fuel for internal combustion engines.
- Place discarded matches, cigarette butts, and other smoking materials in ash trays or suitable containers. "No smoking area" signs shall be posted.
- When entering areas with tall or dried grass, or wooded areas, a regular check of the vehicles is requested check other vehicle often for any trash, twigs, leaves, limbs, or grass. Turn the vehicle off, set the emergency brake, and remove any of these items that are near the exhaust systems, especially around the manifold or catalytic converter systems. Wear gloves to prevent injury to the hands when removing these items. Park the vehicle in the clearest, most convenient area, and try not to park in high grass. Keep close watch on the vehicle and be prepared to extinguish a fire as quickly as possible. Use non-volatile cleaning solvents to clean grease from spills. Use water- soluble degreasers when cleaning and washing inside or in areas in which ventilation is inadequate.
- Use approved containers to carry gasoline, kerosene, solvents, and other flammable liquids. Plastic containers manufactured for food products and other non-petroleum products are not suitable containers for petroleum products. Petroleum products may cause rapid deterioration of this type of plastic container.
- Label all containers as to their contents.



- Use caution when discarding oily and greasy rags. No compatible petroleum products create a reaction that generates heat and can cause a fire.
- Areas used for storage of fuels, kerosene, solvents, and other flammable liquids should clearly be marked as no smoking areas.
- Do not fight a fire that is in eminent danger of contact with explosives. Everyone should move to safety and guard the fire area against intruders.

In addition to the points above, please refer to **GS EP CIV 403**.

9.1.4 Field communications

All safety warnings and safety notices shall be in English and in another relevant language suitable to employed local labourer where applicable.

Each operational unit (any isolated group of person or vehicle) shall be equipped with SSB and/or VHF radio communication system in order to communicate with the base camp and/or the fly camps and/or other units. A radio logbook shall be implemented for documenting emergency radio communications and vehicle tracking communications. Each department shall be instructed to call base camp whenever there is a significant change in location. Backup radio communications shall be provided for any remote areas.

Company reserves the right to immediately stop, at Contractor(s) expenses, any operational unit found out of reliable communication/radio coverage.

Contractor(s) liability to ensure radio/phone coverage is operative for all operational units wherever they travel inside the prospect area, on prospect area accesses, and for liaison vehicles.

Contractor(s) shall provide enough radio frequencies for camp, emergency and journey management, repeater(s) and production needs (each one on a specific channel).

Contractor(s) shall use sufficient number of radio repeater and locate them accordingly.

Contractor(s) shall plan in advance operation moves and anticipate radio coverage changes and repeater moves, in particular for survey crews and up-hole crews.

Contractor(s) shall establish and communicate to Company Representatives before crew Mobilization the accurate list (brand and type, power, serial numbers...) of all VHF, SSB, and other communication means that are present on the crew.

Sufficient spare radios (fixed, mobile and vehicle/boat mounted) shall be included in the list as "spare". Company recommends having at least 10 % of spare radio over actual needs with a minimum of: 1 SSB, 5 handheld and 5 fixed VHF units.

The software and hardware/cables necessary to program radio frequency shall be available on the crew at any time. Two persons shall be trained and responsible of radio programming.

9.1.5 Night work operations

All night operations are subject to a precise and formal "Hazard and risk analysis". The Contractor(s) shall have a full set of procedures covering all aspects of night work. Before commencement of night operations, the applicable procedures shall be reviewed and submitted to Company for approval.



Night operation must follow local regulation. Effect on third parties and environment and disturbance from third parties and environment shall be taken into account, in particular when working in populated areas or inside/near oil field installation (permit to work needed).

Night operations shall be limited in duration and applicable only to vibrator source acquisition. A minimum number of personnel and vehicles should be exposed.

Contractor(s) shall organize for Company Representatives visit to the operation at night (spare driver, security, etc.).

Where applicable, authorizations shall be requested to local authorities and/or military by Contractor(s).

For night operations, the following shall be observed:

Vibroseis operation

Refer to chapter 14.

Explosives

Explosive handling and transport is forbidden at night in camp, explosive storage and field.

No explosive load to be primed or shot at night.

Other activities

Lay out and retrieval of recording equipment is forbidden for cable crews. This shall be done only by line assistant.

Convoying or barge move is forbidden.

Drilling (any type) is forbidden.

Certain workshop night works can be authorized under certain conditions.

Hazardous materials handling, refuelling in particular, is forbidden.

Other activities not listed are basically not allowed and subject to Company approval.

9.2 Camp installation

9.2.1 Generalities

Please refer to [GS EP CIV 403](#) and [GS EP MED 062](#).

9.2.2 From outside

Signals on main access to indicate camp location shall be correctly positioned.

Signs on tracks leading to the camp shall be correctly located.

Camp location shall be optimal, according to villages, water wells, roads and other infrastructures.

Camp entrance control (guards at the gate) shall be implemented 24 hours a day.

Parking zone shall be clearly identified and marked. Light and heavy duty vehicles segregated.

One way tracks shall be implemented for camp entrance and parking zone.

Camp shall be surrounded by a fence.



Camp shall be clean and tidy.

Neither high grass nor shrubs shall be let in the camp.

Waste bins and ashtrays shall be dispatched around the camp.

Camp fences shall be enough lighted in case of security problems.

Inside Camp areas and zones under trailers shall be enough lighted (if allowed by Security).

Audible fire alarms shall be located in strategic positions.

HSES statistics and information boards shall be located in strategic locations and regularly updated.

9.2.3 Staff tents

No smoking policy in tents shall be enforced.

Tents shall be supplied with basic furniture such as bed, table, cupboard and fan with humidifier during hot season.

Tent roof and walls shall be in good condition.

Ground shall be covered with a waterproof tarpaulin.

Tent pegs shall be buried or covered.

Beds shall be in good condition.

Sufficient lighting shall be provided.

Tents shall be cleaned on a daily basis.

Waste bins shall be emptied on a daily basis.

Eating shall not be allowed in the sleeping rooms.

Laundry shall be picked-up and returned daily.

Gutter shall be dug around the tent for rainy conditions.

Pegs and ropes shall be controlled once a week.

Electric plugs, sockets and wires shall be controlled on a weekly basis.

Minimum of 3 square meters shall be allocated per person.

Electrical heater with unguarded resistance shall not be allowed in tents.

Gasoline, wood, diesel or gas heater shall not be allowed in tents.

9.2.4 Bedrooms in building

Please refer to **GS EP CIV 403** chapter 12.2.Housing accommodations.

9.2.5 Offices in building

Emergency exit shall be clearly identified and marked.

Emergency exit shall be free of any potential obstacle.

Corridors shall be free of any potential obstacle.

Doors shall be designed for an opening towards outside.



Sufficient lighting shall be provided.

Fixed electric devices shall be connected to grounded network.

Electric plugs shall not be overloaded.

Office shall be fitted with smoke detector.

First aid kit in premises: 1 per floor level under Doctor Supervision.

Appropriate fire extinguisher shall be located in optimal places, verified monthly and annually certified.

Rooms or corridors shall be fitted with emergency lights.

Evacuation map shall be posted at each floor.

Fire procedure shall be posted on each door.

Personnel shall be trained for emergency evacuation.

Personnel shall be trained to the use of available means to fight fire.

Fire fighting/evacuation responsible person shall be designated.

Efficient air conditioning system shall be provided.

Offices shall be tidy and daily cleaned.

Rubbish bins shall be emptied on a daily basis.

No heavy material shall be stored on shelves/cupboards or at height.

Lockable cupboards shall be available.

9.2.6 Masts

Masts shall be mounted with guy-ropes or guy-wires. Procedure to raise masts shall exist and shall be applied.

9.2.7 Muster point – Fire team – Emergency

Optimal location(s) shall be away from hazardous areas. Several muster points may be needed (up wind of H₂S possible exposure, tide influence...).

Muster point shall be fitted with an emergency light.

Emergency fire team and area evacuation/head count responsible list shall be displayed.

Fire extinguishers (at least one of each type) shall be provided at muster point shall be provided.

Water or sand shall be available at muster point.

Muster point shall be fitted with a manual alarm or electrical alarm on battery.

List of personnel in camp or building with their number of rooms/tents (rooms and tents named or numbered) shall be provided to the Company Representative.

At anytime, reliable and accurate head count system for personnel shall be present in camp and in the field.

A designated fire team and back to back, composed of camp people, shall be trained on real fire cases with all types of fire extinguishers and camp fire fighting water pump.



Contingency plans shall be known and posted in strategic locations.

Emergency phone numbers and frequency (clinics, hospitals, ambulance, emergency response centres) shall be posted on information boards and in radio room.

Designated and equipped emergency air strip or helipad shall be provided (available and operational 24/7).

9.2.8 Fuel Management

- Storage

Fuel storage shall be located at 50m minimum from any naked flame or spark sources.

Fuel storage shall be located on an open place, downwind (prevailing).

"No smoking", "fuel", "flammable material" signs shall be posted.

Fuel type and quantity shall be labelled on fuel tank or bladder.

Specific anti-sparking electrical fuel pumps shall be provided.

Absorbing material shall be stocked in quantity near fuel storages.

Relevant fire extinguishers in relevant number shall be positioned 15 of storages.

Bladder shall be protected from the sun.

- Refuelling area

Refuelling area shall be located at 50m minimum from any naked flame or spark sources.

"No smoking", "fuel", "flammable material", "switch off engine when refuelling", "ground clip when refuelling" signs shall be posted.

No fuelling operations shall be performed at night.

Engine shall be shut down when refuelling, excepted in arctic conditions.

Area shall be sheltered with a waterproof tarpaulin. Ground shall be covered with a recollection tarpaulin. Volume of spill collection area shall be built according to 150% of maximum stored fuel quantity.

Fuel pump shall be fitted with an oil drop recollection tray.

Fuel pump(s) shall be electrical (12/24 V) or pneumatic.

Fuel pump shall be grounded and fitted with vehicle ground clip.

Absorbing material shall be stocked in quantity near refuelling area.

Relevant fire extinguishers in relevant number shall be positioned 15 m of dispenser.

9.2.9 Workshops area (mechanic and cable repair)

Refer to chapter 9.3.

9.2.10 Vehicle washing area

Refer to chapter 9.3.5.



9.2.11 Electricity – Generators

Refer to chapter 9.4 on Electrical Network/Standards.

9.2.12 Pests

Regular fumigation or insecticide spraying shall be implemented (prefer environmentally friendly products).

Mosquito nets shall be available for all.

9.2.13 Emergency

Contingency plans shall be known and posted in strategic locations.

Emergency phone numbers and frequency shall be posted (clinics, hospitals, ambulance, emergency response centres).

Designated and equipped emergency air strip or helipad shall be provided.

9.2.14 Trailer generalities

All trailers levelled and stabilized at horizontal.

All trailers including storage ones fitted with efficient air conditioning system.

Stairs/ Ladder equipped with hand rail in good condition.

All trailers to be waterproof.

Distances between trailers to be greater than 3 m.

All trailers to be “no smoking” places.

All furniture, cupboards, table bolted to the trailer frame.

All room, workshop, storage and office trailers fitted with smoke detectors (except kitchen and bakery).

Trailers to be grounded and fitted with leakage breakers - Trailers poles to be in good condition.

Under trailer areas clean and tidy, free of boxes, ladders, hoses...

Non slippery stairs steps - floor in good condition, with anti-skidding covering.

Stairs free of cables or hoses.

Wheel mounted trailers with brakes, spare wheel, mandatory lightning.

Trailers brakes, wheels, tires, traffic lights, hooks to be checked before any moving.

Camp map and fire procedure posted on the door for Sleepers and Office trailers.

Sticker “beware of the wind” posted on the door.

Sticker “Open slowly” posted on the door.

Doors lockable in open position (not for storage trailers).

9.2.14.1 Sleepers trailers

Eating, smoking shall not be allowed in the sleeping rooms.

Rooms shall be cleaned on a daily basis.



Bed sheets shall be changed at least once a week.

Laundry shall be picked-up and returned daily.

9.2.14.2 Office trailers

Waste bins shall be emptied on a daily basis.

Rooms shall be cleaned on a daily basis.

Electrical plugs shall not be over loaded.

All computers shall be plugged on a PSU (Power Supply Unit).

9.2.14.3 Trailer based toilets/bathrooms

Electric plugs, switch, lighting (no naked bulbs), electric devices and connection shall be in good condition and complying with regulation for use in wet places.

Electric devices, plugs shall be grounded. Water pressure pumps shall be lifted and grounded too.

Sufficient lighting shall be provided and emergency light shall be fitted.

No leakage on the floor, no leakage on taps or under sinks; no leakage outside the trailer shall be observed.

Trailer shall be ventilated and fitted with extractor(s).

Cleaning schedule shall be posted and respected.

Toilets shall be cleaned and disinfected twice a day minimum.

Toilet cabins shall be equipped with lockable doors.

At least one sink shall be installed in toilet area.

9.2.14.4 Storage trailer

Smoke detector shall be fitted.

Lighting shall be correctly adapted.

Place shall be tidy, with no obstacles in paths.

"No smoking" area signs and PPE signs shall be posted.

Heavy articles shall be stored at the lowest level.

Fire extinguisher shall be outside (type depending on fire class).

Current stocks shall be logged in a book or on electronic file.

Solvents and hazardous material shall be segregated in lockable cupboards. All material shall be clearly identified and marked.

Flammable liquid shall be stored in the shade and identified.

9.2.15 Kitchen and food management

Please refer to **GS EP MED 062**.



9.2.16 Showers, toilets and laundry

Toilets and showers in sufficient quantity according to the local Work Legislation (if any), with all hygiene facilities shall be available for all PERSONNEL (Staff and Labour). In case of female personnel on site, showers, toilets and accommodations shall be separated from males ones.

9.2.16.1 Shower

Electric plugs, switch, lighting (no naked bulbs), electric device and connection shall be in good condition and complying with regulation for use in wet places.

Trailer shall be grounded and fitted with leakage breakers.

Electric devices, plugs shall be grounded. Water pressure pumps shall be lifted and grounded too.

Floor shall be in good condition, anti-skidding.

Sufficient lighting shall be provided and emergency light shall be fitted.

No leakage on the floor, no leakage on taps or under sinks; no leakage outside the trailer shall happen.

Trailer shall be well ventilated and fitted with extractor(s).

Cleaning schedule shall be posted and respected.

Sink shall be cleaned and disinfected on a daily basis.

Sink and shower-head and shower mats shall be cleaned and disinfected twice a day minimum.

Shower mat and curtain shall be provided for each shower cabin.

Relevant poster for water saving and hygiene shall be displayed including in local language.

Shower trailer shall be equipped with proper boxes to collect used shaving blades.

Shower trailer shall be equipped with good lighting and emergency light.

At least one shower shall be provided for 15 juniors, and one shower for 10 senior staff.

Clean towels to dry hand shall be available and changed twice a day or absorbent paper dispenser or electric hand dryer (preferred).

Place shall be tidy and empty of any material, objects.

Hot water in sufficient outflow is compulsory.

Soaps or soap dispenser shall be available near sinks.

Air conditioning system and heaters shall be provided.

9.2.16.2 Laundry

Ironing board and iron shall be in good condition (electric cables and grounding included).

Washing machines shall be fixed and grounded.

Smoking or eating shall not be allowed in laundry (posters).

Instruction shall be posted for use of bleach and dangerous material.

Laundry shall be equipped with smokes detector.



9.2.16.3 Toilets – any types

Toilets shall be fed with water in sufficient water-flow.

Hygienic paper rolls shall be available (and flexible tapped water hose according to local habits).

Cleaning schedule shall be posted and respected.

Toilets shall be cleaned and disinfected twice a day minimum.

Toilet cabins shall be equipped with lockable doors.

A minimum of one sink in toilet area shall be provided with soap and towel or paper roll (electric hand dryer preferred).

Hole-in-the-ground type toilets shall be provided.

At least one toilet for 20 juniors shall be provided and one toilet for 10 senior staff.

Relevant poster for water saving and hygiene shall be displayed including in local language.

Rubbish bins shall not be inside toilets – except if female personnel present on site.

Toilets – cabins

Cabins shall be located at least at 50 m from nearest accommodations/houses, taking into account prevailing winds.

Cabins shall be clean, in good condition and ventilated.

Access and path shall be clear of tripping hazards and lighted.

9.3 Workshop standards

9.3.1 Workshop area layout

Area shall be identified and delimited.

Access shall be restricted.

Signs "wear safety shoes", "restricted area", "no smoking" and "hard hat" use shall be posted.

9.3.2 Mechanical area – generalities

Electric plugs, switches, lighting, electric devices and connections shall be in good condition.

All plugs shall be connected to ground.

Rotating equipment (hand-held or bench grinders) shall be equipped with the appropriate guards and shields. Any power driven machine (generators, chainsaws) shall be equipped with a "kill switch".

Sufficient lighting shall be provided.

Trailers shall be tidy, without objects in paths.

"No smoking area" signs and PPE signs shall be posted.

Smoke detectors and fire extinguishers shall be available inside and outside the room/tent/trailer with a minimum of one CO2 and one ABC powder extinguishers.

Relevant PPE(s) shall be available at each work station.



Relevant Posters and PPE(s) signs shall be visible at each workstation.

First aid kit shall be available – minimum one person trained.

Fire blanket shall be available.

Eye wash station shall be available.

Fire alarm shall be available (loud alarm or relay button).

Fixed column drill shall be belt driven type only.

Drill bits and chucks shall be tidily stored.

Emergency button (mushroom type) for all fixed electric devices (drill, grinder, etc.) shall be directly accessible from the workstation.

MSDS shall be available for all material used or stored.

9.3.2.1 Tools and electric tools

Electric cables and plugs shall be in good condition.

Tools shall be in good condition.

Hammers shall be made with plastic handle preferably.

9.3.2.2 Office

Log book or electronic file for equipment maintenance follow up, vehicles in particular.

Relevant HSES documentation corresponding to workshop available (procedures, job description, MSDS...).

9.3.2.3 Personnel

Personnel shall be trained and aware of extinguishers and fire blanket use and locations.

Personnel shall be trained and aware of use of first aid kit.

Personnel shall be trained and certified for specific hazardous activities.

Personnel shall be aware of wild life related hazards when handling boxes, batteries and cables on ground.

Personnel shall be trained and certified for works in confined spaces.

Personnel shall be trained and aware of heavy loads handling procedure, acid handling.

Personnel shall be trained and certified for welding, crane operations.

Personnel shall be trained in PTW system.

9.3.2.4 Batteries charging area

Isolated area shall be clearly identified and restricted to trained people.

Area shall be ventilated.

Chargers shall be grounded, cables in good condition.

No live cables or naked connectors/clips with voltage above 48 V (DC).

Acid store shall be apart and clearly marked.



Goggles, leather apron and gloves shall be available and used.

Posters “flammable”, “no smoking”, compulsory PPE(s) stickers shall be posted.

CO2 extinguisher shall be available.

Eye wash station shall be available in the vicinity, with warning posters.

9.3.2.5 Compressor and compressed gas

All compressed gas cylinders shall be identified and shall comply with: colour codes, expiration date, protective gears (valve assembly, etc.), tests results and certificates, transportation and storage manufacturer (and IAGC recommendations).

Compressor certificate shall be available on the work site.

Compressed gas cylinders certificates shall be available on the work site.

Compressor shall be fitted with manometer, safety valve and good condition hoses.

Lock-out/Tag-out procedure and tools shall be required.

PPE(s) shall be used for compressed air works.

9.3.2.6 Oil and grease storage – waste oil

Segregation of new and wasted oil shall be done.

Oil and grease containers shall be clearly marked.

Storage and use areas shall be located far from welding station.

Storage and use areas shall be waterproof (tarpaulin and containment walls that can contain 200 litres spillage).

Drums shall be rose up from ground level on recollection trays to prevent/collect any leakage. Drums in use to have recollection trays under taps.

9.3.2.7 Metal / tyres storage

Area shall be identified, delimited and tidy.

Stacking new tyres on top of each other shall be avoided.

Heavy duty vehicles tyres shall be stored in upright position and secured by chains or roped up.

9.3.2.8 Parts cleaning areas

Area shall be identified, delimited and ventilated.

Non flammable cleaning liquid (fountain) shall be used – gasoline and diesel shall be forbidden.

Rubbers gloves and goggles shall be available.

9.3.3 Welding area

Electrical and gas welding/cutting equipment shall comply with all legal and regulatory requirements and/or with the manufacturer and/or the IAGC recommendations such as: insulated electrodes and cables, pipes colour coded and in good working conditions, flashback arrestors.

Area shall be identified and delimited, with a metal sheet isolating the area.



Area shall be free of combustible material.

CO2 extinguisher shall be available.

Electric welding unit shall be grounded, cable in good condition

Gas bottles shall be identified and stored in upright position, protected from the sun, segregating full and empty ones.

Oxygen bottle shall be stored and used far from grease, personnel trained about risks related to contact between oxygen and hydrocarbons.

Gas bottles in use shall be vertically fixed on a trolley.

Gas bottles (oxygen and acetylene) shall be fitted with non return valves flash back arrestors on each pipe at both ends (bottle and nozzle side) and manometers.

Gas bottle shall be certified (hydrostatic test not older than 5 years, written on bottles) and pipes with "use-by" date.

PPE(s) shall be available (goggles, leather apron, face shield (even for helpers), leather welding gloves, 100% cotton uniforms) and signs posted.

Welding and gas bottle handling procedures to mention that:

- Bottle shall be transported without shocks and without rolling it on ground,
- Valves to be turned off immediately after use,
- Valves, manometers, hoses and nozzles to be inspected before use,
- Welding flame cannot be ignited with matches or lighter but with a specific device.

9.3.4 Vehicle repair area

The area shall be made of concrete (10 cm minimum thick).

Area shall be sheltered from sun/rain.

Vehicles on jack-up shall be secured with blocks (wood/steel).

9.3.5 Vehicle washing area

Area to be cemented with water drainage and recollection.

High pressure water system shall be powered by diesel or electricity (gasoline forbidden) – electric cable and reel shall be insulated and waterproof.

Relevant signs shall be posted for mandatory PPE(s) and forbidden pointing toward somebody's eyes.

9.3.5.1 Tyre repair area

Area shall be identified and delimited.

Tyre inflating shall use specific cage (or similar system).



9.3.6 Cable / geophones workshop standards

9.3.6.1 Workshop – geophone repair – soldering repair

Electric plugs, switch, lighting, electric devices and connections shall be in good condition.

Rotating equipment (hand-held or bench grinders) shall be equipped with the appropriate guards and shields. Any power driven machine (generators, chainsaws) shall be equipped with a “kill switch”.

Floor shall be in good condition, anti-skidding.

Sufficient lighting shall be provided and emergency light fitted.

Place shall be ventilated, against resin vapour.

Place shall be tidy, with no objects in paths.

“No smoking area” signs and PPE signs shall be posted.

Smoke detectors and fire extinguishers shall be available inside and outside the room/tent/trailer with a minimum of one CO₂ and one ABC powder extinguishers.

Relevant PPE(s) shall be available at each work station.

First aid kit shall be available – minimum one person trained.

Material safety data sheets shall be available to all product used.

Proper eye wash station shall be available.

Soldering area shall be identified and restricted.

Worktops shall be stable and tidy after use.

Solders shall be trained and qualified.

Soldering irons shall be put on stands.

9.3.6.2 Tools and electric tools

Electric cables and plugs shall be in good conditions.

Tools shall be in good condition and put away after use.

9.3.6.3 Office

Log book or electronic file (for equipment maintenance follow up) shall be implemented.

Relevant HSES documentation corresponding to workshop shall be available (procedures, job description, MSDS...).

9.3.7 Storage area

Trailer

Sufficient lighting shall be provided.

Place shall be tidy, with no objects in paths.

“No smoking area signs” and PPE signs shall be posted.

Heavy object shall be stored at the lowest position.



Fire extinguisher shall be available outside (type depending on fire class).

Current stocks shall be logged in a book or on electronic file.

Solvents and hazardous material shall be segregated in lockable cupboards. All material shall be clearly identified and marked.

Flammable liquid shall be stored in the shade and identified.

Tent

Floor shall be in good condition.

Place shall be tidy, with no objects in paths.

Boxes shall be stored on pallets.

Heavy objects shall be stored at the lowest position.

Shelves/cupboard shall be stable.

Current stocks shall be logged in a book or on electronic file.

Solvents and hazardous material shall be segregated in lockable cupboards. All material shall be clearly identified and marked.

Flammable liquid shall be stored in the shade and identified. Storage shall respect MSDSS.

9.3.8 Equipment cleaning area

Isolated area shall be clearly identified and restricted to trained people.

Compressor shall be certified.

Rubber gloves and goggles shall be available; PPE signs shall be posted.

Electric devices shall not be in the vicinity.

9.4 Electrical Network/Standards

Please refer to **GS EP CIV 403** chapter 15.1. Electrical system and to **GS EP SAF 221** chapter 5. Safety requirements for electrical equipment.

9.5 Natural hazards

The relevant natural hazards shall be identified and assessed. Effective control and recovery measures shall be in place, including when relevant:

- list of activities to be permitted in adverse weather,
- weather (sun, ice, snow, rain, fog, lightning, hail, wind, heat, cold),
- weather secondary effects (floods, landslides, sandstorm, static electricity),
- local geology (volcanoes, earthquakes, water tsunamis, radon, methane, H₂S, cave-ins, quicksand),
- avalanche (snow, ice, rock),
- tides and currents (river bores, coastal effects),
- fauna (venomous, poisonous, aggressive),



- flora (poisonous, penetrating/sharp barrier).

Each member of the crew shall be instructed in the identification of hazards in nature such as plants and animals.

Prevention of injury when these hazards exist could result in the wearing of alternative or additional protective clothing other than normally worn in a particular climatic environment. Changes in operating procedures may also be required.

The sun is a natural hazard and the use of long trousers, long-sleeve shirts, and head protection (wide-brimmed hat), sunglasses, and sun screen can help alleviate the effects of the sun.

10. Arctic and Desert Survival & First Aid

10.1 General

Even a short cross-country trip can entail a survival situation. People have been known to become lost and die within a few hundred yards of safety places. Anyone departing a fixed base by aircraft, ground vehicle, or on foot shall carry sufficient protective clothing and food reserves to help in surviving during unexpected weather changes or other unforeseen emergencies.

Never travel alone.

Expected itinerary and arrival time shall be communicated to responsible parties before departing base.

People have to be skilled in the construction of expedient shelters from available materials.

Remember that snow has excellent heat insulating qualities, and is a good shelter construction material.

In an emergency situation, people have to remain with their vehicle or downed aircraft - it may be the best shelter, and they are more likely to be rescued:

- Be calm.
- Prepare the shelter to accommodate people at the best.

If vehicle engines are used for operating heaters, ensure adequate ventilation in order to prevent carbon monoxide poisoning.

Prepare emergency visual signals in accordance with standard codes and procedures (see Chapter 10.3 Desert).

Make every effort to attract attention by other means such as radio, flares, smoke, or reflected light.

Use survival gear and rations sparingly.

A contingency plan with arrangements for air support to conduct personnel search should be established prior to the commencement of desert operations.

Drivers shall always be aware of the local customs.

Temperatures in the desert can reach 50° C (120° F). In the arctic -45°C (- 50°F).

Sitting or sleeping under vehicles is prohibited.

Tents or tarps over personnel carriers can be utilized to provide shade.



Restrict line work to daylight hours.

When two or more vehicles are driving to the same destination, they should travel together and remain within sight of each other. The front driver should keep the vehicle behind him in sight by using his rearview mirror, or with the help of a passenger. If he loses sight of the vehicle, he should stop. If the following vehicle does not reappear quickly, he should backtrack. When in difficulty, the rear driver should turn his headlights on and off several times to signal the front driver to stop and use radio.

When driving across the desert, keep an accurate record of distance, time, direction, and speed. This means that people shall have an odometer, compass, watch, and map. (Note that the compass is in addition to the one contained in the emergency kit.) These items should be mandatory for anyone driving in the desert. Omitting any one of them greatly increases the probability of becoming lost.

When people are ready to start a trip, record the odometer reading, starting direction or bearing, and time. Stop at every major change of direction and record the new bearing, odometer reading, distance travelled, and time. With this information, rough-plot the progress on the map and position shall be checked. Each time the position is checked, make a new estimated time of arrival (ETA).

10.2 Arctic

10.2.1 General

All environmental particularities in arctic or cold regions are important and none can be ignored. The most persistent and most dangerous is that of extremely low temperatures and serious wind-chill factor.

For all practical purposes, there only are two seasons: summer and winter. These periods are defined by temperatures rather than calendar dates.

Summer occurs when the average temperature remains above freezing 0°C (32°F), with winter being the other time of the year when the average daily temperature falls and remains below 0°C (32°F).

In periods of transition between summer and winter, there are wide temperature variations ranging all the way from shirt-sleeve weather to bitter, intense cold.

The primary problem in cold weather is exposure to lower temperatures ranging from 5 to 10°C (40 to 50°F) above zero to 40 to 45°C (104 to 113°F) below. In calm air, 4°C (40°F) above zero might not seem very cold, but in a relatively gentle ten mile per hour wind, the equivalent chill temperature drops below freezing.

Maximum wind speed occurs during periods of seasonal transition and changing temperatures. Winds above 63 km/hr (100 miles/hr) during such periods have been recorded. For the full impact of wind chill, people can note on the windchill chart that follows that a ten mile an hour wind - with a -5°F (-21°C) calm air temperature - produces an equivalent chill of -25°F (-32°C), at which exposed flesh may freeze within one minute.

The adverse effect of cold on man is to produce a condition called hypothermia, which is lowering of body temperature due to loss of heat at a rate faster than the body can produce it. Normal, body temperature is 37°C (98.6°F). When body temperature falls below 34°C (94°F) the patient may become disoriented and lapse into a coma. Heart failure and death can result if body temperature falls below 31° to 32°C (88 to 90°F).



Frostbite (a cold injury caused by freezing of the body tissues or body part) can occur without hypothermia when extremities do not receive sufficient heat from the central body due to restricted blood circulation or inadequate insulation. Both conditions (hypothermia and frostbite) may occur at the same time if the body is exposed to subfreezing temperatures. Whenever a patient is treated to thaw any portion of the body, care should be exercised to prevent the possibility of refreezing.

Hypothermia can occur from exposure to temperatures above freezing in instances such as immersion in cold water, exposure to wind (wind chill), physical exhaustion, and insufficient food.

Personal Protection

Refer to [OGP Report N°398](#).

10.2.2 Foods and Liquids

Refer to [OGP Report N°398](#).

10.2.3 Personal Hygiene

Bathe as frequently as conditions will permit.

Keep hair cut and beard shaved or clipped close. Long hair or a beard adds very little insulation value and natural hair oils soil clothing. In the open, a beard serves as a base for ice build-up, and will mask the appearance of frostbite.

Since shaving with a blade and soap removes protective face oils, it should be done several hours before exposure to cold in order to allow for replacement of natural oils that reduce the danger of frostbite. Shave at night after work rather than in the morning.

Electric razors are preferable since they do not remove protective oils.

Change socks and wash feet daily. Wool socks are preferable to synthetic or cotton.

People should clean their teeth daily.

People should change their underwear and shirts frequently.

Accomplish regular body waste elimination, before leaving camp.

10.2.4 Adequate Shelter

Refer to [OGP Report N°398](#).

10.2.5 Miscellaneous Equipment

The following items should be on the person at all times, or immediately available if people are going any distance from the base camp:

Sunglasses - In order to prevent snow blindness, UV sunglasses should always be worn on bright days when the ground is covered with snow. They not only provide protection against glare, but also from blowing snow.

Pocket Equipment - Carry the following in the pocket:

- A good sharp knife.

- Waterproof matches for use in an emergency. (Use ordinary matches or lighters at other times).
- Sunburn preventative cream.
- Lip balm.
- Apply lip balm and sunburn preventative cream before exposure.
- Emergency kit - Whenever people depart from the base camp for any reason, carry an emergency kit containing following items:
 - One compass.
 - One emergency thong.
 - One 20 foot long snare wire.
 - One sharp pocket-knife.
 - One (45 X 60 cm) 18 X 24 in. piece of heavy duty aluminium foil (folded).
 - Single-edged razor blades.
 - One signal mirror.
 - Waterproof matches.
 - One plastic whistle.
 - Safety pins.
 - One fluorescent vest.
 - Fishing line.
 - Fish hooks.
 - Fire starters.
 - First aid manual.
 - High carbohydrate food bars.
 - Bouillon cubes.

10.2.5.1 Frostbite

Refer to [OGP Report N°398](#).

10.2.5.2 Snow blindness

Refer to [OGP Report N°398](#).

10.2.5.3 Carbon Monoxide Poisoning

Carbon monoxide is a deadly gas, even in low concentration, and is particularly dangerous because it is odorless. It is an ever present hazard in shelters where stoves, open fires, gasoline heaters, or internal combustion engines are used.

A steady supply of fresh air in living and working shelters is vital.

Symptoms are elusive. However, with mild poisoning, the following may be detected:



Headache, dizziness, yawning, weariness, nausea, red flush of the skin, and ringing in the ears. Later, the heart begins to flutter and throb.

The gas may hit without any warning, and the individual may not detect the hazard until his knees buckle. When this happens, he may not be able to walk or crawl. Unconsciousness follows; then death.

First Aid:

Move the victim to fresh air at once, but keep him warm.

In winter, ensure that fresh air is circulated in the shelter.

Exposure to outdoor cold can cause collapse. If the only fresh air is outdoors, the patient should be put into a sleeping bag for warmth.

A carbon monoxide victim should never be exercised since this will further increase requirements for oxygen.

If the patient stops breathing or breaths only in gasps, mouth-to-mouth resuscitation should be started immediately. In such cases, the operator's movements shall be carefully synchronized with the victim's gasps.

Administration of oxygen removes carbon monoxide from the blood faster and greatly hastens recovery. Carbon monoxide poisoning is serious. A victim who survives shall be absolutely quiet and warm for at least a day. Hot-water bottles and pads are helpful in maintaining normal body temperature.

After first aid, qualified medical attention should be sought.

Care and Emergency Evacuation of Injured -- Injured personnel should be evacuated to the nearest medical facility by the fastest means of transportation available. Speed is essential in order to combat the combined effects of severe cold and shock.

Protection from the cold and shock.

Place the victim in a warm sleeping bag.

Administer warm drinks, except in the case of abdominal injury.

Control bleeding by direct pressure. Once a tourniquet has been applied, the victim should be examined by a doctor as soon as possible. A tourniquet should be used with extreme caution.

10.2.5.4 Caution

Use a tourniquet to control bleeding for an amputated, mangled, or crushed arm or leg, or for profuse bleeding that cannot be otherwise stopped.

To apply a tourniquet, use only a strong, wide piece of cloth. Never use wire, rope, twine, or other narrow material. Wrap the tourniquet around the upper part of the limb above the wound; tie a half-knot; place a short stick on the half knot, tie a full knot over the stick; twist the stick just tight enough to stop bleeding. Mark the letters "TK" and the time on the victim's forehead with a crayon, pencil, soot, etc. Do not cover the tourniquet.

If there is a delay in getting to a doctor, cautiously loosen the tourniquet after 20 to 30 minutes. If no bleeding re-occurs, leave the tourniquet loosely in place so it can be re-tightened if bleeding resumes. Keep a loose tourniquet under continuous observation until the victim is hospitalized.

10.2.5.5 Body Parasites

Body parasites are common in the more populated areas because of crowded living conditions and shortages of bathing and cleaning facilities. Under such conditions, individuals should inspect clothing and the body each night for parasites. If parasites are present, the following methods of removal are recommended:

- While extreme cold does not kill lice, it paralyzes them; therefore, garments should be hung in the cold, then beaten and brushed. This will help get rid of the lice, but not the louse eggs.
- Insecticide powder can be used to free the body and clothing of parasites. Wash the clothing before wear.

Cold-Weather Operations and Survival:

One of the most important lessons to be learned is that, in all cases, extreme cold dictates that additional time is required to complete a job assignment, and such time shall always be allowed in the planning phase.

10.3 Desert

Never drink fluid from the vehicle's radiator.

A chain can be attached to one side of the rear bumper, dragging the ground, to allow for identification of the vehicle tracks.

Although every vehicle should carry a compass, it can still find a direction without one:

- In a sandstorm, note the direction from which the wind comes. Sand always builds up in the lee of a bush, pebble, or other small obstruction; that is, on the side opposite from which the wind is coming. Knowledge of this may help to get a good bearing, assuming no major wind shift occurs.
- The sun and moon both rise in about the east, and set in about the west. If people are facing the rising sun in the morning as people go to work, they will be facing the setting sun when they return to camp in the evening. If the sun is rising on their left as they go to the field in the morning, it will be setting on their left as they return in the evening.
- The best guide in the sky at night is the North Star (Polaris), which can be seen in the Northern Hemisphere. It is easily located by extending a line from the two pointer stars, which are the outer "lip" of the Big Dipper (or plough). The Big Dipper is located approximately 30 degrees from Polaris.
- If they are too far south in the Southern Hemisphere to see the North Star, then the Southern Cross can help them get a rough orientation at night. The Southern Cross consists of four stars, two of which are very bright, and form a crucifix-like cross.
- People can drive a straight line by sighting ahead from feature-to-feature. Very small items can be used even if the desert is relatively bare. Distant clouds may also be used; however, if they do so, ensure that they are not rapidly moving clouds. To do this, line up objects on the ground in relation to the cloud and watch the cloud for a moment. If the position changes rapidly, then do not use the cloud. If the wind is strong at cloud level, the features of the cloud change rapidly, so they can tell if there is movement by watching the cloud as they drive.



- If people are trying to drive a specific direction using only the sun as a guide, travel in the early morning before 10:30 a.m., or in the late afternoon after 3:00 p.m. At other times, especially around noon, they can use a simple sun compass. Place a stick in a hole on the hood (bonnet) or fender (mud-guard), or attach a piece of wire in an upright position. The stick or wire will cast a shadow on a flat place for their reference. If they use this system, note that even if the vehicle is still, the shadow moves. Therefore, as they drive, the reference point moves. The factor is about 15 degrees per hour. Once the stick or wire is placed, mark the shadow position with a soft lead pencil. Then make other marks at about 15 degree intervals from the shadow in the direction the shadow moves because of the sun's movement. When this is completed, as they drive the first hour, be sure that the shadow gradually moves toward the first mark from the reference. During the second hour, use the next mark, and so on.
- In the Northern Hemisphere, point the hour hand of their watch at the sun, and bisect the angle between 12 o'clock and the hour hand to find south. In the Southern Hemisphere, the method gives the north.
- A compass is the best method to maintain the direction.
- Know the crew's emergency search procedures:
- If people are not back by their expected return time, when will a search party begin looking for them?
- Do emergency procedures include night searches?

Stay with the vehicle unless it is sure that the distance is not more than two to three km from the destination. It is easier for rescuers to locate a stationary vehicle in desert than a walking person.

Do not panic -- calmly assess the situation sensibly.

Never drive until the vehicle is out of fuel because it may need some for signalling.

Do not use up energy in wild bursts of activity. Conserve energy and body fluids. The first 12 hours. Excessive water is urinated.

Keep as cool as possible by resting out of the sun.

10.3.1 To help when stuck

Check the tire pressure and deflate it if it is too hard.

Dig out the sand in front of and behind all tires. Move the vehicle in a straight line without spinning the tires or turning the steering wheel.

In very hot weather, wait until the sun goes down, the sand cools and firms up for better traction.

If it is plenty of water or diesel fuel, use it around the wheels to pack the sand.

If the vehicle has a winch, dig a hole, attach the winch rope to the spare wheel, and bury the wheel in order to use it as an anchor.

10.3.2 To help rescuers

If the vehicle can be driven, drive to the highest point in the area. Do not park the vehicle under or near a bush or tree.



To signal at night, use the headlights on high beam and signal for five minutes at the beginning of each hour between 9:00 p.m. and midnight. Signal in all directions.

Light a fire using garbage, toilet tissue, etc.

A smoke signal on a high point in day time can be effective.

Use flares, if possible.

Try calling on the radio every half hour.

Use shirt as a flag.

To signal during the day, use the signal mirror contained in the emergency kit or a truck mirror to flash the sun at the rescuers.

10.3.3 Searching operation

Accident - If the missing person has had an accident, he may be injured. He is not lost, and probably will be found in the work area or between the camp and the work area.

Mechanical Trouble - If his truck will not run or if he is stuck in the sand, he is not lost and probably will be found in the work area or between the camp and work area.

Lost - If the missing person is lost on the way to work, he probably will try to return to camp after looking for the work area. He could easily bypass the camp and be somewhere on the opposite of the camp in relation to the work area. If he gets lost while returning to camp after work, he probably will start in the right direction and bypass the camp, ending up in the opposite direction in relation to the work area.

Lost and An Accident - A lost person who continues driving tends to drive faster and faster as time goes by. He feels the camp may be just over the next hill and, of course, when it is not, panic sets in. For some people, this is very dangerous, and accidents are likely to occur.

State of Mind - Every crew member shall realize that sooner or later, they may be involved in an accident or breakdown, or get lost, and not be able to return to camp

The missing person is less likely to panic when he knows the crew search policy, and that he will be found if he follows that policy exactly.

10.3.3.1 Organization

Each search party should consist of two or three people. The party manager shall ensure that there is at least one experienced person on each search party. Each search party shall have sufficient supplies and take all the necessary precautions. The party manager shall ensure that adequate backup vehicles and personnel remain in camp. Good radio communication is essential to any search procedure.

The party manager shall make the following information known to all crew members:

- If a person does not return to camp or fails to arrive at his destination, a search shall be made.
- All members of the crew will be expected to help with the search if called on by the party manager.
- Night-signals from the missing person shall be made at predetermined times. Searchers should stop and carefully watch for signals.



- If the missing person is not found by midnight, the search parties should return to camp for food and rest.
- A search shall be carried out the next morning with further night and day searches continuing as long as necessary.

10.3.3.2 Night Search

The first night:

- Four search parties shall be mobilized. One search party travels in the direction from which the missing vehicle was expected to arrive, one travels in the opposite direction, and one travels to each of the remaining two sides.
- Each party drives about 25 km (16 mi) from camp, stops on a high point, and is prepared to scan the horizon when the signal is expected at 9:00 p.m.

Note:

Extinguish all vehicle lights five minutes before the hour so that the eyes will adjust. Do not light a cigarette immediately before or during the watch.

If nothing is spotted the first hour, the parties should move about 20 km (13 mi) farther and be ready to scan the horizon for the second signal.

If nothing is spotted the second hour, the parties should move about 15 km (9 mi) farther and scan the horizon.

If nothing is spotted the third hour, the parties should move about 10 km farther and scan the horizon for the last time that night (at midnight). This is when the missing person should release a parachute flare.

If there is no sign of the missing person at midnight, the parties should return to camp for rest and regrouping.

Each search party should move in the same general direction whenever it moves to the next observation point. This ensures a systematic search, and makes it easier for the party to return to camp.

The lost person may see the headlights of the search party. It is suggested that each search vehicle, with headlights on high beam, make several tight circles on top of each observation point before moving to the next.

Never drive aimlessly around the desert looking for lost persons.

At 9:00 p.m., 10:00 p.m., 11:00 p.m., and midnight, two or three people in camp should climb onto trailers or drive to the highest point near camp to look for signals from the missing vehicle.

A radio check-in should be made from all rescue units at 10-15 minutes past the signal hours, (i.e., 9:10, 10:10, 11:10 and 12:10).

The second night:

The second night search is exactly the same as the first night, except that the search parties travel in directions bisecting the previous night's directions.



Signals for Night Search:

It is assumed that the lost person has been instructed by the party manager that night signals are to be made at 9:00 p.m., 10:00 p.m., 11:00 p.m., and midnight. These signals should be made from the highest point possible as follows:

- A parachute flare (or Very Pistol) should be fired at midnight.
- If the vehicle can be driven to the highest point available, the lost person should turn his headlights on high beam and drive in a tight circle for five minutes starting at 9:00 p.m., 10:00 p.m., 11:00 p.m., and midnight.
- If the truck will not run, the truck battery and a headlight can be removed from the truck and converted into a spotlight. When this type of signal is placed on a hilltop, it is excellent, and can be spotted for many miles.
- When gasoline is poured out onto the ground and ignited, it can be seen for a long distance. An excellent flare is made by filling a can with sand, pouring in gasoline, and then igniting. Note: a roll of toilet tissue soaked in gasoline will burn for approximately 15 minutes. Use extreme care when igniting the gasoline or petrol.

10.3.3.3 Day Search

Vehicles used for the day search parties should be in good condition and adequately equipped, just as they are for night search parties. All drivers of day-search vehicles should, unless otherwise instructed by the party manager, return to camp before dark to report and prepare for the night search.

Signals for Day Search:

The heliograph (mirror) contained in the emergency pack should be used to signal any vehicle or aircraft sighted. If no signal mirror, remove the rearview mirror from the truck and use it to reflect the sun's rays. (Note: This is only effective after the lost person sees the search party.)

The mirror is extremely directional and shall be aimed properly to be effective. Hold up one hand, spread the first two fingers to form a V, and position this V so that the object to be signalled (airplane or truck) is kept as near as possible to the center of the V. At the same time, hold the mirror just below one eye where the target to be signalled can be seen just above the mirror; then flick the reflecting light rays on the two fingers forming the V.

This requires skill. The lost person should practice this before doing it.

Drape the reflective aluminium foil that is in each emergency pack over the truck or on top of a hill. This gives the lost person a much better chance of being spotted by either land search groups or airplane. Keep one roll of foil in reserve in case the first signal is damaged by high wind.

A smoke signal on a high point is highly effective, especially if the wind is not blowing hard. Smoke canisters may be provided for this purpose, or if necessary, burn the spare or a tire or if necessary a tire that has been removed from the vehicle. Tires burn a long time and provide a lot of black smoke. Deflate the tire pressure before setting fire.

If the lost person's vehicle still runs, make long lines of new tracks extending several kilometres out from this elected high point. If a search party crosses one of the new tracks, the lost person will be found shortly thereafter.

**Clues to look for:**

A mirror or some bright object flashing on a high point or on the horizon.

Smoke signals on a high point or on the horizon. The missing person may make a signal by setting fire to one of the tires.

Tracking is one of the surest ways to find a lost person if the tracks remain in good condition. New tracks indicate that the lost person is still driving.

People can determine the direction in which the vehicle is going by examining the tracks as they cross over a small ditch. The tire will bulge out as it strikes the far side. If a chain was dragged from the left side of the rear of the vehicle, the chain mark will be near the left track when facing the direction of vehicle travel.

If the lost person circled around and crossed his own tracks, follow the top track after checking the direction of the vehicle.

A lost person who is still driving often stops at the high points, walks around the truck a few times, and looks for something familiar. He sometimes decides on a new direction at this point.

If the wind is blowing, the truck tracks disappear quickly. Tracks usually remain visible much longer in low places and between sand dunes. The condition of these tracks range from very good to barely visible.

While tracking, periodically note progress and position. Look back frequently to see whether the own tracks are blowing away. If people are not certain of their own position, back-track at once.

10.3.4 Rescue**The first day:**

On the first day, one search party travels the missing vehicle's assumed arrival route.

A second search party reconnoiters all the likely places, such as water wells, villages, etc.

The party manager shall compute the maximum range of the missing vehicle and draw a circle of this radius around the vehicle's departure point. He shall divide the area within the circle into grids and initiate a systematic search of the grid.

The second and subsequent days:

All available vehicles shall be used to continue the systematic search of the grid.

The airplane search shall never be considered anything but an aid to a land search. It normally takes at least 24 hours to organize an air search; two days are often required.

If the lost person has a radio-beacon with him, he may be found quickly, if and when an air search starts.

If the lost person does not have a radio-beacon, the air search will be less effective. However, the value of the air search is enhanced if the plane carries experienced spotters, and if the lost person is experienced in making the proper signals.

When the lost person hears the aircraft engine, the best thing he can do is to drive his vehicle in a large circle. A moving truck, especially if it is kicking up dust, can be spotted at a great distance.

Large HELP signs of stones or written in the sand are helpful. Anything that will reflect the sunlight is good; mirrors, bright food cans with labels removed, or aluminium foil spread on the



ground or draped on the truck. Smoke signals are good if the wind is not too strong. Use the smoke canister that is provided or burn a tire. If the airplane can search at night, the lost person can be spotted quickly if he signals every hour on the hour with truck headlights.

The air search should start with a reconnaissance of likely places. If this does not yield results, it should be followed by search patterns flown in grids. Grid size shall be determined by the range of available aircraft and fuel available. The altitude and proximity or flight path shall be determined by visibility.

Night Landing in the Desert:

Rolls of toilet tissue or sand buckets soaked in kerosene, then ignited, make excellent night-landing airstrip markers. A landing strip outlined with these flares is usable for about 45 minutes.

If the landing strip is good and if the pilot is experienced, small vehicles placed off each end of the strip with the headlights on low beam make good landing aids. The pilot comes in over one vehicle and lands toward the headlights of the second vehicle.

11. Survey and Line Operations

In Some case mine clearance should be performed prior to operations: "Mine Clearance" shall include any type of explosive or harmful substance that might be encountered in the operations area, such as unexploded ordnance, mines, misfired seismic charges etc.

11.1 General

Radio communications shall be mandatory from any work site.

Work area shall be permitted before activities start.

At least one first aider shall be present per crew, with first aid kit available.

Drinkable water shall be available on site.

All danger and obstruction (sub-surface, surface and overhead) shall be recorded and identified (field markers).

Wearing gloves, overall and shoes shall be adapted to ground condition.

Surveyor shall keep in mind environmental concerns and regulation in their daily work; see chapter 6.Environment:

- Surveyor plans shall limit impact on environment and can be requested by Company
- Surveyors shall report accurately, on a daily basis, all actions that affect the environment: clearance in forest, needs for accesses, tree cutting, markers.
- Surveyors shall accurately report, on a daily basis all environmental sensitive areas or activities that can affect or can be affected by seismic operations such as villages, possible damage to landscape, specific or protected species, archaeological sites, new obstructions, dangerous wildlife,...

11.1.1 Machete operations

Compulsory PPEs are: hard hat, goggles, gloves, overall, boots, leg protectors.

Machetes shall be in good condition with one sharp side only and rounded end.

Machete handle shall be fitted with grip rubber.



Machete shall be transported in holster when not used.

5 meters minimum shall be respected between machete workers.

All machete workers shall use a wood stick to prevent direct injury.

Cutting shall be done below ankle level – no bevel cutting (both to prevent trip hazards).

Opened track width shall respect local/contractual regulations.

Maximum tree trunk diameter to be cut shall follow local/contractual regulations.

11.1.2 Bridging

Measuring rod personnel shall be equipped with wood stick to measure depth.

Bridging shall be made of (minimum) one wide walk lane and one hand rail supported by cross pins.

Personnel involved in bridging shall be trained and certified (records) – personnel shall use life jackets.

Bridging shall be stable and strong and wide enough for people and equipment transport.

Bridging shall be inspected and approved by key person before use against a checklist.

Maximum tree diameter cut shall be respected as mentioned above. Limit bridging number to a minimum, using alternate solutions to limit tree cutting.

11.1.3 Chainsaw operation

Compulsory PPEs and equipment are: hard hat with face shield, ear defenders, chainsaw operator safety trousers, gloves, safety shoes, reflective jacket, whistle ...

Whistle shall be used to warn on tree fall. When felling a tree, all crew members should be grouped at a distance corresponding to at least twice the tree height. The chain saw operator shall have a planned escape route before cutting any tree. Personnel are not allowed in the perimeter of 2 times the tree's height.

Chainsaw shall be in good condition, with daily check system in place to ensure chain is tight and sharpened, chain break is operative.

Chainsaw shall be fitted with an automatic chain break, cutter bar guard, clutches to grip tree, double command throttle, chain guard for transport, kill switch and kickback safety stop

Chainsaw operator shall be equipped with a basic repair and maintenance kit (spare spark plug, plug wrench, chain file, spanners, screwdriver...). Tools to be carried in a designated bag, never inside overall pockets.

Fire extinguishers, radio communication and first aid kit (with anti-histaminic and aspi-venum) to be available on the team.

Chainsaw shall be off and chain cover on when moving.

Work site shall be prepared, clear of obstructions and "danger, tree felling" signs shall be posted before cutting.

Refuelling/oil feeding procedure (procedure available on team) shall be known and applied with use of proper funnel.

Gasoline and oil shall be stored in marked metallic jerry cans.



Chainsaw operators and helpers shall be all trained to first aid (records available).

11.1.4 Personnel

Minimum of two people shall be present per work team.

Personnel shall be trained for fire fighting.

PPE are compulsory.

Safe work procedure shall be known and respected.

Emergency procedure shall be known and applied.

At least one first aider shall be present per crew, with first aid kit available.

Medevac procedure shall be known and applied.

11.1.5 Bulldozing and grading equipment standards

The use of bulldozers is forbidden unless duly mentioned in the contract. Then, all bulldozer works are either pending to authorization and/or daily follow up or records as per Company requirements.

Bulldozing and grading operations shall be carried out under Contractor(s)'s specific procedures. These procedures shall be included in the Operational HSES Plan and provided to the Company Supervisor before the Company's HSES Audit.

All bulldozers involved in operation have to pass an inspection to comply with Company and Contractor(s) expectations (most constraining standard applies). Company requirements are listed below.

Each machine shall have the following safety equipment:

- Overhead protection to withstand rollover (never weld, modify, drill into or alter rollover protection without consulting the vehicle manufacturer.) and allow sun protection.
- Automatic reversing alarm with intermittently sounding tone that is audible above the engine noise.
- Rear-view mirror.
- Functioning parking brakes and gear lock.
- Ear protection for drivers.
- Seat belts.
- First aid kit and fire extinguisher.
- In areas where bees or other insect hazards exist, a closed cabin is needed to protect the operator.
- Immediate access to a functional radio with crew frequencies.
- "No smoking", "fasten seat belt", "PPEs wearing compulsory" signs posted in cabin.
- Rotative flashing light.
- Immediate access to absorbing material (enough for 200 litres) in case of leakage (fuel, oil).



Operators of this type of heavy equipment shall follow these safety procedures:

- All drivers should be competent, properly qualified and tested by a qualified supervisor prior to operating heavy equipment.
- Seat belts shall be fitted and worn at all times. Hard hats are mandatory where overhead hazards exist; safety shoes, ear defenders and dust mask are needed. Loose clothing or jewellery not to be worn.
- The operator has to inspect daily the machine.
- Secure all loose items, such as lunch boxes, tools and other items that are not part of the machine.
- Do not allow unauthorized personnel on the machine or anybody to stand on the tracks unless the machine is in neutral with the brake set or the engine is stopped.
- The operator has to check at all times that all personnel are at a safe distance from the machine and, in particular, out of the reach of toppling trees.
- When leaving the machine, the operator should lower blade and attachments to the ground, apply parking brakes, place machine in neutral gear, lock gear lever and switch the engine off.
- Park on ground level, stop the engine and switch off the master battery switch.

Maintenance program shall be performed and records shall be kept for each machine.

Daily inspection includes checks of: engine oil level, water, battery and tire pressure (where applicable), possible hydraulic leak, safety items listed above, condition of the winch rope, protective guards and covers.

All line clearance work shall be pre-programmed. The operator shall have pilot maps and not deviate from the pre-programmed work schedule without permission. Pilot maps shall be setup with due consideration to hazards, local environment regulations and contractual requirements.

All bulldozer groups (starting from 1 bulldozer) shall be supervised at anytime by a designated person.

Support vehicle shall be in the immediate vicinity of bulldozer at all times.

11.1.6 Road Operations

Traffic control is necessary to provide maximum warnings to prevent accidents, and promote a continuous flow of traffic.

Warning lights, flags and signs are required when working along road and street right-of-side.

Where local authorities do not require a specific standard, the procedures set forth below are recommended:

- When operating on any public road or hard shoulder, all vehicles shall display regulation warnings. These may be rotating or flashing light beacons, or strobe lights. Vehicle warnings shall be clearly visible from all directions.
- When operating on any public road or hard shoulder, each vehicle shall also have all lights and four-way flashers operating. Vehicles shall also display red flags and/or slow moving signs.

- Flagmen and all members of the crew working on the operations should wear bright safety vests and hard hats to enhance their visibility, and distinguish them from other road users.
- When one lane of a public roadway is blocked, flagmen shall be posted in order to control traffic around the obstructing equipment. The flagmen shall be equipped with two-way radios and with Stop and Go signs, and with any additional equipment required by local authorities. Each flagman shall be instructed in proper methods to control efficiently traffic, and proper procedures in emergency situations.
- When operating on any public road or hard shoulder, warning signs (with local language instructions if necessary) shall be placed and maintained on each side and along the work area.
- The location, number, size, and type of signs will be determined by the speed of traffic, visibility restrictions caused by hills and bends, and by local regulations.
- If any vehicle is parked on the hard shoulder of the road, several orange cones should be placed on the road ahead of, and behind the vehicle.
- Be aware that noise from equipment may drown the sound of oncoming traffic. Always look at both ways before stepping onto the road, or getting off any vehicle. Don't jump out of vehicle!
- Where possible, cables crossing a roadway should be passed through culverts. If a cable has to cross the surface of a road, it should be placed into a cable protector and secured to the surface of the roadway with duct sticky tape.
- Cables crossing high traffic level highways should be checked often to ensure that they are still anchored or taped.
- Whenever possible, avoid suspending cable over a roadway. If the cable has to be suspended, be sure it is sufficiently high to allow vehicles to pass underneath. Secure the cables firmly. Put up warning signs, and tie ribbons on the cable to make it more visible.

11.2 Surveyors

Surveyors are generally the first members of the party to enter a location. They shall warn other party members of dangers such as dangerous animals, insects (bees), underground gas or electric lines, electric fences, hunters in the area, old cisterns, wells, mines or partially concealed holes or pits, and posted poison gas.

Surveyors shall prepare sketch maps to be dispatched to all crew members showing the location of all points of danger, including but not limited to:

- Power, gas, water, and telephone lines,
- Radio, television, and radar transmitters,
- Weak bridges,
- Holes or pits,
- Fences,
- Animals and insects (such as bees),
- Access.



When surveying a line, pay attention to the location of radio and television transmitters. Advise drilling and explosives crews on their location.

Do not stake a shot point closer than twice the depth of the shot hole from any overhead power line. This is to keep the length of the cap wire plus firing line from accidentally blowing over the power line. Local regulations on safety distances will generally prevail.

Keep brush-cutting tools sharp and in good condition. Keep a light preservative on the blade at all times, and clean the tools daily. Experience has proven that brush hooks are safer to use than machetes. The machete should have an anti-slip handle and sheath to be provided to the machete man. When cutting grass in open areas, a wooden stick held vertically and resting on the ground shall protect the leg opposite the machete

Be always very cautious when working near bulldozers.

12. Shot Hole Drilling

12.1 Generalities

Work area shall be clear of any obstruction and flat and stable enough for drilling equipment.

Work area shall be located at 20 m at least from all electric line or more according to safety distances.

Safety distances shall be checked by surveyors and respected.

Work area shall be permitted before activities start.

First aid kit shall be available on all rigs and support vehicles.

At least one ABC powder extinguisher shall be available on site (not from nearest vehicle).

Worksite shall be within the radio coverage.

Underground map shall be available in urbanized area (pipes, electrical wires...).

All shafts, sprockets, pulleys, gears and other moving parts shall be guarded.

Rig preventive maintenance shall be performed and recorded.

Daily pre and post start-up checks shall be performed and records kept against guards, leakages, safety equipment, gauges and pressures ...

Inspect winch lines, chains and hoists frequently and change any damaged cable.

Daily production shall be recorded (number of point drilled, depths, remarks...).

Personnel not involved in drilling shall be kept clear from rig.

PPE(s) are compulsory for all drilling type: hard hat, ear plugs/defender, safety shoes, gloves, goggles, overall and no loose clothes or rings/jewellery. Relevant posters shall be displayed with compulsory PPE(s).

All activities shall be suspended during storms and sand winds.

Overhead obstruction shall always be checked before raising the mast.

For buggy and truck mounted drill, there shall be a support vehicle at or in contact with the drill location to be used in case of emergency.



The driller and assistant are the only members of the party designated to operate the drilling equipment. No employee should operate the drill in training or practice, unless under direct supervision.

Do not attempt repairs, maintenance, or service while the machinery is running. If adjustments have to be made while the machinery is running, do so only when an assistant is at the control, who can take emergency measures in the event of a malfunction.

Never prime a charge prior to completion of drilling the hole.

Drilling units shall have an emergency shut-down switch fitted in such a way that either the driller or helper can actuate it.

Both explosive and detonator day boxes must be made according to regulatory standards of the country, and be kept secured.

The driller shall have all persons in sight before raising or lowering the mast. Be certain to be clear of any overhead power lines or other hazards.

Do not operate the mud pump until the intake and discharge valves are checked and opened. When blocked circulation stops the mud pump, relieve the pressure immediately by opening the wash hose valve.

The mud pump shall have a proper pressure gauge and relief valve. The relief valve shall be guarded, and the blow pipe directed toward the ground. The mud lines shall be secured to the mast and to the drill.

The slush pit shall be equipped with a tie-down chain.

Clean and inspect the slip tongs and wrenches frequently, and replace them before they are badly worn. Never hammer or sledge the tongs. Set the line brake and rotate the rod.

When the drilling crew loads the holes and an air drill is in use, the hole should not be loaded until water has been used to "cool" the hole, or sufficient time has elapsed to allow the hole to cool.

Never hold or grab a drill bit by the blade.

Never use the fingers to align the bit and stem.

When an air drill is being used, the air pressure shall be completely released before breaking any line or connection. Check the gauge. Do not use hands to check an air stream.

For shot pattern drilling, the rig can be moved on short distances without lowering the mast, but only if the shot points are on level ground, and there are no overhead obstructions.

Use extreme caution when moving a drill with the mast up.

In the event of an approaching electrical storm, stop all operations. Lower the drill masts, and move all personnel to a safe distance from the explosive magazines that may be located on the drill.

The shot hole should not be drilled closer than two times the hole depth from any power line. Consider offsets in order to meet this requirement.

When drilling with air, adequate hearing and eye protection shall be used at all times.

Drilling should not be carried out on any shot-hole that has been previously shot or contained explosives.



The mud pit, return ditch, and slump hole should be filled in immediately after a shot hole has been drilled.

If a rig is backed from a shot hole onto a road, a helper should act as a guide, and if necessary, hold up traffic to ensure that the manoeuvre is carried out safely.

An Emergency team should be ready to intervene in the location

12.2 Drilling rig

Drilling vehicle shall be checked and approved before assigned to operation.

Stabilizers shall be used before any drilling operation.

Stabilizers shall be secured with pin or equivalent.

Rig mast shall be lowered and secured before any moving.

Compressor certificate shall be available on the work site.

One 6 kg ABC powder extinguisher minimum shall be available near air compressor/drilling equipment.

Air compressor shall be parked in a low vegetation place.

Air hoses from the compressor shall be secured with safety chains (both ends and connections).

High pressure air and hydraulic pipes shall be secured with safety chains on drilling equipment.

Air and/or hydraulic fluid flexible shall be in good condition and controlled regularly.

Air pressure shall be down before disconnecting hoses from compressor.

Valves and manometer shall function and be controlled regularly.

Hydraulic leakage shall not occur.

Safe work procedures shall be available on site for drilling, equipment move and equipment set up.

"No smoking area" and "no smoking" signs shall be provided.

Absorbent material shall be available in sufficient quantity to prevent pollution.

Drilling stems shall be transported in a separated compartment than passenger or in a different vehicle. Stems shall always be fixed during transport.

Hydraulic jaws shall be operative and used for stem change.

25 m shall be the minimal distance between equipment

12.2.1 Drilling work station

"Dead man" type commands shall be operative.

Emergency button is compulsory.

Noise exposure analysis shall be performed on workstation.

12.3 "Flushing" drilling

Mud tray shall be located 3 m from drilling point.



Water pump shall be located away from workers (noise disturbance).

Water pump shall be checked before ignition.

Water pressure shall be down before casing change.

Equipment shall be stored away from immediate work area.

12.4 Pop-shot drilling

PPE(s) are compulsory: goggles, ear defender, dust mask, gloves and overall.

Air hoses shall be secured with safety chain (compressor output, tool input and each hoses connections).

Compressor shall be inspected by mechanic/HSES department (documented).

Compressor shall be inspected daily.

12.5 Airboat/jack-up drilling

Vessel shall be fitted with surrounding railing.

Vessel shall be equipped with extinguisher and no smoking signs.

Jack-up shall be equipped of four anchoring points for stability.

Water pump shall be away from workers and stable.

Water pump shall be checked before ignition.

Drilling stems shall be on racks when not in use.

12.6 Portable Drills

Portable drills are manufactured in various models and sizes, and are used in heavy jungle, swamps, mountain, and flatland areas in which shallow holes are required.

The driller and assistant are the only members of the crew designated to operate the drilling equipment. No one should operate the drill in training or practice unless under direct supervision.

The driller should plan ahead the job. Problems should be assessed.

The driller and helpers should wear properly fitted hard hats, safety shoes, gloves, and where appropriate, hearing and eye protection

When guards are removed for maintenance, they shall be correctly replaced before putting the equipment back in use.

Pre-start-up check should include guards, fuel lines, fuel tank and lids, spark plug wires, switches (for proper insulation), hoses and couplings, oil levels, and air filters. The engine stop switch operation should be checked at the start of each day's operation.

Post start-up check should include throttle operation, gauges, and hoses to prevent from hydraulic or air leaks.

Make sure supervisor or mechanic is told at once if a drill is not operating properly

Before starting drilling, discuss how people are going to keep the stemming or cuttings away from the hole. A dust deflector or rake may be used. Never use foot or hands to remove the dirt.



Make sure the area around the drill location is on the level and clear of obstructions. A platform may need to be built for the portable drill.

Once drilling begins, keep all non-essential people away from the drill.

Keep hands and feet away from rotating drill stems.

Before moving a drill to a new location, always shut the engine off.

Some soils cave in easily, and make it difficult to keep the hole open. Where the hole have to be loaded quickly, do not rush or forget the basic safety rules.

Bits and augers shall be protected during transport.

12.7 Fuel handling

Refuelling procedure shall be available and respected.

Refuelling shall be performed with engine off.

Funnel equipped with filter shall be available.

When refuelling, gloves shall be worn and fire extinguisher shall be nearby.

Only approved containers for fuel can be used and shall be properly marked with their content. These containers shall be kept away from portable magazines containing explosives or detonating caps.

Fuel tanks should be mounted away from hot parts of the engine or other ignition sources. Where this is not possible, then only metal fuel cans with explosion preventors fitted into the spout should be used...).

Where fuel tanks are mounted on the drill, engines shall be switched off before refuelling. Care should be taken to avoid spills.

12.8 Environment protection

Environmental concerns: accidental creation of artesian wells or loss of shallow water from aquifers or surface shall be prevented by appropriate precautions (refer to EIA and local regulation). In addition: mud pits and open holes shall be back filled.

Worksite shall be free of rubbish.

Absorbent material shall be available with hydraulic drilling equipment.

All drilled shot holes shall be carefully back-filled and tamped.

12.9 Personnel

At least one first aider shall be present per crew, with first aid kit available.

PPE are compulsory.

Safe work procedure shall be know and used.

Use and location of fire extinguishers shall be known and emergency procedure too.

Personnel shall be trained for fire fighting.

Work procedure in case of storm / sand winds shall be known.

Medevac procedure shall be known.



2 overalls shall be provided per workers, wearing overall is compulsory.

Correct loads handling procedure shall be known and use. Personnel shall be trained about this procedure.

When working or travelling over water, personnel shall wear proper Personal Flotation Devices (PFDs) and swimming tests recorded.

13. Energy Source/Explosives

The minimum safety distance shall be derived from a "peak particle velocity" method (where applicable).

13.1 Surface Energy Sources

Safeguards should be implemented to ensure that the local population cannot get too close to the operating equipment. Safe operating distances from buildings and other structures shall be observed at all times. Caution should be used when operating in areas with low power lines or other overhead obstructions.

Most surface energy-source vehicles use hydraulic systems. The operating pressure is typically 3,000 psi (2.1 kPa); however, pressures as high as 6,000 psi (4.1 kPa) are not unusual.

Personnel, other than the operator, shall keep a safe distance when the pressure is up. When the system is pressurized, leaks, blow-outs, and ruptures can cause serious disabilities or fatal injuries.

Do not attempt to make adjustments or repairs until the system is pressured down. If adjustments have to be made and the pressure is not "0", wear protective goggles or face mask. Do not forget the 40 to 100 psi (0.02 to 0.07 kPa) pre-charge in some systems, particularly in the reservoir.

13.1.1 Land Air Gun

The land air gun operates under extremely high pressure, and can be dangerous when fired.

Only qualified persons shall operate the air guns, its handling gear, and the air compressor. All other personnel shall stay clear of the equipment any time it is running or pressured up. Always assume the system is pressured up. It can be very dangerous! Stay clear!

Never operate the air gun with pressure above 2,000 psi (1.4 Kpa).

Never leave the system unattended when it is pressured up.

Never handle, tighten, or loosen bolts or fittings, or hammer on any part of a high-pressure air system when the pressure is applied.

Make sure that all pressure is released, and that the shuttle is open before touching an air gun with hands.

Inspect system regularly and replace any worn or faulty parts.

Be certain that all replacement parts meet the equipment manufacturer's specifications.

Various other energy sources are being used to a lesser degree. Each of these has special safety requirements that employees should strictly adhere to.



13.1.2 Weight Dropper

Never attempt repairs or adjustments until the weight is on the ground and the electronic raise/drop controls are deactivated.

Never place any part of the body between the weight and the ground unless the weight is carefully and properly blocked and bridged.

Never place any part of the body between the weight and the vehicle unless the weight is chained off or safely chocked or bridged.

Do not use the weight as a work platform or table.

Check the cables and chains daily. Replace distorted or damaged chains immediately.

When cleaning the pad or bottom of the weight, use a long-handled scraper, and never place any part of the body past the safety chains.

Do not allow anyone to approach closer than 10 m (30 ft) during weight-drop operations. Hot oil under pressure, ricocheting mud, dirt, rock, and other debris can cause serious injury.

13.2 Explosives Generalities

Transport of caps and dynamite shall be distant of 25 m minimum and in different vehicles. 25 m distances shall also be respected when transporting explosive material in specific boxes in the field.

Dynamite handling, transportation, magazine keeping shall only be performed by authorized and qualified personnel.

All activities shall be suspended during storms and sand winds.

A minimum safety distance of 50m between radio sets and electric lines shall be known by the crew, and respected.

Use of radio during all priming and loading stages shall not occur.

Smoking or naked flames are not allowed during operation.

Specific cap boxes (Faraday cage) shall be used.

Caps wires shall be handled only if short-circuited.

Work area shall be permitted before activities start.

Night operations involving explosive material are banned.

The employer shall maintain an Inventory and Use record of all explosives, according to local regulations.

All tools, machines, equipment, or devices used with explosives shall be kept in good condition, and be checked or tested periodically to ensure that they function properly, and in accordance with the manufacturer's recommendations.

Do not detonate explosives in congested areas or in close proximity to any structure, railroad, highway, power line, communication line, pier, dock, vessel, or other installation that may be damaged.

Take the following precautions to prevent accidental discharge of electric blasting caps from current induced by galvanic currents, radio transmitters, electrified fences, lightning, adjacent power lines, dust or sand storms, snowstorms, or other sources. Extremely high static



conditions exist in snow or blowing snow. The same conditions are present during sand storms. Suspend all explosive operations during these high-static conditions. Disconnect recording cables to prevent possible damage. Be aware of possible electrical shock when touching any grounded metal object.

- Use static-resistant caps that are shunted at all times, except when being tested or when ready to fire.
- Use only approved blaster's galvanometers or other instruments designed for testing electric blasting cap circuits.
- Do not use multimeters or circuit testers to test caps.
- Comply with IAGC recommendations concerning shooting in the vicinity of radio transmitters.
- Post warning signs against the use of mobile radio transmitters on all roads within 100 m (350 ft) of the loading and shooting operations. Signs shall have 10cm (4-in.) white letters with 1.4cm (5/8-in.) stroke on a red background with words, "Explosives in Use - Turn Off Transmitters," or the equivalent in the local language.
- Do not use tools, equipment, or material that may cause dangerous electrical currents by galvanic action or sparks in a shot hole.
- Handle and use explosives only during the hours from one-half hour before sunrise to one-half hour after sunset. If explosives have to be handled at night, provide and use adequate light.

13.2.1 Misfire

Shot is declared "misfire" after two shot attempts.

Shooter shall stand by 5 minutes before stepping inside the shoot area and performing the detonator test.

After a third failed test and 5 minutes stand-by, the shooter can test again the detonator and disconnect caps' wires - Shot point is considered as "Abandoned shot hole".

Misfire shot point numbers shall be recorded and transmitted to observers, HSES Advisor and Client by detailed written report.

In case of misfire, all persons in the vicinity shall stay away from the charge for at least half an hour. It is not recommended to prime again a loaded hole, except in supervised circumstances.

13.2.2 Abandoned shot holes

All shot points or explosive charges abandoned for whatever reason (misfires, non-detonated, etc.) shall be carefully secured (plugged with cement) or separately blasted according to the local regulation (if any) and/or to a specific procedure (HSES Project Plan). All surface signs, marks, labels used to identify the shot point location shall be removed.

For each abandoned shot point or explosive charge, the Contractor(s)'s Safety Department shall issue a precise and documented report (date, reason for abandon, photos, depth of charge, quantity of explosives, SP co-ordinates, etc.). Copy of this report shall be addressed to the Company Supervisor within 24 hours.

In case of lack of local regulation or Contractor(s) specific procedure, it is recommended to:



- Disconnect caps' wires, dig 20cm deep, cutting wires, short-circuiting and covered up.
- Abandon load in the ground.

13.2.3 Pattern loading

Pattern loading shall be performed one hole after the other.

13.2.4 Personnel

All personnel involved in explosive handling/transport/shooting/magazine are to be trained and certified.

Minimum of two people shall be present per work team.

Personnel shall be trained for fire fighting.

PPE are compulsory.

Safe work procedure shall be known and applied.

Use and location of fire extinguishers shall be known; emergency procedure shall be known and applied.

At least one first abider shall be present per crew, with first aid kit available.

Work procedure in case of storm/sand winds shall be known and applied.

Medevac procedure shall be known and applied.

13.2.5 Storage

Dynamite and caps shall be stored in non-flammable containers, distant of 25 minimum if there is no solid obstacle between the two storages.

"Restricted access", "danger" and "explosive storage" signs shall be displayed on storage access road and "Restricted area", "danger", "switch off radio", "on smoking", "Safety distance" signs shall be displayed on storage site.

"Restricted area", "danger" and "on smoking" signs shall be displayed on each container sides and doors.

5 m minimum around storage containers shall be set free of vegetation.

Storage area shall be delimited by walls or barbed wire fence distant of 10 m minimum from containers.

250 m minimum shall be respected between storage and any house or fuel store; 30 m distance from power lines.

Containers shall be locked and key kept by Contractor(s)'s seismologist.

Containers to be dry, clean, tidy, ventilated and equipped with mini-maxi thermometers.

Containers/storage inside walls, ground and doors shall be lined with wood sheets

List of authorized people shall be displayed at storage gate.

Caps and explosive manufacturer boxes shall be stored in such a way to enable sufficient ventilation, with gap between each box and a 20 cm distance from walls. Oldest material shall be used first.



Not complete box shall not be kept in store, no cut or damaged explosive bar kept

Opening boxes is forbidden inside storage area.

A trained, certified and designated magazine keeper crew shall keep the store 24/24h.

Storage area lighting system shall be 30 m away from magazines; magazine keepers can use battery torches.

Magazine keepers shall have communication means (respecting radio safety distances) to contact nearest camp at any time.

Magazine keeper office to be located at the storage entrance. Gateman shall record every visitor's name, time and purpose of visit. All visitors are to drop all flammable/dangerous or forbidden material at the gate.

Lightning conductor and boosters are compulsory and located near containers. They are mounted on a secured mast and deeply grounded in the ground and at least fitted at a minimum of 30 m from the storage area.

Containers shall be grounded with a grounding plug 1.5 meters deep at least.

2 ABC powder extinguishers minimum, sand bucket and shovel shall be available near each container.

The accurate storage inventory shall be up to date at all times on a log book (material in and out). Party Chief takes the responsibility of stock inventory, check and sign for inventory on a weekly basis.

Barge storage or floating storage: a dedicated evacuation boat and a planned evacuation route must be planned (fire, attack, etc.). Stock excess elimination

13.2.6 Explosive surplus

Explosive surplus cannot be burned but destroyed by explosion.

Destruction of buried explosive shall be performed with 20 kg maximum per shot.

Destruction thanks to surface shot shall be performed with 250 kg maximum per shot.

Shooter shall be at 300 metres minimum from surface shot point.

Shooter shall be at 600 metres minimum from shot point if explosives are inside a metallic container.

13.2.7 Loading / handling

Dynamite handling shall only be performed by authorized and qualified personnel – safe work procedures shall be given.

Personnel PPE(s) shall be provided: hard hat, gloves, safety shoes, reflective jacket, red flags and whistle.

Personnel equipment shall be provided: galvanometer, wood poles and aluminium boxes.

Explosive handlers shall check and shall be responsible for material quantity and short circuited caps.

Explosive material shall be permanently attended to.

Material, equipment and personnel shall be moved away from shot point before hole loading.



Preloading shall not be done when depth is less than 3 m

Daily report shall be issued, mentioning shot point failed, bad depth, bad load test, etc.

A first aid kit and trained first aider shall be present on each crew.

Explosives other than the charge being loaded shall not be closer than 3 m (10 ft) of a loaded hole or 8 m (25 ft) of a hole being loaded, except when explosives are carried in a ready box on the drilling unit that is used in the loading process. Use special precautions if explosives other than the charge being loaded are closer than 8 m (25 ft) of a hole being loaded

Unfold the cap leads only as necessary in order to lower the primed charge. Never toss or throw cap leads in the air, or extend them along the ground until the charge is in place (this to avoid the antenna effect and so, to reduce the sensitivity to electromagnetic fields).

When using loading poles or tools, use only steady pressure to overcome the buoyancy of the charge. The charge shall never be jarred or struck with loading poles or tools.

Dynamite shall be brought first near hole, then the cap(s) and loading performed by the loader.

Cap shall be introduced inside the dynamite with a wood or copper stick/tool.

Cap cable shall be tied around dynamite with 2 key knots.

Load shall be driven down the hole with wood/aluminium poles.

Loader shall load the hole with his arms strength and doesn't use his weight on the poles.

Detonator shall be tested only when the load is down the hole.

Radio communication (receiving/emitting) shall not be in the safe distance area

13.2.8 Land transport

Transport planning shall be planned in advance and unbreakable.

No explosive material shall be transported together (same flight) with personnel.

Dedicated vehicles carrying explosive material shall be inspected and approved.

Explosive material transport vehicle must be diesel powered, non smoking, not carrying fuel, not carrying firearm (unless local regulation).

Electric blasting caps may be transported on the same vehicle with other explosives, provided they are segregated and carried in an approved cap container subject to Company approval.

Every motor vehicle or conveyance used for transporting explosives shall be marked or have placards on sides, the front and the rear. The placard shall signify the class of explosives being transported, unless local government regulations require alternative identification procedures. They shall not be taken inside a garage or shop for repairs or servicing.

Each vehicle used for transporting explosives shall be equipped with two fully charged fire extinguishers in good condition. The driver shall be trained in the use of the extinguishers on the vehicle. The vehicle shall also include a first-aid kit, tool kit, etc. Radio communications should be made available in an escort vehicle only.

Do not carry or transport explosives in a public conveyance, or in a vehicle carrying passengers for hire.

Explosives can be transported on vehicles carrying equipment (i.e., drills) or materials (i.e., water), provided that the explosives are carried only in approved magazines securely mounted



on the vehicle, and that while driving on public roads, the magazine and separate cap box are closed and locked.

Explosives can be transferred from one vehicle to another within the project area without notifying authorities, provided that the transfer is made under qualified supervision, and not in a congested area or near a public road, inhabited building, operating equipment, or any kind of loading or shooting operation.

When explosives are transported by a vehicle with an open body, they shall be in the original manufacturer's containers, protected against sparks and moisture with a fire-resistant tarpaulin, and lashed securely down the conveyance.

In the event of breakdown or collision, the local fire and police departments shall be promptly notified.

Vehicles transporting explosives shall avoid congested areas and heavy traffic. Routes for hazardous materials through congested areas that have been designated by local authorities shall be followed.

Do not leave any vehicle transporting explosives unattended. A minimum of two people should accompany the vehicle.

Do not transport explosives manually or on harnessed animals during sand or snow storms, or any time where there is a high static electricity condition.

13.2.9 Heliborne transport

IATA regulations shall be respected, as well as country regulations and pilot rules (most constraining ones).

Transport planning shall be planned in advance and unbreakable.

Pilot shall be aware of explosive material transport.

Detonators and dynamite shall be transported on long sling (unless local regulation) on separated flights.

Explosives shall be transported in their origin boxes.

Detonators shall be transported in specific and locked containers.

Explosive material shall not be transported together (same flight) with personnel.

If by local regulation, caps are to be transported and attended inside the cabin, one shooter shall be in charge of carrying it.

13.2.10 Preloading from vessels

Catamaran shall be tidy and deck free of any object/rubbish (if applicable).

Whistle shall be used to inform drilling ended and request loading operation.

Explosive shall be loaded with an anti-floating device.

After loading, detonator wires shall be short-circuited and attached to a buoy.

13.2.11 Shooting

Personnel shall be trained and certified with procedures, pilot maps and safety distances.



Two people minimum shall be present per team but no extra useless person.

Personnel PPE(s) shall be provided: hard hat, gloves, safety shoes, reflective jacket, red flags and whistle.

Personnel equipment shall be provided: galvanometer, unique shooting line.

A first aid kit and trained first aider shall be present on each crew.

Shooting procedure shall respect the following points: detonator tested before shooting; 25 m radius area from shot point to be clear of people (workers, third parties); shooter to be at safe distance from shot point with direct view on spot; blow the whistle before and after shooting.

Shooter shall be located high side of the shot point on sloping terrain.

Cables, rubbishes shall be picked up after the shot is completed.

A report shall be done and mention any misfire/trouble to observers who record events.

Before detonating any explosive, ensure the safety of employees, the public, livestock, wildlife, and the property:

- The shooter shall be in control of the shot point area and stationed a safe distance before initiation of the shot. The shooter shall know the size and depth of the charge, how the shot hole is tamped or plugged, proximity to power lines or any other structures or installation, and the presence of any persons in the vicinity of the shot point.
- The shooter at his station shall have an unobstructed view of the shot point area, or should station spotters around the area to signal when the area is clear.
- The shooter shall determine the time of the shoot, but the shot instant may be provided remotely from the recording instruments. If a remote device is used, the blasting machine shall have at least one "dead man" type switch that the shooter shall close in order to close the circuit and allow the charge ignition complete.
- The firing line shall be shunted before cap leads are connected and shall be kept shunted until connected to the blasting machine.
- The connections shall be carefully made, and all wires well insulated and in good condition. Pattern holes shall use a series circuit firing line.
- Blasting machines shall be capable of delivering current in excess of that required to fire all the caps in the circuit. Use only series circuits. All caps used in any single shot shall be of the same type and manufacturer. Do not mix unlike caps.
- Test the blasting machines periodically using procedures recommended by the manufacturer in order to determine that they are capable of delivering power at the rated capacity.
- Before a shot is fired, a loud warning signal shall be given by the person in charge, who has made certain that all surface explosives are in a safe location, all persons and conveyances are at a safe distance or under sufficient cover, and that an adequate warning has been given.
- Whenever the cap leads or firing line might be thrown over a power line by the force of an explosion, ensure that the total length of wires is kept short enough to avoid hitting the lines, and that the wires are securely anchored to the ground at the shot hole location.



- A shot hole should not be drilled closer than two times the projected hole depth from a power line. If a firing line wire is thrown on to a power line, post a guard and call the power provider Company to remedy the situation. Do not touch the blasting machine.
- When a cased hole is shot, take special precautions to avoid possible injury from casing being ejected from the shot hole.
- Shooters and shooter's helpers should remain upwind and avoid breathing smoke, fumes, and dust from the shot. These may cause severe headaches and nausea.
- Always beware of possible delayed blowouts up to five minutes after the initial shot.
- Never use more than one firing line in order to avoid connecting to the wrong firing line and detonating a different charge than the one intended.
- Shooter should check cap lead and observe the amount of lead exposed (occasionally, a charge will be pulled toward surface or float if not properly tamped or loaded).

13.2.11.1 Land Surface Shooting

Before any surface shooting begins, a plan shall be made and approved by management and client detailing:

- Type and amount of explosive used, including fire retardant characteristics.
- A pattern diagram.
- The method of operation.
- Safety requirements including sympathetic detonation prevention.
- Aircraft operations.

Procedures to ensure the safety of employees, the public, livestock, wildlife and property shall be established prior to any implementation of surface shooting techniques using explosives.

Explosives shall be transported and handled according to prevailing regulations.

Blasting caps shall be transported and handled in compliance with local regulations.

Employees working in the shot area shall be provided with approved hearing protection devices, and shall wear them at the time of the detonation shot.

Employees working in the shot area shall wear hard hats.

Employees shall be thoroughly instructed in the hazards that exist in surface shooting techniques, and a warning system shall be established.

Shooter and shooter's helpers should be aware of overhead fallout from trees, cliffs, or rocks resulting from the shot. Stay up slope of the shot point in case there is landslide and loosened rocks.

The supervisor shall monitor and enforce the use of personal protective equipment provided to the employees.

Prior to actual layout of explosives, each employee shall be assigned a specific duty to perform, and instructed to adhere to the planned procedure. Should that procedure be altered in any manner, the employee in charge of the layout operation shall be notified of that change, and all members of the layout crew shall be made aware of that change. Additional instructions shall be given at this time to alleviate any chance the altered procedure might pose additional hazards.



Only qualified persons (shooters and helpers) designated by the person in charge shall prime explosives, and then only when instructed by that supervisor.

Minimum distances shall be maintained between persons handling explosives or exposed charges and any transmitter.

The shooter shall have complete control of the shot detonation. He can, at any time, abort the shot due to any abnormality at the shot location.

Communications between the shooter, powder crew, and all other members of the crew shall be established prior to detonation in order to eliminate any chance of anyone entering the shot area. All crew members should report the presence of any non-crew members seen in the project area.

In the event the shot pattern is located in such a configuration that the entire pattern is not visible to the shooter, guards or observers shall be positioned in such a manner as to be visible to the shooter and - at the same time - to have clear visibility of the shot area. If the area is located in such a way as to make this impossible, audible communication shall be established, either by radio or prearranged signals, as to the conditions of the shot area between the guards or observers and the shooter. The shot shall not be detonated until the shooter is completely satisfied the area is secured.

An audible signal - of sufficient audible level to be heard within the area of the shot pattern, shall be sounded prior to each shot time.

No employee shall enter the shot area after detonation until the shooter or employee in charge gives permission to do so.

Warning signs shall be posted on all roads and trails that lead to the shot area. The signs shall denote the use of explosives in that area. Use the local language on all signs and placards.

All permit stipulations concerning crew conduct and clean-up operations shall be strictly followed and enforced.

14. Vibroseis

Safe operating distances from buildings and other structures shall be observed at all times. Safety distances tables shall be available, taking into account different nature and type of obstruction (man-made or natural), sweep mode, drive force, vibrator weight.

14.1 Generalities

Work area shall be permitted before activities start.

At least one first aider per crew shall be present, with first aid kit available.

Drinkable water shall be available on site.

All danger and obstruction (sub-surface, surface and overhead) shall be recorded and identified (field markers). Pilot maps shall be available on board.

Noise analysis shall be performed at the operation start.

Nobody is allowed to approach vibrators during production at less than 25 m. Anybody involved in vibrator operation shall wear reflective jackets and ear defenders.

Vibrators to be inspected on a daily basis by their drivers.



When working in populated areas, safeguards shall be implemented to ensure that the local population cannot get too close to the operating equipment.

All area shall be properly scouted against obstructions by surveyors. Pilot maps shall be issued well in advance and a system shall be in place to inspect production ahead by a vibrator or recording department professional.

Safe work procedures to be available for: vibrating near or inside populated areas, working near or on roads, convoying, changing tires, changing drivers, road crossing.

14.2 Vibrators

Vibrators shall be equipped with the following safety equipment:

- fire extinguishers (inside the cabin and outside, easily reachable),
- first aid kits, reflective jacket, set belt for each seat, safety triangle,
- VHF radio,
- Outside warning signs, in particular "slow vehicle, 25km/h max" at the back,
- loud back-up alarm (over engine noise level) together with a white light at the back,
- contingency plans including spillage to be available in the cabin,
- inside cabin stickers: speed limits, safety belt wearing, safety distances table,
- two orange Rotary lights, one on the top of the cabin, the other at the end of the vibrator, horn,
- three rear mirrors and windscreen and windows in good condition,
- safety chain on plate,
- guards and shield on all rotary parts; metal screen to the rear cab windows,
- hydraulic emergency stop button,
- operative manometers on nitrogen bottles.

The vibe service truck and the vibrators shall carry sufficient absorbent material to clean where necessary after any spillage.

Other vibrator compulsory equipments shall be available:

- Operative air conditioning and heater,
- Warnings on operative gauges (oil, brakes, temperature, fuel...),
- Anti-skidding material on rear decks,
- Gas bottles clearly marked for contents and rated pressure.

Inspections shall be conducted prior to daily operations. This inspection shall include – but not be limited to – above safety item list, tires, brakes, park brakes, all fluid levels, steering, air and hydraulic pressure hoses condition, oil leaks, windscreen wipers, lights and direction lights.

Vibrators drivers shall be provided with up to date pilot maps showing all obstructions, distances to obstructions and hazards, routes and detours to take, significant key points (villages, roads, antennae...).



Vibrator pusher shall be equipped with listed PPE, handset radio and pilot maps. Pusher shall be responsible for vibrator moves and for choosing safest unit locations to prevent sliding.

14.2.1 Maintenance

Vibrators maintenance planning shall be available and respected.

All maintenance works shall always be supervised by Vibrator chief mechanic.

Maintenance works shall always be performed at low pressure; if not, a “high pressure maintenance work” procedure shall be issued and respected.

Personnel shall not be inside the cabin while operating on vibrator’s engine/hydraulic system/plate.

14.2.2 Road crossing / works on road / convoying

Specific safe work procedure shall be available and respected.

HSES and operational meetings shall be held in advance for all non-routine jobs (24h minimum) with pilot map, in order to decide which vehicle and personnel assigned to those specific operations.

Road crossing shall be performed under supervision of the “field operation supervisor” or “chief vibrator” whoever is with the highest field responsibility.

Minimum of 2 flagmen shall be present, with communication means, flags and reflective jackets.

Minimum of 2 sets of road signs shall be available, in English and local language (in accordance with local regulation).

All rotary lights, 4 way indicators and head lights shall be switched on road crossing or road operations.

Escort vehicles shall be fitted with flags, rotary lights and road signs to warn on danger ahead.

Escort vehicles and flagmen have to be posted 50m ahead in case of curves.

All personnel involved in road crossing or operations on road shall wear reflective jackets.

Vibrators could cross road when receiving order only from the designated operation supervisor.

14.2.3 Works in populated areas

Specific safe work procedure shall be available and respected.

HSES and operational meeting shall be held in advance for all non-routine jobs (24h minimum) with pilot map in order to decide which vehicle and personnel assigned to those specific operations. Safety distances are to be plotted on pilot maps.

Escort vehicles shall be fitted with flags, rotary lights and road signs to warn on danger ahead

Walking flagmen shall be present on each side of vibrators groups (minimum of 5 m); walking flagman behind vibrators groups.

All involved flagmen, supervisors and pushers shall wear reflective jackets, ear defenders, flags and whistles.

All third people shall be kept at a minimum safety distance of 25 m

Vibrators leader shall request driver change over by radio to the observers.



Base plate shall be lowered before drivers change.

Replacement driver shall wait for the driver to get off the vibrator before approaching and climbing by the left door.

The new driver shall wait for the area to be clear of all personnel within safety distance (Pressure down during the personnel changed).

14.2.4 Personnel

Safe work procedures shall be known and applied, in particular refuelling, climbing on vibrators, environmental damages.

Personnel shall be trained for fire fighting.

PPE are compulsory.

Medevac procedure shall be known and applied.

Use and location of fire extinguishers shall be known; emergency procedure shall be known and applied.

14.2.5 Night operations

Specific safe work procedure shall be available and respected after approval from Company representatives.

Night operation shall not be planned in rough terrain condition/dense obstruction areas.

HSES and operational meeting shall be held in advance for all non-routine jobs (24h minimum) with pilot map in order to decide which vehicle and personnel to be assigned to operations. Safety distances are to be plotted on pilot maps.

Minimum requirements:

- On top of standard PPE for everybody, pusher will wear a head light,
- Escort vehicle fitted with rotary light on, road signs, flags, lights on, 4 way indicators on, Limit personnel and vehicle exposure to a minimum (no equipment lay out or retrieving in particular),
- Adequate illumination should be provided for all work groups,
- Frequent radio contact with all personnel on the line (1 hour maximum) and accurate head count of all groups at the end of the night work,
- First aiders with the crews at all times,
- Local authorities should be advised of all night-time operations,
- No cross country trekking should be attempted at night

The emergency response plan shall be updated to reflect night operations. If no emergency response is possible at night, then night operations cannot be performed.

Key positions, such as base HSES Advisor, doctor/nurse, camp radio operator, and ambulance driver shall be mobilized when work is being conducted in the field. HSES Advisor and doctor/nurse standby in the field during operation.

Concerning Contractor(s)'s personnel, a shift system shall be in place before the night operations to avoid excess working hours. Key positions like vibrator operators, line assistants,



field manager, observers, party manager, medic and radio operator shall be doubled. Shift shall be performed at day light to allow the new crew to travel with sun light.

During night operation, the ambulance shall be on standby close to the recording truck position.

Personnel assigned to work operations shall have a sleeping period of 8 hours before and after being assigned to night works with the overall limitation of 12 exposure hours over a period of 24 hours.

The personnel number in the field shall be reduced to the strict minimum to ease the journey management.

15. Recording Operations

Company prefers the use of biodegradable markers and materials that may be left behind (if this practice is supported by the ESIA).

15.1 General

To prevent fires, the recording vehicle should be parked in an area free of tall grass and brush.

When laying out or picking up cables by vehicle, be aware bushes, low hanging wire, and other hazards.

Cable handlers feeding the cable in or out of the truck should have the emergency horn button in close reach.

While the vehicle is in motion, never stand on platforms without fastening safety belts and holding on with at least one hand. Always face the direction of travel.

When handling the cable manually, do not be overload. Never jump ditches, climb over, through, or under fences while carrying a load. Do not descend or climb embankments while carrying a heavy load. Get help. Be extremely careful when looping cable over head when picking it up.

Use extreme caution when coiling the cable around the body. Serious injury will result if one end of the cable is snagged by a passing vehicle.

Never sit or stand on a string of geophones. The spikes can cause a puncture accident.

Don't jerk or pull excessively on geophone strings. It will either damage equipment or geophone will dislodge and hit someone causing possible injury. Gently kick individual geophones before stringing on hasp.

When a truck-mounted recording operation is used, the exhaust system from the generator should be checked periodically to ensure that exhaust fumes are not entering the recording cab.

15.1.1 Environment protection

Mud pit shall be filled up again and place flatten (cuttings).

Caps wires and empty explosive packaging shall be recollected.

Rubbish shall not be abandoned on field.

Hole shall be back-filled; "Crater" filled up again if needed.

Drilled Up-Hole: restoration reports shall be issued to Company for approval, with coordinates and site pictures before, during and after operation, then after restoration.



16. Cranes and Lifting Devices

16.1 Equipment

16.1.1 Cranes

The crane(s) shall be in good condition and clean.

Storage containers shall be clean and well organized.

Certification shall be valid and crane shall have been tested in the last 12 months.

Load/radius chart shall be displayed.

Regular inspections shall be done with a reporting system on stop conditions.

Fluid levels shall be checked (engine oil, hydraulic oil, battery fluid, radiator coolant, fuel).

Pressure gauge shall be operational.

Windscreen shall be clean (if applicable).

All operational functions of crane shall be checked.

Hydraulic and pneumatic hoses shall be in good conditions. Leakage shall not happen in hoses, cylinders or valves.

Electrical wiring and lighting shall be in good conditions and operational.

Level gauge shall be installed.

Main horn shall be operational.

Height-limiting devices shall be fitted on all lines.

Load limiting device shall be operational. Safe working load (SWL) shall be displayed; SWL ratings for dynamic load lifted from seaways shall be displayed.

16.1.2 Mobile cranes

Following devices shall be in good conditions: light and indicators, brakes, parking brake, windscreen wiper with washer, rear-view mirror, flashing light for road transit.

Following items shall be available: reflective emergency triangle, warning decals in English and local language (outriggers control functions, hand signals, electrocution warning hazard), first aid kit, fire extinguisher in driving cab and on platform.

Inertia type seat belts shall be installed, with a "fasten seat belt" and Speed limit sign posted in English and/or local language.

Warning signal (light and sound) shall be used during operations and moves.

Crane shall be recently certified; certificate is kept in the mechanic office.

Posters and stickers are posted on crane truck for compulsory PPE(s) for crane operation.

Oxygen bottles shall not be transported together with hydrocarbon material. All material planned to be transported shall be compatible for transport together as per their Material Safety Data Sheets.

Maximum crane pay-load shall be clearly marked and respected. Max load shall take into account crane angle and lifting distance, on a table for instance.



All equipment and material transported shall be securely stowed with cables, straps, ropes.

Truck jacks shall be deployed if existing. Wood block shall be used on sandy area.

Crane hydraulic system shall be regularly checked and free of leakage.

16.1.3 Cable truck

Speed shall be limited to 20 km/h when dropping equipment with personnel at the back.

A system shall be in place to prevent personnel to fall from the rear deck.

Vehicle shall be fitted with roll bar not only to protect driver, but also personnel at the back. Sun protection shall be installed.

The driver shall have direct view to the back deck. The personnel in the back shall be able to communicate with the driver.

16.1.4 Lifting gear

Equipment shall be registered.

Winches shall have been certified in the last 12 months.

Pull tests for winches shall be carried out on regular intervals.

Brakes shall adequately be rated for SWL. Brakes shall auto-apply (auto-activate) on loss of power.

A warning shall be displayed to check failsafe brake before using.

Cable shall be of correct type and size for winch. It shall properly be terminated

Hook shall be adequately rated for SWL. It shall be in good condition, including swivel and safety latch.

Operating levers shall return automatically in neutral position when released. They shall clearly be labelled.

Slings and chains shall be certified and in good condition.

Sheaves shall be in good condition.

All lines shall be clearly tagged for identification.

Warning signal (light and sound) shall be used during operations.

16.1.5 Winches and Cables

Winches should only be operated by trained personnel.

The winch cable should be run out and inspected regularly. If more than 5% of the wires are broken in a part of 30 cm (1 ft) long, or if kinks are present, then the cable should be replaced.

The winch cable should be maintained by keeping it clean and oiled with light preservative. When re-spooling, avoid kinking the cable.

Always wear leather gloves during cable handling. Always run cable hand over hand when re-spooling.

Apply moderate pressure to the end of winch cable when re-spooling.



Never stand near, step over, or go underneath a cable. It may suddenly go under tension, or it may break with a whipping action and fly through the air

Stand clear of objects being lifted or pulled. If the cable breaks, the objects may fall or roll back.

Do not stretch a cable across a road or street. Do not hook cables on telephone or telegraph poles. Do not use man-made objects as an anchor unless prior approval has been obtained from the owner.

16.1.6 Control systems

Controls shall be clear (centre sprung).

Remote control systems – interlocks/accidental operation security of spare systems

Positioning of controls shall be safe with respect to load.

Cranes shall have limit stop switches and alarms.

16.2 Personnel

Appropriate PPE shall be used, including, for operator and helper: overall, helmet, goggles, strong gloves and safety shoes.

Permit To Work/lockout tag out procedure shall be in place during maintenance.

Crane operators shall be trained, competent, and certified.

Crane drivers shall have a local license if applicable; bank men shall exist, with assigned operators.

Standardised signals shall be available in the cab, in English and/or in local language.

16.3 Weather conditions

Crane operations shall not start if weather conditions are not within the following criteria:

- Wind maximum 45 knots or 6 Beaufort.
- Swell combined height less than 6 m.
- Daylight conditions.
- Visibility greater than 100 m.

Otherwise, if Contractor(s)'s standards are more stringent, they shall be applied.



Appendix 1 List of PPE

Light duty driver	100 % cotton overall – safety shoes – gloves – goggles and sunglass in desert – reflective jacket
Heavy duty driver	100 % cotton overall – safety shoes – gloves – goggles and sunglass in desert – reflective jacket
Cooks and assistants	100 % cotton white uniform – anti-slipping shoes – paper hats or caps
Waiters	100 % cotton shirt and trouser – anti-slipping shoes
Mechanics	100 % cotton overall – helmet - goggles – strong gloves – safety shoes
Welder	100 % cotton overall with long sleeves – leather welding gloves - leather apron – safety shoes - black goggles or mask
Grinder	100 % cotton overall with long sleeves – leather - safety shoes – safety glasses or face mask – ear protection –cap, woollen hat or bandana
Electrician	100 % cotton overall – helmet - goggles – strong gloves – safety shoes – electrician high voltage gloves
Crane operator and helper	100 % cotton overall – helmet – goggles – strong gloves – safety shoes
Batteries handler	100 % cotton overall with long sleeves – rubber gloves – goggles – safety shoes
Painter / compressed air open.	100 % cotton overall with long sleeves – cap – dust mask – goggles – strong shoes
Dozer operator	100 % cotton overall with long sleeves – safety shoes – gloves – goggles in desert – dust mask – ear protection
Machete user	100 % cotton overall with long sleeves – helmet – goggles – gloves – legs protector – strong shoes – protecting stick
Chainsaws operator	100 % cotton overall with long sleeves – helmet with ear and face protectors – gloves – special legs protector – safety shoes – whistle
Driller	100 % cotton overall with long sleeves – helmet with ear protectors – goggles – strong gloves – safety (steel toe) shoes – dust mask
Up-hole / LVL-WZ crew	100 % cotton overall with long sleeves – helmet – Goggles to hit on the metallic plate – strong gloves – safety shoes – dust mask
Jack-up personnel	100 % cotton overall with long sleeves – helmet with ear protectors – goggles – strong gloves – safety shoes – life jacket
Cable labour	100 % cotton overall with long sleeves – good shoes – gloves – goggles in desert – sunglass and dust mask depending on weather condition
Loader / shooter	100 % cotton overall with long sleeves – good shoes – gloves – goggles – helmet (non metallic) – whistle
Hooker and load master (helicopter)	100 % cotton overall with long sleeves – leather gloves – goggles – fluorescent jacket – helmet with chin strap – ear protectors – safety shoes
Helicopter passenger	All passengers to wear ear plugs / ear defenders when on board.
Boat pilot	100 % cotton overall with long sleeves – life jacket – anti slipping shoes – cap – dead-man switch for out board engines – sunglass if needed
Airboat pilot	100 % cotton overall with long sleeves – life jacket – anti slipping shoes – cap – ear protectors – goggles – sunglass if needed
For water body areas and for all boats passengers	On top of dedicated equipment, extra equipment is needed: life-jacket worn all time when exposed, regardless of water depth
For rainy areas	Poncho, raincoat or waterproof wet weather clothing, rubber boots for field personnel
For hot and sunny areas	Caps, straw hats provided to field personnel. Good quality sun glasses provided to the drivers and field personnel