[Table 2: Minimum expectations for the control of specific risk areas 2](#_Toc491418500)

[2.1 Safety critical equipment & activities 2](#_Toc491418501)

[2.2 Emergency response planning 12](#_Toc491418502)

[2.3 Contracted services 16](#_Toc491418503)

[2.4 Occupational health and medical care 17](#_Toc491418504)

[2.5 Medical resources (facilities, equipment, medicines and staff) 19](#_Toc491418505)

[2.6 Personal health 20](#_Toc491418506)

[2.7 Health and hygiene standards 21](#_Toc491418507)

[2.8 Hazardous materials 24](#_Toc491418508)

[2.9 Work environment 28](#_Toc491418509)

[2.10 Natural & man-made hazards 33](#_Toc491418510)

[2.11 Environment 39](#_Toc491418511)

[2.12 Social Responsibility 41](#_Toc491418512)

[2.13 Transport - ground and water 44](#_Toc491418513)

[2.13a Ground transport 45](#_Toc491418514)

[2.13b Water transport and operations (in land or TZ projects) 56](#_Toc491418515)

[2.14 Marine vessels: geophysical and support 63](#_Toc491418516)

[2.15 Back deck marine operations: geophysical and support 71](#_Toc491418517)

[2.16 Workboat operations 74](#_Toc491418518)

[2.17 Air transport 77](#_Toc491418519)

[2.18 Camps and field workshops 79](#_Toc491418520)

[2.19 Security (land and marine) 82](#_Toc491418521)

[2.20 Survey and line operations 84](#_Toc491418522)

[2.21 Shot hole drilling 85](#_Toc491418523)

[2.22 Explosives 86](#_Toc491418524)

[2.23 Vibroseis 90](#_Toc491418525)

[2.24 Land recording operations 91](#_Toc491418526)

[2.25 High pressure air sources 93](#_Toc491418527)

[2.26 High voltage electricity (including EM & ROV) 94](#_Toc491418528)

[2.27 Other energy sources 95](#_Toc491418529)

[2.28 Cranes/lifting devices 95](#_Toc491418530)

# Table 2: Minimum expectations for the control of specific risk areas

|  | | **Minimum expectation required to control the hazard(s)/risk(s)** | **Alternative or exception** | | **Reference** |
| --- | --- | --- | --- | --- | --- |
| 2.1 Safety critical equipment & activities | | | | | |
| 2.1.1  Equipment Inventory | | An inventory of all equipment, portable appliances, machinery and plants that require regular preventative maintenance should be available and regularly updated, e.g.:   * Vehicles of all types * Vessels * In water equipment * Small boats, engines * Generators * Trailers * Fire detection and control equipment * Medical equipment * Air conditioners/heaters * Cranes, winches, hoists, rigging * Workshop equipment (e.g. welding sets) * Compressors * Water pumps * Chainsaw * Drill units * Water and waste treatment plants * Aircraft and helicopters * Aircraft and helicopter cargo equipment, internal and external * Elevators.   Inventory to include unique identification numbers of all units. |  | | GENERAL  S5  S6  E5 |
| 2.1.2  Permit To Work (PTW) | | A PTW system should be in place. PTWs should be authorized, monitored and re-validated by the responsible senior crew member.  A log book of PTW forms issued should be maintained and archived for a minimum of twelve months.  PTW should be used for the following safety critical activities:   * Hot work (outside designated areas) * Working at Height * Confined Space Entry * Work on stored energy systems (i.e. electrical, high pressure air, hydraulics and mechanical) * Diving * Excavation * SIMOPS (Simultaneous Operations) * Non-routine operations with significant risk, e.g. non-routine lifting, * Operating Hull penetrating equipment * Other potentially hazardous tasks.   PTW should define the scope of work, tasks required, its location, when the permit expires, and indicate that no other work is authorized under that permit.  PTW should identify the hazards and risks associated with the work, establishing control measures to eliminate or reduce risk and measures required to return to normal operations.  PTW should identify LOTO (Lock out − tag out) and energy isolation requirements related to the task.  PTW should only be issued following a pre-job workplace inspection to confirm the required control measures are in place, conditions have not changed, and any new potential hazards have been risk assessed and managed.  Energy isolations should not be removed before all related permits have been signed off as complete.  PTW should not extend across shift changes.  Before a PTW is closed, the workplace should be inspected and re-activation of all disabled systems confirmed and if necessary, tested.  PTW activities should not be performed by a lone worker.  Routine jobs that are not controlled using a PTW system should be risk assessed and be covered by a procedure if necessary. |  | | GENERAL  M3  S4  S5  S6 |
| 2.1.3  Energy Isolation | | Any isolation of energy systems; mechanical, electrical, process, hydraulic, pneumatic and others, cannot proceed unless:   * The method of isolation, discharge and reinstatement of stored energy (including possible multiple paths) are agreed and executed by a competent person(s) * Where possible, stored energy is discharged and its absence confirmed (zero energy state) * A system of locks and tags (LOTO) is utilized at isolation points * A test is conducted before any related work begins to confirm the isolation is effective * The isolation is periodically monitored for effectiveness * There is a process to communicate the status of isolations between shifts and different workgroups. |  | | GENERAL  S5  S6 |
| 2.1.4  Lock out/Tag out (LOTO) | | A LOTO procedure should include but not limited to the requirements to:   * Identify all parts to be shut down * Advise all personnel involved * Identify authorized and competent person to apply LOTO * Identify all power sources * Utilize unique locking devices * Tag out all locking devices recording ‘who’, ‘when’ and ‘why’ * Removal of LOTO on completion. |  | | GENERAL  S4  S5  S6  M3 |
| 2.1.5  Working at heights or aloft | | Work at height or aloft is any work in any place where a person could fall a distance liable to cause personal injury. Specific height limits will vary by jurisdiction.  The following activities require controls:   * Working in a location where there is exposure to a fall from height * Routine and occasional access and egress to a location at height * Where a fall from any height would be into a hostile environment (such as water).   These activities cannot proceed unless the most appropriate and practical controls below are met:   * A fixed platform is used with guard or hand rails, verified by a competent person * Use of short lanyards to prevent or limit falls * Fall arrest system that ensures 100% tie-off at all times is used that has:   + - A proper anchor mounted overhead     - Full body harness using double latch self-locking snap hooks at each connection     - Synthetic fibre lanyards     - Where appropriate, double lanyards, and/or shock absorbers * Fall arrest equipment should limit free fall to less than 1.8 metres (6 feet) * A visual inspection of the fall arrest equipment and system is completed prior to each use and any equipment that is damaged or has been activated is taken out of service * Person(s) are competent to perform the work * A controlled access zones procedure is in place where conventional fall protection methods cannot be used * There should be a procedure in place to rescue from height, including trained personnel and necessary equipment.   All personnel should be made aware of the dangers of jumping.  The above should be captured in the working at height procedure and task specific rescue should be addressed in the PTW.  A Dropped Objects Prevention Scheme (DROPS) process should be in place to prevent tools and equipment from being dropped onto personnel or equipment below. |  | | GENERAL  S5  S6  M3  S26  S50 |
| 2.1.6  Edge protection | | Edge protection (barrier to falling) should be installed where there is a risk of falling to a lower level or hostile environment such as water. Edge protection can be permanent or temporary. |  | | GENERAL  M10 |
| 2.1.7  Ladders and scaffolding | | Any work conducted from ladders or scaffolding is considered working at height and should be authorized and controlled.  Compliance with regulations, guidelines, requirements and practices in the reference document:   * Designed to support load * Buddy system * Isolated ladder for electrical work * Safety feet and rubber tips for extension and straight ladders * Step ladders not to be used as straight ladders * Personal protective equipment (PPE) * Tool belts or pouches.   Special construction ladders designed for specific purposes may be used if properly maintained and used according to manufacturers’ instructions (e.g. aircraft maintenance access step ladder).  Safety harnesses should be worn for scaffolding erection/dismantling operations.  Scaffolding should be inspected, approved and tagged by a certified competent individual prior to use, after any alteration or on a regular basis if no alteration occurred. |  | | GENERAL  Regulatory framework  S5  S6 |
| 2.1.8  Fixed ladders | | Fixed ladders should be used only in restricted areas and escape routes. For regular use, inclined staircases with handrails should be provided.  Safety rings also known as ‘backscratchers’ have been proven ineffective and making rescue at height very difficult. Where regulations allow, replace by sliding fall arrest rails. If sliding fall arrest rails are not installed, use a harness and double lanyards with self-locking snap hooks at each end. |  | | GENERAL  S58 |
| 2.1.9  Mobile Elevating Work Platforms (MEWP) | | Power-operated mobile platforms should have priority over cradles lifted by crane, or forklifts. Work at height with personnel baskets should be strictly limited. In this case, lifting appliances should be of a personnel-certified type. |  | | GENERAL |
| 2.1.10  Confined space entry | | Confined spaces include:   * Spaces not normally ventilated and that have a risk of presenting a non-life supporting atmosphere or toxic/explosive gases * Non-fully enclosed spaces where the atmosphere can become hazardous e.g. use of inert gases * Spaces from which egress or escape may be difficult, or where persons may become trapped * Temporary structures or situations that meet the above criteria.   Entry into a confined space cannot proceed unless the specifications are met:   * All other options have been ruled out, and there are no practical alternatives to entry * PTW is issued with authorization by a responsible person(s) * The hazards, risks and controls specified in the PTW are communicated to all affected personnel and posted, as required * All persons involved are competent to do the work * All sources of energy affecting the space have been isolated * Testing of atmospheres is conducted, verified safe for occupancy and repeated as often as defined by the permit * Personal gas detectors are regularly calibrated and tested prior to each use * Appropriate PPE is identified and worn * Secure lines of communication are established between worker, standby person and rescue personnel * Intrinsically safe equipment should be utilized as appropriate * Stand-by person is stationed at the entrance of the confined space (buddy system) and maintains communication with entrants during the time they are inside the confined space * Unauthorized entry is prevented * Medic available and on standby for rapid response.   There should be a procedure for confined space rescue, including trained personnel and necessary equipment available. The task specific rescue should be addressed in the PTW.  All personnel on the crew should be briefed on the dangers of confined spaces and be reminded to never attempt rescue without the proper preparation and equipment.  Note: It has been reported in the oil and gas industry that for every asphyxiated entrant, two would-be rescuers die. |  | | GENERAL  M3  S5  S6 |
| 2.1.11  Excavation and ground disturbance (excluding shot-hole drilling) | | Work that involves a man-made cut, cavity, trench or depression in the earth’s surface formed by earth removal cannot proceed unless the specifications are met.   * A risk assessment of the worksite is completed by competent person/s * All associated underground hazards, i.e. pipelines, electric cables, etc. have been identified, located and if necessary isolated * Determine if a Permit to Work is required * Plan and agree design of excavation taking into consideration heavy equipment use * A plan is in place to control access to the worksite * Inspections are completed after man-made or natural events such as heavy rainfall * Where persons enter an excavation greater than 1.5 meters deep:   + A confined space PTW should be issued if the entry meets the confined space definition   + Ground movement is controlled and collapse is prevented by systematically shoring, sloping, benching, etc. as appropriate   + Ground and environmental conditions are continuously monitored for change   + There is a procedure for timely extraction and rescue of personnel. |  | | LAND |
| 2.1.12  Hot Work | | Compliance with guidelines, requirements and practices in the reference document.  Hot work should not proceed unless:   * All potential flammable and combustible materials have been isolated, removed and/or protected from the sources of ignition * The work area is assessed for potential flammable atmospheres, and where such a risk exists an authorized person tests the atmosphere prior to the start of the work and during work as often as the permit requires * Levels of oxygen and flammable substances are kept within acceptable ranges or additional barriers applied * Emergency response plans are in place as appropriate given the job’s risk assessment and any appropriate site requirements. |  | | GENERAL  S5  S6 |
| 2.1.13  Non-routine lifting | | Contractor should have generic lifting plans in place, approved by a competent lifting authority. Any lifting operation not covered by such plans should be subject to a PTW and a specific lifting plan should be developed and approved by a competent lifting authority.  Reference defines 4 categories of non-routine lift, which should be followed as applicable:   * Simple * Complicated * Complex/critical * Heavy. |  | | GENERAL  S20 |
| 2.1.14  Diving operations | | Should divers be required, they should be qualified personnel, using certified equipment.  Diving operations to be subject to agreement between client/contractor/subcontractor. A PTW system should be in place with LOTO systems controlling energy sources, and also through the hull suction or discharge systems. For example water inlet or outlet pumps, propellers, etc. |  | | GENERAL  S6  S19  S23  S25 |
| 2.1.15  Simultaneous Operations (SIMOPS) | | Planning for field SIMOPS should include but not be limited to:   * Project area description (including all fixed obstructions, infrastructure, oilfield and third party activities, and any geographic boundaries, safe distances) * Organizations involved, key contact information and roles and responsibilities including radio and emergency contacts * Communications process specifying frequency, time, location and work units; * Daily written reporting requirements and distribution * Additional project risk assessment where necessary.   Planning should include or reference existing procedures for:   * Description of potential emergencies and stop work criteria * Emergency Response and Incident Notification Procedure * Permit to work processes.   Planning should consider additional resources that may be required based on field activity complexity, such as a dedicated SIMOPS coordinator. |  | | GENERAL  M16  S42  S43 |
| 2.1.16  Operating hull penetrating equipment | | Operating hull penetrating equipment that is not permanently built into the vessel should be subject to a Matrix of Permitted Operations (MOPO), PTW, LOTO and specific procedure. Such operations should be conducted by competent persons. |  | | MARINE |
| 2.1.17  Lone worker | | A specific focus regarding the duty of care should be applied to lone worker situations.  Employers should identify where people may work alone and risk assessment should be applied and recorded.  Example of considerations:   * Whether the workplace presents a special risk to the lone worker * Length of time the person should be working alone * Communications * Location of the work * Type or nature of the work * Characteristics required by the individual working alone * The time frame and means to reach person if no contact is made * Controlled periodic checks * Automatic warning devices (e.g. panic alarms, no movement alarms) * Ability to report incidents.   Particular attention should be given to:   * Bridge/Engine room manning * Lone drivers or pilots * Boat drivers * Back deck operations * Small craft operations * Long haul trips in vehicles.   Lone worker implications should include operations such as lone drivers particularly where there is high statistical evidence of failure, e.g. significant number of lone driver fatalities. |  | | GENERAL  M10  M20 |
| 2.1.18  Short Service Employees (SSE) | | SSE programs are typically for permanent employees and not temporary workforce personnel. A process/procedure for managing SSEs may include:   * Definition of SSE (e.g. < 6 months in role) * Mentorship * Criteria for exiting the program * Acceptable percentage of SSE in work groups * SSEs in supervisory roles * Identification of SSEs (e.g. green hard hats, arm band, colour of coverall, etc.) * Consideration of whether or not an SSE should be a lone worker, or work on high risk tasks * Job induction for new employees * On the job training including the use of relevant work instructions and risk assessments * SSE participation in crew inductions and HSE meetings * Signed documentation of each SSE’s individual progress and graduation from the program. |  | | GENERAL  S5 |
| 2.2 Emergency response planning | | | | | |
| 2.2.1  Procedures for major emergency situations | | Emergency situations considered should include at least the following:   * Fire for facility/vessel/camp * Abandon ship * Extreme weather * Fuel/chemical spill * Aircraft/helicopter emergencies * Loss of power, propulsion or steering * Towed equipment crash or entanglement * Collision/vessel grounding * Workboat emergency recovery * Man lost/search and rescue operation (SAR) * Vehicles (e.g. collision or rollover) * Third party emergency * Natural disaster * Pandemics * Security:   + Interference from activist groups   + Civil disturbances and external attacks   + Country evacuation   + Criminal activity   + Piracy   + Hi-jacking   + Kidnapping   + Sabotage   + Terrorism * Medevac, including in-field and inter-vessel transport * Man OverBoard (MOB) recovery.   Both Emergency Response and Crisis Management should be documented in the Bridging document between client and contractor.  Community impact mitigation should be included in plans where appropriate.  Consider and provide for the management of potential stresses resulting from any incidents. |  | | GENERAL  M1  M2  M8  S1  S3  S5  S6  S7  SEC4  SEC5  SEC6  SEC7  SEC11  H25 |
| 2.2.2  Competence and training for emergency responses | | All crew members should be clearly briefed on their roles and responsibilities in emergency situations, and should have received appropriate training (e.g. Incident Command System) to fulfil their job in developing emergency plans and during emergency situations. This includes at a minimum, the following roles:   * Master and first mate * Party chiefs and operation managers * Fire crews on land operations * Firefighting crews on marine operations − each shift should have at least 4 persons with STCW compliant firefighting training from a recognized body * Fire crews for helicopter operations - Helideckcrew should be trained in aircraft-specific fire-fighting training course recognized by OPITO, or an equivalent body * Medic or doctor * Other relevant roles that are part of the emergency response teams.   Personnel assigned jobs with physical exertion (e.g. fire crews) should have medical examinations specific to the role. |  | | GENERAL  M3  S7  H8  S14 |
| 2.2.3  Communication and emergency support | | Each work unit (e.g. line cutting crew, drilling crew), fly camps, vehicles, small boats and support vessels in use should have an effective means of communication with the main centre of operations (base camps/main vessel /barge).  Communication centres should maintain a log of work unit movements and status, and Persons On Board (POB) count.  Vessels and remote operations should have 24 hour per day recourse to assistance from a shore/town support organization.  Training and competence as per the reference. |  | | GENERAL  M3 |
| 2.2.4  Emergency systems for fires on vessels | | System to detect and protect from fires on vessels should be in-line with reference and the following:   * The preferred type of fixed fire detection system is the self-monitoring type. * Where indicated by risk assessment, fixed fire-fighting systems should be considered in areas of potential fire including, but not limited to: * Over streamer reels * Streamer storage areas * Paint storage areas * Tape storage areas * Engine spaces, generator rooms and compressor rooms. |  | | MARINE  S6  S7 |
| 2.2.5  Emergency systems for fires onshore | | A system to detect and protect from fires onshore should be in line with reference and the following:   * Unless there is a documented and well disseminated ‘burn down policy’ for crew assets, supported by adequate rescue facility for trapped personnel, land field camps should have fire-fighting capabilities which include: fire water, pumps, hoses and a trained fire crew with fire retardant PPE. |  | | LAND  S5 |
| 2.2.6  Medical emergency response times | | Medical emergency plans (Medevac) should meet the following response times, and it should be applied to all units within the project:   * 4 min – life saving first aid (level 1) * 20 min – fully trained & certified first aider (level 2) * 60 minutes – paramedic, site doctor (level 3/4) * 4 hours – hospital with medical specialists (level 5).   If this is not feasible then a risk assessment should determine what additional resources are needed and can be applied. The risk assessment should address:   * Vessel(s) not fitted with helideck and consider any neighbouring installations and local conditions * Areas where helicopters can’t fly 24/7 in case of life threatening condition.   Real-time monitoring of response times should restrict high risk operations if emergency response times cannot be met.  Under certain circumstances the use of basket transfer may be necessary to meet the recommended response times. This transfer method is most frequently used to transfer an ill / injured person from a support vessel to an offshore installation, providing amongst other:   * + The support vessel is allowed to enter the five hundred (500) metres safety zone   + The support vessel has sufficient deck space for the involved basket designed for such transfer   + A work instruction and/or risk assessment has been developed and has been approved by the Offshore Installation Manager (OIM)   + Such practice should be the last option, e.g. if the person is in a life threatening condition. |  | | GENERAL  H3 |
| 2.2.7  Safety and survival training | | All persons including personnel assigned on behalf of client should receive the relevant survival training before beginning work in the field.  For marine operations, transition and shallow seismic this should be a recognized training course, i.e. STCW-95 or BOSIET for personnel working offshore.  On land operations, the need for survival training should be assessed, and if applicable, an appropriate formal course of training relevant to the environment and type of operation agreed between client/contractor/subcontractor.  Vehicle underwater escape training in areas with significant risk of vehicle entry in water. |  | | GENERAL  M3 |
| 2.2.8  Helicopters working over water | | HUET training is required for personnel flying on helicopters with likelihood of ditching in water. |  | | MARINE  M3 |
| 2.2.9  Emergency response plan, verification and drills | | All emergency response plans relevant to the operation should be verified and subsequently tested on a regular basis, under realistic conditions, but without taking unnecessary risks. An exercise plan, including escalating factors, should be developed covering all ER scenarios:   * All drills should have clearly defined scope, scale and frequency * Drills should be followed by a debriefing and a documented evaluation * Response times should be monitored and where relevant, evaluated against pre-defined performance objectives (e.g. rescue at height < 15 min, man overboard, fire team assembly, rescue from confined space) * Drills should occasionally be carried out without warning but announced as ‘a drill’. |  | | GENERAL  S6  S7 |
| 2.3 Contracted services | | | | | |
| 2.3.1  Subcontractors | | Subcontractors involved in the project should adhere to all contract requirements and be included in the HSE-MS, according to Mode of engagement. Their involvement should include, but not be limited to:   * Participation in the project planning * Reporting of incidents * Reporting and participating in SMART leading and lagging indicators * Emergency response planning and arrangements * Vehicle, driving, tracking and monitoring requirements * Journey management. |  | | GENERAL  M1  M2  S5  S6  M11 |
| 2.3.2  Temporary workforce | | Geophysical operations may involve temporary employment of local personnel in varying numbers. The employment of a temporary local workforce has potential to attract a diverse number of significant hazards and risks across the project. The following should be taken into account:   * Local recruitment practices * Understanding and empathy with local culture(s) * Health considerations including medical check-up * Living in camps vs local residences * Third party ‘followers’ and shadow camps * Remuneration * Orientation and training * Composition of work groups * Appropriate supervision and task coaching * Security and discipline * Trade unions or worker’s councils * Recreation and entertainment * Catering * Emergency response * Demobilization. |  | | GENERAL  M11 |
| 2.4 Occupational health and medical care | | | | | |
| 2.4.1  Health risk assessments (HRA) | | A documented HRA relevant to the operation and jobs on the Crew should be available, which should consider the following risks and also circumstances mentioned in following related sections. Any significant implications of the HRA should be reflected in the project plan, such as:   * Prevalent patterns of local disease * Local health and work related health risks * Waste disposal, including medical * Bacteria * Blood borne pathogens * Specific resistant strains (‘super bugs’) * Substances hazardous to health * Vibration (hand-arm and whole body) and noise.   The HRA should include an evaluation of possible job specific health hazards, including but not limited to:   * Noise * Food hygiene * Water quality * Ultra violet light (sun light) * Vibration * Substances hazardous to health * Ergonomics * Extreme climates (hot/cold) * Climate control, ventilation and lighting.   Some other technology hazards include:   * High voltage systems – AUV / EM operations * Potential effect of high voltage in proximity to personnel * Electrolyte in use for AUV operations, splashing when refilling.   The HRA should assist in defining:   * Surveillance programmes * Awareness and education programmes, e.g. HIV awareness training * Control of substances hazardous to health   + Immunization programmes   + Need for appropriate medical repatriation insurance to ensure transfer of patient to quality medical care. |  | | GENERAL  M5  H4  H5  H7  H9  H11  H18  E5 |
| 2.4.2  Environmental health risks in the project area | | The HRA should include an evaluation of possible environmental health risks in the area of operation, e.g. urban air pollution, radioactive materials from nuclear testing; based on international standards and expert advice. |  | | GENERAL |
| 2.4.3  Health Programs | | As defined by the HRA, Health programs should be developed to include:   * Inoculation program * Hearing conservation program: * Awareness training * Hearing protection * Noise exposure limits * Periodic audiometric tests * Control of infectious diseases: * Endemic vector borne diseases * In malaria endemic areas, there should be a Malaria Management Programme (MMP) in place, including, but not limited to:   + Awareness Training for personnel;   + Bite prevention measures (i.e. sprays, netting, long sleeves and trousers)   + Chemoprophylaxis suitable for type of Malaria   + Early diagnosis of symptoms and treatment.   + Consider including a Tuberculosis (TB) Control Program in TB endemic areas. * Consider infectious diseases control programs for Ebola, Norovirus, etc. |  | | GENERAL  H13  H14  H25 |
| 2.5 Medical resources (facilities, equipment, medicines and staff) | | | | | |
| 2.5.1  Facilities, medical  equipment and essential medicines | The standards of medical facilities, equipment and medicines to be provided should be professionally reviewed and be based on the recommendations of the reference, data from the Health Risk Assessment (HRA) and relevant for the medical emergency response times. The following (where relevant) need to be identified and considered:   * Location of operations * Land base camps * Fly camps * Ambulances (vehicle and boat) * Medevac equipment compatible with transportation (vessel, inter-vessel, helicopter, platform, ambulance, etc.) * Land/Transition zone (TZ) line units medical kits * Marine seismic vessel * Support and escort vessels * Shallow water/TZ mother vessel/barge * Type of energy source * Unexploded ordinance (UXO)/explosive remnants of war (ERW). | |  | GENERAL  H3  SEC11  S53 | |
| 2.5.2  Trained health personnel | Compliance with the reference and commensurate with the HRA output, and addressing where relevant, requirements for remote line units. Consider qualifications such as Pre Hospital Trauma Life Support (PHTLS) and Advanced Cardiac Life Support (ACLS). | |  | GENERAL  H3 | |
| 2.5.3  Evaluation of local  external medical facilities and resources | A documented assessment should be performed on the standards of local medical facilities and resources, covering but not limited to:   * Competence and experience of medical and supporting personnel * Range and quality of equipment and supplies * Hygiene standards * Administration procedures and standards * Transportation and communication.   Special functions available and location should include but not be limited to:   * ICU * Trauma care * Cardiology * Burns unit * Bacteriological/tropical medicine. | |  | GENERAL  H3 | |
| 2.5.4  Remote medical support | The crew should have access to 24/7 remote specialist medical advice and support. | |  | GENERAL  H19 | |
| 2.6 Personal health | | | | | |
| 2.6.1  Medical fitness checks | | Medical fitness checks, where legally permitted or required, should be recorded and cover the following aspects but not be limited to:   * The pre-employment fitness standards (e.g. for Offshore Oil & Gas UK, STCW 95, or Norwegian Maritime Authority) * Pre-employment medical to confirm fitness for the job assigned * Pre-employment substance abuse testing for safety critical positions (all marine personnel should be tested) * Medical checks during employment at a frequency depending on risks associated with employment role * Return to work.   More stringent medical fitness standards can be applied for extremely remote environments.  Functional agility tests as applicable to the project and role specific requirements.  Dental checks should be required for working in remote locations. |  | | GENERAL  H1  H3  H8  H12  S14  S27 |
| 2.6.2  Lifestyle and health promotion | | The provision of a healthy environment in the workplace is a duty of care:   * Provision of opportunity for exercise, both mental and physical * Easy and inexpensive communications with family * Opportunity to manage personal affairs and arrangements while assigned to the project.   Recreational and welfare facilities should be provided for camps and vessels, which should include:   * Telephone, email & internet facilities * Television, video and films * Exercise and sporting facilities * Religious facilities if appropriate.   A health promotion programme should be in place, which is appropriate to the level of risk (malaria, smoking, stress, diet, exercise, HIV etc.). |  | | GENERAL  S5  S6  S53 |
| 2.6.3  Smoking | | A written smoking policy should be available, disseminated on the crew and be strictly enforced.  The policy should protect non-smokers from exposure to tobacco smoke or e-cigarettes throughout working, recreational and accommodation areas.  Unless smoking is completely forbidden at the work site a suitable location for smoking, that doesn't compromise the company policy, should be identified. Smoking should not be encouraged and a programme of assistance to stop smoking is recommended. |  | | GENERAL  S6 |
| 2.6.4  Substance abuse | | A policy should be in place that recognises the dangers of substance abuse that includes inappropriate use of prescription medicines and alcohol as well as recreational and illegal substances.  The possession, use of, or being under the influence of such substances should not be tolerated in the work environment.  A programme of reassuring that no substance abuse exists in the workplace should be organized, which can be applied at point of hire, random, periodic and with cause. This should include the provision of the necessary trained personnel and equipment to implement the assurance programme.  A rehabilitation programme may be considered. |  | | GENERAL  H1  Check for new IOGP ref on D&A testing |
| 2.6.5  Prescription Medication | | Upon arrival at site or when prescribed, all medication should be declared to the medical officer or authorized person on the operation. |  | | GENERAL |
| 2.7 Health and hygiene standards | | | | | |
| 2.7.1  Land accommodation facilities | | The crew accommodation should be designed, constructed and maintained to comply with the reference(s).  Hygiene standards on land facilities should be professionally managed by a competent person such as the camp boss. |  | | LAND  S5  S6  S31  S32 |
| 2.7.2  Marine accommodation facilities | | The crew accommodation should be designed, constructed and maintained to meet the following considerations but not limited to:   * Separate bed for each person with free floor access between beds or bunks; curtains for bunks if more than one in same room. Ladders for safe access to upper bunks * Good quality and clean bedding made of approved materials which can be easily cleaned. No polyurethane * Sanitary facilities including toilets, showers and washbasins * Showers and wash basins should have hot and cold running potable water * Space for secure storage of personal possessions, including individual clothes lockers * Adequate number of electrical outlets for personal appliances * Adequate laundry facilities * Provision of carbon monoxide detectors where potential sources exist * Smoke detectors, fire alarms, fire extinguishers and life jackets as per SOLAS requirements. Flash lights or similar for escape in darkness * Smoke hoods in cabins, with restricted egress * Adequate escape routes with emergency lights * Muster stations, emergency signals and escape routes posted in each cabin * Emergency cut off for electricity * Adequate heating, air conditioning and ventilation * Low noise and vibration * Adequate lighting in rooms and bedside reading lights * Compliance with reference. |  | | MARINE  S27 |
| 2.7.3  Domestic animals | | Pets and other domesticated animals should be prohibited from all crew facilities. |  | | LAND  S31  S32 |
| 2.7.4  Toilet and sanitary facilities in base and fly camps | | Compliance with reference(s) |  | | LAND  S31  S32 |
| 2.7.5  Sewage, grey water disposal | | Compliance with reference(s) |  | | GENERAL  E6  E7 |
| 2.7.6  Cleaning and housekeeping | | Procedures should be established for camp/vessel cleaning and housekeeping (to mitigate possible health risks) which include:   * Cleaning schedules and their scope * Monitoring and inspections programmes * Pest control * Laundry * Domestic waste removal. |  | | GENERAL  S5  S31  S32 |
| 2.7.7  Water supplies | | Sufficient potable water per person per day from acceptable sources should be provided and maintained for all personnel at all locations:   * Drinking water standards as reference * Regular testing for chemical and bacteriological contamination (including legionella), with water samples taken from several points of use * Potable water should be used for showers |  | | GENERAL  S5  H9  H11  H20 |
| 2.7.8  Kitchen/galley facilities | | The crew kitchen/galley facilities are designed constructed and maintained to comply with the references.  Use of hazard analysis and critical control points (HACCP) principles. |  | | GENERAL  S5  S6 |
| 2.7.9  Eating places and provision of meals | | The crew meal provision service is designed, constructed and maintained to meet the reference. The following should be included:   * The catering arrangements should consider number of people, the shift pattern, dining facility capacity, sanitary conditions and timing * At least two meals per day, one being hot. |  | | GENERAL  H11 |
| 2.7.10  Food handlers | | The crew food handlers should have:   * Medical examinations every 6 months (may be subject to local regulations); * Additional test for TB (chest X-ray), ova parasites, hepatitis, HIV should be available at the start of the job * Valid medical certificates * Received food handling training * Sets of PPE catering clothing issued, kept clean and replaced if damaged. |  | | GENERAL  M3  S5  S6  H8  H11 |
| 2.7.11  Food supplies and storage | | The food provided should meet the following criteria:   * Quantity and quality adequate * Is in date (shelf life adequate); * First in, first out system is in place * The delivery temperatures are adequate * A food segregation system is in place * A monitoring system is in place for frozen and other food storage temperatures * Food not accessible to vermin * Food waste protected from vermin. |  | | GENERAL  S5  S6  H11  E5 |
| 2.7.12  Food preparation, and cooking | | Contractor should ensure that the quality of food preparation, water utilized and storage conditions are managed through an efficient process by a competent person.  During food preparation, a food segregation system should be in place. |  | | GENERAL  S5  H11 |
| 2.8 Hazardous materials | | | | | |
| 2.8.1  Control of Substances Hazardous to Health (COSHH) | | The controls recommended by the HRA relating to substances hazardous to health should be in place and the identified specific risk areas should be addressed.  Contractor should ensure the proper implementation of procedures for the inventory, handling, storage, use and final disposal of any substances or material considered as toxic or hazardous to health under the relevant regulations.  Support information can be obtained from COSHH regulations or equivalent from various countries.  The crew and line management should have awareness, knowledge and understanding in the management of substances hazardous to health. Personnel working with hazardous chemicals should be trained handling, use and disposal of such chemicals.  There should be an accurate and current inventory of all substances hazardous to health.  There should be Safety Data Sheets (SDS) for all substances in the inventory at key locations such as:   * Site clinics * All locations of regular storage.   In other locations simplified SDS or hazard awareness cards should be provided:   * Easy access to all crew members in common language * At any locations of regular use. |  | | GENERAL  M3  S5  S6 |
| 2.8.2  Storage of chemicals, oxidants, acids | | Procedures should be in place which include, but not limited to, the following controls:   * Appropriate hazardous communication Training programme * An inventory of all hazardous materials is maintained by the crew: relevant SDS to be available at the storage location, work location if appropriate, and at a location accessible to all crew * Stored according to SDS * Isolated from offices, accommodations, and other work areas * Appropriate PPE available near storage * Eye wash station * Emergency shower if appropriate * Chemicals clearly labelled and stored in proper containers * Chemicals assessed for compatibility with other stored chemicals, conditions and proximity * Adequate ventilation * Appropriate fire extinguisher media.   Training including practical experience should be provided for specific recovery equipment. |  | | GENERAL  M1  M3  S5  S6 |
| 2.8.3  Lithium battery handling | | Contractor should have a Lithium Battery management procedure which should be based on the manufacturers’ specifications of the products used. Procedure should include:   * Personnel handling lithium batteries or equipment containing these should be trained in the handling of lithium batteries and the risks related to them. * Suspect batteries or equipment containing these (odour, smoke or heat) should be discarded securely in the open air or very well ventilated space, and kept separate from other batteries or equipment * Electronic equipment such as birds showing signs of heating from lithium battery self-ignition should not be kept in a Workboat and should be ditched immediately into the sea. The same is recommended for back deck operations * No attempts should be made to open or repair equipment containing suspect lithium batteries until cooled down and vented (minimum 24 hours delay) and this should be done by qualified personnel using appropriate PPE * If the batteries are rechargeable, fit-for-purpose chargers should be used to avoid over charging. |  | | GENERAL  S5  S6 |
| 2.8.4  Lithium battery storage | | Lithium battery storage should include:   * Suitably signposted * Dedicated storage cabinets not used for other products * Well ventilated, cool and dry (< 30 degrees C, < 80% humidity) * Heat resistant (steel or concrete) * Batteries to be kept in their original packaging (also for used batteries) * Used and new batteries to be kept separate, preferably in separate stores. * Segregated in small quantities to prevent massive chain reaction in case of self-ignition * Heat detectors and alarms * Sprinklers or water deluge firefighting or fire hydrant with adequate capacity   Where Lithium batteries are stored or used a Lithium Emergency Response kit should be available, with personnel trained in its use.  Note: As the lithium in the batteries is sealed, Class D fire extinguishers are not effective. Also, the actual lithium content in a battery should burn off in a matter of seconds. Large volumes of water should be used to absorb the heat created by self-ignition of a battery. |  | | GENERAL |
| 2.8.5  Handling/storage of other types of batteries | | All battery types should be stored correctly in designated areas. This includes small alkaline batteries.  Personnel should be trained in handling and disposal procedures. Spent battery terminals should be isolated. |  | | GENERAL  M3  S6 |
| 2.8.6  H2S (oil installations) | | If there is a risk of exposure to H2S, controls should be in place, including but not limited to:   * Recognized H2S training * Portable H2S alarms * Breathing apparatus available * Wind socks * PPE as required * Personnel are aware of appropriate escape routes * Rescue equipment and Emergency Response Plans. |  | | LAND  S5 |
| 2.8.7 Radioactive sources | | Project risk assessments should consider exposure to potential sources of ionizing (alpha, beta, gamma, x-ray, neutrons) and non-ionizing radiation (UV light, infra-red, lasers, radio and microwaves). Sources of radiation include:   * nuclear test sites * battlefield risk areas * depleted uranium * non-destructive testing equipment (NDT) * naturally occurring radioactive materials (NORM) * Radon, etc.   Contractors and subcontractors should be notified by the client, as soon as practicable, of potential exposure to radioactive sources when identified during preliminary project risk assessments and a realistic estimate of exposure doses and frequency should be made.  Competent advice should be sought to assist planning, design of control measures, dosimetry and recording requirements, monitoring performance and contingency planning.  Dose limits should not exceed local legal requirements or the ILO reference.  The principle of radiation control is based upon a triangle comprised of exposure, distance, and shielding. These three factors should be taken into account when determining risk mitigation measures. |  | | GENERAL  H21  H22  H23  H24 |
| 2.8.8  Dusts (desert dust, shot hole drilling dust, abrasive materials, silica) | | Dust particles may clog and accumulate inside the lungs reducing lung capacity. Silica dust can be produced during shot-hole drilling in certain areas. Exposure to free respirable crystalline silica (RCS) has been associated with silicosis, which is not curable.   * Information and induction briefings should be provided where people may be exposed to dust, including dust abatement methods and PPE * Where dust exposure occurs, sampling methods and analysis should be employed to determine the workplace exposure time-weighted average (TWA) * Survey results should be provided to the affected workers and provide mitigation requirements such as Respiratory Protection Equipment (RPE) * RPE maintenance and replacement schedule should be based upon exposure, dust particle size and concentration * Dust suppression methods should be evaluated, tested and installed on drilling rigs. Some effective dust suppression methods include: Venturi, Vacuum, water injection and blower fan. |  | | LAND  S30  S33 |
| 2.8.9  Asbestos | | Asbestos should not be used.  The presence of asbestos should be formally recorded in the asbestos management plan and advice posted with certification describing:   * Type * Applicable restrictions.   Only registered specialists can remove asbestos unless the type of asbestos is certified otherwise.  Asbestos free vessels should provide certificate to this effect. |  | | GENERAL  S34 |
| 2.9 Work environment | | | | | |
| 2.9.1 General controls | | Information and induction briefings should be provided as well as the appropriate PPE corresponding to the hazards present in the work environment |  | | GENERAL |
| 2.9.2  Noise | | The following should be available on the crew to manage noise risks:   * Information on the noise generated by equipment * Noise assessment surveys results (e.g. noise level map) should be addressed according to a hierarchy of controls (elimination at the source, isolation using enclosures, exposure time, controlled access and PPE requirements) * Information and signage. |  | | GENERAL  S33  S35 |
| 2.9.3  Cold climates (heat loss) | | Workers should be made aware of risk of frostbite and hypothermia.  Procedures should be in place for working in the cold including the provision of warm-up breaks, shelters, and suitable PPE. |  | | GENERAL  H2  S5 |
| 2.9.4  Hot climates (heat stress) | | Workers should be made aware of risk of heat stroke and dehydration.  Procedures should be in place for working in hot climates, including provision of shade and adequate quantities of cool water for breaks. |  | | GENERAL  H2  S5 |
| 2.9.5  UV light | | UV light is a component of sunlight that is also found in arc welding, tungsten halogen lamps, food and water sterilization lamps.  Chronic effects of exposure to UV radiation are premature aging of skin and cancer.  Workers should be made aware of risk to UV exposure and be provided with:   * UV protective gear including clothing, glasses and hat * High protection factor sunscreen for exposed skin (should not be used as substitute for covering up) * provision of screened covered areas * interlock systems to UV lamp-housing * all surfaces made dull or matt black to prevent reflections * Welders full body cover and face shield. |  | | GENERAL |
| 2.9.6  Hand-arm vibrations (HAV) | | Exposure to vibrations can cause a range of conditions known as Hand Arm Vibration Syndrome (HAVS). This includes carpal tunnel syndrome and ‘vibration-induced white fingers’.  Vibrating frequencies between 2 to 1,500 Hz can be harmful and more potentially damaging between 5 and 20 Hz. Other factors to consider include:   * Strength of the grip required to operate tool * Tool position and orientation * Length of exposure and rest periods * Frequency of exposure * Ambient temperature (affecting blood circulation) * Individual characteristics including age, health and general wellbeing.   The following should be available on the crew to manage HAV risks:   * Information on the vibration levels generated by the equipment * Signage regarding vibrating tools and activities where HAV is a risk * HAV assessments on the use of vibrating tools.   Any employee diagnosed as suffering from HAVS should receive advice from a Doctor or Occupational Health Medical Practitioner. |  | | GENERAL  H16  S33 |
| 2.9.7  Whole body vibration (WBV) | | Where there are vibration risks the employer should complete a specific risk assessment of exposure including the following:   * Observation of specific working practices * Reference to relevant information on the probable magnitude of the vibration corresponding to the equipment used in the particular working condition.   If necessary, the employer should take measurement of the magnitude of vibration to which employees are exposed.  A common effect of WBV is lower back pain.  Regular drivers are particularly at risk.  Preventive measures may include:   * Provide fully adjustable driver seat and easily accessible controls to minimize twisting, bending, leaning and stretching to operate equipment * Improve driver posture * Provide frequent breaks to move and change body position * Reduce manual handling and lifting of loads by the driver * Provide steps to facilitate access to and from a high cab, minimizing climbing and jumping down. |  | | GENERAL  H17  S33 |
| 2.9.8  Ergonomics | | Workspace ergonomic design lay out and positioning should be based on the results of the health risk assessment.  The risk of muscular-skeletal strain associated with lifting and working in difficult terrain should consider:   * + Provision of lifting and handling training   + Provision of lifting and handling aids   + Identification of an appropriate maximum weight limit for normal lifting is encouraged. |  | | GENERAL  M3  S5  S6  H3  H18 |
| 2.9.9  Climate control, ventilation and lighting | | In order to maintain worker’s good health and wellbeing, every enclosed workplace should be ventilated by a sufficient quantity of fresh or purified air.   * Stale, hot or humid air as a result of workplace processes or equipment should be replaced at a reasonable rate * Where necessary, mechanical ventilation systems should be fitted to permit adjusting temperature and humidity. Re-circulated air should be adequately filtered to remove impurities * The temperature in workrooms should provide reasonable comfort without the need for special clothing * Lighting should be sufficient to enable people to work without experiencing eye-strain * Local lighting should be provided at individual workstations, and at places of particular risk, such as stairs, walkways and evacuation routes * Workplace lighting design should consider qualitative aspects of lighting that should affect people’s perception of their work environment, such as glare, light distribution, brightness, diffusion and colour rendition * Lamps/luminaires need to be kept clean and replaced on a regular basis, as illuminance levels decline with age * Light measurements can be made with a pocket light-meter to determine the average illuminance and minimum measured illuminance. These should be compared against the illuminance recommendation per activity and location provided in the reference. | General | | GENERAL  S36 |
| 2.9.10  Working hours and working schedules | | Crew working hours and working schedules should meet the following:   * Compliance with the relevant regulations (e.g. STCW) * Seek ways to honour the ILO reference when faced with conflicting national requirements * A maximum of 12 hours per day for jobs with significant manual work (line units, drilling units) * A maximum 15 hours per day for line managers * A minimum 7.5 hours rest period per day * Adequate care and planning given to the provision of rest, with a maximum shift length of 6 months, and not more than 3 months for HSE critical roles * Working overtime should not be allowed on a regular basis * Fatigue management should be applied in assessing travel and work schedules, in particular for HSE critical roles. |  | | GENERAL  S3  S5  S6  H6  H15  H26  SR10 |
| 2.10 Natural & man-made hazards | | | | | |
| 2.10.1  Lightning | | Lightning procedure to be in place as applicable. When lightning is identified as a project risk, contractor should plan for a fixed detector at prominent locations, e.g. recorder, flight tower, radio room and for portable detectors for field crews. |  | | GENERAL  S5  S21 |
| 2.10.2  Drowning | | Drowning has been the second highest cause of fatality in the geophysical industry and occurs mostly in land operations. Marine operations fatalities have occurred as a result of falling overboard.  A risk assessment of drowning should be conducted and recorded for all operations.  At risk examples are:   * Falling into and then not being able to get out of pits (e.g. ponds, mud pits, oil sumps) * River crossings * Taking short cuts * Not waiting for boats * Voluntary entry * Recreational water sports * Diving * Inability to swim * Swept overboard * Over the side toilet activity * Wearing heavy rubber boots.   Some control measures include the provision of floatation devices, swim tests and rescue plans. |  | | GENERAL  M10  S25  M12 |
| 2.10.3  Weather, terrain,  flora and fauna | | The relevant natural hazards should be identified, assessed and taken into account during the planning of the project including where relevant:   * Weather (sun, ice, snow, rain, fog, lightning, hail, wind, heat, cold) * Weather secondary effects (floods, landslides, sandstorm, static electricity) * Geological (volcanoes, earthquakes, tsunamis, radon, methane, H2S, cave-ins, Karst, sink holes, quicksand) * Avalanche (snow, ice, rock, mud) * Tides and currents (river bores, coastal effects, flash flooding, rogue wave events) * Bush fires * Fauna (venomous, poisonous, aggressive) * Flora (poisonous, penetrating [sharp], barrier).   Effective control and recovery measures should be in place, including where relevant:   * Matrix of Permitted Operations (MOPO) - Which activities should be permitted in adverse weather * Weather forecast from more than one source * Current monitoring and tidal prediction * Tsunami, rogue wave warning systems * Anti-venom and anti-histamine * Bee elimination procedures. |  | | GENERAL  S5  S6  H5 |
| 2.10.4  Shallow-water | | When planning to operate in shallow-water survey areas the following should be utilized as applicable:   * Accurate and up to date bathymetry * Side scan surveys * Satellite imaging * Up to date charts * Tidal charts * Any available depth hazard information (obstacles, pipelines, ship wrecks) * Environmental Baseline Studies and/or Environmental Impact Assessment information from the client * Management of equipment resources (types and number of vessels, tracking, etc.) * Redundancy/calibration & reliability of equipment * Scouting and escape routes. |  | | GENERAL |
| 2.10.5  Personal Floatation Devices (PFD’s) | | Personal Flotation Devices (PFDs) should be appropriate to task and purpose. Assessment for application should be recorded and include justification for application.  All exposed staff to be trained in appropriate use and inspection of PFD’s. These should be worn in the correct manner.  In any case, dual chamber and dual cylinders are recommended for inflatable life jackets. |  | | GENERAL  S5  S10  S7  S38 |
| 2.10.6  PFD assessment | | PFD assessment should include, but not be limited to:  **Purpose of PFD:**   * To give buoyancy where there is intention or requirement to enter the water (inherent buoyancy) * To protect life in case of accidental entry to the water (auto inflate buoyancy) * To protect life in case of submersion (e.g. helicopter or inside the cab of a fast boat) (manual inflated buoyancy).   **Buoyancy capacity requirement:**   * A 50 Newton inherent flotation device may be appropriate to assist in shallow, wading depth with minimal clothing (simple coveralls) * A 150 Newton auto inflatable life jacket may be appropriate when there is a potential to fall into water wearing normal clothing * A 275 Newton auto inflatable life jacket may be appropriate when there is a potential to fall into water wearing additional clothing and equipment * Buoyancy conflicts and compatibility should be considered (e.g. when worn with clothing already containing inherent buoyancy such as an exposure suit).   **Whether additional specification is necessary such as:**   * Spray hood * Water activated location light * Personal locator beacon (VHF and GPS); * Whistle (pealess) * Reflective tape * Rescue (lifting) harness * Automatic and manual inflation.   **Design:**   * Ease of donning * Adjustment including crotch strap if a design requirement * Comfort or wear and profile in use (i.e. can it be worn without interfering with the task at hand?) * Adequacy of fastening * Length of potential time in the water. |  | | GENERAL  S7  S38  S41 |
| 2.10.7  Overhead power lines | | Crews should have procedures in place when working in areas where overhead power lines exist. The use of hazard maps is recommended.  Procedures should include:   * Shot holes should be placed at a distance that is more than twice their depth away from the overhead powerline * Care around high voltage power lines to prevent induced voltage and arcing * Minimum horizontal distance required from the hazards * Potential determination of exclusion zones. |  | | LAND  S5 |
| 2.10.8  Explosive Remnants of War (ERW) and UneXploded Ordnance (UXO) requiring clearance | | A comprehensive set of ERW/UXO clearance procedures should be developed based on Client’s specialized assessment of the area.  These should include but not be limited to:   * ERW risk assessment to identify Suspected Hazardous Areas (SHA) and immediately release all other land for use * Non-technical survey to identify Confirmed Hazardous Areas (CHA) within SHA and immediately release remainder for use * Technical survey to identify Defined Hazardous Areas (DHA) within CHA and release remainder for immediate use * ERW clearance to release DHA for use if avoidance of the DHA is not possible * Compliance with relevant local military and civil regulations * Qualified specialists should be contracted to locate and if necessary destroy ERW/UXO * Provide visible marking of hazardous zone * Strict enforcement of procedures on access to danger areas * Go/no-go instructions * Daily report on ERW/UXO clearance and accessible areas * Training and meetings on the danger of ERW/UXO and identification of restricted areas * Provision and use of specialist ERW/UXO clearance PPE * Crew awareness/training of nature of ERW/UXO * Locations of known and cleared ERW/UXO should be mapped. |  | | GENERAL  SEC11  SEC13 |
| 2.11 Environment | | | | | |
| 2.11.1  Environmental Baseline Study (EBS) and Environmental Impact Assessment (EIA) | | EBS/EIA undertaken on behalf of the client should be made available to contractor at the tender stage or whenever completed.  The recommendations should be reflected in part of the Project HSE Plan.  Reduce the potential intrusion of alien invasive species based on an understanding of pre-existing ecological conditions and potential operational threats (from vessel, contaminated wheels, etc.). |  | | GENERAL  E6  E13 |
| 2.11.2  Project Environmental Management | | Contractor should document its anticipated project environmental management activities.  Contractor should define environmental objectives, implement controls (mitigation measures) and monitor performance to meet relevant legal and regulatory requirements.   * Contractor and crew management should have completed appropriate environmental management training; * Recommendations of relevant EBS/EIA should be taken into account * Training (and other controls) should address recovery measures necessary to minimise significant effects on the environment under operational and also emergency situations * The controls should as a minimum be in compliance with relevant sections of references. |  | | GENERAL  M3  E1  E2  E3  E4  E5  E6  E9  E10 |
| 2.11.3  Specific Waste Management | | Contractor should manage waste generated by the project in compliance with the references, the foregoing and the following:   * Regulatory requirements including MARPOL * Implement waste management strategies such as Prevent, Reduce, Re-use, Re-cycle, Recover * Controls identified by EBS/EIAs and any environmentally significant aspects that have been identified by client, contractor, subcontractor. * Confirmation of a formal and documented process of selection and monitoring of waste disposal subcontractors and include:   + - Seek to minimize and strictly control the export of hazardous waste     - Emphasis recycling opportunities and the use of biodegradable materials. |  | | GENERAL  E5  E7 |
| 2.11.4  Non-hazardous waste | | Non-hazardous waste may include: waste from offices, operational, residential and camp locations, etc.):   * Industrial waste (wooden pallets, plastic, cap wire, survey pegs, camp construction waste, scrap metal, etc.) * Domestic waste (kitchen waste grey water) * Office waste (used stationary, plastics, printer and toner cartridges, tapes and disks).   Biodegradable detergents and products qualified as non-hazardous, to be used, where at all possible. |  | | GENERAL  E5  E6 |
| 2.11.5  Hazardous waste | | Hazardous waste may include:   * Medical waste * Oily waste (spent lube oils, etc.) * Chemical waste (batteries, obsolete chemicals shot/up hole drilling mud etc.) * Black water and sewage sludge which should not be disposed of untreated * Toxic materials (PCBs, etc.)   Approved waste disposal services should be identified and used wherever available.  Documentation confirming appropriate safe disposal of hazardous waste (e.g. receipts from licensed waste management subcontractors) should be retained.  Where new technology provides new hazardous waste, it should be identified and best practice should be maintained. |  | | GENERAL  E5  E6 |
| 2.11.6  Ozone-depleting substances | | Halon-based fixed and portable fire suppression systems should not be used.   * Halocarbon inventories and losses should be recorded on an annual basis * Appropriately qualified and licensed subcontractors should be used to perform maintenance on equipment containing halocarbons * Redundant halocarbon stock should not be sold to third parties * Preventative maintenance programmes meeting manufacturer recommendations should be implemented to minimize leaks of ozone depleting refrigerants (e.g. Freon, Halon) from items of equipment. |  | | GENERAL  S6 |
| 2.11.7  Marine life and sound | | Mitigation and monitoring measures as defined by applicable national guidelines or requirements. In the absence of national requirements, use of industry practices such as:   * Survey timing/duration to consider sensitive/protected areas and species * Exclusion zone for monitoring purposes * Visual monitoring * Soft-start procedure * On-board Marine Mammal Observers (MMOs) or Protected Species Observers (PSOs) trained to local regulatory requirements * Source delay and/or shut-down procedure (for marine mammals, turtles, etc.) * Turtle guards on tail-buoys and similar deployed equipment * Reporting of sightings and environmental incidents * Training for personnel in local marine ecology and marine life.   These practices may be supplemented by other specific measures based on the outcome of a project specific risk assessment. For example:   * Passive Acoustic Monitoring (PAM) * Sound source verification. |  | | MARINE  E8  E12  E14  E15  E16  E17 |
| 2.12 Social Responsibility | | | | | |
| 2.12.1  Social Impact Assessment (SIA) | | SIA undertaken on behalf of the client should be made available to contractor at tender level or whenever it becomes available. SIA may be separate or as a combined assessment with EIA. The SIA recommendations should be reflected in the project plan. |  | | GENERAL  E6  SR10 |
| 2.12.2  Stakeholder mapping, including the interaction of the project with third parties | | Stakeholder mapping undertaken by company should be made available to contractor upon award of the contract, or later whenever it becomes available. Such mapping should highlight the relative levels of positive or negative influence of stakeholders on the project.  Responsibilities should be clearly identified and agreed between client/contractor/subcontractor.  Assess and document the third party activities (including local community livelihoods) that might routinely exist in the area of operation.  Document the procedures that are to be followed in case of interaction occurring. Events to be addressed may include:   * Competent management (client, contractor, subcontractor) to handle community and media/public relations * Interaction with fishing vessels and general shipping * Interaction with other commercial or leisure activities * Interaction with other oil and gas related operations * Interaction with the general public * Interaction on public highways * Interaction with farmers and/or their animals * Interaction with commercial and artisanal fishing and/or hunting activities * Interaction with refugees * NGO protests * Interaction with stowaways * Authorities, emergency services and public utilities * Any entities from which permits, approvals or support are required. |  | | GENERAL  M3  E6 |
| 2.12.3  Health Impact Assessment on local communities | | Health Impact Assessment (HIA) undertaken on behalf of the client should be made available to contractor at tender stage or whenever it becomes available. Recommendations should be reflected in the project plan |  | | GENERAL  E13  SR10 |
| 2.12.4  Project Social Impact Management | | Client, and then contractor, should document its anticipated project social impact management activities. This should include defining social objectives, implement controls and monitor performance to meet relevant legal/regulatory requirements. Other aspects to be considered:   * Recommendations of relevant SIA and HIA should be taken into account * Controls, including positive relationships, local content and training, should be implemented to maintain the agreed performance standards for each impact identified and any mitigations necessary to minimise negative effects and maximise effectiveness of sustainable positive contribution.   At tendering stage, client and contractor should agree on the assignment of responsibilities including, but not limited to:   * Respect for human rights * Respect and awareness of local communities * Assigning community liaison officers by both client and contractor * Obtaining formal permission for access to prospect area * Management of the local temporary workforce and local contracted services * Fair and prompt compensation for negative impacts resulting from the project * Grievance procedure (communities and workers) * Local communities monitoring and close-out report. |  | | GENERAL  E14  SR1  SR3  SR4  SR5  SR6  SR7  SR10 |
| 2.12.5  Key elements for management of temporary local personnel | | Contractor should provide details of how temporary workforce(s) should be managed, based on a detailed analysis considering project, location, culture, literacy and education. |  | | GENERAL  M11 |
| 2.12.6  Cultural property and archaeology | | Activities and facilities should be located to avoid cultural property and archaeology as a first priority and where this is not practicable/feasible should minimize any impacts.   * Relevant stakeholders should be consulted to improve understanding of cultural property and archaeology issues in an area of operation * A ‘chance finds’ procedure should be developed and implemented in areas where there is potential for previously unknown cultural property or archaeology to be encountered during project operations * All cultural property and archaeology findings should be secured, recorded and reported to the appropriate national authority and local stakeholders. |  | | GENERAL  S5  E6 |
| 2.13 Transport - ground and water | | | | | |
| 2.13.1  Integrated project transport management - ground and water | | Integrated transport (logistics) management should be in place to include:   * Comply with local legal and regulatory requirements * Focus on reducing transport exposure * Selection of the safest mode of transport (road, water, air, train) * Take into account the road/river/water hazard identification for the area * All client, contractor and subcontractor vehicles/craft involved with the project; * Where the operation involves the use of subcontractor vehicles /craft there should be:   + Pre-qualification, including driver testing   + Acceptance inspection.   Driver and coxswain working hours should be recognized as part of a labour intensive HSE critical job and adequate rest hours should be planned. Any loading and home-work travel time to be taken into account. |  | | GENERAL  S3-1  S3-6  S3-13 |
| 2.13a Ground transport | | | | | |
| 2.13a.1  Inventory | | There should be a comprehensive inventory of vehicles describing:   * Type, number of units and allocation of units * Speed limits on and off road * To be used off road only, off road and on road or on road only * Equipped with speed limiting device yes/no * Equipped with IVMS yes/no * Equipped with VTS yes/no * For carrying passengers yes/no * Passenger seating arrangement and maximum number of passengers * Cargo load limits * Maintenance schedule * Type of tyres (tread, temperature ratings) and pressure * Exotic modes of transportation agreed between client and contractor and contractually recorded. |  | | GENERAL  S3 |
| 2.13a.2  Vehicle selection and properties | | Vehicles should:   * Be fit for the intended purpose and demonstrably well maintained * Be essentially compliant with manufacturer’s specifications and the referenced standards * Meet local legal limits and regulatory requirements * Have a strong reputation in terms of safety and endurance/reliability * Have seats to be forward or rearward facing, not sideways. Folding seats to be securely lockable and adult rated * Not have protruding or sharp objects in bodywork which could injure passengers or pedestrians * Have cargo areas segregated from passengers or have cargo securing nets or not be used for cargo and passengers simultaneously.   Client and contractor should agree on light and heavy vehicle age and mileage limits. Special purpose vehicles (Instrument or drill trucks, buggies) which do not drive much should be given special considerations.  Buses:   * As above for heavy vehicles and: * Have as a minimum two escape exits placed on different sides of the vehicle (side, top or rear, can be windows of suitable size equipped with emergency hammer) * Body strength should conform to US DOT FMVSS regulations, EC regulation 66 or ADR 59 to ensure sufficient roll over protection * Passenger carrying trucks should meet the specifications provided in TRL report referenced * Access door should be on the kerb side of the vehicle * Preferably diesel powered where fuel supply needs to be in own camp, to avoid the risks related to storage and handling of large quantities of petrol.   Not acceptable:   * Motor bikes, two or three wheeled * Open quads or ATV’s (i.e. without Roll over and passenger protection) * Saloon cars with no or weak superstructure (i.e. cabrio’s) |  | | GENERAL  S3  S3-14  S3-15  S3-16  S24 |
| 2.13a.3  Vehicle equipment - all vehicles | | All vehicles should comply with the reference. In addition should be fitted with:   * Reversing alarm * Means of two way communication * Flash light * Reflective jacket for at least the driver * Where it may be expected that vehicle engines are left idling for climatic conditions (air-conditioning, heating) CO detectors in driver and passenger cabins; * GPS navigation system * Emergency response information. |  | | GENERAL  S3  S5 |
| 2.13a.4  Vehicle equipment -  light vehicles | | Light vehicles (< 4 T and < 8 passengers) should have:   * Side impact protection * Adjustable side mirrors on driver and passenger side * For pick-ups and larger light vehicles:   + Wheel chocks |  | | GENERAL  S3 |
| 2.13a.5  Vehicle equipment - heavy vehicles | | All heavy vehicles should comply with the reference. In addition they should have:   * Step and grab handles for getting into the drivers cab. |  | | GENERAL  S3 |
| 2.13a.6  Vehicle equipment - buses and passenger carriers | | All buses and passenger carriers should comply with the reference, and **heavy vehicles** line item above. In addition they should have:   * 3 point seat belts for driver and front passenger and seats with open space in front of them (if not fitted, these seats not to be used) * At least two point seat belts for all other seats * Clear signs for emergency exits * In hot climates: sun shade tarpaulins. |  | | GENERAL  S3 |
| 2.13a.7  Vehicle equipment - trailers | | * Full operational lights, brake lights and indicator lights * Effective braking system compatible with the towing vehicle. |  | | GENERAL |
| 2.13a.8  Vehicle equipment -tanker trucks | | Same as for **heavy vehicles**, plus:   * Roll over protection on driver cabin * Baffles or surge plates in the tanks * Ladder, non-slip walkway with (foldable) rails for secure access to top hatches * Double skinned tankers are preferred for fuel transport * To be driven with empty or full tanks, half full to be avoided. |  | | LAND |
| 2.13a.9  Vehicle equipment -emergency response vehicles | | Compliance with the reference. |  | | GENERAL  S3-16 |
| 2.13a.10  Wheel design | | Fatalities have occurred when inflating certain types and designs of wheels.  Wheels constructed with a multi part securing ring (‘split rim’) should not be used where suitable single part rim types are available.  Where multiple piece or split rims are unavoidable, appropriate protection is required when inflating tyre during assembly, fitting (e.g. wheel and tyre cage) and re-inflation after passage through soft sand (sprocket). Drivers of vehicles fitted with such wheels should be given training for the inflation of the tires. |  | | GENERAL |
| 2.13a.11  Tyres | | Tyres should be free of any visible damage, abrasion, cracks or cuts and should be regularly inspected (both sides!).  Tyres, including spares, to be of same construction, type, profile and thread.  ‘Remould’ or ‘re-tread’ tyres not to be used.  Minimum thread depth 3 mm across 75% of the tire width and with a visible thread pattern across 100% of the tire surface.  Temperature rating (A, B, C) and traction grading preference (AA or A) applicable to the operating climate and conditions (e.g. winter tires).  Load capacity suitable for the type of vehicle and maximum speed.  Tire pressure should be kept within the manufacturer recommended range and be checked regularly.  Contractor should have a tire change procedure and drivers should be trained in the use of this.  Best practice is to remove the weight from the tires and protect from sun exposure when trailers are stationary for a long time. |  | | GENERAL |
| 2.13a.12  Tyres in soft sand | | Tyres may be deflated for use in soft sand and where this may be done, the vehicle should have a pressure gauge and equipment to re-inflate the tires. |  | | LAND |
| 2.13a.13  Roll over protection | | Roll over prevention built into vehicle design by the manufacturer is preferred.  Roll over protection systems (ROPS) are recommended where there is an increased risk or history of roll over resulting in serious injuries. ROPS should be properly engineered.  Such construction should meet the IIHS roof strength criterion ‘Acceptable’ or ‘Good’. The TRL report should be applied to the modification of vehicles.  Factors to be taken into account in deciding whether ROPS would be required are:   * Roof strength of the vehicle * Likelihood of roll over occurring as a function of vehicle type and terrain or road conditions.   Off road terrain conditions usually increase the likelihood of roll over significantly.  Vehicles with a high centre of gravity are more prone to roll over. Typically this would be SUV’s, Pickup trucks and minivans. These same vehicles often do not have sufficient roof strength to ensure the maintenance of sufficient survival space in case of roll over.  The higher the speed at which a roll over occurs, the more severe the impact on the roof should be. |  | | GENERAL  S3  S24 |
| 2.13a.13 Continued | | In view of the above, the following is recommended:   * Saloon cars or sedans should not benefit from ROPS * SUV’s or Pick Ups that meet IIHS roll over crash testing criteria ‘Acceptable’ or ‘Good’ do not require ROPS * Vehicles used predominantly in an urban environment or on low speed country roads do not require ROPS * All other vehicles, in particular SUV’s, Pickup trucks and Minivans should be fitted with ROPS * A more formal technical criterion is based on the so called static stability factor (SSF). * SSF = W/2H, where H is the height of the centre of gravity and W is the width of the wheel base, measured from the outside of the tyres * ROPS is recommended in case SSF < 1.25.   In view of industry history ROPS is further strongly recommended for:   * Driver cabin of tankers * Driver cabin of Heavy Goods Vehicles (HGV) if to be used in steep terrain or dunes.   ROPS should be designed to meet the IIHS roof strength criterion ‘Acceptable’ or ‘Good’.  ROPS should preferably be mounted externally and not interfere with other vehicle safety design aspects or devices, such as crumple zones or airbags.  Internal ROPS should be suitably padded with shock absorbing material. |  | | GENERAL |
| 2.13a.14  Off road driving | | Off-road driving is subject to a number of exceptions described in the guideline.  Drivers should be given specific off road driving training as relevant for the area of operations.  Off road speed limit should be 40 km/hr, preferably enforced by a speed limiting device, possibly set to slightly higher value to allow acceleration to ascend sand dunes.  For off road driving a base plate should be provided for the jack.  Slow moving, walking pace operations where personnel are deploying equipment from vehicles may be desirable. In these circumstances assessment should be conducted to determine acceptable work practices, controls and recovery.  Low speed tip or roll overs in sand dunes need not be recorded as a motor vehicle crashes. However, there is still significant potential from both event and recovery, and such incidents should be recorded appropriately.  Light vehicles to be fitted with buggy whip flex shaft flags in sand dune areas.  Equipment for getting vehicles unstuck from soft sand as appropriate (connection points for towing, winch, boards, shovels, etc.)  ABS not needed off-road. |  | | LAND  S3-7  S3-5 |
| 2.13a.15  Special vehicles and situations, bulldozers | | Hazard identification and risk assessment to be conducted to decide on the need for special protection of special vehicles.  For Bulldozers:   * Roll over cage and protective canopy for driver cab to protect from falling objects such as trees as well as roll over * Gear blocking mechanism * Enclosed and pressurized cab where there are Africanized bees or high dust levels.   Large rear view mirrors and preferably reversing camera. |  | | LAND  S5  S3-17 |
| 2.13a.16  In Vehicle Monitoring Systems (IVMS) | | Vehicles should be equipped with IVMS (VDR), (as per reference document).  IVMS data should be downloaded and reviewed at least weekly and where possible daily. |  | | GENERAL  S3  S3-12 |
| 2.13a.17  Vehicle Tracking System (VTS) | | A vehicle tracking system (VTS) is recommended for all vehicles but is considered essential vehicles operating in high risk situations (as identified and agreed upon by client/contractor/subcontractor) which includes but is not limited to:   * Remote areas * Areas requiring geo-fencing such as for:   + Mine fields   + Country frontiers   + Protected areas   + Military exercise areas.   A VTS central system/operator to monitor crew vehicle journeys in real time. |  | | GENERAL  S3 |
| 2.13a.18  Speed limiting devices | | The use of speed limiting devices on vehicles is strongly recommended, in particular for off road driving and long haul trips.  Recommended speed limiting settings:   * < 50 km/hr off road * < 80 km/hr for graded roads * < 110% of national speed limit for highways   Automatic dual speed limiters can be used for combination of off road and graded road conditions. |  | | GENERAL |
| 2.13a.19  Vehicle maintenance | | Maintenance programme tied to hours/km on vehicle and manufacturer’s recommendations should be in place including:   * Vehicle log book/records * Daily inspection (signed off) by drivers * Defect reporting system and follow-up.   Regular inspection by mechanic or manufacturer recognized service company. |  | | GENERAL  S3  S5 |
| 2.13a.20  Competent mechanics | | Persons responsible for and carrying out vehicle maintenance:   * Should be formally assessed as competent by the contractor * Recorded as such at their place of work (certificate and photo). |  | | GENERAL |
| 2.13a.21  Equipment | | Adequate and appropriate tools, equipment and facilities should be available to allow for proper repair and maintenance of vehicles and their ancillary equipment.  Suitable equipment and facility to be provided for inherently safe under the vehicle work and inspection. |  | | GENERAL  S5 |
| 2.13a.22  Records | | Records of vehicle maintenance and repair should be kept including:  Personnel carrying out such work  Date and time  Parts and consumable used  Unique identifier for vehicle. |  | | GENERAL |
| 2.13a.23  Drivers selection, training and competence | | Drivers should be minimum 21 years of age with 3 years of experience in the profession.  Vehicles with more than 9 passengers should be driven by dedicated professional drivers.  Drivers should have a valid driving license for the type of vehicle to be driven and to drive in that country.  Drivers training and competence should be assessed and documented.  Other checks to include:   * Medical examination including an annual vision test * Character and background * Qualities and experience; document checks, driving tests, (theory and hands on) * Special skills such as terrain and climatic experience.   Driver identity should be confirmed prior to each journey.  Drivers should be rested and alert and do not operate any vehicle when fatigued. |  | | GENERAL  S3  S3-8  S3-9 |
| 2.13a.24  Driving permits and records | | Driver records should be maintained, including:   * Personal and employment details * Current photo of driver taken by contractor * Types of vehicle licensed to drive * Operating conditions (terrain) approved to drive * Types of cargo licensed to carry * Training received. |  | | GENERAL  S3  S5 |
| 2.13a.25  Driver routines | | Drivers should:  At all times comply with the local traffic code and what they have been taught in their training.  Not be under influence of alcohol, drugs or medication which could impair their fitness to drive.  Refuse to drive if they do not feel sufficiently fit or rested to do so.  Observe rest periods (every 2.5 hrs) and their maximum duty hours as per the reference.  Avoid distractions and not make use of mobile telephones or other two way communication while their vehicle is in motion.  Ensure their passengers use their seat belts.  Perform daily inspection of their vehicle and report defects.  For pick-up trucks or larger vehicles, walk around and inspect their vehicle before driving off.  Be aware of the blind spots around their vehicle and avoid reversing; where they need to reverse large vehicles they should get the help of a banksman.  Use wheel chocks when parking on slopes.  Not allow third party passengers other than official crew visitors.  Wear suitable footwear (flip flops and bare feet prohibited)  Not leave their vehicle until the engine has been stopped, the handbrake firmly applied and the starter keys removed.  Keys should not be left in a vehicle but kept by the driver or handed over to a responsible person.  One track policy off road should be considered. |  | | GENERAL  S3  S5 |
| 2.13a.26  Driver induction and training | | All drivers should be given Defensive Driving training in line with the references. Reassessment criteria are addressed in referred documents.  Additional training as appropriate:   * Off road driving * Use of GPS and radio or other means of communication * Adverse weather driving * Anti-skid training * Loading and load restraint for cargo truck drivers. |  | | GENERAL  S3  S3-11 |
| 2.13a.27  Driver performance monitoring and improvement | | Drivers should be periodically re-assessed to identify deficiencies, analyse causes and select appropriate retraining including:   * Review of IVMS and VTS data with drivers and crew management * Driving performance-monitoring records are maintained.   Drivers are reminded of their personal duty to stop work includes their own physical condition, e.g. fatigue, illness etc., and any changes to it such as failing eye sight. |  | | GENERAL  S3  S3-3 |
| 2.13a.28  Passenger routines | | Passengers should:   * Use their seat belts * Place their luggage in the correct place (no loose objects) * Not distract the driver, rather assist him staying alert * Monitor driver behaviour and report near misses or incidents * Assist the driver as appropriate: respond to radio or phone calls, placement of wheel chocks, tyre changing, reversing, etc. |  | | GENERAL |
| 2.13a.29  Pedestrian vulnerability | | High visibility reflective clothing or vests to be worn by all personnel outdoors on land operations.  Maintain pedestrian traffic separation in camps and parking areas |  | | GENERAL |
| 2.13a.30  Third party awareness of crew traffic risks | | Briefings should be given to relevant third parties and local communities on land transport safety. |  | | LAND  S5 |
| 2.13a.31  Third party risk to project | | Analysis of local driving habits and road conditions should be conducted to identify areas of caution and danger which should be mitigated where possible, and crew drivers and others should be adequately advised. |  | | GENERAL |
| 2.13a.32  Community vulnerability | | Crew drivers should be made aware of the habits of local peoples where they could be particularly at risk , for example:   * Children * Elderly * Persons, animals or places considered sacred by the local community; * Lack of awareness of vehicle dangers. |  | | GENERAL |
| 2.13a.33  Journey management | | Compliance with guidelines, requirements and practices in the reference document including a documented journey management procedure covering:   * Road hazard identification * Country security risk profile * Driving after dark * Off-road driving * Journey reporting * Breakdown procedures * Convoy procedures * Documented limit to number of driving hours permitted in 24 hrs. (Ref S3 driving hours are related to long distance and black top driving. For off road conditions with low speed driving appropriate work/rest schedules should be established.) * Off duty travel to and from the crew.   Such procedures may also include for example:   * Marine administrators * Shore representatives, client/contractor/subcontractor * Suppliers * Crew persons driving home at crew change * Field managers may be included in Training requirements for journey management.   Routine trips and camp field movements can be performed under simplified journey management procedure. |  | | GENERAL  S3  S3-2  S3-10  S5 |
| 2.13a.34  Special procedures | | Contractor should have the following procedures as appropriate:   * Dust cloud procedure * Adverse weather procedure * Vehicle brake down procedure * Tire change procedure * Convoy procedure * Towing procedure * Vehicle recovery procedure. |  | | GENERAL  S3-4 |
| 2.13a.35  Additional requirements for special vehicles and operations | | Compliance with guidelines, requirements and practices in the reference document for. Appropriate training should be agreed for operators of special vehicles such as:   * Snowmobiles * Vibrators * Tracked vehicles * Buggies * Small utility vehicles (‘Mule’, ‘Rhino’, etc.) * Fork lift trucks * Bulldozers, graders and front end loaders. |  | | LAND  S5 |
| 2.13a.36  Slow speed vehicle incidents | | Specific hazard analysis and risk assessment is required.  Example risks:   * Crushing * Running over * Movement of unmanned vehicles (e.g. no parking brake applied) * Parking on slopes or unconsolidated ground.   Example controls:   * Chocking blocks * Looking about vehicle * No reversing * Drive in drive out – one way system * Parking away from pedestrian areas (segregation in design) * Standard reversing alarm * Banks man for necessary reversing of large vehicles * Lighting of parking areas. |  | | GENERAL  M10 |
| 2.13b Water transport and operations (in land or TZ projects) | | | | | |
| 2.13b.1  Compliance with local regulations | | Water transport should comply with applicable local regulations. When local regulations are lacking, industry best practice should be followed. Self-regulation may be needed to achieve safe operations. |  | | GENERAL  S10 |
| 2.13b.2  Control by competence | | There is a much larger variety of watercraft and waterways and operating conditions than there is for vehicle transport. Establishing clear and concise guidelines is therefore difficult. Operators should have to rely heavily on competence of the personnel involved in all respects including:   * Risk assessment of all aspects of water transport and operations should be performed * Selection, design and equipment fit * Inventory * Operating procedures * Competency assessment, training and supervision of boat drivers.   Note that for the same reason the key IOGP reference for the subject is structured as a generic hazards and control inventory. |  | | GENERAL  S10 |
| 2.13b.3  Inventory | | There should be a comprehensive inventory of watercraft describing:   * Type, number of units and allocation of units * Type of propulsion and fuel * Draft, length and width * Cruising and maximum speed * Autonomy with normal fuel capacity * Equipped with VTS * For carrying passengers * For accommodation * Crane and crane capacity * Radar * Passenger seating arrangement and maximum number of passengers * Cargo load limits * Minimum manning level and crew qualifications * Maintenance schedule. |  | | GENERAL |
| 2.13b.4  Navigation area | | Contractor should establish a hazard map of the navigation areas and waterways to be used, which apart from normal geographic and depth information should:   * Indicate hazards such as:   + (Submerged) obstacles   + Underwater pipelines, cables and other utilities such as overhead powerlines   + Current speeds and directions   + Surf zones   + Rapids   + Sharp bends   + Populated areas along the shores   + Fishing nets   + Powerlines and fence wire * Jetties, port, mooring and quay facilities * Refuelling and accommodation facilities * Speed limitations * Operating boundaries for the various types of craft. |  | | GENERAL |
| 2.13b.5  Design considerations | | Hazard analysis and risk assessment of drowning should be conducted for all operations.  (Note: Historically drowning shared the biggest percentage for fatalities with road transportation. Most of those fatalities were related to land operations, not marine.)  The selection and design of small boats and watercraft used for geophysical operations should be in accordance with the relevant sections in the reference.  Locally procured craft should be inspected by a competent person and where necessary upgraded to meet acceptable standards.  Recommended hull construction materials are aluminium, steel, wood and fiberglass. Single hull Glass Reinforced Plastics (GRP) is prone to shatter on impact and should be avoided in areas where collision with objects is a risk. Double foam filled GRP hulls do not have this drawback.  Small craft (without life rafts) should have suitable buoyancy built in to stay afloat (including their passengers) even if swamped with water.  Larger craft and barges should have SOLAS approved life rafts and lifejackets at muster stations.  Loading of barges should be subject to load and stability calculations. |  | | GENERAL  S10  S39  S40 |
| 2.13b.6  Equipment fit | | Equipment fit should be in accordance with the recommendations in the reference.  Key elements:   * Dual propulsion if possible * Diesel engines preferred − inboard petrol engines strongly recommended against. * Fixed fuel tanks are preferred over portable ones * Railings or grab ropes around the craft, ladders for exiting the water * Protection against sun and rain for personnel as appropriate * Windscreen and wipers * Navigation and communication equipment * Dead man’s switch on engine as appropriate * Navigation lights. |  | | GENERAL  S10  S5 |
| 2.13b.7  General safety equipment | | All small boats and watercraft should as a minimum comply with the equipment guideline in the reference document.  All craft should have a means of communication with the base location. |  | | GENERAL  S10  S5 |
| 2.13b.8  Vessel tracking system | | A tracking system is recommended to be installed on all small boats but is considered essential for watercraft operating in high risk situations (based on risk assessment).  A VTS central system/operator to monitor and control crew journeys in real time. |  | | GENERAL |
| 2.13b.9  Small boat maintenance | | Small boat and watercraft maintenance should be carried out in accordance with the reference and manufacturer’s recommendations. |  | | GENERAL  S10 |
| 2.13b.10  Competence | | All small boat drivers and crew should be competent for the type of craft they are operating in accordance with the reference.  Boat drivers or crew should be able to perform common repairs on engines and craft such as:   * Cleaning spark plugs * De-air fuel system * Replace damaged propellers * Fan belt replacement.   In addition to ability to operate their craft, boat drivers should be familiar with the navigation area or be locally trained and given time to familiarize.  Boat driver performance should be monitored by a competent supervisor. |  | | GENERAL  S2  S10  S29 |
| 2.13b.11  Driving permits and records | | Driver and crew records should be maintained and should include:   * Personal and employment details * Types of boats the coxswain is licensed to drive. |  | | GENERAL |
| 2.13b.12  Boat driver and crew driving hours | | Contractor and Client should agree on maximum boat driver driving and working hours. The general recommendation is that these should be the same or less than the well documented driver duty hours for vehicles, taking into account that driving of small craft, especially speed boats can be much more strenuous than vehicle driving.  Where regular rest stops (every 2.5 hrs) are not possible during the voyage, two drivers should alternate.  Fatigue management and monitoring as for vehicle drivers. |  | | GENERAL  S3  H26  (see also above for vehicle drivers) |
| 2.13b.13  Boat driver routines | | Boat drivers should:   * Ensure their passengers wear their PFD’s as instructed and that they are fitted correctly * Control boarding and off boarding * Use Deadman’s switch * Slow down and use audible warning signals for:   + Blind angles   + Other traffic as appropriate * Not engage in two way communication when driving at high speed * Follow Journey Management (JM) procedure * Regular rest stops (2.5 hours) * Ensure maximum number of passengers and cargo load is not exceeded * Ensure proper stowage of cargo * Not allow third party passengers.   Boat drivers should not travel alone and have a competent helper on the craft.  Boat driver helper should be able to use a spare Deadman cord, re-start the engine and recover the boat driver should he be MOB. Helper should be able to use the crafts’ navigation and communication means. |  | | GENERAL |
| 2.13b.14  Passenger routines | | Passengers should:   * Wear their PFD’s * Follow boat driver instructions * Sit down in small transport craft * Assist the boat driver as appropriate * Keep their hands inboard * Spread out to balance the craft * Not smoke inside the craft. |  | | GENERAL |
| 2.13b.15  Drowning prevention | | Drowning has been a major cause of fatal accidents in the geophysical industry.  Essential preventive measures to be rigorously applied are:   * Use of PFD’s on any craft but also near water (e.g. jetties) * Training in the correct donning and wearing of specific PFD * Swim testing where appropriate * Not wearing heavy (rubber) boots in small craft as these make swimming extremely difficult * Life rings and quoits * Water exit ladders where egress from water is difficult, e.g. on jetties. |  | | GENERAL  M10  S10  S41 |
| 2.13b.16  Swim test | | All exposed personnel to be swim tested with PFD before being exposed to shallow water or river operations.  NOTE: This is not applicable to marine operations which are covered by the requirement for offshore safety and survival training. |  | | LAND  S5 |
| 2.13b.17  Journey management (JM) | | All small boat and watercraft operations should be carried out in accordance with a Journey Management system.  Operating guidelines to be followed and precautions to be taken are described in the references.  The JM system should include a MOPO  The crew should monitor a reliable weather forecast system and have a means to alert all craft in case of imminent adverse weather. |  | | GENERAL  S3  S3-2  S3-10  S5 |
| 2.13b.18  Restricted operations | | Night time deployment of small craft should only be allowed in the event of an Emergency unless night time operations are contractually agreed.  The latest permitted departure time should be defined and enforced to avoid night time operations. |  | | GENERAL  S5  S10 |
| 2.13b.19  Procedures | | Documented procedures should be in place for water borne operations, creek and river crossing:   * All crossing points are approved by crew management before use and clearly marked * Prohibition against water crossing alone * Prohibition against bathing in unauthorized areas * Swift water rescue plans * Required use of PFD whenever working near water.   Procedures should be in place for controlling specific hazards, e.g.:   * Refuelling * Anchoring * Towing * Traffic * Predators * Debris * Low hanging tree limbs or vegetation * Tides and currents * Shallow water * Blind corners * Overnight procedure in case destination cannot be reached in daylight.   Emergency procedures:   * MOB * Collision with other small craft * Smaller craft being swamped * Abandon ship for larger craft * Assistance to third parties * SAR * Small craft malfunction. |  | | GENERAL  S5  S10 |
| 2.13b.20  Airboat operations | | Compliance with guidelines, requirements and practices in the reference document in particular the following:   * All seats to be fitted with seat belts * Safety shroud around the propeller * Procedures in place for controlling unique hazards, (back wash from propeller, large wake, slow to come to a stop) * Wire catcher on the front of the craft in areas where fence wires may be encountered * Assessment of local hazards and level of risk for introducing airboat operations into new locations and different cultures.   Airboats typically do not have built-in flotation. |  | | GENERAL  S5 |
| 2.14 Marine vessels: geophysical and support | | | | | |
| 2.14.1  SOLAS and MARPOL | | For all vessels engaged irrespective of size, the best practices of SOLAS and MARPOL are preferred. Where guidance in this document differs the most stringent should be applied. |  | | MARINE  S7 & E7  S10  S12  S53 |
| 2.14.2  Non mandatory vessels | | Non-mandatory vessels under the tonnage requirements for IMO and ISM should be gap assessed against these standards, and applied as far as reasonably practicable, in agreement between client and contractor.  Examples include:   * Ability to communicate effectively with the seismic vessel * Basic recovery of MOB and able to demonstrate the use of the equipment * Minimum cruising speed of 6 knots. |  | | MARINE  S7 & E7  S12  Class requirements |
| 2.14.3  Vessel design and certification | | All vessels should be built and equipped to the requirements of a recognized and accepted international classification society and/or administration, and should have valid certification issued by this classification society and/or administration for the type and area of operation.  All relevant certificates and ship documents should be available on the vessel. |  | | MARINE  Class requirements  S7  S12 |
| 2.14.4  Small craft and special purpose craft design and certification | | Such craft should be designed and constructed according to best practice under the control and acceptance of recognized and accepted technical authorities.  Small craft and special purpose design craft only to be used for their intended purpose. |  | | MARINE  S2-1 |
| 2.14.5  Manning - competence | | The vessel crew should be certified for the vessel class, size, area and type of operation., The flag state’s minimum manning requirements should be fulfilled but does not take into account special activities such as geophysical operations where additional administrative and operations responsibilities apply to all the vessel operations.  Client/contractor/subcontractor should contractually agree manning levels pertinent to the requirements of the project (use and risk based). This includes supply boats, workboats and Fast Rescue Crafts (FRCs). |  | | MARINE  Flag state requirements  S7  S14 |
| 2.14.6  Automatic water tight doors | | On vessels with automatic operating water tight doors: personnel should receive pertinent instructions about these within 24 hrs of boarding vessel. |  | | MARINE |
| 2.14.7  Emergency equipment/life- saving appliances - general | | The vessel(s) should be appropriately equipped for its class with life-saving appliances complying with the references.  All emergency equipment on-board should be maintained in a state of readiness at all times.  For vessels, the following tests should be considered:   * All fire-fighting monitors tested once per month (or weekly if the vessel has a specific fire-fighting role) * Life-raft and release units serviced annually * Fast rescue craft/ lifeboats launched and tested at least once per month * Fire pumps run at least weekly.   All periodic inspections and tests should be performed per schedule by recognized service companies.  The relevant personnel on-board should be trained in its use. |  | | MARINE  Class requirement  S7  S11  S14 |
| 2.14.8  Life rafts | | Where not required by the reference the life raft capacity on either one side of the vessel should be sufficient to accommodate the total number of persons on board.  For smaller boats where it is not possible to mount two or more life rafts the minimum allowable life raft capacity is 150% of the maximum permitted persons on board.  All life rafts are to be fitted with hydrostatic releases. Where shallow water operations preclude guaranteed action of hydrostatic releases a more appropriate method of float free operation should be provided.  An emergency MOB life raft should be located and releasable from the back deck. |  | | MARINE  S7 |
| 2.14.9  Survival craft | | In cold-water and remote areas rigid hulled life boat(s) i.e. the Totally Enclosed Motor Propelled Survival Craft (TEMPSC) are preferred. |  | | MARINE  S7 |
| 2.14.10  Abandon ship Life-jackets | | Life-jackets are to be provided for a minimum of 200% of the total number of berths on board and should be placed as to be readily accessible in domestic areas, the work place and muster points.  The life-jackets' position and donning instructions should be clearly displayed.  Wherever possible it is preferred for 100% of life-jackets to be available on open deck. |  | | MARINE  S7  S6 |
| 2.14.11  Integrated Survival System | | Life-jackets can be integrated as part of an ISS when working in cold climates, includes three unique components:  • Personal Flotation Device (PFD) according to SOLAS dual chamber standard with minimum 275nm buoyancy  • Personal Locator Beacon (PLB)  • Personal Protection Equipment (PPE).  PLBs should be fitted to life-jackets whenever there is a risk of personnel falling overboard from a vessel or workboat. |  | | MARINE  S41 |
| 2.14.12  Survival suits (with insulation) | | Where operational conditions demand their use, the vessel should be equipped with survival suits of appropriate sizes for all persons on board.  The survival suits should be readily accessible and their position and donning instructions should be clearly displayed.  Of the 200% abandon ship life-jackets, survival suits that have a built-in PFD (which meet the requirements of an abandon ship life-jacket expressed by the LSA Code) may account for up to 100% of the abandon ship life-jackets in cold climates. |  | | MARINE  S7  S56 |
| 2.14.13  Smoke hoods | | Based on risk assessment, smoke hoods should be provided in cabins and workspaces where immediate egress is not available. Donning instructions should be clearly displayed. Light sticks can be provided as an aid. |  | | MARINE |
| 2.14.14  Safety harnesses | | Safety harnesses approved to suitable standards should be provided for personnel working in areas where there is a danger of them either falling or being dragged overboard.  The harnesses should have suitably positioned, safe and load tested attachment points.  Integrated PFD and harness, or PFD with attachment point for fall arrestors, should be considered. A robust regime of inspection and maintenance should be in place.  Harnesses consisting of a single waist belt should not be used. |  | | MARINE  S6 |
| 2.14.15  Fixed fire detection and protection system | | The preferred type of fixed fire detection system is a ‘self-monitoring type’ (i.e. has a fail-safe mode in the event of component failure).  High pressure water mist fire protection systems are preferred in engine areas. |  | | MARINE |
| 2.14.16  Transfer of personnel at sea | | The need and circumstances for transfer of personnel at sea should be contractually agreed.  Documented procedures should be in place and transfer should only go ahead after a specific risk assessment prior to transfer, and after the Captain has approved.  The consent of the person transferring should also be obtained. Such transfers should comply with local regulations.  The use of a suitably designed embarkation platform or gangway can be considered. |  | | MARINE  S6  S54 |
| 2.14.17  Basket transfers | | Basket transfers are not recommended and should only be conducted if contractually agreed, risk assessed and controls in place including, but not limited to:   * Consent from all participants * Good visibility & daylight * MOPO for weather and sea conditions * Crane approved for personnel transfer * Basket should be designed and approved for personnel transfer * Use of best available technology * Training for personnel in basket riding including baggage handling and positioning and behaviour of personnel * A basket transfer test could be carried out at mobilization start, if agreed by all parties. |  | | MARINE  S6 |
| 2.14.18  Loading/offloading | | Documented procedures should be in place for offloading/loading at main vessel (offshore) or at quayside, to include but not limited to:   * Data * Provisions * Technical equipment * Fuel * Containers/Remotely Operated Vehicles (ROV). |  | | MARINE  S6 |
| 2.14.19  Support and escort vessel management | | Support vessels need to be provided with full set of relevant project documentation and procedures, and receive project induction briefing from contractor management.  Documented procedures and formal risk assessment should be in place for:   * Mobilizing and recovery non-standard heavy equipment, streamer reels, AUVs etc. * TS-Dip operations * Recovery of equipment lost at sea * Alongside operations * Emergency tow * Bunkering * Workboat support * Third party engagement * Debris removal * Independent operations * Man overboard location and recovery. |  | | MARINE  S53 |
| 2.14.20  Bunkering | | Procedures should be in place for bunkering, including:   * Fuel quality (control and testing) * Spill containment * Fuel transfer method (in-line, alongside) * Fuel hose fitted with automatic shutoff couplings (e.g. TODO, Breakaway) * Use of tested and certified connectors and fittings to ensure compatibility * Fuel hose subject to pre-use inspections * Spill response plan. |  | | MARINE |
| 2.14.21  Close pass operations or when otherwise entering safety zones | | Project plan should include a risk assessment and identify procedures for entering the safetyzone. SIMOPS and platform liaison document should be developed which may include, but not be limited to, the following:   * PTW protocol − vessel may work under PTW system of third party * Safety zone is clearly established * Communication protocols between the parties are agreed upon * Closest approach permitted for vessel and towed equipment given specific metocean conditions * Pre-entry checks required * Ship’s Bridge & Engine room manning criteria * Operational readiness status of auxiliary equipment required * Diving, sub-sea ROV, working overboard and helicopter operations * Pre-entry radio checks and final permission * Ban on emergency drills * Radio silence controls agreed * Emergency tow on standby * Spark arrestors * Specified in the MOPO. |  | | MARINE  S6  S19  S23  S25 |
| 2.14.22  Multi vessel operations – Ocean Bottom Cable (OBC), Ocean Bottom Node (OBN), Wide Azimuth (WAZ), etc. | | In multi vessel operations a single control point for overall vessel movement should be established. A dedicated communications coordinator may be required. |  | | MARINE  S6 |
| 2.14.23  Collision risk management | | Mitigation measures for detecting threats and preventing collision includes:   * Agreed vessel suitability and acceptance process implemented for all vessels * Approved extended safe navigation area * Client’s maritime instructions in the area implemented by Contractor * Close passes and undershooting controls approved by Client where applicable * Advanced communication to interested parties of projected work area * Collision detection, e.g. visual lookout, use of stand-by vessels, radar, hybrid radar, Automatic Identification Systems (AIS) including on the outer tail buoys or a combination of these commensurate to the density of the collision threats * Means of communication including but not limited to contact details from all field units in the SIMOPS plan, Global Maritime Distress and Safety System (GMDSS) procedures, searchlights and sirens, coastguard * Contingency plans including emergency towing. |  | | MARINE  S16  S42  S43 |
| 2.14.24  Emergency towing | | The requirements for emergency tow vessel(s) should be contractually agreed between client and contractor to mitigate any seismic vessel’s loss of propulsion.  Emergency towing requirements should consider the seismic vessel’s Redundant Propulsion (RP) Class Notation and Failure Modes and Effects Analysis (FMEA).  RP and RPS (RP with Separation) Class vessels with additional qualifier (+) operating in open waters may be exempted from certain emergency towing requirements. Qualifier (+) may be assigned to both RP and RPS notations when it is verified that the vessels propulsion and steering system is of a redundant design.  Contractor should define the conditions and frequency for emergency tow drills.  When emergency tow capacity is required to mitigate a seismic vessel’s loss of propulsion, emergency tow vessel(s) should:   * + Conduct a tow test at the start of the project prior to streamer deployment, or whenever a tow vessel is replaced   + Have a fit-for-purpose and certified bollard pull to maintain the seismic vessel and in-sea equipment, at a water speed of at least 3 knots   + Have fit-for-purpose and certified back deck equipment including emergency release   + Be manned by officers experienced in towing operations.   Vessels-specific work instructions and risk assessment should be approved by both captains.  Streamer vessel should have an emergency release with a preference for remote operated towing line cutting tool. |  | | MARINE  S57 |
| 2.14.25  Dynamically positioned (DP) vessels | | Operations with DP vessels should be in compliance with the reference document. |  | | S17 |
| 2.14.26  Marine operations in arctic waters | | Arctic operations should be in compliance with the reference document. |  | | S55 |
| 2.15 Back deck marine operations: geophysical and support | | | | | |
| 2.15.1  Working environment | | Working areas should be designed and maintained to achieve:   * Protection from adverse weather * Safe and secure footing for those working there * Effective communications between back deck, ship’s bridge and Instrument room. * Acceptable noise levels * Adequate levels of lighting * Deck markings reference PPE requirements.   In addition:   * Appropriate PPE – wet/cold weather wear should be available * Should they exist, areas of high noise should be clearly identified, marked with warning signs and appropriate PPE provided * Deck areas should be maintained, clean and kept free from obstructions * Equipment and stores should be securely shored up to prevent movement in rough weather. |  | | MARINE  S6  H2  S53 |
| 2.15.2  Back deck fire prevention, detection, protection | | Back deck fire prevention measures should include but not limited to:   * Identification of where smoking is permitted * PTW for hot-work on back deck * Provision of smoke/heat detection system in high risk areas * Appropriate deluge systems should be installed over high risk areas (e.g. streamers) * Provision for dealing with lithium fires. |  | | MARINE  M3  S6 |
| 2.15.3  Edge protection from falls | | Suitable railing around work deck areas.  Use of fall arrestors when operating in open slip-ways or over railings – signed appropriately.  Provision of written fall protection plan where appropriate.  MOB Alarm interfaced with energy source.  On an airgun slipway, the safety harness should be attached to a self-retracting lifeline, with a maximum length that would keep a person on the slipway. |  | | MARINE  S6 |
| 2.15.4  Lone Worker | | A person should not work alone on the back deck without supervisor approval. |  | | MARINE |
| 2.15.5  Protection from dynamic loads | | The risk of injury from dynamic loads should be reduced by use of the following but not limited to:   * Design of deck to minimise exposure * Restricted access areas * Minimise exposure for authorized personnel in the line of fire or snap-back zones * Clear access-ways with adequate width; * Correct use of wires/ropes * Utilization of MOPO. |  | | MARINE  M3  S6  S20 |
| 2.15.6  Protection from rotating/moving equipment | | The risk of injury from rotating/moving equipment should be reduced by use of the following but not limited to:   * Design of deck to minimise exposure * Restricted access areas * Clear access-ways with adequate width * Guarding on rotating and moving machinery parts * Barriers to moving equipment * Emergency stop devices for machinery and conveyor belts * Certification of equipment and machinery according to manufacturer specifications * Defined maintenance and inspection requirements * Procedure to restrict the use of loose clothing, loose long hair, and jewellery while working to protect personnel from getting caught up in machinery * Operating procedures and training for operators. |  | | MARINE  M3  S6 |
| 2.15.7  Protection from electrocution | | All power to be removed from streamer when disconnecting or connecting sections; |  | | MARINE  S6  M8 |
| 2.15.8  Portable equipment/hand  tools | | Use of battery operated or low voltage tools with transformer isolated supply preferred. Strongly recommended to use residual current circuit breakers (RCCB) on utility outlets used in wet areas, where practical.  Double insulated if higher voltage.  Preventative maintenance required and a system of recorded portable appliance testing recommended.  Pneumatic tools preferred to electric where no additional exposure is introduced.  Whip checks to be available for hoses on pneumatic tools. |  | | MARINE  M3  S6 |
| 2.15.9  Emergency response – equipment, communications | | Strong emphasis on protection against a person falling overboard including, but not limited to:   * Safe working practices * Matrix of Permitted Operations (MOPO) * Barriers * Life lines.   MOPO should define the sea state and other conditions which operations are not permitted. These conditions should be regularly checked.  As a minimum, the following should be in place in all areas and activities where there is a risk of falling overboard:   * Wearing of automatic inflating life-jackets with reflective material and water activated lights * Personal locator beacons * Vinyl dip work vests should not be used.   In case of man overboard:   * Marker buoys, light rings and other such devices that can be thrown overboard to aid person in water and mark their location * Emergency life raft should be releasable from back decks * Established communications devices readily available to personnel on back deck * Video monitoring of key working areas of back deck by ship’s bridge and instrument room * MoB alarm. |  | | MARINE  S6 |
| 2.15.10  Certification/testing of load bearing equipment | | Winches, booms, cranes, wires, chains, cables, straps, tie down points, pad-eyes and devices subject to proof load test and maintained under survey. |  | | MARINE |
| 2.15.11  Defined procedures for HSE critical operations, limitations on back deck operations | | Procedures for recovery, deployment to include a table defining limits for operations as affected by natural phenomena and simultaneous operations. A specific MOPO or to be included in the vessel or Crew MOPO. |  | | MARINE  S6 |
| 2.15.12  Housekeeping - good seamanship | | Minimization of slip/trip hazards.  Proper stowage of equipment.  Equipment tied down in adverse weather. |  | | MARINE  S6 |
| 2.15.13  Environmental protection | | No waste to be thrown overboard.  Streamer and umbilical fluid should drain to tanks and not over the side.  Spills kit to be available on back deck with personnel trained in its use.  Small items including waste are not allowed to be left loose on deck (e.g. spent tape, tie wraps, plastics, etc.). |  | | MARINE  M3  S6  E7 |
| 2.15.14  Streamer tangle | | The size of the streamers configuration should be balanced with the capabilities of the seismic vessel, in order to reduce the risks of:   * + Collision with assets or ship traffic   + Streamer tangle and the subsequent HSE exposure in the recovery of in-sea equipment.   This evaluation should encompass the:   * + Redundancy   + Electrical and propulsion power capacity   + Spare tow points and winches for recovery   + Environmental conditions including prevailing weather, sea state, barnacle growth, currents.   Any non-routine equipment recovery should be subject to a risk assessment and appropriate approval process. |  | | MARINE |
| 2.16 Workboat operations | | | | | |
| 2.16.1  General operations | | Operational planning and execution should be carried out in accordance with reference and related guidance in this document. |  | | MARINE  S2  S2-1  S2-2  S6 |
| 2.16.2  Specific training requirements | | All workboat crew should have undergone Training in the operation of the particular workboat type and specific in-water repair operation.  Contractor may include one trainee in the workboat crew when it's a documented aspect of the contractor’s training programme. |  | | MARINE  M3  S6  S29 |
| 2.16.3  Workboat launch toolbox meetings | | Toolbox meetings should always be conducted prior to launch of workboats for in-water repair at which time a risk assessment of the specific operation should be carried out. |  | | MARINE |
| 2.16.4  Specific hazards associated with streamer and in-water equipment and repairs | | Risks associated with workboat operations should be assessed as part of procedure development, highlighted at pre-launch meetings and operations, to include:   * Dangers of being towed by streamer * Integrity of section changing hardware * Ergonomics of handling equipment over side of small boat * Isolation of streamer power * Tangling with surfaced streamers * Navigation of small boat relative to the streamer not the vessel(s) * Support/auxiliary vessel safety when they take equipment in tow (tangling props etc.) * Boarding of in-water gear * Fire risks (e.g. lithium batteries) * Quick releases of equipment * Visibility and adverse weather * Dangers of in-water flora/fauna * Duration and scope of task to manage fatigue including the effects of sun/salt/heat/cold on boat crew. |  | | MARINE  S6 |
| 2.16.5  In-water repair procedures | | Workboat operations should be permitted only where procedures have been specified and validated in exercises.  Workboat crew should wear Personal Locators Beacons (PLB).  Main and support vessels should have the necessary direction finders for the PLBs in use |  | | MARINE  S6 |
| 2.16.6  MOPO for workboat operations identifying prohibited jobs, including during helicopter operations | | A MOPO or matrix summary should be developed for in-water maintenance jobs using workboats. Such a MOPO for example would not permit in-water maintenance on the following:   * Air gun arrays * Lead-ins * Doors, paravanes, pullavanes.   Personnel should not be allowed to disembark from the workboat onto tail buoys. |  | | MARINE  S2  S2-1  S2-2  S6 |
| 2.16.7  Management of change | | If the scope of the repair operations does change significantly, the workboat should return to the mother vessel where a risk assessment for the new operation should be carried out. |  | | MARINE  M1 |
| 2.16.8  Emergency planning for workboat operations | | In the event that extensive in-water maintenance work is envisaged using workboats (e.g. 3D multi streamer operations), the following should be required.  A full time support vessel should act as a rescue craft to be stationed in close proximity to the workboat while performing in-water maintenance jobs.  The support vessel should be equipped to recover personnel from the water (e.g. scoop or cradle). |  | | MARINE  M3  S2  S2-1  S2-2  S6 |
| 2.16.9  PPE | | Minimum PPE requirements are:   * Automatic inflating dual chamber lifejacket * PLB * Steel-toed shoes * Marine rescue helmet with chin strap * Coveralls or survival suits depending upon water temperature * Safety glasses * Gloves. |  | | MARINE |
| 2.16.10  Fast Rescue Craft (FRC) | | A rescue craft with competent crew should be readily available for launching:   * Water jet propulsion is preferred * Rigid hull preferred * Diesel powered (inboard petrol power engines are not acceptable) * Minimum manning levels established * Craft to be unsinkable and fitted with manually operated self-righting system. |  | | MARINE  S7 |

|  |  |  |  |
| --- | --- | --- | --- |
| 2.17 Air transport | | | |
| 2.17.1  Air operations- procedures | Air operation(s) should be in compliance with the relevant guidelines, requirements and practices in the reference documents. |  | GENERAL  S1  S8  S13  S44 |
| 2.17.2  Audit of air operations | A competent aviation expert should conduct an independent audit of the aircraft operator, personnel and equipment, before the start of operations (by client or contractor). |  | GENERAL  S1 |
| 2.17.3  Helicopter selection | Helicopters should be fit for purpose.  Offshore, there is a preference for:   * Helicopters that are fitted with flotation devices that are automatically deployable * Helicopters that are equipped with push out windows for passengers * Helicopters which are equipped with Emergency Breathing Systems (EBS). |  | GENERAL |
| 2.17.4  Helicopter decks | Requirements for and availability of helicopter landing decks should be contractually agreed. Requirements and conditions include but are not limited to:   * The helideck crew, HLO, helideck assistants, and fire fighters, are suitably trained and experienced, this should include helideck fire-fighting training. * The entire helideck crew should have exercised together before the first helicopter operation. This should include proof that the fire-fighting equipment has been tested and is fully serviceable. * The helideck fire-fighting system should be fit for purpose and have sufficient coverage of fire-fighting systems and equipment. * The helideck should be certified for the largest size and weight of aircraft expected to be used. * The helideck friction should meet the environment and equipment to be used. If this includes a net it should be installed and appropriate for the aircraft using the helideck. * If re-fuelling is to be carried out, the equipment is certified and the nominated crew competent to use it. * A working inspection programme for the helideck should be in place that includes pre-arrival and departure helicopter checks, routine facility audits by the operator of the facility and the aircraft operator. * The vessel should have procedures for helicopter operations; these procedures should include all elements list above and detailed passenger handling instructions, and formal passenger safety briefing procedures. * Weather and deck heave monitoring available. * During offshore helicopter operations, a FRC should be in stand-by ready for immediate deployment. |  | MARINE  S13  S45 |
| 2.17.5  Helicopter landing zones (LZ) | Requirements for and availability of helicopter landing zones should be contractually agreed and planned in advance as the logistics involved in clearing them can take some preparation. Sections 6 and 7 of the reference contain more in-depth guidance for LZ construction. Requirements and conditions include but are not limited to:   * The LZ should be clear of all hazards and have the dimensions to allow the working helicopter to land and to manoeuvre (take-off and landing) without problems. A take-off and landing path should be considered as well as the prevalent wind direction. * The area of the Landing Zone should be sufficient and appropriate for the largest size and weight of aircraft expected to be used. * No loose objects left in a landing zone (clothing, garbage, tarps, etc.) * If re-fuelling is to be carried out, the equipment should be certified and the nominated crew competent to use it. * A working inspection programme for the LZ should be in place. For remote locations, the LZ should need to be maintained and cleared at a designated frequency. * Frequently used LZ should have wind direction indicators such as windsocks. * LZ should be clearly identified prior to an operation and coordinates to this LZ should be, in some cases, provided to emergency services or be kept in a central location where coordinates of these sites are readily available. * In the case of an LZ in tree canopy, the gap in the canopy, should reflect the gap on the ground: a recommended LZ area is 35 m by 35 m. This area should be cleared in the canopy. * If LZ is used to embark/disembark passengers, a clear path to and from the aircraft should be outlined and communicated to all passengers to avoid accidental walking into the tail rotor. All passengers should exit and approach the aircraft in clear and direct view from the pilot. * If the LZ is to be fitted with re-fuelling stations, proper equipment and firefighting capabilities should be present. * If LZ is also used for overnight maintenance, the LZ should be properly fitted with sufficient lighting. * Where aircraft need to be washed with water and soap regularly, a system (berm and grease traps, etc.) should be built around the pad to collect biodegradable soaps/oils. * The pilot has the ultimate word on accepting or rejecting an LZ site. |  | LAND  S8 |
| 2.17.6  Fast Rescue Craft (FRC) | A rescue craft with competent crew should be readily available for immediate launching whilst helicopter operations are taking place. |  | MARINE  S7 |
| 2.18 Camps and field workshops | | | |
| 2.18.1  Camp sites selection, construction and layout | Compliance with the references |  | LAND  S31  S32 |
| 2.18.2  Electrical | A competent person should be identified as responsible for all electrical aspects on the crew.  Client/contractor/subcontractor should mutually agree on applicable standards.  Compliance with guidelines, requirements and practices in the reference document. |  | LAND  S5  S6  S32 |
| 2.18.3  HP air, water and hydraulic systems | Procedures should be in place, which include but not limited to the following controls:   * Competent personnel * Designated area with warning signs * Hose connections, fan belts and pulleys protected/cleated * Inspection/maintenance programmes * Unattended machinery to be checked at a specified interval during operations * Unattended machinery should be provided with comprehensive alarm and shutdown devices that are periodically checked for effectiveness * HP hoses and piping to be certified to a safe working pressure that reflects the maximum that may develop in the system * Over pressure relief valves are installed * HP piping to be screened where practical where personnel may be at risk * Periodic (defined period) testing by competent authority * LOTO procedures utilized during maintenance. |  | LAND  S5  S6  M3 |
| 2.18.4  Battery charging | Battery charging procedures should be in place, which include the following controls:   * Designated, suitable separate area * Area well ventilated * Smoking prohibited * Appropriate PPE available (face shield, apron, gloves, rubber mats) * Eye-wash station * Fire-fighting equipment * Training requirements * Monitoring, control and recovery measure for battery (including lithium) failure. |  | LAND  S5  S6 |
| 2.18.5  Fuel transfer or storage | Procedures should be in place, made available to both receiving and supplying parties, which include the following controls:   * Storage and fuelling operations should be above the high water mark of any body of water and an adequate distance from water sources (e.g. ponds, rivers creeks) to avoid possibility of hydrocarbon pollution * Designated area(s) * Electrical equipment within the hazardous area to be suitable for the purpose and intrinsically safe * Fuel hoses with automatic shut-off valves * Spill prevention plan and containment equipment (secondary containment/drip pans) to avoid environmental incidents * Oil spill consumables and equipment ready to handle any oil spill incident * Separation of hazardous areas * High visibility warning signs * Appropriate fire-fighting equipment positioned within 15 m of pumps or dispensers * Only approved fuel tankers to be used * Tankers adequately grounded during fuel transfers * Appropriate PPE; * Designated and trained fueler should be present during fuelling operations.   Berms with a minimum 110% containment should be provided on all fuel storage, with the exception of steel road tankers. The latter should have a close off valve directly on the tank itself, which should be closed at all times when fuel is not being dispensed and drip containment in place. Note: berm (containment arrangement) should take into account rainwater contribution where appropriate. |  | LAND  S5  S6  S32  E6 |
| 2.18.6  Fuelling operations | Procedures should be in place for fuel handing, including:   * Fuel quality (control and testing) * Fuel storage (including spill containment) * Fuel transport * Spill prevention plan * Refuelling * Record of competent persons authorized to carry out fuelling operations. |  | LAND  S5  S6  E6 |
| 2.18.7  Compressed gases | Procedures should be place for compressed gases, including:   * Segregation * Safe distances * Hydrostatic testing * Labelling * Storage * Handing * Non return valves and flash back arrestors should be used on Oxygen and Acetylene gas bottles. |  | LAND  S5  S6 |
| 2.18.8  Maintenance facilities | Where vehicles and equipment are maintained in camp a hardstand and sheltered area should be provided for this work.  A safe and practical method of under vehicle work/inspection should be provided. Inspection pits should be properly constructed to be safe. |  | LAND |
| 2.19 Security (land and marine) | | | |
| 2.19.1  Assessment | During tender phase, client should provide contractor with client’s initial risk assessment, or hazard list. The assigned responsibilities and resources should be contractually agreed. Before the project start-up, the security of the operation should be assessed or re-assessed in the event of changing conditions.  In marine operations the Company Security Officer (CSO) should ensure that the vessel is fully aware of any raised ISPS security level (2 or 3) in the area of operation and that any additional controls are in place. Contractor should have a single focal point for local security. |  | GENERAL  SEC4  SEC6  SEC8  SEC9  SEC11  SEC12 |
| 2.19.2  Procedures | Security procedures should be in place covering a range of situations including:   * Assault * Robbery/theft * Abduction/missing persons * Threats by telephone * Cargo/baggage integrity * Vandalism/sabotage * War/terrorism/piracy * Civil disobedience/strikes * Guarding of camp * Temporary local workforce * Cyber security * Security response and communication.   In marine operations, client /contractor/subcontractor should agree on security arrangements even if vessels do not fall under ISPS requirements and/or non-ISPS certified ports are contemplated. |  | GENERAL  SEC2  SEC3  SEC4  SEC5  SEC10  M11 |
| 2.19.3  Personal awareness | Personnel involved in the project to be trained in basic preventive measures to reduce potential security incidents.  Where assessment identifies a security risk to personnel, guidance should be provided on appropriate behaviour in the event of a security Incident.  A policy of ‘no resistance’ is recommended.  Limit cash and valuables and maintain secrecy about cash transfers/transport |  | GENERAL  SEC1  SEC2  SEC3  SEC4  SEC5 |
| 2.19.4  Potentially aggressive interference or intervention by third parties to the project | Identify, assess and document the risks that exist from third party activists.  Document the procedures that are to be followed, which might include:   * Interference with vessels/vehicles/ equipment by a third party * Radio contact from a suspicious third party * Third party puts themselves or crew members in danger * Third party shows aggression towards the crew personnel * Third party attempts to take possession of crew property. |  | GENERAL  SEC1  SEC2  SEC3  SEC5  SEC6  SEC11 |
| 2.19.5  Social media | Provide policy and instructions on the use of social media. |  | GENERAL  M3 |
| 2.20 Survey and line operations | | | |
| 2.20.1  Surveying / Line Clearance | Client and contractor/subcontractor should mutually agree on the necessity and scope of line clearance activities and perform a risk assessment.  Surveyors should identify hazardous areas and indicate them on line maps to assist subsequent operations.  Line markings should be recovered, reused or recycled where possible, and biodegradable materials should be used where available.  Compliance with guidelines, requirements and practices in the line clearing reference document(s), addressing:   * Brush cutting with hand tools or light powered tools * Line clearance machinery (including bulldozers, mulchers, hydro-axes and back-hoes) * Tree felling and chain saw operations * Bridging. |  | LAND  S5  S46  S47  S48 |
| 2.20.2  Steep Slopes | If working on steep slopes, a comprehensive set of procedures should be developed which includes:   * The use of specialists (mountaineers) for very steep terrain * Training of personnel on techniques for working on slopes * Medevac preparations adapted to terrain, e.g. helicopters with winches for evacuation, drop zones and specific training for personnel; * Use of a zoning system, e.g. ‘no go’, ‘mountaineers only’, ‘supported by mountaineers’, etc.   PPE for working on slopes including boots with ankle support and proper non-slip soles. Helmets should be mountaineering helmets which also provide head protection during a fall. |  | LAND  S49 |
| 2.20.3  Risk from falling objects | Recognition of risks from falling objects to include but not limited to:  Chain saw operations:   * Falling trees * Falling branches * Dead and insecure trees and limbs not actually being cut.   Line clearing:   * Insect habitats, e.g. wasp or bee hives * Falling creatures, e.g. snakes and spiders * Leaning and dead trees * Dead branches.   Heli-portable operations:   * External loads. |  | LAND  S5  S50 |
| 2.21 Shot hole drilling | | | |
| 2.21.1  Drill unit resources: type, selection, and design | An assessment should be available for the required drill units, which should cover the lithology, terrain, required depth and ergonomics. |  | LAND  S5 |
| 2.21.2  Safety equipment for drill/ramming units | Compliance with manufacturers’ recommendations and guidelines, requirements and practices in the reference document.  In addition, adequate measures are to be taken to avoid injuries from rotating drill stem (cages, emergency stop, interlocks).  Jewellery policy should be in place.  PPE should take into account the need to wear tightly fitted clothing to reduce the potential of being snagged.  Rotation shall be stopped for clamp/pipe cleaning.  Prefer hold-to-run rotation controls on drilling units, mandatory for auger drilling.  Ensure emergency switches are easy to reach and actually stop the hydraulic, not only the engine.  Identify solutions to provide protection from rotating parts e.g.:   * Cage around rotation head and rod to prevent access to moving parts * Implementation of an interlock when the cage is opened * Inside the cage, use of sensitive protective devices to control the residual risk. |  | LAND  S5 |
| 2.21.3  Maintenance | Compliance with manufacturers’ recommendations and guidelines, requirements and practices in the reference document. |  | LAND  S5 |
| 2.21.4  Operators competence and selection | Perform an assessment in line with reference document of drilling operator experience, skill, training and understanding on the specific unit(s) used.  All drill crew personnel to be made aware of the hazards related to:   * Overhead power lines * Explosives * Buried objects. |  | LAND  M3  S5 |
| 2.21.5  Heli-portable drilling loadmasters | Heli-portable drilling operators should be trained as helicopter loadmasters to the acceptance of the helicopter operator. |  | LAND  M3  S1  S5  S8 |
| 2.21.6  Operational procedures, for different types of drilling units | Procedures should be in place for the specific drill units being used, which are in compliance with guidelines, requirements and practices in the reference document:   * Truck mounted drills * Buggy mounted drills * Airboat mounted drills * Marsh buggy mounted drills * Ramming rigs * Heli-portable drills * Man-portable drills. |  | LAND  S1  S5  E6 |
| 2.21.7  Clean up, move up | Hazards should be managed such as:   * Flowing hole/artesian well * Contact between fresh and salt water aquifers * Loss of water through drilled holes in irrigated land.   Compliance with guidelines, requirements and practices in the reference document. |  | LAND  S5  E6 |
| 2.21.8  Ground disturbance | Procedures should be in place to:   * Locate and map buried objects such as pipelines, underground power lines, etc. * Ensure safe passage across underground utilities, including the construction of temporary ramps * What to do if unknown object encountered. |  | LAND |
| 2.22 Explosives | | | |
| 2.22.1  Planning | The relevant laws governing the storage, transportation and use of explosives in geophysical operations are known, available on the crew and should be complied with. |  | LAND  S5  S51 |
| 2.22.2  Supervision | Supervisors responsible for operations where explosives are used should meet the competencies defined in the reference. |  | LAND  M3  S5 |
| 2.22.3  Personnel | All personnel handing explosives should be qualified, licensed (where required) and certified as competent to perform the allotted explosives handling jobs. |  | LAND  M3  S5 |
| 2.22.4  Offsets | Agree safety distance to private/public buildings and archaeological sites based on peak particle velocity (PPV) measurements and implement active monitoring with post acquisition inspection if appropriate.  Source locations should be planned to conform to the largest distance requirements stated in relevant local regulation or the reference document for shot to object (e.g. pipelines, buildings). |  | LAND  S5  E9  E10 |
| 2.22.5  Proximity of radio emissions | The measures including safety distances for the prevention of unplanned detonation of electric detonators by radio frequency radiation (including radar) should meet the recommendations in the reference. |  | LAND  S5  S22  E9  E10 |
| 2.22.6  Type | Criteria of choice includes, amongst others:   * Avoid nitro-glycerine based products (more hazardous, adverse health effects) * Buoyancy (buoyant charges may be a problem) * Self-destruction time (in case of misfire or loss) * Type of packaging, feasibility of using anchor plugs * Self-destructing products are recommended * Electronic detonators are recommended both for safety and security reasons * Where practical, the use of double detonators is recommended where abandoning misfires is considered unacceptable or not allowed by the regulators. |  | LAND  S5  E6 |
| 2.22.7  Explosives packaging | Explosives packaging should be securely stored until disposed of, so that is cannot be stolen by malicious elements.  To be disposed of by controlled burning. |  | LAND |
| 2.22.8  Unused Explosives | Procedures should be in place for disposal of explosives in coordination with the manufacturer and/or suppliers and in accordance with IME practices. |  | LAND |
| 2.22.9  Transportation - land, water, air | Procedures should be in place for explosives transportation (land, water and air), as per reference documents |  | LAND  S1  S5  S8  S15 |
| 2.22.10  Storage distances | The distances of explosives storage facilities from other structures, buildings and infrastructure and should meet the recommendations as stated in the reference. |  | LAND  S5  E9  E10 |
| 2.22.11  Storage | Storage of explosives should comply with local regulations.  Area to be kept clean |  | LAND  S5 |
| 2.22.12  Storage management | Only competent personnel should be made responsible for the control of explosive inventories. Key control. |  | LAND  M3  S5 |
| 2.22.13  Storage – locations  See “Storage distances” above | Explosives storage location(s) should be:   * At safe distances from occupied places * In areas clear of any combustible material for at least 15 m. |  | LAND  S5  E9  E10 |
| 2.22.14  Magazines | Explosives magazines should comply with the following:   * Be of sound construction according to the local regulations or IME guideline * Efficient lightning protection * The use of active (ionizing chamber) lightning conductor(s) is not recommended, their effectiveness is not considered proven * Adequate earthing * Controlled access and adequate security * Temperature extremes controlled * Adequate ventilation around explosives * Magazines on barges should take into account load distribution to prevent capsizing. |  | LAND  S5  S21  S51 |
| 2.22.15  Temporary field storage | Temporary storage facilities for explosives in the field should have:   * Adequate security (including secured for unauthorized removal) * Adequate weather protection * Adequate ventilation * Up to date inventory. |  | LAND  S5  E9  E10 |
| 2.22.16  Separation from other materials | Explosives to be stored in isolation from other materials. Detonators always stored away from explosives. |  | LAND  S5  E9 |
| 2.22.17  Shot hole loading | Compliance with guidelines, requirements and practices in the reference document.  Multiple charges at various depths in a single hole are not recommended.  If required should only be considered where knowledge of the near surface, the small size of charge, separation and tamping practice gives confidence that the risk of blow out is avoided.  Procedures for priming and loading should always ensure only a minimum number of operators are exposed, for a minimum duration. |  | LAND  S5 |
| 2.22.18  Shot firing | Compliance with guidelines, requirements and practices in the reference document.  Delayed blow-outs procedures providing minimum approach times after shot initiation has commenced. This should never be less than one minute, and a wait of at least 15 minutes is recommended for electrical detonators, and 30 minutes for electronic detonators.  Multiple firing lines are not permitted. A blaster should only use a single firing line.  Firing lines should be anchored, when warranted, to avoid being blow out in the direction of other hazards.  Adequate firing line length should be of a minimum of 30 m or 100 ft. |  | LAND  S5 |
| 2.22.19  Disposal | Procedures should be in place for disposal of explosives in coordination with the manufacturer and/or supplier.  International and local legal requirements should be complied with  Packing should be burned in field and not re-used. |  | LAND |
| 2.22.20  Abandoning misfires | Procedures for handling abandoned charges should be mutually agreed upon by client and contractor during the bidding stage.  Basic requirements for abandoning a misfired charge include but are not limited to:   * The detonator lead wires should be cut and placed in the drill hole as deep as possible beneath the surface * The surface should be covered with drill cuttings * The contractor should keep a permanent record of the misfire, including information on the location, explosive type, size and depth * If required, reports should be submitted to appropriate regulatory agencies.   The following practices are **not** recommended but may be required by local regulations in some jurisdictions:   * Sympathetic detonation (re-entry or drilling near-by) * Attempts to retrieve the misfired charge (assess erosion and area activities) * Surface identification or monumenting of abandoned charges to prevent unlawful recovery. |  | LAND  S5  E6 |
| 2.23 Vibroseis | | | |
| 2.23.1  Training | Operator and mechanic training to be conducted so that personnel are aware of the fatal risk of crushing   * No approach to vibrator without notifying the driver * If approach/work necessary: power down, pad down * Pad down while stopped * Emergency shut down switches on pad and near wheels * Walk around before re-starting. |  | LAND  M3 |
| 2.23.2  Awareness | All employees involved with vibrators to be aware of the risks from HP hydraulic oil.  In bad terrain or restricted areas, consideration should be given to vibrator pushers/guides. |  | LAND  M3  S5 |
| 2.23.3  Maintenance | Maintenance schedules should be defined. Manufacturers’ recommendations should be followed. |  | LAND  S5  Manufacturer manuals |
| 2.23.4  Force | Distances and force values should be pre-defined by mutual agreement between client and contractor to avoid damage to structures, utilities, sub-surface economic features. |  | LAND  E6  E9  E10 |
| 2.23.5  Hydraulic fluid leaks | Procedures should be in place to minimise impact in case of hydraulic spills |  | LAND  S5  E6 |
| 2.24 Land recording operations | | | |
| 2.24.1  Safety equipment | All recommended PPE to be worn according to agreed PPE matrix and work conditions.  High visibility reflective clothing to be worn by all personnel outdoors in land operations.  Any unit with generator power (recorder, battery charging units, mechanic shop, etc.) to be fitted with fire extinguishers, smoke detectors, carbon monoxide detectors (where appropriate).  Ensure there is adequate grounding between generator and adjacent vehicles. |  | LAND  M2  S5 |
| 2.24.2  Communications, camp to field | Communication systems should be established to allow direct communication between base camp and field units at all times. Adequate repeaters should be installed as necessary. |  | LAND  M2  S5 |
| 2.24.3  Recording equipment pick up/lay out by hand or vehicle | Compliance with guidelines, requirements and practices in the reference document. |  | LAND  S5 |
| 2.24.4  Line checking | In areas of high risk, (swamp, very rough terrain), line checkers to work in pairs as a minimum, using the buddy system. |  | LAND |
| 2.24.5  Environment | There should be contractual agreement that provides for an acceptable process to ensure that no trash has been left on line location. |  | LAND  E6  S5 |
| 2.24.6  Additional requirements  for different types of  operations | Compliance with guidelines, requirements and practices in the reference documents for the following types of operations:   * Night operations * Helicopter operations * Road operations * Operations during electrical storms * Development of working alone guidelines * Urban area guidelines. |  | LAND  S5 |
| 2.24.7  Land operations in darkness | Mutual agreement should be achieved prior to allowing night time operations.  Procedures for operations in hours of darkness on land should include:   * An on-going risk assessment to determine what operations can be safely conducted in the prevailing conditions (terrain, environment, transport, energy source, emergency response capability, etc.) * All personnel working should wear reflective clothing * Additional lighting (vehicles, facilities, personal) should be considered * Liaison with local authorities and other interested parties as appropriate, e.g. relative to noise and traffic in urban or populated areas * More frequent journey management checks are done.   Unforeseen requirement for working at night time should be subject to a management of change process. |  | LAND  S5 |
| 2.24.8  Ice operations | Compliance with guidelines, requirements and practices in the reference document.  Use of ground penetrating radar (GPR) and competent operator should be considered.  Ice thickness and ice freeboard measurements should be taken when working on frozen water bodies. |  | LAND  S5  H2  E4  S52 |
| 2.25 High pressure air sources | | | |
| 2.25.1  Integrity of HP air systems including compressors | The integrity of air compressor and HP air systems including HP piping and hoses, should be documented & demonstrated by:   * Certification of the system by an identified 'competent person' as complying with the requirements of an appropriate pressure standard or code * The split of responsibilities between Chief Engineer and Chief Gun Mechanic should be clearly determined * Panels with relief valves should be located away from passage ways or in an isolated area * Hydrostatic testing before being brought into use. Thereafter periodically (5 years maximum) and also after modification or repair is recommended * Preventive maintenance plan * Position/design and operation of relief valves/burst disks * Operation of shut downs/emergency stops * Protection of flexible hoses (minimise in design) * Testing of relief valves and safety devices * Condition of manifold valves for bypass – leave drain valves open * Competence of fitters/repairers.   For valves or appliance operating above 100 bar (1,450 psi), remote operation is preferred. |  | MARINE  M3  S5  S6 |
| 2.25.2  Integrity/design of array systems and air guns | The integrity of the air gun array systems and air guns should be demonstrated by:   * Design of array to minimize manual handling/ergonomics; * Design of array to minimize shock/damage to air guns during deployment/recovery * Preventive maintenance plan * Regular bleed off tests * Safe procedures for isolating and locating air leaks * No local modifications * Inspection routines. |  | MARINE  S6 |
| 2.25.3  Air gun operations procedures | Air gun operational procedures should be in place, which should include:   * Safe system of work for maintenance – procedures * Awareness training in the risks of HP air * Protection of air manifold/gauge * Warning signs /signals when air guns on deck * Ergonomics – manual handling of air guns/heavy parts is minimized * Safe system of work if test firing * Minimization of pressured air guns on deck – bled down before recovery to deck * Medical emergency procedures in place in case of HP air injury including first aid training * LOTO during maintenance * Awareness of explosion risk of oil in HP air lines, e.g. non-greasing philosophy * Emergency shut-down of compressors away from the panels, e.g. gun deck office, and astern. |  | MARINE  M3  S6 |
| 2.26 High voltage electricity (including EM & ROV) | | | |
| 2.26.1  High voltage electricity – Electromagnetic (EM), ROV operations | Certification of the system to a recognized standard should be in place and procedures that include, but are not limited to:   * Awareness training to understand the risks of high voltage electricity * Safe system of work for maintenance procedures * LOTO of electrical systems during maintenance or adjustment * Repairs/maintenance of high voltage equipment only conducted by certified/competent persons * Protection from high voltage electrical systems * Warning signs & barriers when operational * Safe system of work if testing on deck * Medical emergency procedures in place in case of high voltage injury including first aid training * Ergonomics – manual handling of EM fish/source is minimized. |  | MARINE  S6 |
| 2.27 Other energy sources | | | |
| 2.27.1  New technology and developments | As existing technology is developed and new technology identified, other energy sources should be subject to best practice requiring the safe operation of those sources, the protection of personnel operating them, third parties and local fauna. An MoC procedure may be necessary. |  | GENERAL |
| 2.28 Cranes/lifting devices | | | |
| 2.28.1  Integrity of cranes, davits, winches, and other lifting systems | The lifting equipment and gear should be in accordance with the reference and include, but not be limited to:   * Lifting register of equipment * Valid certification/approved type for use to local regulatory requirements * Preventive maintenance system in place * Structural condition of foundations/lifting points * Safe Working Loads (SWL) ratings for dynamic loads lifted from seaways (marine systems) * Regular inspection/reports on condition of stops and limit switches * Pull tests for winches carried out at regular intervals * All personnel should wear high visibility and reflective clothing. |  | GENERAL  S20 |
| 2.28.2  Integrity of lifting wires, slings, pallets, hooks, barrel clamps | The lifting gear should be in accordance with the reference and assured by:   * A preventive maintenance plan * A lifting register to identify wires/slings * All hooks having safety latches. |  | GENERAL |
| 2.28.3  Control systems | All cranes and lifting devices should have:   * Clear controls (centre sprung) * Remote control systems – interlocks/accidental operation security of operating unit and spare systems * Safe positioning of controls with respect to load * Cranes should have limit stop switches and alarms.   Any safety devices installed on lifting equipment should be confirmed as operational prior to use. |  | GENERAL  S20 |
| 2.28.4  Operations - procedure | The operation of all cranes and lifting equipment should be carried out with:   * PTW and LOTO procedures in place during maintenance * Inspection routines in place * Trained and competent operators * Assigned operators/banksmen * Standardized signals * Established clear lines of communication * Use of appropriate PPE * SWL and angles clearly marked * Use of tag lines * Dropped object protection for personnel and equipment.   Prior to any lift, the following should be in place:   * An assessment of the lift has been completed and the lift method and equipment has been determined by a competent person(s) * A lifting plan in place for crane operations * Anyone involved in the operation, including rigging, is competent for the specific job and/or equipment on which they are working * Load does not exceed dynamic and/or static capacities of the lifting equipment * A competent person(s) has visually examined all lifting devices and equipment before each lift * A safety zone has been established to limit access to all workers except essential personnel * External conditions which could affect the lift are monitored (e.g. ground condition, wind, etc.). |  | GENERAL  M3  S20  S50 |