

Crew HSE Plan

CREW HEALTH, SAFETY AND ENVIRONMENT PLAN

CGG Pacific Titan



Crew HSE Plan

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Contents

1	INTRODUCTION	7
1.1	Generalities	7
1.1.1	General and Historic Points	7
1.1.2	Composition of the Crew HSE Plan	7
1.2	Management Summary	8
1.2.1	Definition of a Crew HSE Plan	8
1.2.2	Why CGGVeritas prepared the Crew HSE Plan	9
2	DESCRIPTION OF THE FACILITIES AND OPERATIONS	10
2.1	Vessel Operations	10
2.1.1	Bridge	10
2.1.2	Deck crew	10
2.1.3	Catering	10
2.1.4	Engine room	10
2.1.5	Instrument room	10
2.1.6	Back deck	11
2.1.7	Gun deck	11
2.1.8	Streamer deck	11
2.2	Seismic Operation	11

Crew HSE Plan

2.2.1	Introduction	11
2.2.2	Generalities	12
2.2.3	Navigation department	12
2.2.4	Recording department	12
2.2.5	Mechanic department	12
2.2.6	Processing department	13
2.2.7	Onboard HSE advisor	13
2.2.8	Party Chief (pc)	13
2.2.9	Escort vessel	13
2.2.10	Small boats / Workboats	13
2.3	Helicopter operations	14
2.4	Vehicles	14
2.5	Emergency Response	14
2.5.1	Emergency Response and Drills	14
2.5.1.1.	Emergency Response Procedures and Contingency Plans	14
2.5.1.2.	Drills	15
2.6	Human Behaviour	15
2.6.1	Incident reporting/Safety cards	15
2.6.2	Drug and alcohol	15
2.6.3	Smoking policy	15
2.7	Documentation	15
2.7.1	Crew HSE Plan and Project HSE Plan	15
2.7.2	Work practices / procedures and checklists	15
2.8	Environment	15
2.8.1	Environmental preservation	15
2.8.1.1.	Water	16
2.8.1.2.	Wildlife	16
2.8.2	Waste Management	16
2.8.3	Community relation/Permitting/Damage activity	16
2.9	Health	16
2.9.1	Health and fitness	17
2.9.2	Hygiene	17

3 DESCRIPTION OF THE OPERATIONAL HEALTH, SAFETY AND ENVIRONMENT MANAGEMENT SYSTEM (HSE MS) 18

3.1	Leadership and Commitment	20
3.1.1	CGGVERITAS created and sustains a culture that supports the HSE MS	21
3.1.2	Management demonstration of Leadership and commitment	21
3.1.3	Further demonstration of leadership and commitment	21
3.1.4	CGGVERITAS / PACIFIC OFFSHORE common awareness	22
3.2	HSE Policy and Strategic Objectives	22
3.2.1	CGGVERITAS corporate HSE policies	23
	CGGVERITAS HSE Policy	24
3.2.1.1.	CGGVERITAS Drug & Alcohol Policy	25
3.2.1.2.	CGGVERITAS Smoking Policy	27
3.2.1.3.	CGGVERITAS Stop Work Policy	28
3.2.1.4.	CGGVERITAS Workboat Policy	29
3.2.1.5.	CGGVERITAS HSE Operational Regulation	30
3.2.1.5.1.	Aircraft operations	30
3.2.1.5.2.	Water operations	30
3.2.1.5.3.	Working in bad weather	31
3.2.1.5.4.	Use of safety equipment	31
3.2.1.5.5.	Waste management	31
3.2.1.5.6.	Land transportation	32
3.2.1.5.7.	AIDS	32
3.2.2	CGGVERITAS Offshore HSE Strategic Objectives	33

Crew HSE Plan

3.2.2.1.	CGGVERITAS Corporate HSE Strategic Objectives	34
3.2.2.2.	CGGVERITAS Crew HSE Objectives and Targets	35
3.3	Organisation, Responsibilities, Resources, Training, Communication, Documents and Standards	40
3.3.1	HSE organisation	40
3.3.2	CGGVERITAS organisation	40
3.3.3	Responsibilities	41
	Party Chief's awareness	42
	Master's awareness	42
	PACIFIC OFFSHORE's awareness	42
	Master's control and demonstration	42
	PACIFIC OFFSHORE control and audit	42
	CGGVERITAS Management Representative (Operations Manager)	43
	CGGVERITAS Vessel Operation Manager (appointed for each vessel)	43
	Pacific Offshore Shipping Fleet General Manager	43
	Pacific Offshore Shipping Safety & Quality Officer	43
	CGGVERITAS Party Chief	44
	Survey Vessel Master	44
	CGGVERITAS and Pacific Offshore Shipping Onboard HSE Representatives	45
3.3.3.1.	Employees HSE responsibilities	45
3.3.4	Operational support	45
3.3.5	Resources (Human, Material and Time)	46
3.3.6	Work force competency and training	46
3.3.6.1.	CGGVERITAS Competence Assurance	46
3.3.6.2.	HSE Training	46
3.3.6.2.1.	Training Responsibilities	46
3.3.6.2.2.	Training Coverage	47
3.3.6.2.3.	Training References	49
3.3.6.2.4.	Training Matrix	52
3.3.6.2.5.	The case of the emergency response	53
3.3.6.2.6.	FRC - Mob Boat – Work Boat crew	55
	Medical fitness	55
3.3.7	Communication (HSE Meetings) and motivation	55
3.3.7.1.	Communication (HSE Meetings)	55
	CGGVERITAS Survey	56
	Pacific Offshore Shipping	56
3.3.7.2.	HSE crew committee	56
3.3.8	Documentation system	57
3.3.8.1.	A structured documentation	57
3.3.8.2.	A process approach	57
3.3.9	HSE Standards and Legal Regulations	58
3.3.10	General issues	60
3.3.10.1.	Medical welfare	60
3.3.10.2.	Environmental commitment	60
3.3.10.3.	Security	60
3.3.10.4.	Rule of Two and Buddy System	60
3.3.10.5.	Subcontractors and support services management	60
3.4	Hazards and Effects Management Process	61
3.4.1	Identification	62
3.4.2	Assessment	66
3.4.3	Escalating factors	66
3.4.4	Evaluation before mitigation	66
3.4.5	Controls	66
3.4.6	Evaluation after mitigation	66
3.4.7	Recovery	66
	Communication	67
3.4.8	Risk reduction, Permit To Work and Lock Out/Tag Out	67

Crew HSE Plan

3.4.9	Contract review by Captain	68
3.4.10	Risk Matrix	69
3.5	HSE Planning and Procedures.....	70
3.5.1	Planning	70
3.5.2	Emergency planning	70
3.5.3	Management of change	70
3.5.4	Crew changes	71
3.5.5	Waste management	71
3.5.6	Workboats/fast rescue craft	71
3.5.7	Manning	71
	Emergency response training requirements	71
	Medical fitness	71
	FRC - Mob Boat – Work Boat crew	71
3.5.8	CGGVERITAS Equipment management	71
3.5.9	Maintenance of the ship's conformity	72
3.5.10	HSE in force procedures	72
3.5.11	HSE Specifications	76
3.5.11.1.	Medical facilities	76
3.5.11.2.	Working environment	76
3.5.11.3.	Life saving appliances and arrangements	78
3.5.11.4.	Personnel Protective equipment	78
3.5.11.5.	Safety equipment and fire protection	78
3.5.11.6.	Housekeeping	78
3.5.11.7.	Tools and equipment	78
3.5.11.8.	Maintenance and Certification	79
3.5.11.9.	Vehicle, driving and passenger protection	80
3.5.11.10.	Vessel facilities	80
3.5.11.11.	Medical personnel and Medical Emergency Response	82
3.6	Implementation and Monitoring.....	82
3.6.1	Pro active monitoring	82
3.6.2	Reactive monitoring	83
3.6.3	Accident / Incident Investigation & Reporting	83
3.6.4	Reporting	85
3.6.4.1.	Regular Reports	85
3.6.4.2.	Cumulative Reports	86
3.7	Audits, Corrective Actions and Improvement	86
3.7.1	Objectives of HSE audits	86
3.7.2	Definition	86
3.7.3	Audit plan	87
3.7.3.1.	CGGVERITAS	87
3.7.4	Audits recommendations, corrective actions and Follow up	87
3.7.5	Unsafe act auditing	87
3.7.6	Safety cards	88
3.8	Management Review and Improvement Process	89
3.8.1	Review of performance & effectiveness of the HSE MS	89
3.8.2	Review of performance & effectiveness of the Crew HSE Plan	89
3.8.3	Review of performance & effectiveness of the Project HSE Plan	89

4 HAZARD REGISTER 90

4.1	The hazard register database.....	90
4.2	Health Risk Assessment (HRA)	92
4.3	The Manual of Permitted Operations (MOPO)	94

5 REMEDIAL PLAN 95

5.1	Action Tracking and Close-Out	95
5.2	Remedial Plan.....	95

Crew HSE Plan

6	STATEMENT OF FITNESS	96
6.1	Conclusion.....	96
6.2	Statements.....	96
6.2.1	Statement of the Case Holder	96
6.2.2	Statement of fitness	97

Crew HSE Plan

1 INTRODUCTION

1.1 Generalities

1.1.1 General and Historic Points

This Crew HSE Plan has been produced as a part of the ongoing CGGVeritas management initiative for safer working conditions for all personnel in seismic survey operations throughout the world. The Crew HSE Plan comprises six sections in line with the OGP Crew HSE Plan structure as in the "HSE Aspects in a Contracting Environment for Geophysical Operations (Schedules and Plans)", May 2001, Report 6.92/317. It covers the methodology and hazards faced onboard the VESSEL.

1.1.2 Composition of the Crew HSE Plan

The Crew HSE Plan has six sections:

- Section 1. Introduction
- Section 2. Description of the Facilities and Operations
- Section 3. Description of the Operational HSE Management System (HSE MS)
- Section 4. Hazard Register
- Section 5. Remedial Plan
- Section 6. Statement of Fitness

Introduction

An introduction to the Crew HSE Plan listing the contents, details of the specific operation to which it applies, a management endorsement of the HSE MS method of HSE management and a summary of the main conclusions reached.

Description of the Facilities and Operations.

This is a brief review of the whole operation to which the Crew HSE Plan refers. It is included so that those unfamiliar with the operation can learn what the operation does, how it does it and what systems are employed to ensure the operation achieves its goals safely.

Description of the Operational HSE Management System (HSE MS)

The **CGGVeritas HSE MS** is based on the following principles:

- 1) Leadership and Commitment
- 2) Policy and Strategic Objectives
- 3) Organizations, Responsibilities, Resources, Training, Communication, Documents & Standards
- 4) Hazards and Effects Management Process
- 5) Planning and Procedures
- 6) Implementation and Monitoring
- 7) Audit, Corrective actions and Improvement
- 8) Management Review and Improvement Process

Crew HSE Plan

Hazard Register.

This section demonstrates that all known hazards within the operation have been identified, assessed and understood, and that control and recovery measures are in place to ensure the complete safety of the operation. This part is the most important part of the Crew HSE Plan as a correct understanding of hazards is a pre-requisite to their successful management.

All Hazards identified as being present within the operation are recorded in a **Hazard Register**. This database shows how the hazards have been identified, assessed, controlled and also what systems are in place that should be necessary to recover from inadvertent exposure of the hazards. It demonstrates that the owners of the Crew HSE Plan fully understand the hazards facing them in the operation and know how to manage them safely.

The Manual of Permitted Operations (MOPO) is the final section of this part. This detail the limits to which activities may continue when normal safe operating conditions cannot be met.

Remedial Plan.

The Crew HSE Plan is intended to be a dynamic, evolving document updated throughout the life of the operation to which it applies. Therefore, there will always be areas of the Crew HSE Plan that need improvement, perhaps because of new information about a hazard which requires its incorporation into the established working procedures, or because the operation is moving into an area where little about the hazards is known. Such areas of deficiency within the Crew HSE Plan are recorded here along with the methods to be used to ensure these deficiencies are addressed in an ordered manner.

Statement of Fitness.

This part summarizes the main findings of the Crew HSE Plan and lists the major hazards associated with the operation. It ends with Statement **of Fitness** to Operate signed by the person with overall responsibility for HSE MS within the operation.

1.2 Management Summary

1.2.1 Definition of a Crew HSE Plan

The purpose of the Crew HSE Plan is to provide assurance of the effective working of the Corporate HSE MS at the vessel level. It can be used both as a master reference document for HSE in operations and as an audit tool with which non specialist third parties can ensure that all reasonable and practicable measures have and are taken to ensure safe operations.

Crew HSE Plan

1.2.2 Why CGGVeritas prepared the Crew HSE Plan

CGGVeritas prepared the Crew HSE Plan as a matter of commitment.

ITS PURPOSES ARE.

1. To prevent a major disaster and so to protect reputation and prevent escalation and loss of critical installations.
2. To protect people by
 - Providing safe working environment.
 - Reducing the risk exposure of the worker.
 - Defining the limits of safe operation.
3. To meet legislation where required.

It is:

- 1) A system to manage hazards and thereby risks.
- 2) A way ensuring that different activities are performed to requirement.
- 3) A structure of management controls to task level.
- 4) An improvement process.
- 5) A system built on what already exists and successful program already in use.

It consists of:

- 1) HSE Policy visibly implemented within a HSE Management System.
- 2) Specific Hazard Management Controls for each activity.
- 3) Compilation of Key References Standards, Statutory Compliance and other Documents used in Hazard Management.
- 4) Project Management Descriptions, Organization and Resources
- 5) Crew HSE Plan Review Cycle and Responsibilities

Its objectives are:

- A. To ensure the corporate HSE MS is applied to operations.
- B. To make a Hazard Register used onsite.
- C. To demonstrate that risks have been reduced to the lowest practical level.
- D. To demonstrate that safety limits of the operations to be conducted are defined.
- E. To make a plan to remedy deficiencies to be implemented onsite.
- F. To prepare a Statement of Fitness i.e. "IT IS CONSIDERED SAFE TO OPERATE"

Crew HSE Plan

2 DESCRIPTION OF THE FACILITIES AND OPERATIONS

2.1 Vessel Operations

2.1.1 Bridge

As we are all aware this is the control centre of the ship. In the seismic case both the marine Captain and the party chief operate from the bridge. Navigators have strong links to the bridge because they are the people who know where the ship must be during seismic data acquisition. Most of the time, the vessel is steered automatically by the Integrated Navigation System in the Instrument Room. The Officer on Watch (OOV) is dealing with the traffic and ensures that no vessel is coming too close to our equipment. He adjusts the speed according to the Instrument Room request. For his work, one or several escort vessels assist him.

2.1.2 Deck crew

Deck crews, under the responsibility of the Chief Officer, are in charge of the routine maintenance on the vessel. They participate in usual marine operations such as Mobboat/Workboat operations, vessel resupply (provisions, fuel), mooring operations as well as helicopter operations.

During helicopter operations (landing and take off), the HLO, firemen equipped with BA, fire valve attendant and baggage handler are present on the helideck.

The HLO ensures that spectators remain well clear of the helideck area.

2.1.3 Catering

All food is prepared and served in the galley and mess area and can be found in the main accommodation area. The ship manager provides the catering. The team is made of 2 cooks and 2 Stewards/stewardesses. There are 3 meals a day provided: Breakfast **05:30** to **06:30**, lunch **11:30** to **12:30** and dinner, which is from **17:30** to **18:30**. There is also warm and cold food available at midnight.

2.1.4 Engine room

Obviously, from its name this is where the engines and related auxiliary equipment are fitted. It is often very noisy. Many controls, valves and motors etc. are fitted around this area. The Chief engineer heads this department. The engineering department is responsible for the all the maintenance and efficient operation of the electrical and mechanical equipment on board the vessel, including maintenance and repair of the propulsion Unit, all auxiliary, hotel and galley equipment, cargo handling equipment and all machinery and electrical items on board.

2.1.5 Instrument room

The instrument room is the main area of activity for the Observers, Navigators and QC/processors. The seismic recording equipment and navigation systems are installed and operated from here. Smaller instrument workshops and tape stores are also connected to the instrument room. Close by and in the same room, the navigation processing and data processing areas will be found; these have their own dedicated instrumentation, computers etc. This is also the main area for the navigation processors and geophysicists. All the control screens and computers are located here, navigation screens (vessel and streamers position, weather, GPS data), observer's screens (recording system control, source controller, real time data acquisition screens, QC...)

Crew HSE Plan

2.1.6 Back deck

The 'back deck' consists of the streamer decks and the gun deck. These areas are the most dangerous areas on board the vessel. There are many potential hazards. Follow the safety instructions posted at the entrance of these areas: hard hats, safety shoes are compulsory and smoking is totally prohibited.

Several Specific Procedures have been written for the works performed in these areas. These procedures explain how the work is done and analyse the danger of each step in the work. Make sure you read and understand them before taking part in any operation and ask an experienced crew member to show you where to stand and what to do the first time you take part in an operation: it is essential to be trained on board a seismic vessel.

2.1.7 Gun deck

We create an acoustic wave with an airgun, a kind of a chamber filled with air at 130 bars and suddenly released. Several guns are suspended under a large float, which together makes a 'gun array'. This array is connected to the vessel with an 'umbilical' that supplies the array with air and electrical lines. For maintenance, they are brought on board via a gun slip and attached to a number of trolley blocks, which then allows them to be suspended from a gun rail for safe storage whilst onboard. Each array weighs about 4 tons: never pass under them when they are on board and take extreme care during the deployment or the recovery: a sudden movement of an umbilical may break your leg in a second.

A flashing warning sign advises you when an array is on the gun deck. An ear protector is compulsory as air under pressure is still in the array and a gun may shoot out of control and damage definitely your ears. Furthermore, the gun deck is a high noise level area (several vents) and a continued exposure without protection will permanently damage your hearing.

Dilt floats, which are used to hold the front end of the streamers at a specific depth, are stored on the gun deck. They are heavy pieces of equipment, so ensure they are properly secured when stored on the deck.

Several Specific Procedures and work instructions have been written for the works performed in these areas.

2.1.8 Streamer deck

The acoustic wave, after reflections on the geology, is heard by thousand of sensitive microphones located within the streamer.

The streamer is connected to the vessel with a 'lead-in', armoured steel cable with internal optic lines to collect the seismic data from the streamer. In production, this is the only part visible on the streamer deck. As the streamers are several thousand meters long, these lead-ins are under high tension. Do not stand in their close vicinity if you do not need to. The lead-in is providing as well the necessary power supply to the streamer. Do not open any part of the streamer before having the confirmation that the power is down.

We can control the depth of each streamer through devices called 'birds', located every 300 m. These birds are powered with lithium batteries. Lithium is a volatile substance, which will ignite when exposed to water and, once ignited, will give off harmful gases. In the event of a lithium fire, the only extinguishers that can be used are Lith-X extinguishers. When doing your seismic tour, look at the location of these extinguishers.

The Lithium battery cells in use on this vessel are harmless provided the cell is not damaged: do not expose it to shock, excessive heat or excessive pressure and never try to recharge it. All Lithium batteries (spare and used) are stored in a dedicated room. Never dispose of Lithium batteries anywhere else.

2.2 Seismic Operation

2.2.1 Introduction

The aim of our vessel is to acquire geophysical data in order to illustrate the sub-oil geology of a potential gas and oil reservoir and to send the corresponding data recorded on magnetic

Crew HSE Plan

supports to the onshore office for a heavy computer processing before selling them to the oil companies.

To achieve this, we generate acoustic waves using air guns. The air guns are laid out in the water at about 7 m deep suspended under a flexible rubber float. The acoustic waves reflect themselves on the geology structure and the result signal is recorded with hydrophones located within the streamers (the seismic cables towed by the vessel).

The position of all the in-sea equipment is well known due to the use of RGPS beacon, compass, acoustic network etc

Once the data are acquired, we check the quality on board before sending them onshore.

2.2.2 Generalities

With the brief above introduction, we can easily highlight 5 different departments acting in the seismic acquisition process. These departments will be described below.

A seismic vessel is an industrial vessel and therefore with dangerous working areas with cables under tension. Within the first days on board, you will be presented to the 'back deck' areas where the seismic crew is working when doing maintenance on the in-sea equipment (cable recovery or deployment). This back deck is a potential hazardous area. The Chief Mechanic for the 'Gun deck' and the Chief Observer for the 'streamer deck' will do this presentation.

But first, read carefully this introduction.

2.2.3 Navigation department

The Navigation department is responsible for the positioning of the seismic vessel and its in sea equipment, during and outside production. This involves knowing the client's requirements and planning the vessel-shooting schedule to these requirements within the agreed accuracy specifications. The core necessity is to fix the co-ordinates for the sources and streamer groups at every shot, but related to this is the positioning of the vessel. In 3D surveys the navigation department is responsible for monitoring how the assigned coverage bins are being 'filled' with the seismic data. The vessel is guided through an Integrated Navigation System (INS), controlled by the Navigators. In addition, this department assists on the back-deck during recovery and deployment of streamers. They are also assisting in workboat operations.

2.2.4 Recording department

The Observer department is in charge of the recording of seismic data. Working in 'real time', the observers write the line production report with comments for the events that happened during the line (QC control). The observers have a general responsibility to record the seismic data to specified standards. This means that they must constantly monitor the total seismic system to ensure that signal versus noise characteristics are acceptable. The recording department is fully aware of the clients specified shooting parameters, and ensures the seismic instruments and streamers are correctly configured. The observers are responsible for all aspects of the seismic streamer(s) such as deployment, recovery, maintenance and repair. They are well involved in the 'work boat' operations (small boat sent at sea from the mother vessel to perform the maintenance at sea)

2.2.5 Mechanic department

The Mechanical department is responsible for all things concerned with the seismic energy sources including deployment and recovery. He is also in charge of all seismic towing equipment. Specifically for the maintenance, operation and rigging of the source guns in their arrays and all associated towing and monitoring equipment for sources and streamers. This department also maintains all winches and winch systems. They carry out the general maintenance and the design improvement of the working areas (welding, hydraulic pipes maintenance.). The mechanics output is a smoothly running energy source system, which operates with minimal problems and causes minimal down time.

Crew HSE Plan

2.2.6 Processing /QC department

The onboard processing department has a prime responsibility to ensure that the acquired seismic data is being produced to the required standards, and is the final stage of the Quality Control. Specifically the processors test and analyze the seismic data and produce output displays or lists, which are studied in conjunction with the Party Chief and Client representative and used as quality indicators. The seismic data may be pre-processed in the field prior to shipment to an onshore processing facility. The processing department may be responsible for fully processing the seismic data in the field if this is a client requirement. They are also assisting in back deck work and workboat operations.

2.2.7 Onboard HSE advisor

The HSE advisor promotes reporting of accidents & incidents and ensures that the various HSE regulations, standards and rules have been implemented and are compatible with client / contractual requirements. He assists in training the crew on non-conformities, definitions, problem-solving methodology and introduction to the Quality Management System, He also assists the crew for hazard assessment and updates the Hazard Register. He records the HSE performance and reminds the crew of the HSE policy and objectives (Q&HSE). He also conducts internal Inspections and conducts training sessions, which are coded to OGP guidelines.

2.2.8 Party Chief (pc)

The Party chief is the head of all seismic departments, supervising up to 20-25 persons, the chase boats and the sub-contractors. He is in charge of the acquisition operations to the best interest of the Client, CGGVERITAS and the on board personnel through active support of the Company's philosophy and objectives, as well as the HSE and Quality policies. Some of his main activities are to supervise and motivate his teams to ensure the optimum use of the equipments and the application of the contract parameters.

He also controls the effectiveness of the work, by analysing production and quality indicators and to take the necessary corrective actions. He is the point of contact for the onboard Client's representative for all questions and problems associated with the survey. Draws up and submits to the Client daily billing information and to write the daily progress report.

Together with the vessel Master, he ensures that applicable HSE & QA procedures are available, known understood and implemented in all Departments. Ensures that all HSE & QA records are managed according to procedures. He is responsible for the safety of the in sea equipment and is the link between the crew and the office.

2.2.9 Escort vessel

The Escort / support vessel plays a large part in the operation ensuring other vessels keep at a Safe distance and clear of all in-sea equipment. It also assists in recovering lost or broken equipment when needed. Due to the time it would take to recover the equipment the support Vessel replenishes the mother vessel with fresh supplies and fuel during a survey. The support vessel also has an interface document with the mother vessel regarding all joint operations.

2.2.10 Small boats / Workboats

For maintenance of the seismic equipment and equipment or personal transfers, the Workboat is used.

The Vessel is equipped with 1 or more Workboats, which are under the Master's responsibility.

Crew HSE Plan

They are used according to CGGVeritas /Ship Manager Procedures and any operation is submitted to a Tool Box Meeting and Permit to Work system.



2.3 Helicopter operations

Not Applicable on the Pacific Titan

2.4 Vehicles

During transit and port calls, CGGVeritas personnel use vehicles. CGGVeritas has the responsibility to take the necessary measures to provide vehicles in good state, equipped with seat belts, extinguisher and first aid kit.

CGGVeritas Safety rules for the use of vehicles and policies shall be enforced with the agent.

2.5 Emergency Response

2.5.1 Emergency Response and Drills

2.5.1.1. Emergency Response Procedures and Contingency Plans

Emergency Response Procedures and contingency plans are the responsibilities of the Master regarding the International regulation. On board and among others the following emergency procedures are available:

- Fire procedure
- Man Over board procedure
- Spillage plan
- Medevac procedure
- Crash helicopter procedure
- Black out procedure
- Abandon procedure

Crew HSE Plan

2.5.1.2. Drills

A drill planning is available on board. The master is responsible for the drill planning on board regarding the international regulation.

2.6 Human Behaviour

2.6.1 Incident reporting/Safety cards

It is all personnel's duty to report incidents, accidents or unsafe situations happening on the vessel or ashore (when the vessel is alongside) during CGGVeritas operations.

Unsafe Situations or Acts shall be reported using the Safety Cards posted in different locations onboard the vessel. See §3.7.6.

2.6.2 Drug and alcohol

The use of alcohol and drugs are strictly forbidden on board .It is forbidden to be under the influence of alcohol when boarding the vessel (max 0,5g/l alcohol). Test of alcohol and drug may be done just before boarding and during the trip, after an accident or suspicion case. CGGVeritas yearly tests 50% of the key personnel in marine seismic operation

2.6.3 Smoking policy

Smoking at the work place is strictly forbidden. It is forbidden to smoke inside the vessel. Smoking is only allowed outside in designated areas.

2.7 Documentation

2.7.1 Crew HSE Plan and Project HSE Plan

Crew HSE plan and Project HSE are available in the Hse/ plan file on the server.

2.7.2 Work practices / procedures and checklists

Working Instructions, checklists and procedures are available in the HSE folder structure on the server:

- All safety related Information can be found in these folders

Interface document

If applicable, an interface document between the chase boat and the main vessel is available in annex of the Project HSE Plan.

Matrix document

If applicable, a matrix in annex of the Project HSE Plan will specify if project specific procedures apply and which procedure we apply. (CGGVeritas, Client, Escort Vessel.

2.8 Environment

2.8.1 Environmental preservation

The MARPOL 73/78 regulation is fully implemented on our vessels.

Every vessel develop its own Shipboard Oil Pollution Emergency Plan (SOPEP) as required by MARPOL 73/78, Annex I, Regulation 26.

Crew HSE Plan

This exhaustive plan (about 60 pages) details:

- The personnel responsibilities for the deployment and the maintenance of the response equipment
- The emergency plan in case of pollution
- The communications and contacts required,
- The measures to control and limit the discharge,
- The required forms to be completed and transmitted.

The SOPEP is approved by National Maritime Authorities.

The provision of International Convention for the prevention of pollution from ship 1973 and protocol 1978 (MARPOL 73/78) and Local regulations governing oil pollution are strictly complied with.

This includes the management of the legally required Oil Record Book, maintained up-to-date: all shipboard operations where machinery space bilges are pumped overboard, as well as all bunkering operations, oil residue pumping operations ashore, and oil transfers within the vessel are recorded. The record includes details of the oil being pumped, details of the oil movement and the time of commencement and completion of the operation.

2.8.1.1. Water

The black and grey water are treated before thrown out in the sea (Ship manager in charge).

2.8.1.2. Wildlife

A soft start procedure is in place on all CGGVeritas vessels .It is available onboard as an onboard Work Instruction.

2.8.2 Waste Management

The purpose of this system is to minimise the impact on the environment by a description of the different treatments operated regarding waste.

Garbage is dealt with MARPOL 73/78, Annex V "Regulations for the prevention of pollution by garbage from ships". A Garbage Management Plan is implemented on board our vessels, under the responsibility of the Master. Records are kept in a specific Garbage Discharge record book. Its rules are applied by all crewmembers.

- Paper, plastic, woods are burnt in the incinerator.
- Special waste (lithium battery) are kept in board and sent back to supplier.

2.8.3 Community relation/Permitting/Damage activity

Fishing representatives may be onboard to liaise with local fishermen depending on the survey location.

2.9 Health

Whilst CGGVeritas will provide good quality training, careful supervision and comprehensive planning for this survey, CGGVeritas nevertheless accepts it may be desirable to further anticipate potential incidents and plan clear, appropriate and rapid responses to them. An

Crew HSE Plan

emergency response plan is therefore prepared in consultation with the client and is issued during the mobilisation for the survey.

It includes the following:

- **Medic on board:** equipped sick bay is available on board with the emergency material
- Equipment.
- **Emergency services:** prior the start up of the survey, a complete analysis of the local conditions allows to establish a "Medevac" procedure:
- **Coastguard:** all rescues to be co-ordinated through a nominated rescue centre, but to be used only in genuine emergencies where no other suitable help is available.
- **International Maritime Emergency system is the GMDSS (Global Maritime Distress and Safety System).**
- **Hospital Services**
- **Contact numbers & radio channels**
- **Military authorities**, if deemed necessary
- **Emergency procedures**

If deemed necessary, additional procedures shall be created following pre-survey consultation

2.9.1 Health and fitness

A sick bay and medical personnel are available on board. The Medic is in charge of the hygiene under the Master supervision.

2.9.2 Hygiene

The Master, the medic and the HSE advisor do hygiene inspection regularly. Kitchen and food storage are weekly inspected. Hygiene and kitchen checks are carried out each month as part of the department cross inspections.

Crew HSE Plan

3 DESCRIPTION OF THE OPERATIONAL HEALTH, SAFETY AND ENVIRONMENT MANAGEMENT SYSTEM (HSE MS)

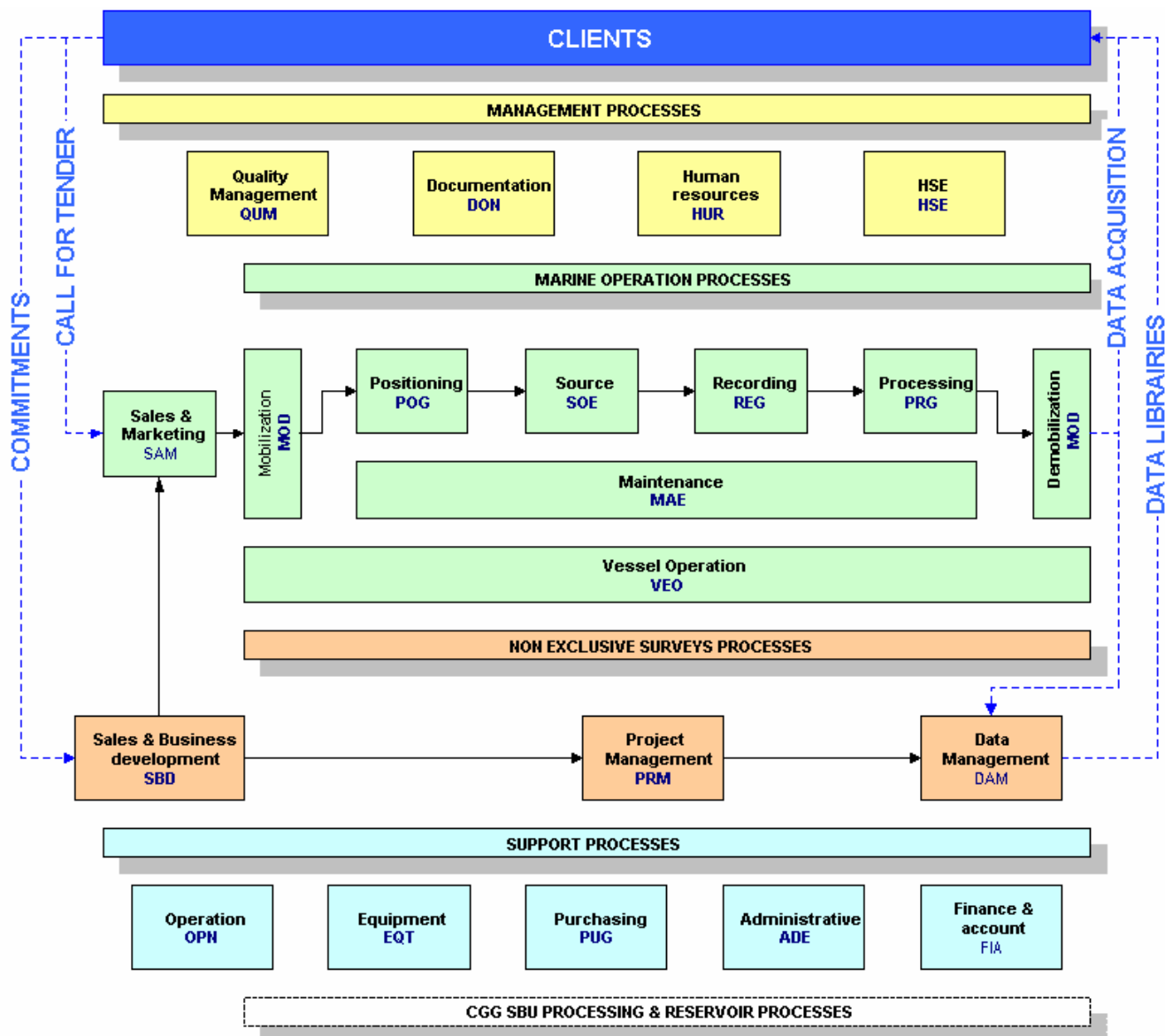
The structure of CGGVeritas HSE Management System is in line with the principles established in OGP Guidelines for the Development and Application of HSE Management Systems (Report 6.36/210).

Health Safety Environmental Management System **HSEMS**

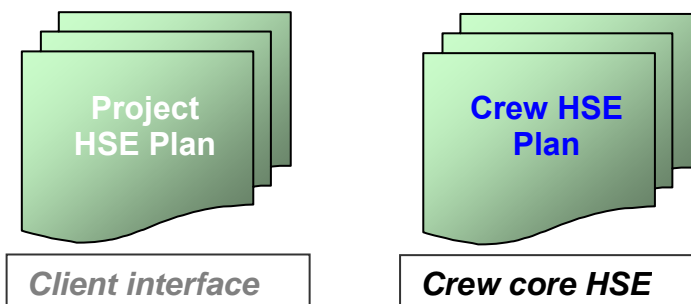


Crew HSE Plan

We consider the HSEMS as a sub-system of our Quality System, stating that implementation of HSE processes are a pre-requisite to Quality ones.



CGGVeritas Offshore HSE-MS is supported by three main documents: the HSE Manual, the Crew HSE Plan and Project HSE Plan. With an identical framework, these Project and Crew HSE Plans aim at reaching different goals as shown below:



Specific **Health** and **Environmental** aspects are variously addressed in each of these documents.

Crew HSE Plan

3.1 Leadership and Commitment

Senior management of CGGVERITAS and PACIFIC OFFSHORE provides strong, visible leadership and commitment, and ensures that this commitment is translated into the necessary resources, to develop, operate and maintain the HSE MS and to attain the policy and strategic objectives. CGGVERITAS Management ensures that full account is taken of HSE policy requirements and provides support for local actions taken to protect health, safety and environment.

A common HSE statement has been signed.



HSE STATEMENT

Both CGG Marine and GC RIEBER SHIPPING have developed Health, Safety and Environment systems in accordance with HSE Industry standards.

We believe that the two systems are complementary and compatible.

Our common objective is to conduct safe operations, to maintain health and to preserve the environment, everywhere and at all times.

GC RIEBER SHIPPING's HSE system fulfils the International Safety Management (ISM) Code, whilst CGG Marine's ensures both parties comply with recognised Oil Industry Standards.

Parts of our HSE practises are already standardised and further integrated within the bridging document between CGG and GC RIEBER SHIPPING (vessel Crew HSE Plan) and Project HSE Plans.

We believe that all CGG and GC RIEBER SHIPPING personnel together demonstrate their absolute awareness and commitment to the above principles by an active and common approach to improve our HSE performance.



CGG MARINE
Luc Benoit-Cattin



GC RIEBER SHIPPING
Sven Rong

Crew HSE Plan

3.1.1 CGGVERITAS created and sustains a culture that supports the HSE MS

This culture is based on:

- Belief that CGGVERITAS desires to improve HSE performance.
- Motivation to improve personal HSE performance.
- Acceptance of individual responsibility and accountability for HSE performance.
- Participation and involvement at all levels in HSE MS development.
- Commitment to an effective HSE MS.

CGGVERITAS promotes a healthy lifestyle, an awareness of safety and a responsibility for environmental preservation amongst all personnel. Employees of both CGGVERITAS and its contractors shall be involved in the creation and maintenance of such a supportive culture.

3.1.2 Management demonstration of Leadership and commitment

This demonstration includes:

- Allocating the necessary resources, such as time and money, to HSE matters.
- Setting a personal example in day-to-day work.
- Putting HSE matters high on the agenda of meetings, from the board downwards.
- Being actively involved in HSE activities and reviews, at both local and remote sites.
- Communicating the importance of HSE considerations in business decisions.
- Recognizing performance when objectives are achieved.
- Encouraging employees' suggestions for measures to improve HSE performance.
- Participating in internal and external initiatives.

CGGVERITAS/PACIFIC OFFSHORE shall take all necessary HSE precautions related to and arising out of the performance of a seismic contract in order to protect the work, the personnel and property of CGGVERITAS, the client, the contractors and all third parties.

3.1.3 Further demonstration of leadership and commitment

In addition to the above, leadership and commitment is further demonstrated by:

- Emphasizing plans for achieving HSE objectives and participating in their execution.
- Nominating high potential key personnel, experienced and competent with a high level of HSE awareness and consciousness, to develop and maintain the HSE MS.
- Attending at and chairing HSE meetings.
- Conducting HSE audits or inspections.
- Participating in accident/incident investigation.
- Communicating with subcontractors on HSE matters.
- Receiving and acting on HSE reports and holding HSE review and analysis sessions.

CGGVERITAS/PACIFIC OFFSHORE has a documentation system addressing health, safety, environmental, community affairs and security issues, relating to company's business, and used by all supervisors in the company. The documents include an outline of the company HSE organization, procedures and methods of communication to and from personnel.

Crew HSE Plan

3.1.4 CGGVERITAS / PACIFIC OFFSHORE common awareness

Both CGGVERITAS and PACIFIC OFFSHORE:

- Acknowledge the situation where two different systems are existing with the common concern to avoid writing a third one,
- Acknowledge the common obligation to maintain the vessel conform to legal rules, regulations, Codes, requirements either technically and operationally,
- Accept that some CGGVERITAS records are made available to non CGGVERITAS people, strictly limited to:
 - Master of the vessel,
 - BV / BVQI auditor when carrying out an official ISM / ISO audit,
 - Port State Control Officer,
 - PACIFIC OFFSHORE internal auditor.
- Accept that this part of the Safety Management System is routinely audited by PACIFIC OFFSHORE
- Insist on the confidentiality, which is attached to this kind of investigation.

3.2 HSE Policy and Strategic Objectives

The HSEMS of CGGVERITAS and PACIFIC OFFSHORE have been checked for compatibility. Both statements are available to personnel on the vessel. Both Policy Statements can be found under the following heading:

CGGVERITAS refers to: HSE Manual - Chapter 2

PACIFIC OFFSHORE refers to: SQAM 0104 'Safety and Prevention of Pollution Policy'

After close review and comparison of both Policies and associated documentation by personnel from both Companies, the Policies have been found to be compatible. The HSE Statement emphasises this compatibility and the close co-operation onboard the vessel and ashore.

PACIFIC OFFSHORE practices should comply with CGGVERITAS Policies.

In some cases, CGGVERITAS recognizes that their practices should be aligned with PACIFIC OFFSHORE policies.

As a general rule and in case of conflict, the more stringent policy should apply.

CGGVERITAS and PACIFIC OFFSHORE will be responsible for the management of their own attached objectives.

Crew HSE Plan

3.2.1 CGGVERITAS corporate HSE policies

CGGVERITAS has a corporate "HSE policy" available, chairman signed, fully covering personnel Health, Safety and Environmental protection, aiming to CREATE a healthy work environment and actively promote the staff health and well-being, to PREVENT all incidents that might arise through the company activities, to PRESERVE the environment.

HSE planning at CORPORATE level in Massy (France) consists of developing the HSE Policies, Strategic Objectives and HSE Management System.

The HSE policies and strategic objectives are disseminated; all employees understand the CGGVERITAS HSE policy and strategic objectives and these are on display in/within the company premises in prominent locations.

Crew HSE Plan

CGGVeritas HSE Policy

Date for Review: December 31st 2007

QHSE POLICY

CGGVeritas is committed to achieving and maintaining excellence in all aspects of its activities. CGGVeritas recognizes and accepts the mandate to conduct its activities in a responsible manner. CGGVeritas will, so far as it is reasonably practicable, provide a system of work that in order to protect the health, safety and security of our employees, visitors, contractors and the public and at the same time minimizes the impact of its activities on the environment. CGGVeritas recognizes that all injuries are preventable.

To achieve excellence in our business and work environment, the commitment and cooperation of all management, staff, contractors and visitors is essential. Line management is accountable for achieving these objectives.

In order to support this policy CGGVeritas will:

- Develop, implement and maintain an Integrity Management System (IMS) having integral components of Quality, Performance, Health, Safety, Environment and Security supported by Integrity;
- Comply with local, international regulations and industry standards;
- Promote and maintain awareness of workplace hazards, the risks associated with them and the techniques to render risks as low as reasonably practicable;
- Ensure that employees are competent to conduct their specified tasks;
- Set objectives, regularly review performance, specify Key Performance Indicators and recognize excellence;
- Maintain a reporting system that allows analysis of incidents, potential incidents and non-conformities which disseminates recommendations to prevent recurrence across the Company;
- Conduct regular audits and inspections of company, and where applicable, contractor facilities;
- Demonstrate continuous improvement.

CGGVeritas will allocate sufficient resources to achieve these objectives, and all employees and contractors will be required to:

- Comply with or exceed relevant standards specified by statute, industry or the Integrity Management System (IMS);
- Accept responsibility for protecting themselves, fellow employees, visitors and members of the public who may be affected by their activities;
- Contribute to the planning process, actively participate in assisting the company in achieving its objectives;
- Actively participate in the reporting and subsequent investigation of all accidents, incidents, hazards and near misses that have the potential to impact on CGGVeritas operations;
- Proactively propose opportunities for improvement and communicate as appropriate;

Paris, January 2007



Robert BRUNCK
Chairman and CEO

Crew HSE Plan

3.2.1.1. CGGVERITAS Drug & Alcohol Policy



OFFSHORE SBU - DRUG & ALCOHOL POLICY

CGG Offshore SBU¹ recognises that the consumption of prohibited drugs and alcohol and other intoxicants can have a detrimental effect on the health and safety of individuals and co-workers.

All employees are expected to be in a suitable mental and physical condition to perform their duties in a satisfactory manner and to behave appropriately. They must also be in a fit condition at all times to be able to deal with any emergency situation which may arise.

It is prohibited to be under the influence of alcohol and drugs for all CGG Offshore people and subcontractors, from the time of boarding any vessel. Therefore, alcohol and drug consumption is strictly prohibited on board vessels involved in CGG Offshore operations.

An individual test for drugs or alcohol may be decided by CGG Offshore, in compliance with local law and regulations:

- ✓ When an employee is obviously under the influence of alcohol or drugs ;
- ✓ When an employee is involved in an accident.

With a view to preventing casualties, CGG Offshore reserves also the right, subject to local laws and regulations, to carry out :

- ✓ An individual test on employees with a potentially sensitive job function, prior to the start of operations ;
- ✓ Some random testing.

Where appropriate, CGG Offshore will assist individuals in dealing with drugs and alcohol-related issues.


Luc Benoit-Cattin
Offshore SBU Executive VP

¹SBU: Strategic Business Unit

Distribution: all departments, agencies, offices and vessels for general display

April 2006

Drug & Alcohol Policy of CGGVERITAS and Pacific Offshore Shipping has been checked for compatibility.

Crew HSE Plan

CGGVERITAS refers to:

- HSE Manual - Chapter 2.5: D&A policy
- HSE Manual - Chapter 3.7: D&A programme

Common agreement:

It has been agreed between both parties that on board CGGVERITAS vessels, managed by PACIFIC OFFSHORE, the CGGVERITAS D&A Policy and related procedures will be applied to both companies. The CGGVERITAS Policy, Procedures and Work Instructions supersede the above-mentioned PACIFIC OFFSHORE Policy.

When this policy is applied, **the Party Chief** (or senior survey crewmember) **has the overall responsibility** and the **Master** will provide any **assistance**, which may be necessary.

Crew HSE Plan

3.2.1.2. CGGVERITAS Smoking Policy



OFFSHORE SBU - SMOKING POLICY

CGG Offshore SBU¹ considers that smoking is not only harmful to health, but also represents a potential safety hazard.

CGG Offshore SBU therefore requests its personnel to ensure that the following regulations are respected:

- ✓ Smoking is strictly prohibited on hazardous work sites where there is a risk of explosion or fire. In such places, « No Smoking » signs must be clearly posted;
- ✓ Smoking is also prohibited inside premises and is therefore only allowed in designated places outside premises in open deck areas where “Smoking Area” signs will be posted and specific ashtrays (fixed and closed) provided. In all other areas (corridors, mess rooms, cabins, control rooms, lounges, etc) prominent “No Smoking” signs should be posted.

Furthermore, CGG Offshore SBU encourages its personnel not to smoke, will inform them about the negative effects of smoking on health and do its best to assist personnel who smoke and wish to give up the habit.



Luc Benoit-Cattin
Offshore SBU Executive VP

¹SBU: Strategic Business Unit

Distribution: all departments, agencies, offices and vessels for general display

April 2006

Common agreement:

It has been agreed between both parties that on board CGGVERITAS vessels, managed by PACIFIC OFFSHORE, the CGGVERITAS Smoking Policy and related procedures will be applied to both companies.

When this policy is applied, **the Party Chief** (or senior survey crewmember) **has the overall responsibility** and the **Master** will provide any **assistance**, which may be necessary.

Crew HSE Plan

3.2.1.3. CGGVERITAS Stop Work Policy



OFFSHORE SBU – STOP WORK POLICY

CGG Offshore SBU¹ recognizes that the responsibility for HSE performance starts with the individuals. Each individual contracted or subcontracted by CGG Offshore is responsible for his own health, his safety and the safety of anybody around him.

In virtue of this principle, any worker may stop any task in any of the following circumstances:

- ✓ The task to be carried out contradicts CGG HSE policies.
- ✓ The method of carrying out the task contradicts CGG HSE procedures.
- ✓ The worker is not aware of the HSE procedures to carry out a particular task.
- ✓ The worker faces a serious and imminent hazard.

Any worker has the right and obligation to stop work that is unsafe.

If a worker feels entitled to implement his right to stop work in the above-mentioned circumstances, he must immediately inform his direct supervisor, so that corrective steps are taken and the work may resume.



Luc Benoit-Cattin
Offshore SBU Executive VP

¹SBU: Strategic Business Unit

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April 2006

Crew HSE Plan

3.2.1.4. CGGVERITAS Workboat Policy



OFFSHORE SBU - WORKBOAT POLICY

Workboat operations are today essential to efficient offshore streamer seismic acquisition.

CGG Offshore SBU¹ will work to promote Workboat maintenance operations in safe conditions by developing risk assessment before each operation, increasing training, experience sharing, HSE awareness and behavior.

CGG Offshore SBU policy is:

- ✓ To give priority to durability, reliability, immunity to environmental aggression, and user friendliness of possible repair or replacement at sea, in the selection of equipment,
- ✓ To promote the efficient use of workboat to change or repair equipment at sea in the best possible safety conditions as part of towed equipment preventive maintenance policy.
- ✓ To strictly restrict the use of workboats for any other utilization through anticipation and validation of alternative solutions,
- ✓ To associate maritime expertise through the establishment of a strong partnership with ship managers for the design, maintenance, and navigation of workboats and construction of associated procedures based on share of experience.
- ✓ To actively participate in all initiatives within the industry related to improvement of safety of the workboat operations.



Luc Benoit-Cattin
Offshore SBU Executive VP

¹SBU: Strategic Business Unit

Distribution: all departments, agencies, offices and vessels for general display

April 2006

Crew HSE Plan

3.2.1.5. CGGVERITAS HSE Operational Regulation

3.2.1.5.1. Aircraft operations

The hazards related to aircraft operations carry the maximum level of risk. We are therefore committed to giving priority to all means necessary for minimising them and guaranteeing optimum recovery in the event of an accident.

This will be achieved by:

- Giving priority to safety parameters in the selection of aircraft sub-contractors.
- Having our helicopter subcontractors audited by professionals at least every 2 years, and after any serious incident.
- Examining airlines' safety records and restricting personnel to using only those airlines judged acceptable by international standards.
- Auditing aircraft sub-contractors' installations and procedures in relation to international standards before operations begin.
- All personnel must receive training in the basic rule for helicopters.(HUET)
- Having internal load handling done by qualified personnel.
- Respecting strict observance of national and international regulations when transporting dangerous goods.
- Always abiding by the pilot's decision regarding unsafe flying conditions in bad weather.
- Establishing an emergency plan for the event of a crash on board. (PACIFIC OFFSHORE)
- Landing / take off managed by HLO personnel on board, and trained firemen in place.
- Maintain communication with the enroute aircraft.
- Safety equipment on the helideck immediately available during helicopter traffic.

3.2.1.5.2. Water operations

The marine transport (WB) is the main cause of incidents/accidents within the marine seismic. In addition to the above Workboat policy we undertake to:

- Give priority to the safety aspects of design, general shape and maintenance for small boats used in operations.
- Have a minimum of two persons to operate small boats and be capable of handling the boat.
- Ensure boat pilots are qualified for the type of boat used and the environment of the operation.
- Ensure all boats used on operations are provided with the necessary safety equipment as required by national regulations and international standards.
- Devise working methods and establish working procedures in order to minimise the transferral of personnel over water.
- Ensure all boat movements within operations are controlled through a strict journey management system.
- Ensure small boats are deployed only with the permission of the Master.
- In case of MOB, the OOW gives the permission.
- Implement regular water emergency drills in order to train personnel for emergency situations.
- Ensure small boats operations are applied in accordance of the MOPO.

Crew HSE Plan

3.2.1.5.3. Working in bad weather

Taking into account the possibility of bad weather is therefore an absolute necessity for setting the limits of acceptable working conditions.

We undertake to:

- Identify and assess the meteorological hazards associated to all operations before they begin.
- Establish in our operational procedures the limits of weather conditions beyond which specific activities or the whole operation must be stopped.
- Make sure all personnel are aware of the procedures applicable to their position.
- Draw up for each crew a Manual of Permitted Operations (MOPO), which defines the conditions for carrying out specific activities in deteriorating circumstances.
- Make sure all operations in deteriorating circumstances are carried out only with the approval and under the supervision of the Party Chief and the Master (weather deteriorating especially), in accordance with the MOPO and the bad weather procedure.

3.2.1.5.4. Use of safety equipment

The use of personal and collective safety equipment is the primary means of recovery in most accidents.

We therefore undertake to ensure that:

- The necessary personal and collective safety equipment for every job or working/living site is defined in our HSE System.
- All personnel within our operations are informed of the personal and collective safety equipment required for their job or working site and know how to use it.
- All personnel within our operations wear the required personal protective equipment.
- All working and living sites are fitted with the collective protective equipment as set out in our standards.
- All supervisory personnel and visiting headquarters personnel set an example by wearing the required protective equipment.
- Sanctions are taken against any member of personnel who deliberately breaches the PPE rules or who does so out of negligence.

3.2.1.5.5. Waste management

Production and disposal of waste is the most common cause of impact upon the environment by all types of seismic operations.

We undertake to control the crews waste management by:

- Reducing the production of waste by giving priority to methods and tools selected according to this criterion.
- Avoiding the contamination of the sea by ensuring the treatment of all grey and black waters.
- Follow the international regulation about biodegradable solid domestic waste.
- All solid non-biodegradable waste are treated in accordance with IMO regulations.
- Collecting used oils and chemical and metallic waste and recycling them whenever adequate installations exist locally.
- Collecting used lithium batteries.

Crew HSE Plan

3.2.1.5.6. Land transportation

The transport of personnel and equipment is a cause of accidents within the seismic industry. In order to minimise this major source of hazards and, convinced that all transport incidents are avoidable.

We undertake at all management levels to:

- Select the vehicles used in operations giving priority to the safety aspects of design, general shape and maintenance.
- Ensure all drivers are certified for the type of vehicle they use and trained for the driving environment they face.
- Ensure all vehicles on operations are provided with the necessary safety equipment, in accordance with local regulations and oil industry standards.

3.2.1.5.7. AIDS

Every one of us is exposed to the risk of contracting AIDS, for which no cure has yet been developed.

Individuals can fight AIDS and its effects by protecting themselves, promoting the means of prevention and not discriminating against AIDS patients.


We therefore undertake to:

- Provide all personnel with accurate information on AIDS, its ways of transmission and means of prevention.
- Make means of prevention available to all crews and promote their use.
- Not discriminate against AIDS sufferers in employment or other policies, within the context of local laws and regulations.

Crew HSE Plan

3.2.2 CGGVERITAS Offshore HSE Strategic Objectives

CGGVERITAS sets annually HSE Strategic Objectives consistent with the HSE policy.



HSE OBJECTIVES 2007

2007 PRIORITIES & TARGETS

➤ **CONTINUOUS IMPROVEMENT**

No fatal accident - No permanent total or partial disabilities	
• Lost Time Injury frequency (LTIF)	< 0.25
• Lost Time Injury & Restricted Work Case frequency (LTI+RWC) F	< 0.5
• Total Recordable Case frequency (TRCF)	< 1.5
• Specific targets are defined for the most hazardous activities :	
➤ Workshops and Maintenance (LTI+RWC+MTC) F	< 0.7
➤ Lifting and Handling (LTI+RWC+MTC) F	< 0.5
• Health : Lost Time Medical Case Frequency	< 1
• Environnement : Environmental Disturbances Frequency (ENDF)	< 1

➤ **ENVIRONMENT**

- **Environmental Risk Management**
 - ➔ Further develop the **Environmental Risk Assessment** focusing on Aspects and Impacts Assessments and Performance Monitoring for all surveys in sensitive environment areas.
 - ➔ Review the Waste Management standards and implement consistently on all vessels.

➤ **HEALTH**

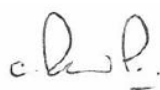
- ➔ Deploy the **Vector Control Program** (Malaria, dengue, chikungunya ...) in relevant areas.

➤ **HUMAN BEHAVIOUR**

- ➔ Reinforce participation in QHSE Programs through the development and implementation of individual **QHSE Incentive program** including subcontractors.

➤ **HSE MANAGEMENT SYSTEM**

- **Risk management** ➔ Improve control of critical Ship Manager operations through deployment of the **Risk Management program**. Achieve 100 % closure of actions within the year.
- **Implementation and Monitoring** ➔ **High Risk actions** from audits and High Potential Incidents shall be monitored and followed up in Management Reviews.
- **Auditing** ➔ Perform **2 internal Audits** per vessel within the year.
- **Training** ➔ 100% of **Department Heads** trained to **HSEMS** within the year (2 days sessions).




C. Richard Price
Executive VP
Marine Acquisition Product Line

All targets and objectives include the performance of our subcontractors.
All figures are on a basis of 24H per day and 1 million hours.
Distribution: all departments, agencies, offices and vessels for general display

January 2007

Crew HSE Plan

3.2.2.1. CGGVERITAS Corporate HSE Strategic Objectives



HSE OBJECTIVES 2007

2007 PRIORITIES & TARGETS

➤ **CONTINUOUS IMPROVEMENT**

No fatal accident No permanent total or partial disabilities	
• Lost Time Injury frequency (LTIF)	➔ < 0.5 or at least 25% below 2006 results
• Lost Time Injury & Restricted Work Case frequency (LTI+RWC) F	➔ < 1.0 or at least 25% below 2006 results
• Total Recordable Case frequency (TRCF)	➔ < 3.0 or at least 25% below 2006 results
• Seriousness Rate for the current year	➔ At least half of 2006 results
• Environmental Disturbance Frequency (ENDF)	➔ < 2

➤ **ENVIRONMENT**

- ➔ The expansion of the scope of implementation of the **Environmental Risk Assessment** shall be undertaken throughout the seismic acquisition activities.
- ➔ The **Waste Management systems** shall be standardised across the vessels, land crews and offices.
- ➔ The **participation into industry organizations** (IAGC / OGP / JIP) shall be maintained and developed.

➤ **HEALTH**

- ➔ A new **Vector Control Policy** (malaria kits, dengue, chikungunya, West Nile Fever...) shall be defined and implemented for personnel exposed to these risks.
- ➔ The **Health Risk Assessment** (HRA) and Manufacturer Safety Data Sheets (**MSDS**) shall be automatically linked.

➤ **HUMAN BEHAVIOUR**

- ➔ A **self assessment questionnaire** shall be conducted by line management.

➤ **SECURITY**

- ➔ One **security crisis drill** per region shall be conducted.


➤ **HSE MANAGEMENT SYSTEM (HSEMS)**

- **Implementation & Monitoring**
 - ➔ The **High Risk Actions** from HPI and audits shall be monitored and followed up at all levels of the organization.
- **Training**
 - ➔ **HSEMS training** shall be cascaded to next management level with a target of 80% of head of departments trained.
 - ➔ 80% of **on site training modules** shall be completed and ready to use for Field Management and Operator.

All targets & objectives include the performance of our subcontractors.

Paris, January 2007

Distribution: All departments, agencies, vessels, offices and crews (for general display).



Robert BRUNCK
Chairman & CEO

Crew HSE Plan

3.2.2.2. CGGVERITAS Crew HSE Objectives and Targets

N°	Topic	N°	Task	Who	When
1	Management commitment to Safety	1.1	Allocating the necessary resources to HSE matters.	VOM	Before start then on going
		1.2	Recognizing performance when objectives are achieved.	VOM	Always
		1.3	Encouraging employees' suggestions for measures to improve HSE performance.	VOM	Always
		1.4	Emphasizing plans for achieving HSE objectives and participating in their execution.	VOM	Before start
		1.5	Attending at and chairing HSE meetings.	VOM	Each visit
		1.6	Conducting HSE audits or inspections.	VOM	Monthly
		1.7	Participating in accident/incident investigation.	VOM	When applicable High risk accident
		1.8	Communicating with subcontractors on HSE matters.	VOM	Before signing Any contract
		1.9	Receiving and acting on HSE reports and holding HSE review and analysis sessions.	VOM	Monthly
2	HSE Policy	2.1	To define and prepare a vessel HSE policy	VOM	Before start
		2.2	To pass on the HSE policy and Objectives at office and on vessel.	VOM	Management visit
		2.3	To ensure the implementation of the policy.	Party Chief	On going
3	HSE Regulations, Standards, Rules	3.1	To produce and update standards.	Corporate HSE manager	Always
		3.2	To ensure that the various HSE regulations, standards and rules have been implemented and are compatible with client standards.	HSE advisor	Crew management inspection
		3.2	To advise the VOM on the status of standards	HSE advisor	Management meeting

Crew HSE Plan

		3.4	implementation and on any deficiencies that may exist and to suggest remedial action. To disseminate and implement HSE regulations, standards and rules.	Departmental head	Dept meetings
		3.5	To monitor compliance and advises the HSE advisor of any inaccuracies or impracticalities.	Departmental head	Cross Inspections
4	HSE Targets and Objectives	4.1	To set vessel HSE targets and objectives	VOM	Yearly
		4.2	<i>To set HSE objectives and targets for individuals according to their position and their specific responsibilities.</i>	Party Chief	Before start
5	Emergency response	5.1	To establish the Medevac Plan	Medic, HSEA and Party Chief	Before start
		5.3	To establish the Fire Protection & fire fighting plan	Master	Before start
		5.4	To establish the evacuation and abandonment ship/location plan	Master	Before start
		5.5	To establish the man overboard plan	Master	Before start
		5.6	To establish the Spillage control plan	Master I	Before start
		5.7	To establish the Helicopter/Aircraft crash plan	Master	Before start
		5.8	To establish the Security plan When necessary	HSE advisor Party chief Master	Before start

Crew HSE Plan

6	Accident Investigation	6.1	Investigation of a Fatality	Corporate HSE manager/Master	When applicable
		6.2	Investigation of a High risk accident/incident	VOM and/or Party Chief Master HSEA	When applicable
		6.3	Investigation of a Medium high and Medium risk accident/incident	Party Chief/Master HSEA And/or Dept Head	When applicable
		6.4	Investigation of a Low risk accident/incident	Master/HSEA Departmental head	When applicable
7	HSE Meetings	7.2	Crew committee meeting attended by all senior staff.	Party Chief Master HSEA	Two a trip
		7.4	Toolbox meeting attended by all workers.	All involved Party Chief HSEA	Handover/Non routine operation
8	Sub Contractors HSE	8.1	To assess HSE competence of subcontractors with whom we place contracts	VOM	Before start
		8.2	To assess HSE records of subcontractors with whom we place contracts	VOM	Before start
		8.3	To include the required standards to be met by our subcontractors as an integrated part of any signed contracts.	VOM	Before start
9	Personnel Responsibilities	9.1	Responsibilities of Key personnel will be clearly written and will be issued to incumbents as a Job description.	VOM Party Chief Master	Before start
10	Training	10.1	Basic HSE training		
		10.1.1	HSE induction	Training centre	Before start
		10.1.2	First Aid course	Training centre	Before start
		10.1.3	Fire prevention and control	Training centre	Before start
		10.1.4	Unsafe Act auditing	HSE advisor	Before start
		10.2	Job training	Departmental head	Before start then quarterly

Crew HSE Plan

		10.3	Specialised training		
		10.3.1	Survival training	Training centre	Before start then quarterly
		10.3.2	Fire fighters training	Training centre	Before start then quarterly
		10.3.4	Boat drivers training	Dedicated coxswain	When necessary
		10.3.5	Aircraft operations training	HLO (C/O)	Before start
		10.3.6	First aiders training	Medic	Before start then quarterly
		10.3.7	Abandon ship training	Second officer	One by month
11	Effective Motivation and Communication	11.1	To put in place an effective incentive plan and appropriate means of communication	Party Chief	Before start
12	Occupational Health	12.1	To undertake the pre-employment medical examination of all employees	Medical centre	Before start
		12.2	To ensure that all food handlers and kitchen staff passed a pre-employment "Food handlers' test"	Master/ Medic	Before start
		12.3	To develop and establish a Medevac plan and to establish a list of medical services to be used in referrals and emergencies.	HSEA/Medic	Before start
		12.4	To ensure all working station, transportation units, and workshops are equipped with first aid kits	HSEA/Medic	Before start
		12.5	To check and refill first aid kits.	Medic	Monthly and When needed
		12.6	To conduct first aid, medical and occupational health training, and refresher courses to be scheduled.	Medic	Before start then quarterly
		12.7	To investigate Lost Time Medical Cases (LTMC).	Medic	When applicable
		12.8	To inspect kitchen, sick bay Weekly	Medic	Weekly

Crew HSE Plan

		12.9	To monitor medical waste disposal and incineration.	Medic	Always
		12.10	To participate in accident/incident investigation and classification according to the system in place.	Medic	When applicable
13	Permit to Work	13.1	To establish a "Permit To Work" system.	Master / Party chief / HSEA	
		13.3	An internal "PTW" to be established when hazardous activities have to be carried out and form to be completed by the parties wishing to carry out the work and approved by the Master and the HSEA	Master	
14	Personnel Protective Equipment	14.1	To identify the needs of PPE's to be provided to the staff.	Department head	Before start
		14.2	To prepare a stock control program ensuring adequate supplies of PPE's, inventory and quality control checks	HSE advisor	Before start
		14.3	To purchase PPE's available locally and to import specialized ones.	Party Chief	Before start then when needed
		14.4	To conduct training for the safe use of PPE's	HSE advisor	Before start
		14.5	Inspections of PPE's and reporting any bad one to be replaced.	Department head	Daily
16	Planned Inspection and Audits	16.1	Unsafe act "audit"	Everybody	Daily
		16.2	Cross department inspection	Senior staff	1/dept/month
		16.3	VOM inspection	VOM	Each time onboard
		16.4	Full vessel audit	GSR	Every 6 Months

Crew HSE Plan

3.3 Organisation, Responsibilities, Resources, Training, Communication, Documents and Standards

3.3.1 HSE organisation

CGGVERITAS has an HSE organization structure with a fully dedicated Corporate HSE and Quality manager reporting to the Chairman and Chief Executive Officer. Marine acquisition has a Corporate HSE and Quality manager reporting to the Acquisition Vice President. At the operation level, CGGVERITAS has an HSE organization structure with HSE Advisors reporting to the Party Chief on the crew and having a direct line of access to the Vessel operation manager (VOM)

The VOM is accountable for approving the Crew HSE Plan and Project HSE Plan, and for providing the resources to develop the organization to put the plan into effect. He reports to the CGGVERITAS head office at Massy.

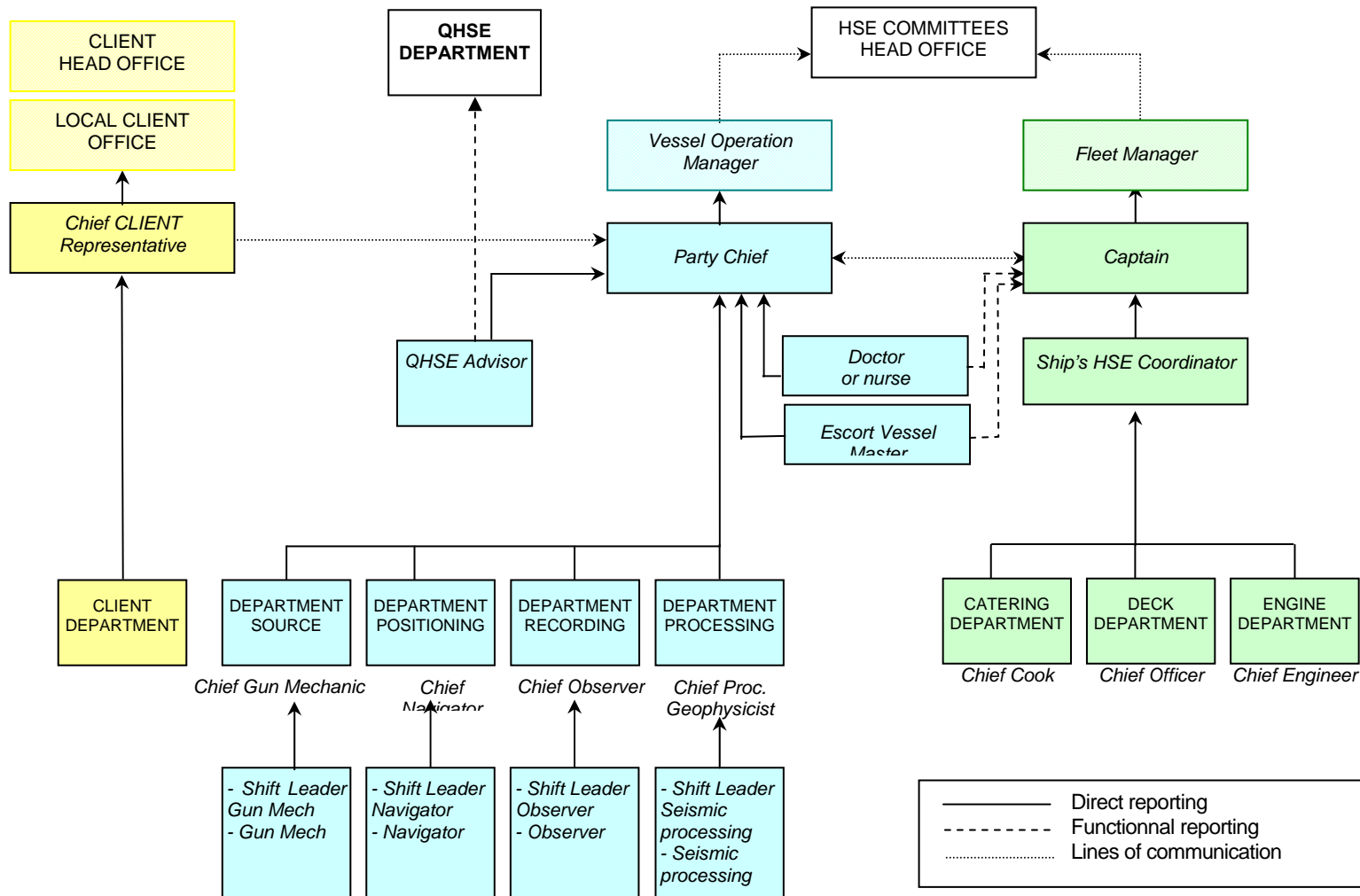
The different department Heads report to the Party Chief, who reports to the VOM. They are responsible for the HSE of their own staff by the implementation of HSE as a line management responsibility and are accountable for the management control of the HSE MS.

Responsibilities of Key personnel are clearly written and will be issued to incumbents as a Job description.

3.3.2 CGGVERITAS organisation

Crew HSE Plan

HSE organisation on board



3.3.3 Responsibilities

Both CGGVERITAS and PACIFIC OFFSHORE managements are responsible for setting clear leadership examples by their own actions and by promoting a high degree of HSE awareness. Specific responsibility statements are detailed below.

CGGVERITAS keeps the liberty to work with any sub-contractor they choose. Some procedures of the CGGVERITAS HSE System are dealing with safety, prevention of pollution and planned maintenance applied on equipment potentially dangerous. These parts, even in broad terms, clearly and logically **involve the Master's authority** because they belong to the ISM Code field.

Reciprocally, **some PACIFIC OFFSHORE procedures**, managed from the Office or on board, **are involving the CGGVERITAS crew** responsibilities / awareness.

PACIFIC OFFSHORE and CGGVERITAS do not intend to rewrite these "common" documents, but encompass them in their own Safety Management Systems. The process and its control are explained below.

Crew HSE Plan

Party Chief's awareness

These documents from PACIFIC OFFSHORE Safety Management System where the CGGVERITAS crew is involved are appearing in the Crew HSE Plan – §3.5.10 – Interface Matrix/Summary as the shaded lines (see legend).

The Party Chief cannot ignore the existence, the contents and the degree of application by CGGVERITAS and PACIFIC OFFSHORE personnel, of these very important documents. These documents must be read and understood by the Party Chief and forwarded when necessary to other CGGVERITAS Personnel.

A sign off sheet must be kept to acknowledge reading of these documents.

Master's awareness

These documents from the CGGVERITAS Management System where the Master is involved are appearing in the Crew HSE Plan – §3.5.10 – Interface Matrix/Summary as the shaded lines (see legend).

The Master cannot ignore the existence, the contents and the degree of his responsibility and of the application by PACIFIC OFFSHORE personnel, of these very important documents.

These documents must be read and understood by the Master and forwarded when necessary to other PACIFIC OFFSHORE Personnel.

A sign off sheet must be kept to acknowledge reading of these documents.

PACIFIC OFFSHORE's awareness

In parallel, PACIFIC OFFSHORE, whose paramount responsibility is to have the ISM Code fully applied on board any managed vessel, has reviewed at least those CGGVERITAS procedures indicated in the shaded lines and considers them as a part of its own Safety Management System.

Master's control and demonstration

The Master, particularly in case of absence of any CGGVERITAS personnel on board, must be able to make the demonstration to any auditor (ISM audit) or Port State control Officer that the ISM code is implemented in every part of his vessel.

To ensure this obligation and for the procedures highlighted in grey lines, CGGVERITAS will:

- Keep the Crew HSE Plan accessible to the Master at any time (by all appropriate means on board),
- Clearly identify the safety / maintenance records attached to these underlined documents and proving their implementation,
- Indicate where to find these records in a filing plan,
- Give the filing plan to the Captain.

PACIFIC OFFSHORE control and audit

For those CGGVERITAS procedures belonging to the "CGGVERITAS Corporate reference" column, PACIFIC OFFSHORE will:

- Prepare the relevant audit questionnaires on its own forms or use the CGGVERITAS ones if existing,
- Incorporate these questionnaires in the existing ones (dedicated to CGGVERITAS vessels internal audits),
- Audit this additional part where PACIFIC OFFSHORE is involved,

Crew HSE Plan

- Carry out this audit through questions asked to the Captain (or the Chief-Engineer), even if a CGGVERITAS representative is on board.
- Keep the records of such audits according to PACIFIC OFFSHORE procedures, with copy of the additional questionnaires filled in to CGGVERITAS.

For the on board CGGVERITAS and PACIFIC OFFSHORE procedures also underlined in grey, PACIFIC OFFSHORE will just use and make reference to them on site, where and as far as it is appropriate.

CGGVERITAS Management Representative (Operations Manager)

Responsible for:

- All Management communications with PACIFIC OFFSHORE;
- Establishing the organisation and controls to ensure that all activities are conducted in accordance with CGGVERITAS and PACIFIC OFFSHORE' HSE Policies and Procedures.

CGGVERITAS Vessel Operation Manager (appointed for each vessel)

Responsible for:

- All operational and HSE communications with PACIFIC OFFSHORE;
- Monitoring the implementation of corrective action to audit deficiencies;
- Ensuring appropriate and effective follow-up to all incidents within CGGVERITAS ;
- Communicating any changes in the work programme to all relevant parties;
- Reviewing the implementation of the Hazard Register to confirm its continuous effectiveness;
- Discussing operational and HSE matters with the relevant PACIFIC OFFSHORE personnel on a continuous basis during the operations;
- Maintaining HSE performance statistics and submitting monthly safety returns to clients as required.

Pacific Offshore Shipping Fleet General Manager

Responsible for:

- Ensuring the availability of necessary resources to support the operation;
- All Management communication with CGGVERITAS ;
- Discussing operational matters with CGGVERITAS personnel on a continuous basis during the operations.

Pacific Offshore Shipping Safety & Quality Officer

Responsible for:

- Reviewing and approving the SMS Interface document;
- Reviewing the safety performance on an annual basis with the crew;
- Reviewing the implementation of the Hazard Register to confirm its continuous effectiveness
- All HSE communications with CGGVERITAS ;
- Implementation of corrective actions to audit deficiencies within PACIFIC OFFSHORE;
- Discussing HSE matters with relevant CGGVERITAS personnel.

Crew HSE Plan

CGGVERITAS Party Chief

Responsible for:

- Taking into account flag state law and worldwide shipping industry practices, the Master has the sole and ultimate responsibility for all actions taken on board the vessel. The Party Chief will be responsible to the Master for the strict observance of the existing documentation (refer to interface matrix) regarding the safety and prevention of pollution, and the application of the HSE statement. In particular he will apply or support the Master in the following aspects of the operation;
- The permanent seaworthiness of the seismic areas he is in charge of and in particular the safety / prevention of pollution aspects but also the lashing / securing of all the equipment, the storage and segregation of all chemicals shipped for the day to day use, the attached material safety data sheets and authorisations of use if any (consumables);
- Writing in conjunction with the master, the procedures and instructions applied by his staff and bearing a heavy Safety at work or a risk of pollution aspects. These procedures are listed in the interface matrix, which means that they need a double approval (PC and Master);
- Training and motivate the identified CGGVERITAS people who has to acknowledge and apply these procedures, and in particular those who are in charge of the bunkering / transfer / management of the cable oil;
- Providing (or clearly delegates) the information related to the back deck operation safety at work to the CGGVERITAS signing on crew;
- the safe execution of the agreed Scopes of Work in accordance with contracts;
- Ensuring that all working codes and practices are implemented for all survey operations in accordance with recognised policies, standards and procedures;
- Ensuring that prompt action is taken in order to rectify any deficiencies in working practices or conditions;
- Ensuring active participation in HSE meetings by all the survey crew;
- Communicating all deficiencies in the operations to the Client Representative;
- Investigating all incidents along with the onboard HSE Representative, the Master and the Client Representative.

Survey Vessel Master

Responsible for:

- Ultimate responsibility for the safe execution of all the operations by the vessel. Additional safety responsibilities include:
- Identification of hazards;
- Prevention of injury or damage to assets or the environment;
- Ensuring the emergency/contingency plan is operable and tested and all personnel are competent to perform their assigned duties;
- Ensuring safe working codes and practices are implemented for all operations in accordance with recognised policies and standards;
- Ensuring prompt actions are taken to rectify any deficiencies in working practices or conditions;
- Ensuring all employees receive appropriate safety induction and training of and observe such safety requirements as the work situation warrants;
- Ensuring HSE meetings are held;
- Writing specific Vessel Instructions in conjunction with the Party Chief.

Crew HSE Plan

CGGVERITAS and Pacific Offshore Shipping Onboard HSE Representatives

Responsible for:

- Promptly reporting on any unsafe equipment that cannot be corrected by the survey or vessel crew;
- Encouraging all crew members to make safety suggestions and encouraging crew member recognition of their personal contribution to incident prevention;
- Assisting in the investigation of all incidents and near-miss incidents;
- Taking an active part in the Unsafe Act Auditing;
- Reviewing the implementation of the Hazard Register onboard and the effectiveness of the department review procedure;
- Reviewing the effectiveness of all onboard HSE meetings, including toolbox meetings and make recommendations for their improvement.

3.3.3.1. Employees HSE responsibilities

All CGGVERITAS /PACIFIC OFFSHORE employees will co-operate in the implementation of health, safety, environmental plans and programs and will take care of the health and safety of themselves and others.

3.3.4 Operational support

➤ **CGGVERITAS**

The following personnel have been identified in CGGVERITAS as providing support to the vessel managers:

- Equipment and Engineering Manager: F Andersen
- Technical Managers: Tore Lind
Rafael Bouraly
Steinar Hovland
oyvind.odegaard
- QHSE Manager: Terence Milner

Full lists of telephone numbers for CGGVERITAS and PACIFIC OFFSHORE support personnel are exchanged routinely between PACIFIC OFFSHORE and CGGVERITAS .

➤

The following personnel have been identified in PACIFIC OFFSHORE as providing support to the vessel operation:

- Engineering Support:
- Technical Department:
- HSE Support:
- Deputy Safety and Quality Officer:

Telephone numbers for CGGVERITAS and PACIFIC OFFSHORE support personnel are provided in the Emergency Contact list.

Crew HSE Plan

3.3.5 Resources (Human, Material and Time)

Senior CGGVERITAS management will allocate sufficient resources to ensure the effectiveness of the HSE MS, including:

- Facilities, plant and equipment to meet legislative and HSE regulatory requirements.
- Personnel and infrastructure to respond to and mitigate emergency situations.
- Time to visit the work sites and to discuss with the employees and supervisors.

Vessel operation manager reviews resource allocations regularly for new development during Project Reviews.

3.3.6 Work force competency and training

3.3.6.1. CGGVERITAS Competence Assurance

All operations and activities in CGGVERITAS will be planned, executed and verified regularly for continuous improvement to ensure that:

- Internal and external stakeholder requirements are always met effectively and efficiently.
- Personnel holding health, safety and environmentally sensitive positions are competent.
- Due consideration is given safety, health, and environment issues.
- CGGVERITAS has a competence assurance process for all personnel holding safety, health and environmentally sensitive positions. They will be issued a job description defining job competence standards and a system to assess an incumbent's competence against these standards will be in place.
- Line management is responsible for establishing a competent work force technically by setting the standards of competence of personnel. The VOM is responsible for providing funds to support the line management.
- CGGVERITAS ensures that its new employees will be given the necessary basic industrial HSE and job related training required by law, client and CGGVERITAS own HSE policy, prior to the start of the work.
- CGGVERITAS designates the following positions and types of positions within as safety, health and environmentally sensitive positions:
- Positions involving responsibility for and control of transportation, including but not limited to fixed engineers, and navigators.
- Positions involving responsibility for storage, transportation scheduling, and handling of hazardous materials.
- Positions involving personnel in charge of health, including but not limited to medical doctors and nurses.

3.3.6.2. HSE Training

3.3.6.2.1. Training Responsibilities

PACIFIC OFFSHORE is responsible for:

- The safety induction tour of every onsigning personnel: Main safety / fire / abandonment procedures and equipment, muster stations, etc.
- The safety at work for the PACIFIC OFFSHORE crew, including the dangers on the back deck particularly when the ship is in operation (deployment / towing / recovery)
- The familiarisation of the PACIFIC OFFSHORE crew to their individual jobs.

Crew HSE Plan

- Fire fighting training, vessel abandon, man over board and spillage training prepared and carried out by the vessel crew (PACIFIC OFFSHORE).

CGGVERITAS is responsible for:

- The safety at work of CGGVERITAS crew
- The familiarisation of the CGGVERITAS crew to their individual jobs
- The familiarisation of the people in charge of the cable oil management (bunkering, debunkering, epuration), including the prevention of pollution awareness, the report to PACIFIC OFFSHORE responsible officer and the record of the quantities processed.
- HSE induction (safety tour) for all new employees prepared and carried out by the HSE department concerning the back deck.
- First aids training for the squad first aides prepared and carried out by the medical department.
- Job training for all new employees prepared and carried out by each section in co-ordination with the HSE department (Deployment / recovery cable, gun etc...)
- All employees on board received specialised training according to CGGVERITAS Policy and the maritime regulation. (HUET, first aid training, fire fighting first level, survival at sea)

3.3.6.2.2. Training Coverage

Training as a minimum will cover the following positions:

- All Personnel
- New assignees on board, before starting to work
- All CGGVERITAS and sub-contractor's personnel, before travel to the area
- Crew management: Party Chief, HSE Advisor, Head of department
- Mechanicals
- Vehicle drivers
- Boat drivers
- Observers
- Helicopter support personnel
- Catering staff
- Vessel crews
- Office crew

The following charts allow a preliminary allocation of training syllabus versus positions:

Module Title	Audience			
	New Assignees	Senior Managers	Field Managers	Operators
The Seismic Industry				
Introduction to the Seismic Industry	AM1			
Company HSE Management Systems				
Company HSE System – top management		MM1A		
Company HSE System - supervisory personnel	AM2	MM1B		
Operational Site Management		MM2		
Meetings and Committee Organisation			FMM1	
Incident Prevention	AM14			
Incident Reporting/Classification			FMM2	

Crew HSE Plan

Incident Investigation (supervisors)		MAM1	FMM5	
Incident Investigation (managers)		MAM1		
Auditing Techniques		MAM2		
Unsafe Act (condition) Auditing		MAM3		
Emergency Response				
Emergency Procedures	AM13	MM3		
Spill Response			FMM18	
Environmental and External Affairs				
Environmental Preservation	AM26			
General Environmental Management			FMM3	
Hazardous and Other Waste Management	AM26		FMM4	
Hazardous Materials Handling	AM18		FMM15	
H2S	AM17			
Local Legislation	AM27			
Public Relations	AM28	MAM6		
Media Relations		MAM6		
Equipment				
Equipment Safety	AM19			
Machinery				OSM14
Abrasive Wheels				OSM15
Cutting and Welding (gas, electric)				OSM16
Pressure Systems in Work place	AM24		FMM16	OSM17
Mechanical Handling				OSM18A
Wire/Synthetic Rope Utilisation				OSM18B
Workshop Practices			FMM11	
Electrical Safety	AM25		FMM21	
Fire Prevention, Detection, Fighting				
Fire Prevention and Control	AM15		FMM7	
Basic Fire Fighting Techniques				OSM26
Fire Warden				OSM27
Advanced Fire Fighter - marine operations				OSM28
Material Handling				
Stepping Handling, Lifting	AM20			
Manual Handling and Lifting				OSM30
Permit to Work, Lockout Tag out Systems				
Lockout/Tag out, Permit to Work	AM16	MAM4	FMM9	OSM13
Confined Spaces	AM23			OSM31
Occupational Health				
First Aid	AM4			
First Aider - module 1				OSM23
First Aider - module 2				OSM24
First Aider - module 3				OSM25
Blood Borne Pathogens (HIV, hepatitis, etc.)	AM6			
Personal Health and Hygiene	AM3			
Substance Abuse	AM5			
Substance Abuse Monitoring & Testing		MAM5		
Hearing Conservation	AM7			
On Site - Food Handling and Hygiene				OSM33
Ergonomic	AM22		FMM19	
Personal Protective Equipment	AM9			
PPE - its proper use			FMM8	
Safety Harnesses			FMM10	OSM22
Breathing Apparatus				OSM29
Working at Heights	AM30			OSM32
Risk Assessment / Analysis				

Crew HSE Plan

Job Hazard Analysis			FMM6	
Seismic Operations				
Operating around Hazardous Facilities/ Activities			FMM17	
Managing Contractor Interfaces			FMM20	
Survival				
Survival - at sea				OSM35A
HUET (helicopter underwater escape)				OSM12
Transportation - Air				
Helicopter Landing Officer				OSM10
Helicopter Loadmaster				OSM11
Transportation - Land				
Defensive Driving	AM10			OSM1
Off Road Driving				OSM2
Specialised Vehicle Driver				OSM3
Forklift Truck				OSM4
Highway Traffic Control				OSM5
Vehicle Recovery				OSM6
Transportation - Water				
Small Boats Rivers and Near Shore	AM29			OSM7
Small Boats Marine Operations	AM29			OSM8
Airboats				OSM9
Welfare				
Responsible Conduct	AM21			
Personal Security	AM8			

3.3.6.2.3. Training References

CGGVERITAS will ensure as well that existing staff HSE knowledge is up to date, and collect certificates to detect overdue training.

CGGVERITAS developed her training program based on the "HSE Competence Assessment and Training Guidelines", OGP, 1999, report 6.78/292.

Awareness Modules (AM)

CGGVERITAS will ensure that new employees have been given the necessary basic industrial HSE and job related training required by law, client and CGGVERITAS own HSE policy, prior to the start of the work.

AM1	Introduction to the Seismic Industry	10 mn
AM2	Company HSE Management System	20 mn
AM3	Personal Health and Hygiene	20 mn
AM4	First Aid	20 mn
AM5	Substance Abuse	10 mn
AM6	Blood Borne Pathogens (HIV, Hepatitis etc.)	10 mn
AM7	Hearing Conservation	10 mn
AM8	Personal Security	10 mn
AM9	Personal Protective Equipment	10 mn
AM10	Defensive Driving	20 mn
AM11	Transport and Travel	20 mn
AM12	Survival (Land & Marine)	20 mn
AM13	Emergency Procedure	20 mn
AM14	Incident Prevention	10 mn
AM15	Fire Prevention and Control	20 mn
AM16	Permit to Work/Lockout Tag out systems	20 mn

Crew HSE Plan

AM17	H2S	20 mn
AM18	Hazardous Substances	20 mn
AM19	Equipment Safety	10 mn
AM20	Stepping, Handling, Lifting	20 mn
AM21	Responsible Conduct	10 mn
AM22	Ergonomic Considerations (equipment work place design)	10 mn
AM23	Confined Spaces	20 mn
AM24	High Pressure Systems	10 mn
AM25	Electrical Safety	10 mn
AM26	Environmental Preservation	20 mn
AM27	Local Legislation	10 mn
AM28	Public Relation	10 mn
AM29	Small Boats (passenger) (new)	20 mn
AM30	Working at heights (new)	10 mn

These AM course generally cover half a day, and then are completed with the other relevant modules (MM, MAM, FMM, OSM).

Management Planning Modules (MM) & Management Activity Modules (MAM)

Our MM and MAM modules are generally managed out from the operations' context, whatever in external training centres or in-house, organized by the corporate HSE department:

- The "HSE management in the Business" course organized by SIEP (Shell International Exploration and Production) in the Netherlands for the group managers and country managers (one week).
- HSE MS course organized in Massy by the CGGVERITAS HSE department for group managers, country managers, party chiefs and HSE Advisors (a five days course).

MM1A	HSE Management System: Executives and Senior Managers	3 hours
MM1B	HSE Management System: Supervisors and Party Chiefs	6 hours
MM2	Operation Sites Management	6 hours
MM3	Emergency Response Planning	3 hours
MM4A	Journey Management (Land)	3 hours
MM4B	Journey Management (Water)	3 hours
MM4C	Journey Management (Air)	3 hours
MAM1	Serious Incident Investigation	6 hours
MAM2	Auditing Techniques	6 hours
MAM3	Unsafe Act Auditing	6 hours
MAM4	Lockout/Tag out and Permit to Work systems	2 hours
MAM5	Substance Abuse Monitoring & Testing	3 hours
MAM6	Media Handling/Public Relations	6 hours

Field Management Modules (FMM)

Standard packages for FMM modules are currently under revisions.

FMM1	Meetings and Committee Organisation	2 hours
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Crew HSE Plan

FMM2	Incident Reporting and Classification	2 hours
FMM3	General Environmental Management	6 hours
FMM4	Hazardous and other Waste Management	3 hours
FMM5	Incident Investigation	6 hours
FMM6	Job Hazard Analysis	3 hours
FMM7	Fire Prevention and Control	6 hours
FMM8	Personal Protective Equipment - Its proper use	3 hours
FMM9	Lockout Tag out and Permit to Work	3 hours
FMM10	Safety Harnesses	2 hours
FMM11	Workshop Practices	3 hours
FMM12	Seismic Line Bridging Operations	2 hours
FMM13	Chainsaw	6 hours
FMM14	Seismic Explosives Operations	3 hours
FMM15	Hazardous Materials Handling	6 hours
FMM16	Pressure Systems in the Workplace	2 hours
FMM17	Operating in and around Hazardous Facilities and Activities	2 hours
FMM18	Spill Response	3 hours
FMM19	Ergonomics	3 hours
FMM20	Managing Contractor Interfaces	6 hours
FMM21	Electrical Safety	6 hours

Operator Skills Modules (OSM)

Some of our OSM courses are conducted in approved external training centres like for instance:

- The "Marins pompiers de Marseille" course on sea survival, fire fighting and first aid in France for the crew management (one week) = OSM 35A/24/26/27/28/29.
- The Nutec course on sea survival, fire fighting, first aid and Helicopter HUET for all persons on board (one week). = OSM 35A/24/26/27/28/2

OSM1	Defensive Driving	3C + 3P
OSM8	Small Boats Marine Operations	2C + 9P
OSM10	Helicopter Landing Officer	6 hours
OSM11	Helicopter Loadmaster	3C + 3P
OSM12	Helicopter Underwater Escape (HUET)	2C + 1P
OSM13	Permit to Work/Lockout/Tagout	3 hours
OSM14	Machinery	1 hour
OSM15	Abrasive Wheels	1 hour
OSM16	Cutting & Welding Gas & Electric	2C + 4P
OSM17	High Pressure	6 hours
OSM18A	Mechanical Handling	1C + 2P
OSM18B	Wire/Synthetic Rope Utilisation	3 hours
OSM22	Safety Harnesses	1 hour
OSM23	First Aider - Module 1	3 hours
OSM24	First Aider - Module 2	18 hours Mix C+P
OSM25	First Aider - Module 3	30 hours Mix C+P
OSM26	Basic Fire Fighting Techniques	3C + 3P
OSM27	Fire Warden	1 hour
OSM28	Advance Fire Fighting - Marine Operations	6C + 6P
OSM29	Breathing Apparatus General Use	2C + 2P
OSM30	Manual Handling and Lifting	2C + 2P

Crew HSE Plan

OSM31	Confined Space Operations	2C + 2P
OSM32	Working at Heights	3 hours
OSM33	On Site Food Handling and Hygiene	6 hours
OSM35A	Survival Techniques (Sea)	6 hours

C = Classroom, P = Practical

3.3.6.2.4. Training Matrix

The CGGVERITAS Training Matrix in line with OGP Training Requirements shows Training standards and refresher periods for all crew depending on their function.

The Matrix is shown below.

In addition the vessel's crew follow STCW 95 training requirements as detailed in the attached

OFFSHORE SBU TRAINING MATRIX GUIDELINE

Job description codes JD:		Duration (min)		Department Manager	Vessel Operations Manager	Party Chief	HSE Advisor	Gun Chief	Chief Observer	Chief Navigator	Chief Seismic Processing	Shift Leader Gun Mechanic	Shift Leader Observer	Shift Leader Navigator	Shift Leader Seismic Processing	Gun Mechanic	Observer	Navigator	Seismic Processor	New employee	Shore Representative	Medical Doctor	Paramedic	Master	Chief Mate	Mate	Chief Engineer	Engineer	Electrician	Filter/Motorman	Boatswain	Seaman	Chief Cook
Duration:																																	
C = Classwork																																	
P = Practical																																	
Symbols:																																	
T = Trainer ability																																	
E = External training center only																																	
S = Special instructions																																	
MM1A/B	HSE MS Executives Senior Managers, PC, PM	6 hours		5	5	5	5																	5									
MM2	Operation Sites Management	6 hours		5	5	5	5																	5									
MM3	Emergency Response Planning	3 hours		5	5	5	5																	5									
MM4 B	Journey Management (Water)	3 hours		5	5	5	5																										
MAM1	Serious Incident Investigation	6 hours		5	5	5	5																	5									
MAM2	Auditing Techniques	6 hours		5	5	5	5																	5									
MAM3	Unsafe Act Auditing	6 hours		5	5	5	5		5	5	5	5												5									
MAM4	Lockout/Tagout and Permit to Work systems	2 hours		5	5	5	5																	5									
MAM5	Substance Abuse Monitoring & Testing	3 hours		5	5	5	5																	5									
MAM6	Media Handling/Public relations	6 hours		5	5	5	5																	5									
FMM1	Meetings and Committee Organisation	2 hours			3	3	T		3	3	3	3												3	3	3	3						
FMM2	Incident Reporting and Classification	2 hours			3	3	T		3	3	3	3												3									
FMM3	General Environmental Management	6 hours			3	3	T																	3									
FMM4	Hazardous and other Waste Management	3 hours			3	3	T		3	3	3	3												3	3	3	3						
FMM5	Incident Investigation	6 hours			3	3	T																	3									
FMM6	Job Hazard Analysis	3 hours			3	3	T		3	3	3	3	3	3	3	3								3	3	3	3						
FMM7	Fire Prevention and Control	6 hours			3	3	T		3	3	3	3	3	3	3	3								3	3	3	3						
FMM8	Personal Protective Equipment - Its proper use	3 hours			3	3	T		3	3	3	3	3											3									
FMM9	Lockout Tagout and Permit to Work	3 hours			3	3	T		3	3	3	3	3	3	3	3								3	3	3	3						
FMM10	Safety Harnesses (new)	2 hours			3	3	T		3	3	3	3												3	3	3							
FMM11	Workshop Practices	3 hours			3	3	T		3	3	3	3	3	3	3	3								3			3						
FMM15	Hazardous Materials Handling	6 hours			3	3	T		3	3	3	3	3	3	3	3								3	3	3	3						
FMM16	Pressure Systems in the Workplace	2 hours			3	3	T		3	3	3	3	3	3	3	3								3	3	3	3						
FMM17	Operating in and around Hazardous Facilities	2 hours			3	3	T		3	3	3	3	3	3	3	3								3	3	3	3						
FMM18	Spill Response	3 hours			3	3	T																	3	3	3	3						
FMM19	Ergonomics	3 hours			3	3	T																	3	3								
FMM20	Managing Contractor Interfaces	6 hours			3	3	T																	3									
FMM21	Electrical Safety	6 hours			3	3	3		3	T	3	3																		T			
XXX	Cetaceans Watching						E																										
XXX	Lifejackets verification training (Remploy)						E																										
OSM8	Small Boats Marine Operations	3C + 9P																							E	E						E	
OSM10	Helicopter Landing Officer	6 hours																						E	E								
OSM11	Helicopter Loadmaster	3C+3P																						E	E								
OSM12	Helicopter Underwater Escape (HUET)	2C + 1P		4E	4E	4E	4E		4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E
OSM13	Permit to Work/Lockout/Tagout	3 hours					T																										
OSM14	Machinery	1 hour					T																										
OSM15	Abrasive Wheels	1 hour					T																										
OSM16	Cutting & Welding Gas & Electric	2C + 4P					T																										
OSM17	High Pressure	6 hours					T																										
OSM18A	Mechanical Handling	1C + 2P					T																										
OSM18B	Wire/Synthetic Rope Utilisation	3 hours					T																										
OSM22	Safety Harnesses	1 hour					T																										
OSM23	First Aider - Module 1 - Basic	3 hours		4E	4E	4E	4E		4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E
OSM24	First Aider - Module 2 - 4 minutes (ERP)	18h C+P					E																	T	E	E	E	E	E	E	E	E	E
OSM25	First Aider - Module 3 - 20 minutes (ERP)	30h C+P					E																	T	E	E	E	E	E	E	E	E	E
OSM26	Basic Fire Fighting Techniques	3C + 3P		4E	4E	4E	4E		4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E
OSM27	Fire Warden	1 hour					T																										
OSM28	Advance Fire Fighting - Marine Operations	6C + 6P					T																										
OSM29	Breathing Apparatus General Use	2C + 2P		4E	4E	4E	4E		4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E
OSM30	Manual Handling and Lifting	2C + 2P					T																										
OSM31	Confined Space Operations	2C + 2P					T																										
OSM32	Working at Heights	3 hours					T																										
OSM33	On Site Food Handling and Hygiene	6 hours					T																										
OSM35A	Survival Techniques (Sea)	6 hours		4E	4E	4E	4E		4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E	4E

Matrix.

Crew HSE Plan

3.3.6.2.5. The case of the emergency response

CGGVERITAS and PACIFIC OFFSHORE ensure that their own personnel have received the appropriate training in accordance with their HSE Policies. Each party shall supply copies of certificates to the other on request.

➤ Case of First aiders training

There are six levels of first aid and medical proficiency: Level 0, 1, 2, 3, 4 and 5. The levels 0, 1 and 2 will be covered during the initial training and refresher training carried by the medical department. A professional training program will be initiated to achieve the required coverage for First Aiders at level 3. Competence of the medical professionals at level 4 and 5 will be assessed by examination of their training/employment records.

The training module will be the following:

- Tier 1:

Training Level 0: Maximum time after injury: **On the site**

Applies to all employees and supervisors.

Competence:

Basic actions in case of accident: Safety of patient and accident site; Medevac procedure.

Training Level 1: Maximum time after injury: **4 minutes**

Applies to Basic First aiders.

Competence: Basic first aids

As level 0 plus basic life saving actions: Patient assessment; Application of the recovery position; Resuscitation; Application of simple dressing; Application of simple splint; Eye washing and other actions resulting from burns by chemicals; Management of snake bite; Communication in an emergency.

Training Level 2: Maximum time after injury: **20 minutes**

Applies to First aiders and carried by certified trainers.

Competence: Reinforced first aids

As level 1 plus life saving actions and general First Aid: Cardiopulmonary resuscitation (CPR); Control of bleeding; Management of shock; Immobilization of fractures, application of splints; Management and handling of unconscious patient; Management of burns and scalds; Dressings and immobilization of injured parts; Management of heat stroke hypothermia

Responsibilities:

- 1) Assess the situation and take over from level 1 person.
- 2) Identify the condition of the casualty, give immediate, appropriate and adequate initial treatment and inform the medical officer.
- 3) Initiates the Medevac if required.

- Tier 2

Training Level 3: Maximum time after injury: **1 hour**

Applies to Advanced First aiders and carried by certified trainers.

Competence: Advanced first aids

As level 2 plus drug administration: Administration of certain drugs under medical supervision, excluding intravenous injections.

Crew HSE Plan

Responsibilities:

- 1) Assess the situation and take over from level 2 person.
- 2) Identify the condition of the casualty, give immediate, appropriate and adequate initial treatment and inform the medical officer and maintain contact with him.
- 3) Organizes the Medevac if required.

Training Level 4:

Maximum time after injury: **1 hour**

Applies to Field Nurses and Paramedics.

Competence: Recognized medical or paramedical professionals

As level 3 plus: Administration of all types of injections; Familiar with medical facilities near work site; Experienced in accident and emergency, tropical medicine and occupational health.

Responsibilities:

- 1) Assess injuries, stabilize patient, contact level 5 for professional action and organize Medevac.
- 2) Administration of certain drugs under medical supervision
- 3) Administration of all types of injections, including intravenous injections in life threatening situations, in the absence of the medical doctor;

- Tier 3

Training Level 5:

Maximum time after injury: **4 hours**

Applies to Experienced doctor, Medical adviser and qualified health professional.

Competence:

Receive patient, assess condition and take the best locally available action. Familiar with available medical facilities near the operating area that could be used for medical referral. In charge of treatment procedures and prophylactic measures required for staff.

Responsibilities:

- 1) To assess the physical, chemical and biological hazards prevailing in the work area.
- 2) To advise on what medical equipment and facilities, what number and types of medically trained personnel are appropriate in each site or location?
- 3) To establish, in association with the management and the HSE advisor a medical emergency plan (Medevac)
- 4) To be familiar with available medical facilities that could be used for medical referral.

➤ Drills and exercises

The Unit's emergency preparedness will be maintained and tested through regular drills and realistic simulation exercises. These will include, but not be limited to:

- **Medevac drill:** Medevac drills to take place the first week of the operations.
- **Fire drills:** fire drills of designated fire-fighting team(s) in board to take place monthly.
- **Abandon ship and fire drills on vessels:** to take place monthly.
- **Man over board drill:** Man overboard drill to take place at least once per month in favourable weather conditions and preferably in calm waters.
- **Spillage control drill:** to take place monthly.

Details of these drills will be logged (e.g. response times) and debriefings shall be held after each drill and action/learning points shall be documented and followed up.

Crew HSE Plan

3.3.6.2.6. FRC - Mob Boat – Work Boat crew

All personnel boarding such boat must have been given the necessary HSE and job related training. The MOB boat's coxswain and personnel crewing the small boat shall comply with the IMO training requirements.

Medical fitness

CGGVERITAS and PACIFIC OFFSHORE ensure that their own personnel have current Medical Certificates of Fitness. Each party shall produce copies of certificates to the other on request. The medical certificates are, as a minimum, renewed yearly in accordance with the Guidelines of the UK Offshore Operators Association/ IMO Regulations / the STCW 95 Code and ILO 73 Convention.

3.3.7 Communication (HSE Meetings) and motivation

3.3.7.1. Communication (HSE Meetings)

➤ Office HSE Committee committee meeting (HSE Committee)

Attendees:	W / WP / WE / WQZ / 1 WPO / Ship Manager if necessary.
Frequency:	Once every 2 months.
Aims:	Incident report analysis Topical Subjects Statistic analysis Performance monitoring Audit follow-up Dispatch of information to the other vessels HSE decisions and monitoring.
Record:	Minutes of the meeting.

➤ Kick Off meeting

Attendees: Vessel Operation Manager, Party Chief, Department Heads, Captain, Sub contractors, client representatives.

Frequency: Each survey.

Aims: Review of contractual and HSE specifications, policies, reporting, hazard notification related to the Project.

Record: Minutes of the meeting.

➤ On Board Safety Committee Meeting (M/V SCM)

Attendees: PC / Master / Chief Officer / Chief Engineer / DHs / HSEA / Paramedic /client rep (when available).

Meeting chaired by Master or Party Chief.

Frequency: Week 2 (or crew change + 1) and week 4 (or crew change –1).

Aims: General review of all HSE issues (outstanding TBM and DM), including review of the Action Point List.

Record: Minutes of the meeting.

Minutes are sent to the VOM, Ship Manager and CGGVERITAS HSE Department.

➤ On Board Departmental Meeting (DM)

Attendees: All department representatives, with formal designation of a chairman (usually the Dept Head).

Crew HSE Plan

Frequency: Week 2 (or crew change + 1) and week 4 (or crew change – 1).

Aims: Analysis of HSE aspects department by department – preparation of vessel's SCM.

Record: On dedicated form WZ-RD-020-01-0603-E (See Annex): Attendees - subjects – decisions.

➤ **Intervention Tool Box Meeting (TBM)**

Attendees: All people involved in the operation + Master for small boat operations

Frequency: Before workboat or mob boat operation and any uncommon operation (incl: door recovery - lost gear recovery - streamer transfer)

Aims: Analysis of all the information available, tasks, job to be done, decisions and designation of the intervention leader.

Record: On Department Daily Note Book or PTW or other dedicated sheet: Name of Attendees - subjects – decisions.

➤ **Handover Tool Box Meeting (TBM)**

Attendees: Each person on shift with his counterpart of the other shift.

Frequency: For shift changes at noon and midnight.

Aims: Analysis of all the information available, tasks, job to be done and transmission to the operators and department heads.

Record: On Department Daily Note Book or specific sheet (4 on board; 1 per Department): subjects, decisions.

CGGVERITAS Survey

The Party Chief sends written daily reports to CGGVERITAS in accordance with the procedure and tools. Verbal daily reports shall be made in accordance with an agreed time schedule as follows:

- Party Chief to Vessel Operation manager or Duty Officer (weekends/public holidays);
- Party Chief/Captain to offshore installations as required.

Pacific Offshore Shipping

Captain sends a copy of all safety-meeting minutes to PACIFIC OFFSHORE office. Copies of PACIFIC OFFSHORE incident reports and near miss reports shall be forwarded to CGGVERITAS.

3.3.7.2. HSE crew committee

The Party Chief, the Master, the HSE advisor, the crew doctor/nurse and the head of different sections, including main subcontractors, form the HSE committee. The committee supports the line management in health, safety, and environmental matters. They meet twice a trip and produce documented minutes of the meetings.

- **Health:**

The crew doctor/nurse advises the line management on occupational health matter.

- **Safety**

The HSE crew committee is responsible for providing advice to the line management on operational safety technical hazard analysis, safety inspections, safety card and reviews, contingency plans.

- **Environmental protection:**

The committee is responsible for:

Monitoring the crew performance in environmental matter against the HSE Plan requirements.

Preparing in close liaison with all relevant parties an environmental action plan to facilitate continuous improvement in environmental performance.

Crew HSE Plan

To promote the application of best (environmental) available practices.

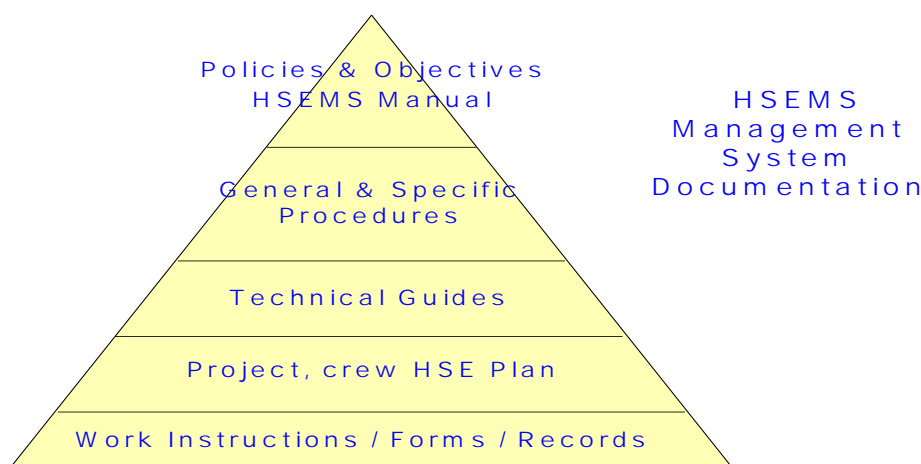
3.3.8 Documentation system

A procedure is a document providing rules and guidelines to achieve activities and tasks in a manner meeting the required standards.

CGGVERITAS has developed a system of structured documentation in line with quality requirements. Access to the system is ensured by the offshore intranet QHSE web site.

3.3.8.1. A structured documentation

The documentation is divided according to a classic document pyramid. Policies, objectives and HSEMS Manual constitutes the top of the pyramid:



Then we find within the documentary pyramid, in order of decreasing importance:

- General Procedures (GP), in addition the CGGVERITAS corporate procedures are referenced in the Marine intranet site.
- Specific Procedures (SP) targeted at more particular subjects.
- Technical Guides (TG).
- Plans (PL), for answers to call for tender or for specific tasks or projects.
- Work Instructions (WI) developed and managed at crew level.
- Finally, records (RD) that are generally attached to forms.

The management of the CGGVERITAS HSEMS documentation is detailed in the Documentation process (DON).

3.3.8.2. A process approach

In line with ISO 9001:2000 recommendations, the HSEMS has been structured around process at two levels:

Generic processes:

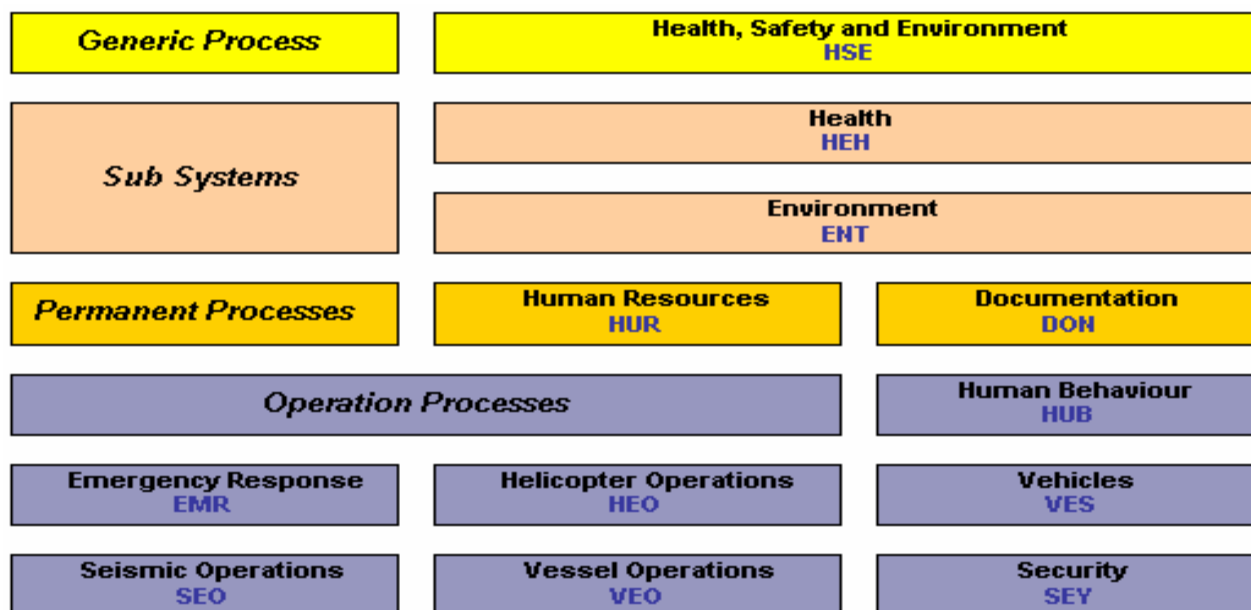
- HSE Safety
- ENT Environment
- HUR Human resources
- DON Documentation

Crew HSE Plan

Operational processes (based on IAGC manuals):

- EMR Emergency response
- HEO Helicopter operation
- VES Vehicles
- SEO Seismic operation
- VEO Vessel operation
- SEY Security

Procedures and guides are necessary linked to one process only.



3.3.9 HSE Standards and Legal Regulations

The HSE standards applicable for the performance of the work shall, as a minimum, consist of the standards defined in:

- 1) All applicable legislation, rules and regulations (SOLAS, Marpol, IMO, JNCC, OGP, IAGC, ISM).
- 2) CGGVERITAS own internal HSE standards and common routines.
- 3) Industry HSE standards adopted by the client, as contained and referenced in the HSE schedules, which are listed below.
- 4) Supplementary HSE standards included in the HSE schedules.

Applicable legislation and regulations as per above shall always prevail, unless the relevant authorities grant a formal exemption. However, where the standards defined under b), c) and d) above are more stringent and are not in conflict with a), the most stringent standard defined in any of these shall prevail.

Where an item or activity is not covered by any of the standards mentioned above, or when the defined standards are considered or found to be inadequate, CGGVERITAS shall immediately notify the client of such absence or inadequacy of defined standards. CGGVERITAS and the client shall then jointly develop and agree on additional standards to cover the item or activity and reduce the associated risk to as low as reasonably practicable (ALARP), before the item or the activity is included or continued in the performance of the work.

- **HSE MS (General & Organisation)**

Crew HSE Plan

- OGP *: Guidelines for the Development and Application of Health, Safety and Environmental Management Systems - Report No. 6.36/210, July 1994.
- OGP: HSE Aspects in a Contracting Environment for Geophysical Operations (Schedules and Plans), May 2001, Report 6.92/317.
- OGP: HSE Competence Assessment and Training Guidelines, E&P Forum, April 1999, Report 6.78/292.
- OGP: Generic Hazards Register for Geophysical Operations - Report No. 6.40/217-December 1994.
- OGP: Safety Incident Reporting System – Users' Guide – Report No 6.5/315 – 2001.
- OGP: HSE Auditing – Report No 6.53/245 – 1996
- OGP: Guidelines for Working Together in a Contract Environment – Report No 6.64/291, 1999.
- OGP: Glossary of HSE Terms – Report No 6.5/244, 1999.
- IMO: ISM Code (IMO A 741 (18) Resolution)

(*) Formerly E&P Forum

- Health

- OGP Health Management Guidelines for Remote Land-Based Geophysical Operations – Report No 6.30/190, 1993.
- OGP Substance Abuse – Guidelines for Management - Report No 6.87/306, 2000.
- OGP Standards for Local Medical Support - Report No 6.44/222, 1995.
- OGP Health Assessment of Fitness - Report No 6.46/228, 1995.
- OGP Guidelines for the Control of HIV – Hepatitis B and C in the workplace - Report No 6.55/321, 2001.
- OGP Strategic Health Management – Principles and guidelines for the oil & gas industry – Report No. 6.88/307, June 2000.
- OGP Health Aspects of Work in Extreme Climates within the E&P Industry – The Cold – Report No. 6.65/270, January 1998.
- OGP Health Performance Indicators – Report No. 6.78/290, June 1999.
- OGP Health Aspects of Work in Extreme Climates within the E&P Industry – The Heat – Report No. 6.70/279, September 1998.

- Safety

- OGP Aircraft Management Guide - Report No 6.51/239, 1998.
- OGP Guidelines on the Use of Small Boats in Marine Geophysical Operations - Report No 6.42/220, 1995.
- OGP Land Transport Safety Guidelines - Report No 6.50/238, 1996.
- OGP Guidelines on Permit to Work (PTW) Systems - Report No 6.29/189, 1993.
- IAGC Land Geophysical Operations Safety Manual, IAGC, 1997.
- IAGC Marine Geophysical Operations Safety Manual, IAGC, 1997.
- SOLAS International Convention for Safety of Life at Sea.

- Environmental

- IAGC Environmental Manual for Worldwide Geophysical Operations – 2001.
- OGP/UNEP Environmental Management in Oil and Gas Exploration and Production - Report No 2.72/254, 1997.
- OGP Guidelines for Environmental Protection: Mangrove - Report No 2.54/184, 1993.
- OGP Guidelines for Environmental Protection: Rainforest - Report No 2.49/170, 1993.
- OGP Waste Management Guidelines - Report No 2.58/196, 1993.
- JNCC Guidelines for minimising acoustic disturbance to marine mammals from seismic surveys, 1998.
- MARPOL Regulations for the Prevention of Pollution at Sea.

Crew HSE Plan

3.3.10 General issues

3.3.10.1. Medical welfare

- CGGVERITAS will be responsible for and will take all preventive and curative measures to protect the medical welfare of its personnel and will take care of periodical medical examinations, arrangements for medical attendance, treatment or hospitalisation if and when necessary and will arrange suitable insurance coverage for such contingencies.
- CGGVERITAS will ensure that working periods of the staff are not excessive such that they are prejudicial to maintenance of good health. Personnel will work no more than 12 hours per day.
- Preventive medicine to be practiced in the form of education of personnel and issue of appropriate protective equipment (protective clothing, etc.). Compulsory vaccinations for prospector staff will be controlled by the CMETE in Paris or equivalent.

3.3.10.2. Environmental commitment

- CGGVERITAS will ensure that all the personnel under her control and authority are briefed and understand CGGVERITAS and Client policy on environmental protection, and will act accordingly.
- CGGVERITAS will take all necessary precautions to protect the environment.
- CGGVERITAS will adhere to existing national statutory regulations concerning environmental damage resulting from the performance of the Work. Local customs, cultural and religious requirements will be respected, avoiding challenge, contradiction and/or criticism thereof.
- CGGVERITAS will prevent the collection, removal, purchase and utilisation directly or indirectly of local environmentally protected resources, including plants, animals, antique artefacts etc. for consumption, profit or any other purpose by the its own personnel or subcontractors' personnel.

3.3.10.3. Security

- CGGVERITAS will implement its security policy that aims to minimise loss of equipment and avoid harm to persons through appropriate responses to various incidents.

3.3.10.4. Rule of Two and Buddy System

- The performance of the services shall be so arranged that everyone shall have recourse to the assistance from a second person at any time. Thus with the exception of low risk environments such as offices or accommodations, no one shall work alone. This applies in particular to bridge officers, personnel in engine or compressor rooms, (boat) drivers.
- During night operations a buddy system shall be implemented, where pairs of individuals shall keep track of each other.

3.3.10.5. Subcontractors and support services management

Subcontractor assessment and selection procedure

CGGVERITAS requires the sub-contractors to prove that:

- They are capable of conducting themselves in a safe and competent manner.
- They apply health, safety, environmental measures fully consistent with those of CGGVERITAS and the Client.
- They achieve comparable levels of safety performance and they consistently demonstrate an acceptable standard of safety awareness.

Crew HSE Plan

CGGVERITAS assesses and selects the subcontractors through the followings criteria:

- Results of HSE audits conducted by specialists on behalf of CGGVERITAS (Helicopters and ship owners companies).
- Their current legal certificates and authorisations.
- Their past accident history.
- Their HSE policy.
- Their HSE performance and monitoring system.
- Their Definition of responsibilities and work force involvement.

CGGVERITAS assesses the records of subcontractors through the following criteria:

- Progress against HSE plan.
- Frequency of inspections, number of deficiencies identified and follows up.
- Frequency and quality of HSE meetings.
- NEM and UNA reports and analysis.
- Quality of incident/accident investigations

The required standards to be met by the subcontractors, the CGGVERITAS HSE policy as well as the Client policy they have to adhere to, will be explained and included as an integrated part of any Sub-contractor management

- The VOM and the legal department prepare the contracts.
- Prior to work commencing, the VOM or Party Chief briefs the sub-contractor on standards to be met while performing the work and the level of HSE performance and HSE management expected.
- The Party Chief, HSE Advisor, and Doctor do a start-up inspection. Client Representatives are welcome to accompany such inspections.
- During execution of the work:
- The VOM evaluates the sub-contractor operations during his monthly crew inspection.
- The VOM has regular meetings with the sub-contractor management.
- The VOM applies sanctions in case of non-compliance with the Party Chief recommendations.
- The Party Chief and HSEA ensure that the sub-contractor adheres to CGGVERITAS standards.
- The Party Chief and HSEA investigate High Risks incidents with the sub-contractor management.
- The HSEA ensures that incidents are correctly reported and investigated.
- The Party Chief and HSEA evaluate sub-contractor's work and HSE performance and ask for adjustment if necessary.
- The HSE Advisor and Doctor control and monitor the HSE performances under the supervision of the Party Chief.

At the end of the contract with the sub-contractor, the VOM and Party Chief prepare a closeout evaluation report for further reference.

3.4 Hazards and Effects Management Process

Major hazards related to the different activities will be Identified and Assessed; appropriate Control and Recovery measures will be in place. Work hazards analysis done for every work type will be documented, issued to staff and discussed at HSE meeting. All the system is supported by electronic databases, cross-linked with Procedures refer to the chapter 4.

Crew HSE Plan

The Hazard and Effects Management Process (HEMP) will be structured as follows:

3.4.1 Identification

The hazard identification is based upon a corporate Hazard Register, containing nearly 200 references, articulated on three levels:

- Category 1 Hazard main category (Environment, Equipment, Product, Method, Personnel, Management)
- Category 2 Family of hazard, like Geological Factors for instance.
- Category 3 The hazard itself, coded on three digits.

As of tender stage, the VOM conducts a yes / no assessment, re-evaluated on contract review and reviewed by the crew at mobilisation.

If adjustment is needed for more precise identification, the system allows creation of sub-hazards, with their own assessment, controls and recoveries, fully managed by the crew.

The main hazards are itemised onto next pages:
All the hazards are in the hazard register of the Vessel.

Crew HSE Plan

Code	Category 1	Category 2	Hazard	Risk	
101	ENVIRONMENT	Biological	Invertebrate animal attacks	C2	MEDIUM
102	ENVIRONMENT	Biological	Vertebrate animal attacks	B3	MEDIUM
105	ENVIRONMENT	Biological	Infectious disease / HIV	D2	MEDIUM
106	ENVIRONMENT	Biological	Skin and intestinal parasites	D2	MEDIUM
107	ENVIRONMENT	Biological	Malaria	D2	MEDIUM
108	ENVIRONMENT	Biological	Contaminated food and water	B2	LOW
109	ENVIRONMENT	Biological	Marine growth on equipment	B2	LOW
111	ENVIRONMENT	Geological factors	Natural gas (methane/H ₂ S)	B2	LOW
112	ENVIRONMENT	Geological factors	Tidal wave	B2	LOW
121	ENVIRONMENT	Meteorological factors	Extreme cold weather	B2	LOW
122	ENVIRONMENT	Meteorological factors	Extreme heat weather	D2	MEDIUM
123	ENVIRONMENT	Meteorological factors	Cold water	D2	MEDIUM
124	ENVIRONMENT	Meteorological factors	High wind	C2	MEDIUM
125	ENVIRONMENT	Meteorological factors	Cyclone / twister	B3	MEDIUM
126	ENVIRONMENT	Meteorological factors	Fog	D2	MEDIUM
127	ENVIRONMENT	Meteorological factors	Precipitations (rain, snow, hail)	C2	MEDIUM
131	ENVIRONMENT	Natural combined factors	Static electricity	C2	MEDIUM
132	ENVIRONMENT	Natural combined factors	Lightning	C2	MEDIUM
134	ENVIRONMENT	Natural combined factors	Rough sea	D2	MEDIUM
135	ENVIRONMENT	Natural combined factors	Fast current	D2	MEDIUM
141	ENVIRONMENT	Natural hazardous terrain	Slippery ground	D2	MEDIUM
154	ENVIRONMENT	Natural obstacles	Floating debris	B2	LOW
155	ENVIRONMENT	Natural obstacles	Shallows	B4	MEDIUM HIGH
161	ENVIRONMENT	Human activity related hazards	Visible obstacles	B3	MEDIUM
162	ENVIRONMENT	Human activity related hazards	Hidden obstacles	C2	MEDIUM
163	ENVIRONMENT	Human activity related hazards	Radioactivity / radiations	B1	LOW
164	ENVIRONMENT	Human activity related hazards	Security problem / robbery	C2	MEDIUM
165	ENVIRONMENT	Human activity related hazards	Security problem / community	B2	LOW
166	ENVIRONMENT	Human activity related hazards	Security problem / civil unrest	B4	MEDIUM HIGH
167	ENVIRONMENT	Human activity related hazards	Security problem / banditism	B3	MEDIUM
201	EQUIPMENT	Dissipation of energy	High noise / vibration generation	D1	LOW
202	EQUIPMENT	Dissipation of energy	Deficient electrical systems	D2	MEDIUM
203	EQUIPMENT	Dissipation of energy	Hot parts and products	D1	LOW
211	EQUIPMENT	High pressure systems	Compressed gas containers	C2	MEDIUM
212	EQUIPMENT	High pressure systems	High pressure air system	B2	LOW
213	EQUIPMENT	High pressure systems	High pressure water system	C2	MEDIUM
214	EQUIPMENT	High pressure systems	High pressure hydraulic system	C2	MEDIUM
221	EQUIPMENT	Tense / suspended parts	Suspended equipment	B3	MEDIUM
222	EQUIPMENT	Tense / suspended parts	Tense equipment	B3	MEDIUM
223	EQUIPMENT	Tense / suspended parts	Erected object	B3	MEDIUM
224	EQUIPMENT	Tense / suspended parts	Falling equipment	B3	MEDIUM
231	EQUIPMENT	Moving parts	Ejected parts	C1	LOW
232	EQUIPMENT	Moving parts	Rotating parts	B1	LOW
233	EQUIPMENT	Moving parts	Translating parts	B3	MEDIUM
241	EQUIPMENT	Equipment design	Sharp parts / razor knives	C3	MEDIUM HIGH
242	EQUIPMENT	Equipment design	Ergonomic	B2	LOW
251	EQUIPMENT	Obstacles / slippery surface	Slippery floor	D2	MEDIUM
252	EQUIPMENT	Obstacles / slippery surface	Overhead obstacles	B2	LOW
253	EQUIPMENT	Obstacles / slippery surface	Steps	D2	MEDIUM
254	EQUIPMENT	Obstacles / slippery surface	Ground level obstacles	D2	MEDIUM
261	EQUIPMENT	Living and working place	Poor lighting	D2	MEDIUM
262	EQUIPMENT	Living and working place	Insufficient room	D1	LOW
263	EQUIPMENT	Living and working place	Insufficient toilets / showers	D1	LOW
264	EQUIPMENT	Living and working place	Abnormal temperature	D1	LOW
265	EQUIPMENT	Living and working place	Abnormal hygrometry level	D1	LOW
267	EQUIPMENT	Living and working place	Insufficient ventilation / air conditioning	D2	MEDIUM
268	EQUIPMENT	Living and working place	Poor working place layout	D2	MEDIUM
271	EQUIPMENT	Vessel equipment	Engine failure (vessel)	B3	MEDIUM

Crew HSE Plan

Code	Category 1	Category 2	Hazard	Risk	
272	EQUIPMENT	Vessel equipment	Power supply failure	B1	LOW
273	EQUIPMENT	Vessel equipment	Steering failure	B3	MEDIUM
301	PRODUCTS	Environment affecting properties	Affecting aquatic environment	D1	LOW
302	PRODUCTS	Environment affecting properties	Affecting atmospheric environment	C1	LOW
303	PRODUCTS	Environment affecting properties	Affecting land environment	D2	MEDIUM
312	PRODUCTS	Physicochemical properties	Combustives / Combustibles	B2	LOW
313	PRODUCTS	Physicochemical properties	Highly flammable products	B3	MEDIUM
314	PRODUCTS	Physicochemical properties	Flammable products	B4	MEDIUM HIGH
315	PRODUCTS	Physicochemical properties	Degraded / contaminated products	C2	MEDIUM
321	PRODUCTS	Toxicological properties	Highly toxic products	B2	LOW
322	PRODUCTS	Toxicological properties	Toxic products	B2	LOW
323	PRODUCTS	Toxicological properties	Corrosive and harmful products	B3	MEDIUM
324	PRODUCTS	Toxicological properties	Irritant products	B2	LOW
401	METHOD	Land transport	Overspeeding	D2	MEDIUM
402	METHOD	Land transport	Loss of vehicle control	C3	MEDIUM HIGH
403	METHOD	Land transport	Overloaded vehicle	D2	MEDIUM
404	METHOD	Land transport	Roll over	D2	MEDIUM
405	METHOD	Land transport	Driving in poor visibility	C2	MEDIUM
406	METHOD	Land transport	Driving on slippery terrain	C2	MEDIUM
407	METHOD	Land transport	Third party traffic	D2	MEDIUM
408	METHOD	Land transport	Parking / manoeuvring	D2	MEDIUM
409	METHOD	Land transport	Collision	C2	MEDIUM
410	METHOD	Water transport	Wreckage	C3	MEDIUM HIGH
411	METHOD	Water transport	Drifting	D2	MEDIUM
412	METHOD	Water transport	Capsizing	B3	MEDIUM
413	METHOD	Water transport	Overspeeding boat	C3	MEDIUM HIGH
414	METHOD	Water transport	Sudden movement of boat	D2	MEDIUM
415	METHOD	Water transport	Overloaded boat	B2	LOW
416	METHOD	Water transport	Navigating with poor visibility	B2	LOW
417	METHOD	Water transport	Man overboard	C2	MEDIUM
418	METHOD	Water transport	Colliding	B3	MEDIUM
419	METHOD	Water transport	Grounding	D2	MEDIUM
421	METHOD	Air transport	Emergency landing	C3	MEDIUM HIGH
422	METHOD	Air transport	Crash	B3	MEDIUM
423	METHOD	Air transport	Engine failure	C2	MEDIUM
424	METHOD	Air transport	Ditching	B3	MEDIUM
425	METHOD	Air transport	construction / design / placement of land	D2	MEDIUM
426	METHOD	Air transport	Overloaded aircraft	C2	MEDIUM
427	METHOD	Air transport	Inadequate flying height	D2	MEDIUM
428	METHOD	Air transport	Flying with poor visibility	B4	MEDIUM HIGH
429	METHOD	Air transport	Sling related failure	C2	MEDIUM
431	METHOD	Maintenance / overhaul	Incorrect use of ladders and scaffolding	D2	MEDIUM
432	METHOD	Maintenance / overhaul	Working aloft	B3	MEDIUM
433	METHOD	Maintenance / overhaul	Working at height (>2m)	D2	MEDIUM
434	METHOD	Maintenance / overhaul	Manhandling heavy loads	D2	MEDIUM
435	METHOD	Maintenance / overhaul	Working on active system	B3	MEDIUM
436	METHOD	Maintenance / overhaul	Working in confined spaces	B2	LOW
441	METHOD	Handling dangerous goods	Deficient labelling	D2	MEDIUM
442	METHOD	Handling dangerous goods	Chemical splashes	B2	LOW
451	METHOD	Managing premises	Insufficient control of access	B2	LOW
452	METHOD	Managing premises	Poor housekeeping	D2	MEDIUM
453	METHOD	Managing premises	Insufficient segregation of hazards	B2	LOW
454	METHOD	Managing premises	Poor access to emergency equipment	B2	LOW
455	METHOD	Managing premises	lack of / poor marking of emergency exit	B2	LOW
461	METHOD	Special methods	Overloading of crane / lifting gear	C2	MEDIUM
462	METHOD	Special methods	Deficiency of attachment points (loads)	C3	MEDIUM HIGH
464	METHOD	Special methods	Airgun pop	B3	MEDIUM
466	METHOD	Special methods	Diving	B2	LOW

Crew HSE Plan

Code	Category 1	Category 2	Hazard	Risk	
471	METHOD	Impact upon external environment	Interacting with local culture	D2	MEDIUM
475	METHOD	Impact upon external environment	Disturbing fauna	D2	MEDIUM
477	METHOD	Impact upon external environment	Damaging constructions, installations	D2	MEDIUM
478	METHOD	Impact upon external environment	Creating visual pollution	B1	LOW
501	PERSONNEL	Medical fitness	Previous recurrent injury / disease	B3	MEDIUM
502	PERSONNEL	Medical fitness	Fatigue / stress	B3	MEDIUM
503	PERSONNEL	Medical fitness	Abnormal size	B1	LOW
504	PERSONNEL	Medical fitness	Unfit body	B2	LOW
505	PERSONNEL	Medical fitness	Lack of coordination in the limbs	B2	LOW
506	PERSONNEL	Medical fitness	Poor eyesight / hearing	B2	LOW
507	PERSONNEL	Medical fitness	Reaction to medicine	B2	LOW
508	PERSONNEL	Medical fitness	Heat exhaustion	C2	MEDIUM
509	PERSONNEL	Medical fitness	Sea sickness	C2	MEDIUM
511	PERSONNEL	Personal behaviour	Negative attitude toward HSE rule	B3	MEDIUM
512	PERSONNEL	Personal behaviour	Lack of concentration	B3	MEDIUM
513	PERSONNEL	Personal behaviour	Incorrect posture	B2	LOW
514	PERSONNEL	Personal behaviour	Overconfidence	B3	MEDIUM
515	PERSONNEL	Personal behaviour	Horseplay / fighting	B3	MEDIUM
516	PERSONNEL	Personal behaviour	Self medication	B2	LOW
517	PERSONNEL	Personal behaviour	Unprotected sexual activity	B3	MEDIUM
518	PERSONNEL	Personal behaviour	Alcohol or drug abuse	C2	MEDIUM
519	PERSONNEL	Personal behaviour	Smoking	C2	MEDIUM
521	PERSONNEL	Uncontrolled situation	Panicking in emergency	B2	LOW
523	PERSONNEL	Uncontrolled situation	Acting with precipitation	C2	MEDIUM
524	PERSONNEL	Uncontrolled situation	Trips / falls (0m - 2m)	C2	MEDIUM
601	MANAGEMENT	Equipment management failure	Deficient PPE / PFD / CPE	D1	LOW
602	MANAGEMENT	Equipment management failure	Deficient machinery guard	C1	LOW
603	MANAGEMENT	Equipment management failure	Deficient maintenance	B3	MEDIUM
604	MANAGEMENT	Equipment management failure	Poorly designed equipment	C2	MEDIUM
605	MANAGEMENT	Equipment management failure	Deficient equipment	B2	LOW
606	MANAGEMENT	Equipment management failure	Deficient emergency / recovery equipment	B2	LOW
607	MANAGEMENT	Equipment management failure	Deficient means of communication	C1	LOW
608	MANAGEMENT	Equipment management failure	Deficient medicine supply	B2	LOW
611	MANAGEMENT	Personnel management failure	Language problem	B1	LOW
612	MANAGEMENT	Personnel management failure	Deficient hand over	B2	LOW
613	MANAGEMENT	Personnel management failure	Inadequate selection of personnel	B1	LOW
614	MANAGEMENT	Personnel management failure	Training deficiency	B2	LOW
615	MANAGEMENT	Personnel management failure	Insufficient personnel (number)	C2	MEDIUM
616	MANAGEMENT	Personnel management failure	Lack of qualified first aider	B3	MEDIUM
617	MANAGEMENT	Personnel management failure	Lack of certified personnel	B1	LOW
621	MANAGEMENT	Subcontractor management failure	Inadequate selection / management of subcontractor	B3	MEDIUM
622	MANAGEMENT	Subcontractor management failure	Inaccurate contract (subcontractor)	B2	LOW
623	MANAGEMENT	Subcontractor management failure	Poorly qualified air carrier	B3	MEDIUM
631	MANAGEMENT	HSEMS failure at country / crew level	Deficient information	C1	LOW
632	MANAGEMENT	HSEMS failure at country / crew level	Planning deficiency	B2	LOW
633	MANAGEMENT	HSEMS failure at country / crew level	Reporting deficiency	B2	LOW
634	MANAGEMENT	HSEMS failure at country / crew level	Inspection / control deficiency	B2	LOW
635	MANAGEMENT	HSEMS failure at country / crew level	Poor investigation	B1	LOW
636	MANAGEMENT	HSEMS failure at country / crew level	Inadequate instruction	C2	MEDIUM
637	MANAGEMENT	HSEMS failure at country / crew level	Insufficient journey management	C2	MEDIUM
641	MANAGEMENT	HSEMS failure at corporate level	Inadequate definition of responsibilities	B1	LOW
642	MANAGEMENT	HSEMS failure at corporate level	Inadequate definition of standard	B3	MEDIUM
643	MANAGEMENT	HSEMS failure at corporate level	Inadequate procedure / policy	B2	LOW
644	MANAGEMENT	HSEMS failure at corporate level	Inadequate resources	B2	LOW
645	MANAGEMENT	HSEMS failure at corporate level	Conflict of interest	C2	MEDIUM
646	MANAGEMENT	HSEMS failure at corporate level	Audit deficiency	B1	LOW

Crew HSE Plan

3.4.2 Assessment

The hazard assessment is conducted individually for each of the 172 generic hazards. This assessment -typically an accident scenario- is supported by the broad CGGVERITAS seismic experience along with the industry knowledge; it is periodically reviewed by CGGVERITAS HSE specialists and crews' feed back.

3.4.3 Escalating factors

All escalating factors are detailed to ensure proper recognition of the hazard and proper suitability of the existing procedures during hazard reviews.

3.4.4 Evaluation before mitigation

A first risk evaluation of the hazard is conducted by using the Risk Matrix (refer to § 3.4.8), this evaluation is determined by the fact that controls are not totally in place.

3.4.5 Controls

The control of hazards is the application of procedures at all levels (Manuals, General Procedures, Specific Procedures and Work Instructions), these procedures induce:

- Work practices in all processes,
- Limited processes (MOPO),
- Determination of training,
- Purchasing specifications,
- System of inspections and checks,
- Planning activities.

Each hazard sheet presents the list of procedures to be applied to get proper controls. The procedures are automatically cross linked to the hazards they control when they are edited. In addition, the link with *who is supervising* and *who is executing* procedures allows precise definition of all responsibilities.

The crew will precisely detail its controls in crew specific Work Instructions.

3.4.6 Evaluation after mitigation

A second risk evaluation of the hazard is conducted by using the Risk Matrix; this evaluation is determined by the fact that controls are totally in place.

3.4.7 Recovery

Measures taken to re-establish control over the hazard once it has been exposed through undertaking actions to regain control. When an incident does occur, response must be timely and effective through different measures like:

- Medevac
- First aid
- Fire fighting
- Abandonment
- Spillage Plan
- Search and Rescue
- Notification, Investigation, Reporting
- Security Plan

Some of these recoveries are already referenced in the Project HSE Plan.

Crew HSE Plan

Communication

- Vessel Hazard Register

The complete Vessel Hazard Register is maintained as a database on the HSE Advisors computer and is available to the Master.

- Survey Risk assessment

A complete H., S. and E. risk assessment is performed before the start of the survey by the Vessel Operation Manager which is included in the Project HSE Plan, dispatched to the Vessel's Master.

- Additional CGGVERITAS Safety Information

The Vessel Operation manager communicates additional safety information and alerts being produced from other vessels of the fleet to the following personnel:

-Party Chief

-Master

-Client Representative

3.4.8 Risk reduction, Permit To Work and Lock Out/Tag Out

A number of especially dangerous operations require appropriate control and recovery measures to be in place before starting these activities, and mainly a close supervision.

Other hazardous activities hazardous activities will need a Permit To Work (PTW) before it can be undertaken. This PTW could be complementary to restrictions already detailed in the Manual Of Permitted Operations (MOPO, see chapter 4). This requires a form to be completed by the parties wishing to carry out the work and approved by the authorised party. Examples of work where a PTW could be requested:

- Workboat operations
- Close passes to an offshore installation.
- Crane and lifting devices operation.
- Working aloft or at height (e.g. mast erection and antenna fixation).
- The use of hot work equipment (welding, cutting, burning) on vessels or in hazardous areas.
- Work on active electrical systems
- Confined space entry and use of equipment in confined spaces.
- Diving operations.
- Critical work on communications and navigation equipment.

The PACIFIC OFFSHORE Permit to Work Procedure applies. However, during any operations within an installation's 500 metres exclusion zone, the vessel shall be subject to the installation PTW system. All requirements shall be agreed in advance in writing with the installation OIM/OIS.

A lock out/tag out system is often associated to PTW in relation with stored energy systems (high pressure, electrical, gravitational, mechanical, etc.) to enable maintenance workers to positively lock the system out (in a guaranteed safe configuration) and hold the key to the lock, while informing others (with the tag) why the system is locked out and when it will be restored.

Crew Work Instructions will detail all dispositions on this matter.

Crew HSE Plan

3.4.9 Contract review by Captain

As soon as available the following information should be forwarded to the vessel Master, typically through the HSE Project Plan and Survey Risk Assessment for his information and review. This should be reviewed finally during the Kick Off Meeting:

Survey Area

- Safe Navigation Area
- Oil Field obstructions: platforms names and positions, buoys, safety distances, working channels, wellheads, and unmanned platforms.
- Shallow waters – Scouting planned
- Local traffic intensity and possible additional escort vessel.

Emergency Response :

- Medevac (helicopter type / company/delays / Helicopter maximum range)

Environment :

- Use of incinerator
- Port reception facilities for oily waters
- Local depollution equipment (availability and eventual obligation of means from CGGVERITAS client through Contract).

Logistics :

- Port of calls for escort vessel and/or main vessel
- Local agent contacts
- Food / Spares supply : means and frequency.
- Refuelling at sea – which vessel used.

Crew HSE Plan

3.4.10 Risk Matrix

The Risk Matrix is an integral part of the HSEMS. It is associated with the Hazard Register system and the Accident/Incident investigation. The matrix may be used to assess an actual situation (real consequences of an accident) as well as the potential of an event: Risk Assessment, Near Misses and Unsafe Acts.

		OCCURRENCE PROBABILITY						
		A	B	C	D	E		
	1							
GRAVITY	2							
	3							
	4							
	5							

	HIGH RISK
	MEDIUM HIGH RISK
	MEDIUM RISK
	LOW RISK

G R A V I T Y				
	People	Material	Environment	Financial
1	Slight injury FAC	Slight Damage	Slight leak	Insignificant
2	Minor injury MTC + RWC	Minor Damage	Minor leak / spill	Installation Level
3	Major injury LTI	Localized Damage	Localized leak / spill	Area level
4	Single fatality	Major Damage	Major leak / spill	SBU level
5	Multiple fatalities	Extensive Damage	Massive leak / spill	Corporate level

PROBABILITY		Example
A	Never heard in the industry	Collision Seismic Vessel/platform
B	Happens in the industry	Burst of high-pressure pipe
C	Happens every year in the industry	Load falling from crane
D	Happens periodically on the crew	Cut by a sharp object
E	Happens every day on the crew	Trip and fall

In case of high & medium/high risks situations; immediate urgent corrective actions are to be taken by the management to bring the crew back to acceptable standards.

Crew HSE Plan

In case of medium & low risks, to ensure a continuous improvement, normal attention must be given by the management to HSE matters and a focus on these risks will maintain the crew within acceptable risk level.

3.5 HSE Planning and Procedures

3.5.1 Planning

CGGVERITAS will maintain, within its overall work program, plans for achieving the HSE strategic objectives, the performance criteria and the risk reduction measures. These should include planning for existing operations, managing changes and safeguarding asset integrity.

From the above, the crew establishes detailed plans for the following:

- Training (names, dates, course syllabus).
- Drills.
- Controls/checks, inspections, cross-inspections.
- Meetings.

3.5.2 Emergency planning

It is important that the interface between CGGVERITAS and Pacific Offshore Shipping is thoroughly understood and managed.

It is important that CGGVERITAS and PACIFIC OFFSHORE at office level and Party Chief/Master at vessel level have an exact knowledge of the client's obligation to provide for emergency resources contained in the Client/CGGVERITAS Contract.

The vessel Master has legal authority to take such actions and issue such orders that may be considered necessary for the safety of life, for the safety of the ship or for the prevention of marine pollution. Emergency response shall be in accordance with the vessel Contingency Plan and the Pacific Offshore Shipping Emergency Response Procedure.

The Master is responsible for ensuring that the emergency response facilities and materials as specified in the emergency procedures are available and fit for purpose at all times. The primary responsibility for all emergencies lies with the Master contacting Pacific Offshore Shipping, CGGVERITAS and/or medical facilities.

A secondary responsibility lies with the Party Chief and the Client Representative who shall contact the nearest platform (if applicable), Vessel Operation manager and the Client emergency response centre.

In the event of an emergency occurring when the vessel is in the 500-metre exclusion zone of a platform, the first point of contact for the vessel is the platform radio room.

3.5.3 Management of change

The Master or Party Chief is responsible for informing the Vessel Operation Manager and the PACIFIC OFFSHORE Operations Manager of any significant change of activity, equipment or personnel that could affect the safety of the vessel or its personnel.

The Vessel Operation manager is responsible for communicating any changes to the approved operations to the Client office. The Client Representative must approve such changes prior to the re-commencement of operations.

Crew HSE Plan

The Client Representative is responsible for communicating any changes to scope of work or equipment requirements to the CGGVERITAS Manager.

3.5.4 Crew changes

Crew changes are organised according to the safest and reasonably practical means, amongst:

- When at port
- By helicopter rotation
- By chase boat and Small Boats transfer.

Whenever a crew change is made, the PACIFIC OFFSHORE Personnel Department provides the CGGVERITAS Vessel Operation manager with details of the off coming and ongoing crew.

3.5.5 Waste management

All waste onboard the vessel is disposed of in an environmentally friendly manner and in line with MARPOL Regulations. Collection and elimination of garbage is managed through the onboard garbage management plan. A Garbage Discharge Book is maintained onboard under the Masters responsibility.

CGGVERITAS and PACIFIC OFFSHORE are jointly required to ensure that the removal and disposal of waste (solid waste, used oils, other hydrocarbon lubricants and liquid wastes) are completed in an environmentally acceptable manner, in accordance with local laws and regulations and client's requirements.

3.5.6 Workboats/fast rescue craft

Where survey vessels are equipped with a Fast Rescue Craft or Work Boats they are operated in accordance with PACIFIC OFFSHORE Procedures.

3.5.7 Manning

Emergency response training requirements

Medical fitness

CGGVERITAS and PACIFIC OFFSHORE ensure that their own personnel have current Medical Certificates of Fitness. Each party shall produce copies of certificates to the other on request. The medical certificates are, as a minimum, renewed yearly in accordance with the Guidelines of the UK Offshore Operators Association/ IMO Regulations / the STCW 95 Code and ILO 73 Convention.

FRC - Mob Boat – Work Boat crew

All personnel boarding such boat must have been given the necessary HSE and job related training. The MOB boat's coxswain and personnel crewing the small boat shall comply with the IMO training requirements.

3.5.8 CGGVERITAS Equipment management

CGGVERITAS is responsible for ensuring that all seismic equipment is fit for purpose and meets with statutory and client requirements, together with additional safe operating standards set forth in the IAGC Safety Manual and the OGP Forum Health and Safety Schedules for Marine Geophysical Operations. Any known hazard or high risk related deficiency is reported as soon as practically possible to the Master, the Vessel Operation Manager and the Client Representative according to the CGGVERITAS Equipment Maintenance procedures.

Crew HSE Plan

3.5.9 Maintenance of the ship's conformity

PACIFIC OFFSHORE is responsible for ensuring that the vessel and all its equipment are fit for purpose and meets with statutory requirements. Any known hazard or risk related deficiency must be reported as soon as practically possible to the Vessel Operation manager and the Client Representative.

CGGVERITAS and PACIFIC OFFSHORE ensure that controls are in place to confirm that their own equipment used is maintained to an appropriate standard and remains fit for purpose.

It is the common interest of CGGVERITAS and PACIFIC OFFSHORE to have the ship and its equipment permanently conform to the applied compulsory rules / requirements. But the operation of the vessel itself impairs this conformity due to the fact that some trials / tests cannot be carried out when the seismic system is at sea.

For that reason, every vessel will prepare a list of such tests, with a schedule and appropriate or legal periodicity's. At the end of the survey, when the seismic system will have been safely stored on board, the master (with the chief engineer) will choose those trials which have to be done and will carry out them accordingly.

At the end, the schedule will be updated and the records will also be made in the relevant deck or engine logbooks.

Example of "list of trials not permitted when towing equipment" (periodicity given as example only)

TRIALS NOT PERMITTED WHEN TOWING EQUIPMENT

ITEM	PERIODICITY	LAST TEST	REF. OF THE JOB (AMOS / SSAMP)
Launch of starboard lifeboat	3 months		
Launch of port lifeboat	3 months		
Starboard propeller emergency stop	1 year		
Port propeller emergency stop	1 year		
Local control of starboard propeller	6 months		
Local control of port propeller	6 months		
Emergency steering drill	3 months		
Safety of starboard rudder	3 months		
Safety of port rudder	3 months		
Override safeties of MEP	1 year		
Coupling of emergency generator	1 year		

3.5.10 HSE in force procedures

This is the list of in force procedures, in addition, it is indicated whether or not they apply to the current crew.

Crew HSE Plan

The following matrix then details the segregation of responsibilities between parties (PACIFIC OFFSHORE and CGGVERITAS):

SUBJECT	REF No.	PACIFIC OFFSHORE	CGGVERITAS	REMARKS
SAFETY				
HSE Policies Statement of Policy		•	•	All policies apply.
Medevac			•	
Offshore Emergency Response		■	•	PACIFIC OFFSHORE takes precedence.
Management of Change			•	
Hazard Register			•	
Incident / Near Miss Reporting		•	•	All reports to be jointly shared by Captain, PC.
Personal Protective Equipment		•	■	CGGVERITAS takes precedence
Buddy System			•	
Safety Committee Meeting		•	■	CGGVERITAS takes precedence
Vessel Remedial Action Plan		•		
HSE/Toolbox Meetings		•	■	CGGVERITAS takes precedence
Safety Induction / Orientation*		•		
Legislation, Laws and Regulations		•		
Lifesaving Equipment		•		

Crew HSE Plan

SUBJECT	REF No.	PACIFIC OFFSHORE	CGGVERITAS	REMARKS
Emergency Drills		•		
Towing Procedures		•		
Operating Within the 500m Exclusion Zone of an Offshore Structure or Installation			•	
MOB Operations		•		
Responding to Interference by Third Party Pressure or Action Groups			•	
Manual Handling		•		
Transfer of Personnel at Sea		•	•	Only with Captain's approval
Refuelling at Sea		•		
Risk Management		•	•	
Operation and Inspection of Lifting Equipment		•	•	Both parties responsible for their own equipment!
Dealing with Criminal Activity/Sudden Death Onboard Vessels		•		
Permit to Work		•	■	PACIFIC OFFSHORE takes precedence
HSE Routine Reporting		•	•	HSE reporting through both organisations
Tag out/Lock out for high voltage / hydraulic / HP Air Systems*		•	•	
GENERAL OPERATIONS				
Workboat Operations		•	•	Only with Captain's approval
Fast Rescue Craft Operations		•		
Helicopter Operations		•		
Adverse Weather		•		
Seismic Operations General Safety Procedure (Equipment Launch and Recovery).			•	

Crew HSE Plan

SUBJECT	REF No.	PACIFIC OFFSHORE	CGGVERITAS	REMARKS
Recovery of Drifting In Sea Equipment*			•	
Action to be taken when a third party vessel is in danger of crossing the streamer*			•	
Inspection of High Pressure Seismic Air Systems		•	•	PACIFIC OFFSHORE responsible from compressors to exhaust valve room – CGGVERITAS responsible from exhaust valve room to guns
Installation, Maintenance and Operation of Hydraulic Systems		•	•	Both parties responsible for their own equipment
Installation, Maintenance and Operation of Compressed Air Systems		•	•	PACIFIC OFFSHORE responsible from compressors to exhaust valve room – CGGVERITAS responsible from exhaust valve room to guns
HP Airguns			•	
Security		•		
ENVIRONMENTAL				
Guidelines for Minimising Acoustic Disturbance to Marine Mammals			•	JNCC Guidelines
Waste Management		•		
Vessel Impact on Sensitive Environment			•	
Shipboard Oil Pollution Emergency Plan		•		
Environmental Protection - Marine Operations		•		
Soft Start			•	
Environmental Impact Assessment			•	
HEALTH				
Control of Substances Hazardous to Health		•		
Lithium Batteries (handling)*			•	

Crew HSE Plan

SUBJECT	REF No.	PACIFIC OFFSHORE	CGGVERITAS	REMARKS
Medical Fitness		•		
Health Checks			•	
Substance Abuse		•	■	CGGVERITAS takes precedence
Stress Management			•	
Visual Display Units			■	CGGVERITAS takes precedence
Hearing Conservation			■	CGGVERITAS takes precedence
Noise Guidelines			■	CGGVERITAS takes precedence
Smoking			■	

3.5.11 HSE Specifications

HSE specifications provide means for performance to be measured or evaluated and enable corrective actions to be identified and executed.

3.5.11.1. Medical facilities

Proper provision of adequate health care / medical support in the area of the crew's operation will be ensured. Suitable facilities, medical supplies and First Aid equipment will be provided as per relevant shipping notice.

The CGGVERITAS Medical Check Lists provide guidance on the contents of first aid boxes, emergency bag, medical equipment and supplies to be made available at base and at the various work locations. These requirements will have to be adjusted to the local situation and to the local sources of supplies.

- **A properly equipped clinic** will be established in board of the vessel to treat and train crew personnel and will be supervised by the medical doctor. The clinic will be stocked with a variety of medicines and equipment including stethoscope, sphygmomanometer, defibrillator, perfusions and infusion sets.
- **A complete medical emergency kit** equipped with a resuscitator, oxygen bottles and vacuum mattress and basket stretcher will be available to offer emergency treatment and stabilize any patient before transfer to a larger medical centre.
- **First aid kits** will be allocated to each working place.
- **Stretchers** will be allocated to clinic.
- **Eye wash stations** will be provided in workshop areas, air gun deck and engine rooms.

3.5.11.2. Working environment

The following systems will be in place to minimize the exposure of our work force to hazardous work environment (physical or chemical agents).

Crew HSE Plan

Noise

- Region of high noise in the workplace will be identified, assessed, measured and controlled.
- Measures to reduce general noise will be incorporated into the design of work equipment and work areas.
- A noise meter for measuring noise levels will be available on the crew.
- Hearing protection will be provided when noise levels in a work area exceed 80 dB and will be mandatory when noise levels exceed 85 dB. Where the use of hearing protectors is mandatory, supervisors will make regular checks to ensure its use.
- No persons will be exposed to steady noise levels above 115 dB irrespective of duration, or to impulse noise levels above 135 dB with or without hearing protection. Such levels may cause irreparable damage to hearing. The personal equivalent continuous noise dose shall not exceed 85 dB over a working day.

Visual Display Units (VDU)

- VDUs will be positioned and be of size to be easily visible from the working position with minimal repetitive head movement.
- The illumination of the work area and VDU will be designed to minimize annoying reflections.
- Each work area will be addressed for suitable ergonomic design so that the operators will be able to maintain a suitable and comfortable posture.
- Prolonged and repetitive exposure, which may result in occupational injury, will be minimized.

Lighting

- CGGVERITAS will provide adequate lighting to all work areas (offices, workshops, etc.) and accommodations (500 lux).
- Emergency lights (that switch on automatically when power switches off) will be provided at strategic positions (ex: Muster point).
- A special device to measure the degree of lighting will be available on the crew.

Temperature

- The temperature of work place will be monitored and controlled to be within acceptable limits.
- CGGVERITAS and Client shall discuss and agree measures to control the adverse effects on personnel of work in extreme temperatures.

Chemicals

- All chemicals will be packed, labelled and stored in accordance with the internationally recognized requirements.
- The workforce will be advised on the properties of chemicals encountered in the course of their work through the pre employment HSE induction and job training, then through the regular HSE meetings, Tool box meeting and refreshing training.
- All involved employees will use appropriate PPE's.
- CGGVERITAS will take all necessary preventative measures and will provide suitable fire extinguishers and first aid equipment including an eye wash station or shower in hazardous areas.
- All involved employees will be monitored for any adverse reaction resulting from long exposure to chemicals
- All areas will be clearly labelled as such with instruction and warning signs visibly posted.

Crew HSE Plan

- MSDS is available in the HSE electronic file.

3.5.11.3. Life saving appliances and arrangements

Safety Harnesses:

- Safety Harness will be approved to suitable standards, with safe attachment points, provided for personnel working in areas where there is a danger of falling (above 2m height).

Life jackets/Buoyancy aids:

- Life jackets will be provided for all passengers.

PLB (Personnel locator beacon):

- A PLB will be available for each worker on the back deck and in the workboat.

Man overboard drill:

- Man overboard drill to take place at least once per month in favourable weather conditions and preferably in calm waters and details of the drills to be logged.

3.5.11.4. Personnel Protective equipment

- CGGVERITAS by applying the Hazard and Effects Management Process (HEMP) to each type of activities will identify the needs of PPEs to be provided to the staff.
- A stock control program ensuring adequate supplies of PPEs, inventory and quality control check will be prepared.
- Additional training for special staff at critical hazardous activities will be given via sectional HSE meetings by the head of sections.
- All PPEs provided will be of international standard and appropriate for the Work, the Area of Operations, the Work environment and the Climate. Sufficient Personal Protective Equipment will be issued to each individual to allow rotational cleaning of and replenishment of worn out.
- CGGVERITAS will provide all personnel with proper and uniform coveralls and footwear as part of its PPEs.

3.5.11.5. Safety equipment and fire protection

- In according to SOLAS Convention.
- Vessel fire plan (PACIFIC OFFSHORE)
- Fire team managed by PACIFIC OFFSHORE
- Fire protection system checked by PACIFIC OFFSHORE.

3.5.11.6. Housekeeping

- To ensure that good housekeeping is maintained continuously throughout the Work with due regards being paid to correct storage, control and disposal of waste material.
- Access ways and emergency exits will be marked and kept clear.

3.5.11.7. Tools and equipment

- All plants, tools, lifting equipment and pressurized systems will be maintained in operable condition and where necessary certified.
- All authorized users of the plant, tool and equipment will be well defined, competent and where necessary licensed and certified. Workshop staff to be trained by the chief mechanic in the correct use of tools and equipment.

Crew HSE Plan

- Potentially dangerous equipment will be protected against unauthorized use: security locks.
- Rotating or moving parts of tools and equipment will be adequately guarded.
- All power driven machine will be provided with an emergency stop button, immediately accessible and readily identifiable to operator.
- Instructions for use and safety-warning signs will be clearly posted in all work areas.
- Dangerous equipment will be protected against usage by intruders or non-responsible.

Electrical equipment

- No free water present in areas where electrical tools are to be used.
- All personnel will be required to check any electrical equipment before use for broken or lose wiring and loose moving parts.
- "Lock out - Tag out system" will be in place for electrical network maintenance operations.

Welding equipment

- Special welding area to be established at the mechanic workshop, away from fuel or lubricants, with movable metal barriers to protect personnel and equipment.

Oxygen/nitrogen/acetylene cylinders

- Care to be taken to see that all are properly labelled and stored upright and chained away from fuel and lubricants. Full and empty cylinders to be stored separately with warning and no smoking signs clearly posted.
- Avoid knocking or jarring acetylene cylinders, which can lead to internal self-heating, and the risk of explosion. No use of acetylene cylinders in a horizontal position, as the acetone solvent may be ejected.
- Under no circumstances shall oxygen be allowed to come into contact with any form of grease or oil, because of the risk of explosion and fire.

3.5.11.8. Maintenance and Certification

Maintenance

- All equipment and structures, both fixed and temporary, will receive regular maintenance, in order to ensure that the safety of personnel who are responsible for operating the equipment is not jeopardized.
- Maintenance of equipment will be logged.
- Certification: A list of appliances and file of test and maintenance certificates relating to pressurized systems, cranes, derricks, lifting beams, pulley blocks, lifting gear, winches, wires and all other lifting appliances and equipment will be held on the crew.

Lifting equipment (cranes)

- All cranes; side booms, lifting slings and tackles as well as associated gear will be inspected and certified by a qualified agency.
- Safe Working Load (SWL) and radius charts will be specified and marked on all equipment.

Pressurized systems

- All pressure containers will be pressure tested at regular intervals not exceeding 5 years.
- "Lock out - Tag out system" will be in place for pressurized system maintenance operations.

Crew HSE Plan

3.5.11.9. Vehicle, driving and passenger protection

Vehicles specification and safety equipment

- All types of vehicles will be correctly fitted with the appropriate safety equipment including: first Aid kit, fire extinguisher, radio, and automatic audible reverse alarms.

Seat Belts

- Seat belts and their use are mandatory. Fastened seat belts will be compulsory for all passengers. On buses, the driver and all passengers will wear seat belts as well.

Passenger Compartments

- All passengers will be seated and seat belt fastened whilst the vehicle is in motion and all seating will be securely fixed.
- The maximum passenger load will be indicated on each vehicle.
- There shall be a means for the driver to observe and communicate with passengers carried in the rear of the vehicle.

Freight

- Passengers and non-hazardous freight will be carried in separate compartments otherwise a separating grid will be installed and a means of securing freight to the vehicle will be provided.
- Conversion of a freight-carrying vehicle to passenger carrying will include a safe means of boarding.
- All fuel containers will be correctly and clearly labelled.
- Hazardous materials will be properly contained and protected, and clearly identified.

3.5.11.10. Vessel facilities

Accommodation

- Accommodations will be of high standards and sufficient for all personnel, such that there will be no overcrowding of rooms or shift usage of bunks and will provide protection against all adverse weather conditions (wind, rain and extreme temperatures).
- A separate sleeping bed will be provided for each individual and spacing between beds/bunks will be sufficient to allow easy access without moving beds or furniture. Secure storage facilities for personnel belongings will be provided.
- Sleeping compartments will be fitted with fire / smoke detectors.
- Recreation areas with recreational facilities like books, TV, Video, Radio cassette, Sports will be provided.
- Adequate and clear escape routes will be available from all areas and will be clearly sign posted.

Food preparation and food storage areas

- Premises used for cooking will be effectively cleaned.
- Adequate and suitable ventilation in the kitchen will be provided.
- Adequate lighting will be installed for all cooking, cleaning and preparation areas.
- Food preparation will be carried out with clean water and on clean non-porous surfaces. The dangers of contamination of food by handlers is greatest amongst unskilled personnel, so person will not to be employed in the preparation, cooking or serving of food or drink or in the handling of eating/drinking utensils until they have undergone a special medical examination (Food Handlers' Test) and the medical officer is satisfied that they fulfil the necessary health requirements.

Crew HSE Plan

- Storage of food will be carefully considered. Rotation of stock and special inspection is necessary. Dry food will be kept in galvanised bins, etc., meat, fish and made-up foods will be refrigerated.
- Adequate drainage will be provided from sinks and wet preparation areas. Care will be taken in the design to prevent back flooding.
- A properly designed waste storage area away from food preparation or storage areas will be provided and kitchen waste will be collected daily and disposed.
- Pest such as flies, mice and rats are of primary concern in catering facilities as they carry diseases, premises will be protected against infestation by vermin and insects.
- Suitable and appropriate fire protection measures will be installed particularly near cooking ranges.

Eating area

- Eating areas will accommodate at least half the personnel normally present at the location at a time.

Provision of meals

- Where appropriate, provision of at least two adequately nourishing meals per day for all personnel will be provided, of which at least one meal will be hot.
- Proper attention will be given to the hygienic storage, preparation and serving of foods.
- Food preparation areas will be cleaned after every meal.

Provision of potable drinking water

- An adequate supply of potable water from an acceptable available source for all personnel will be provided. Clean and bacteria free drinking water is an important factor in maintaining the health of all individuals and several methods of purification will be considered according to the availability and the nature of the water to be treated.
- Water purity standards will be the most stringent and the purity of drinking water will be confirmed by testing periodically and at an agreed upon level.

Toilets and Sanitary facilities

- There will be high standards of sanitation and hygiene in all accommodation areas and rules and regulations to ensure these standards will be posted in plain view.
- Sufficient toilets, showers and washing facilities will be provided for all personnel and will be hygienically maintained.

Waste Disposal

- Wastes will be disposed of in compliance with the applicable laws and regulations.
- Waste management practices will guarantee that there will be the minimum risk practicable to the health and safety of personnel and to the environment in general. Where necessary the physical and chemical properties of wastes will be evaluated.
- An inventory of all waste materials in storage (categorized into either hazardous or non-hazardous wastes) will be maintained and be updated regularly. The disposal of wastes will be documented.

Lighting

- Adequate lighting to all work areas (offices, workshops, etc.), accommodations will be provided day and night to allow safe movement of personnel during the hours of darkness.
- Emergency lighting (that switches on automatically when power switches off) will be available in mess room, kitchens, working spaces and along all escape routes.

Crew HSE Plan

3.5.11.11. Medical personnel and Medical Emergency Response

- The number, availability and location of medical personnel and trained first aid personnel as well as emergency transport availability shall be able to meet the defined response times under all circumstances.
- A full time qualified paramedic will be available. Two trained first aiders will be nominated on each field unit to establish a link with the doctor in case of an emergency and administer first aid treatment.

3.6 Implementation and Monitoring

CGGVERITAS carries out a continuous monitoring process on its operations. Some HSE indicators are established and objectives are given for the year at corporate level. A status of these indicators is monitored monthly by CGGVERITAS 's HSE department and communicated to the Vessel Operation Manager for wide diffusion on board the concerned vessel.

3.6.1 Pro active monitoring

Active monitoring provides information in the absence of any accident/incident. It includes checking that HSE MS requirements are being complied with, and that objectives and performance criteria are met.

Pro-active Monitoring Techniques include:

- **Unsafe act “audits” (Safety card)** to determine reasons for, and conditions under which, unsafe acts might occur. To be carried out by anybody and report to be submitted to the HSE department.
- **Crew management inspections** performed by the PM one/trip, to determine effectiveness of HSE MS and demonstration of line management commitment.
- **VOM inspections** performed by the VOM, to verify the conformance and effectiveness of the established HSE Plans, guidelines and standards with the implementation on Crew level.
- **Cross “audits”** performed by personnel on board belonging to a certain department going to audit another department using a checklist provided by the HSE department.

Pro-active Performance Indicators:

Comparative, quantitative measures to evaluate current achievement against previously specified targets.

It includes the number of:

- Inductions (safety tour)
- Trainings
- Management meetings*
- Crew committee meetings*
- Tool box meetings
- Cross inspections*
- VOM inspection*
- External audits
- Drills / exercises*
- Action points created*
- Action points closed

Crew HSE Plan

- Number of Near Misses, Unsafe Acts (to promote reporting)

(*) Calculation of frequencies versus pre-established targets.

And for the exposure:

- Worked hours CGGVERITAS
- Worked hours maritime crew
- Worked hours subcontractor
- Investments are monitored with costs of:
 - PPEs
 - Fire fighting
 - Health
 - Environment
 - Miscellaneous

3.6.2 Reactive monitoring

Comparative, quantitative measures of actual events, against previously specified targets, which provide a qualitative indication of future projected performance based on current achievement.

Safety

- Fatality
- Lost Time Injury Cases & Frequency
- Restricted Worked Cases
- (RWC + LTI) Frequencies
- Medical Treatment Cases
- Total Recordable Cases Frequency
- First Aid Cases
- Material Accidents

Health

- Lost Time Medical Cases and Frequencies
- Illness Cases (16 sub categories)

Environnemental

- Pollutions by hydrocarbons
- Environmental damages
- Produced solid waste
- Recycled solid waste

3.6.3 Accident / Incident Investigation & Reporting

CGGVERITAS 's reporting system for incidents and near miss incidents is defined in the Company's HSE Incident Investigation & Reporting procedure. For details refer to the procedure "Incident / accident notification and reporting" (reference WZ-HSE-GP-005).

Crew HSE Plan

The Master uses PACIFIC OFFSHORE Forms for accidents relevant to personnel under his responsibility.

The Party Chief uses CGGVERITAS Forms for accidents relevant to personnel under his responsibility.

PACIFIC OFFSHORE accidents and incidents are recorded within CGGVERITAS statistics. Captains are required to give a copy to the Party Chief of relevant PACIFIC OFFSHORE Forms as soon as they are filled in and sent to PACIFIC OFFSHORE.

Regarding accidents and incidents involving CGGVERITAS personnel (or clients and visitors), the Party Chief will give a copy to the Captain to be sent to PACIFIC OFFSHORE with a memo.

Depending on the potential of the incident, it may be necessary for CGGVERITAS 's onshore management to complete a full incident investigation in association with Pacific Offshore management with or without client involvement. A full debriefing meeting is then held between CGGVERITAS and Pacific Offshore Shipping LDA to confirm corrective actions.

For details refer to the procedure "Incident / accident notification and reporting" (reference WZ-HSE-GP-005).

Following are matrix showing level and time frame of reporting:

Crew HSE Plan

	Actual Gravity 4 or 5 & Potential Gravity 5	Other High Risk	Medium / High Risk	Low risk
Party Chief & Master	Immediate		6 hours	1 day
Vessel Operation Manager	6 hours		24 hours	NA
Operation Managers Head Office & Country Manager***	24 hours		1 week	
Offshore QHSE Department				
Vice President Offshore SBU Corporate HSE department	24 hours	QHSE weekly report	NA	
Risk Manager Senior Executive VP Services CGG Group CEO		Corporate QHSE weekly report		
Client		24 hours **		

(*) Quantitative reporting only.

(**) Or according to contract requirement, the time to notify the client might be reduced, in such case, the Country/Project/vessel Manager shall always be notified at the same time as the client.

(***) If relevant

	Actual Gravity 4	Other High Risk & Potential Gravity 5	Medium / High	Low risk MTC, RWC...	Low risk FAC NEM UNA
Full report onboard only					Yes
Quantitative reporting in HSE monthly report	Yes	Yes	Yes	Yes	Yes
Full report to head offices, standard report (appendix 3)	Yes	Yes	Yes	Yes	
Causation tree with separate report	Yes	Yes if 5 <small>Recommended in other cases</small>			
Comex review	Yes				

1.The full report should be filled in by Party chief or HSE Advisor and validated onboard by the Party Chief.

2.Incident reports from ship manager and chase boats should be entered in this specific form.

3.The full report will be sent by the vessel by e mail to the concerned Vessel Operation Manager (VOM) (or his deputy) for approval. Copies should be sent onboard to client representative and Master for information).

4.The report will then be forwarded by the VOM (or his deputy) to his line management and to QHSE department (qhsemarine@cgg.com).

This will be done by email with the mention APPROVED and with the name of the VOM (or deputy) in the body of the e-mail.

3.6.4 Reporting

3.6.4.1. Regular Reports

This will include, but not be limited to:

Crew HSE Plan

- Total exposure hours (monthly)
- Accidents / Incidents (monthly)
- Incidents as near misses and unsafe acts (monthly)
- Drills and exercises (monthly)
- HSE meetings (monthly)
- Waste production and disposal (monthly)
- Audit and inspection action points status (monthly)
- Medical statistics (monthly)
- Spillage (monthly)

3.6.4.2. Cumulative Reports

The above reporting will be accrued into annual figures (if applicable) and totals for the entire operation will be included in the final operations report.

3.7 Audits, Corrective Actions and Improvement

Audits may be internal carried out by personnel from within CGGVERITAS, but independent of the part being audited or external from the Client or carried out using resources selected by the company.

3.7.1 Objectives of HSE audits

Both CGGVERITAS and PACIFIC OFFSHORE conduct planned audits on the survey vessels. Copies of the final reports are made available to each other, the vessel and clients as required. To facilitate prompt action on deficiencies, draft recommendations are left with the vessel before auditors departing for action.

A list of action items from audits is held on the survey vessel. Each audit item is given a unique number. The Party Chief, Captain and the Vessel Operation Manager co-ordinate corrective action follow-up. The Action List is reviewed at each safety meeting onboard until all items have been closed out.

The following schedule of audits has been agreed between CGGVERITAS and PACIFIC OFFSHORE. This excludes any client specific audits, which will be conducted as directed by CGGVERITAS clients.

3.7.2 Definition

Audit: Independent examination of the HSE system (in its whole or by part) to assess how it has been used over a period, and so to make sure it has operated as intended. A formal Audit report is produced.

Inspection: Examination of a precise part of the system through the completion of a Checklist.

Unsafe act audit: Conducted by managers visiting the vessel and on board managers, they complete reports. Serious Unsafe Acts are reported on the Incident forms and treated as other incidents.

SafeT-Cards system allows all employees on board to report unsafe acts and unsafe situations.

Crew HSE Plan

3.7.3 Audit plan

3.7.3.1. CGGVERITAS

Audit team	Vessel	Escort vessel
External Auditor	HSE audit of the whole operations Each vessel audit: 2 / year	HSE audit of the whole operations Each vessel audit: 2 / year
Department Managers (Ops, Equip., HSE)	HSEMS audit + HSE Inspection: Each time boarding a vessel, with a minimum of 4 different vessels per year	HSE audit of the whole operations and HSEMS Combined with the M/V audit
Vessel Operation Manager	HSEMS Audit + HSE Inspection: Minimum of 4 times per year	HSE audit – Technical inspection Start up of operation
Technical Managers	HSE inspection Each time boarding, with a minimum of 4 different vessels per year	
Party Chief, and/or on board HSE Advisor if any	HSE inspection of all the vessel 1 / month	
Head of departments	Cross HSE inspection of their work places 1 / month/dept	

Ship Manager Audits.

Timing: Annually

Auditors: Safety Officer of his deputy

Scope: To control the application of the Safety and Quality Management System, including the CGGVERITAS procedures listed in the Interface Matrix.

3.7.4 Audits recommendations, corrective actions and Follow up

- To implement all audit recommendations, to communicate the findings of the audits and the recommendations made, with the action parties and target dates, to all concerned personnel
- The follow up of the audits recommendations to be rapid, effective and publicized.

For details refer to the procedure “HSE AUDIT” (reference A HSE 4).

3.7.5 Unsafe act auditing

An Unsafe Act is defined as any behaviour or consequences of behaviour, which could lead to a hazardous situation for someone, some equipment or the environment.

The aim of the Unsafe Act auditing is to identify hazardous acts or situations and to correct them before an incident happens. This procedure has to be applied by managers visiting vessels and head of departments on board all vessels.

An Unsafe Act audit needs a positive approach and is not associated with a blame culture. It is a tool to promote HSE communication and to record unsafe acts and situations to set up immediate or further corrective actions, the overall objectives being to prevent incidents and accidents. It also demonstrates to the auditees the HSE awareness and involvement of the auditor, transmitting the HSE culture to the whole company.

Crew HSE Plan

These audits focus on working practices and individual behaviours rather than on material aspect. The Unsafe Act audit is complementary to an inspection with checklist, allowing the auditor to open his eyes on non-listed matters.

A manager visiting the vessel associates the Party Chief, HSE or a Department Head to his Unsafe Act audit. The on board managers could also carry out their audits alone. Ideally, these audits should be conducted in parallel with the HSE inspections and audits. It could be useful, before starting the audit to check findings of previous audits. The time allocated to the audit should not be mixed with other activities. It is obvious that the auditors should themselves respect and apply all safety rules.

A positive approach means that, during discussions, auditor highlights good practices. The Unsafe Act audit report is given to the Party Chief who will establish, in relation with the on board safety committee, the relevant corrective actions, some of them could be integrated in the Action Point Listing by the operation manager of the vessel.

3.7.6 Safety cards


As an extension of the Unsafe Act audit, the aim of the Safe-T-Cards system is to identify hazardous situations and to correct them before an incident happens, from the seismic crew "point-of-view" (including subcontractors on board all vessels).

Every time an unsafe act or situation is detected Safe-T -Cards are completed. The first part is the description of the unsafe act or situation with the date; it is not mandatory to write the name. The second part is the recommendation or action taken, this part could be let empty if nothing has been done or if the recorder has no elements to fill it. It is not a denunciation process, to avoid names in the texts.

It must be noted that potentially serious Unsafe Acts (High Risk) are reported as an incident using the appropriate incident form; a Safe T-Card could have initiated them.

Empty Safe-T-Card forms are prominently displayed in various places of the vessel. Once filled in, they are put in the Safety Box or directly given to the HSE Advisor or Master, who also checks regularly the Safety Box.

The HSE Advisor and the Master monitor the reported unsafe acts or situations. They alert the Party Chief if he judges that immediate action is necessary. Otherwise he reports the contents of the Safe-T-Card to the on board safety committee. If relevant, actions & recommendations are included in the minutes of the safety committee meeting and later included in the Action Point Listing of the vessel.

	Marine	DATE: / /
SAFE T-CARD		
Unsafe act or condition Situation ou comportement dangereux		
Name:(voluntary)		
Action taken or recommendation Action prise ou recommandation		
<small>Use the other side if necessary</small>		
Then put this card in the COLLECTION BOX Puis mettre cette carte dans la boîte sécurité		
<small>WSP 231 REC 01</small>		

Crew HSE Plan

3.8 Management Review and Improvement Process

It includes the review of effectiveness and improvement strategy of the HSE MS, the Crew HSE Plan and the Project HSE Plan.

Management Review of HSE performance, HSEMS documentation pertinence, outstanding of audits is carried out twice a year in accordance with the Company's Management Review procedure respectively in CGGVERITAS and in PACIFIC OFFSHORE.

3.8.1 Review of performance & effectiveness of the HSE MS

Review of performance and effectiveness of the HSE Policy, Strategic objectives and HSE MS at Corporate level during the bi-monthly Marine HSE committee meetings. The HSE MS review will be structured to assess each of the eight elements of the model Management System. Recommendations from corporate audits, external audits, accident/incident investigations and performance reviews are useful input. Detailed minutes are produced and distributed to the entire organisation.

3.8.2 Review of performance & effectiveness of the Crew HSE Plan

The Crew HSE Plan is reviewed during the corporate audit. It should also be reviewed at crew management level, after changes to the organizational structure, modifications to the facility, an unsatisfactory HSE audit or subsequent to an accident/incident where consequences were or may have been significant. The Vessel operation manager approves the reviews of the Crew HSE Plan.

3.8.3 Review of performance & effectiveness of the Project HSE Plan

The Project HSE Plan is reviewed during the corporate audit. It should also be reviewed at VOM level when needed.

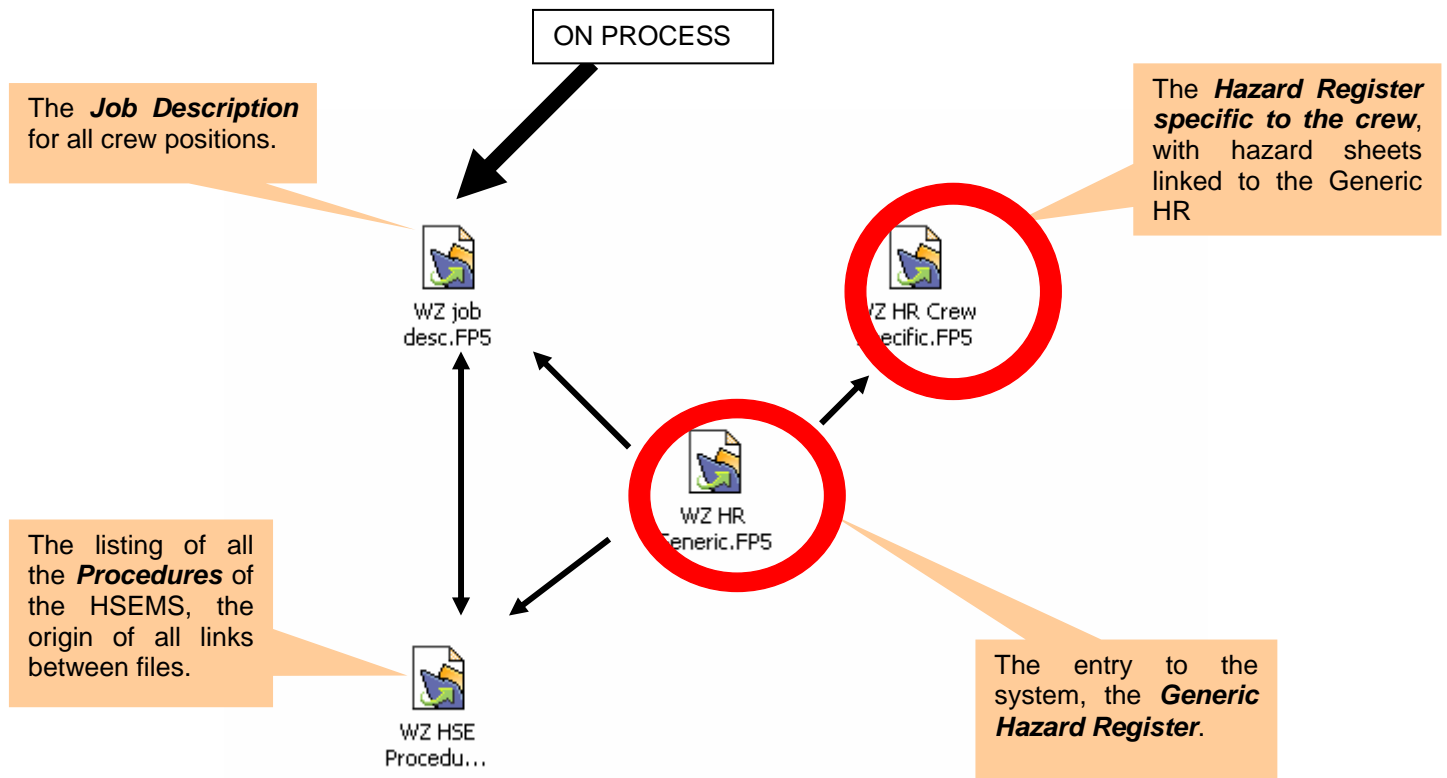
Crew HSE Plan

4 HAZARD REGISTER

4.1 The hazard register database

Changes in this section are done directly in the Crew Hazard Register Database and are not considered a new version of the Crew HSE Plan. Therefore a formal review with a new coding is not necessary when you change Hazard Sheets.

This section demonstrates that all known hazards within the operation have been identified, assessed and understood, and that control and recovery mechanisms are in place to ensure the complete safety of the operation. This part is the most important part of the Crew HSE Plan as correct understanding of hazards is a pre-requisite to their successful management.



The Hazard Register is physically located in the HSE Advisor computer, offering permanent access for immediate update. All details about the management of the Hazard Register are detailed in a procedure "Crew HSE Plan, managing the databases"

The next page is a short preview on how the system is initiated and works.

Crew HSE Plan

First step is to select hazards relevant to the crew (as the example shown below)

OFFSHORE		HAZARD REGISTER		To select hazards relevant to the crew	
Category 1 Hazard Title	Category 2 Hazard Title	Category 3 Hazard Title	Hazard Code	Select hazards	
ENVIRONMENT	Biological	Infectious disease / HIV	105	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Biological	Contaminated food and water	108	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Geological factors	Natural gas (methane/H ₂ S)	111	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Meteorological factors	Extreme cold weather	121	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Meteorological factors	Cold water	123	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Meteorological factors	High wind	124	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Meteorological factors	Fog	126	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Meteorological factors	Precipitations (rain, snow, hail)	127	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Natural combined factors	Static electricity	131	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Natural combined factors	Lightning	132	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Natural combined factors	Rough sea	134	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Natural combined factors	Fast current	135	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Natural hazardous terrain	Slippery ground	141	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Natural obstacles	Floating debris	154	<input type="radio"/> YES	<input type="radio"/> NO
ENVIRONMENT	Natural obstacles	Shallows	155	<input type="radio"/> YES	<input type="radio"/> NO

1 19/03/2003

Then establish the **cross reference** between Hazards, procedures, training and check lists.

Crew HSE Plan

4.2 Health Risk Assessment (HRA)

A full Health Risk Assessment system is available at crew level. Managed by a database, with data collected by our Health Manager through internationally recognised health references, this database allows to cross-check 28 tasks with all known Biological, Chemical, Physical and Ergonomic / Socio-economic agents.

The Exposure and Consequences are detailed, before advising on control measures, these controls are making reference to our HSE system. In addition, the Doctor and/or the HSE Advisor may capture their own data after Job Safety Analysis.

Compagnie Générale de Géophysique

Health Risk Assessment "HRA" Database

Reviewed by: Franck Gerard
Review date: 04/03/2003
Code: HRA 37
Gas welder/Cutter

Job description: The authorised person ensures that there are no flammable substances in the vicinity prior to commencement of welding. Hoses, blow back arrestors and other equipment are checked. Oxygen cylinder is opened and regulated. When ready to weld, acetylene valve

Chemical hazards

Gas welder/Cutter

Causative agent	Exposure & Target organ	Consequences
Cadmium (dust, gases, fumes and vapours)	Inhalation - Ingestion	a. Inhalation: 1. Malignant neoplasm of bronchus and lung (potentially carcinogenic); 2. Bronchitis and pneumonitis 3. Acute pulmonary oedema 4. Upper respiratory inflammation 5. Chronic respiratory conditions (emphysema, bronchiolitis, fibrosis) 6. Nephropathy: renal tubular damage, proteinuria, anaemia; prostate cancer b. Ingestion: 1. Malignant neoplasm of the digestive tract (potentially carcinogenic) 2. Nephropathy: renal tubular damage, proteinuria, anaemia; prostate cancer
Chromium(VI) compounds	Inhalation - Contact (skin, eye)	a. Inhalation: 1. Malignant neoplasm of nasal cavity (associated with hexavalent chromium potentially carcinogenic) - 2. Malignant neoplasm of bronchus and lung (associated with hexavalent chromium potentially carcinogenic) b. Contact: skin sensitization; eyes irritation; mucous membrane irritation and nasal perforation.
Zinc and its compounds (zinc oxide, zinc chloride)	Inhalation (ZnO, ZnCl2) - Contact (skin, eye)	Zinc effects: a. Inhalation: 1. Secondary sideroplastic anaemia - 2. Toxic encephalopathy - 3. Toxic effects: lassitude; metallic taste; headache; blurred vision; low blood pressure; vomiting; malaise; chest tightness; dyspnea, rales, decreased pulmonary function b. Contact: irritation eyes, ZnO may cause "Metal fume fever" (illness similar to flu)
Iron oxides (dust and fumes)	Inhalation	Siderosis: pneumoconiosis due to inorganic dust
Chlorine gases, fumes and vapours	Inhalation - Contact (skin, eyes)	a. Inhalation: 1. Bronchitis and pneumonitis - 2. Acute pulmonary oedema - 3. Upper respiratory inflammation - 4. Chronic respiratory conditions (emphysema, bronchitis, fibrosis) - b. Ingestion: nausea, vomiting, diarrhea; headache - c. Contact: Irritation eyes (burning eyes, lacrimation); nose (rhinorrhea), throat; skin burns, dermatitis; vesicles
Phosgene gases, fumes and vapours	Inhalation - Contact (skin, eye)	a. Inhalation: 1. Bronchitis and pneumonitis - 2. Acute pulmonary oedema - 3. Upper respiratory inflammation - 4. Chronic respiratory conditions (emphysema, bronchitis, fibrosis) b. Contact: Irritation eyes (burning eyes, lacrimation); nose (rhinorrhea), throat; skin burns, dermatitis.

Causative agent: TZ-RD-071-01-0402-E
Exposure & Target organ: Author: Dr Gabriel SAADA - Version: 1.0

Crew HSE Plan

A **Health Database**, built with international references and permanently updated; offers full health data at country and crew level, with more than 200 referenced countries:

COMPAGNIE GENERALE DE GEOPHYSIQUE - Worldwide Health Risk Database

Country Description

062 Country **Ecuador** Region **Tropical South America**

1. Country Identity Card

Map of Ecuador showing major cities and geographical features.

Environmental Hazards

Health Hazards

Health Precautions

Back to Countries Menu

Capital	Surface	Timing	Tel Code
Quito	283 560 km²	- 5 h	593

Languages	Official	Others
	Spanish	

Population	Density
12 336 572 inhabitants (est. 98)	43.51 inhabitants/km²

Religions
Roman Catholic

Important Towns
Guayaquil, Cuenca, Machala, Portoviejo, Riobamba, Ambato, Manta, Esmeraldas

Monetary Unit
Sucre

French embassy at	Phone
Quito	[59] (32) 560 789-562 270

Address
Calle General Leonidas Plaza 107y Patria - BP CP 536

2. Medical Services

Recommended health services : Medical Emergencies - Hospitals and doctors

Emergency	214 977
French embassy doctor	

Hospital	Address
Hôpital Metropolitano	Avenue Mariana de Jesus y Occidental (593) 2-431.520/ 439.030/465.020 - Quito
Hôpital Vozandes	Villalengua 267 y Avenue 10 de Agosto (593) 2-252.142 - Quito
Hôpital « Clinica Kennedy »	Avenue San Jorge Ciudadela Nueva Kennedy (593) 04-286.963 - Guayaquil
Dr Rodrigo Duenas Luzuriaga - Clinica San Francisco	- 6 de diciembre entre Colon y Cordero. (593) 2-462.933.
Dr René Vargas Penaherrera - Centro Medico Metropolitano	- Avenue Mariana de Jesus y Cile B - 2.463.361

TZ-RD-035 02 0601 062 1/4 Author: Dr Gabriel SAADA Date of last update: 30/06/2001

COMPAGNIE GENERALE DE GEOPHYSIQUE - Worldwide Health Risk Database

Environmental Hazards

062 Country **Ecuador** Region **Tropical South America**

Country Description

Health Hazards

Health Precautions

Back to Countries Menu

Map of Ecuador showing major cities and geographical features.

Climate Hazards

- A climatic hazard is the "Equatorial climate", extreme heat and high humidity, mainly in the amazons and along the pacific coast: sunburn, prickly heat, sunstroke and heat exhaustion can occur.

- High altitude (2,835 meters) can be a problem in Quito (2850 m), Cuenca (2600 m) and in the Andes. Altitude sickness (due to the lack of oxygen at high altitudes) includes: shortness of breath, insomnia, nausea, dizziness, headaches, prolonged respiratory infections, fatigue and energy loss. If you visit high altitudes (the Andes Mountains) ascend gradually to allow time for your body to adjust. Because of the thinness of the air, the sun is intense and the risk of sunburn is greater at high altitudes. Use sun block rated at least 15 SPF. Extreme cold at night is another hazard.

Highest Altitude

Chimborazo 6 267 m.

Wildlife Hazards

Hazards may occur from poisonous snake bites.

- Bush master - up to 12 ft. long, wet tropical forests of Central and South America; few bites occur, but mortality rate is high, anti venom required.

- Barba Amarilla or Fe-de-lance - up to 7 ft. long, from tropical Mexico to Brazil; severe tissue damage common; moderate mortality; anti venom required.

Hazards may occur from poisonous scorpions "Centurus" and spiders, some are fatal.

Hazards may occur from leeches.

TZ-RD-035 02 0601 062 2/4 Author: Dr Gabriel SAADA Date of last update: 30/06/2001

COMPAGNIE GENERALE DE GEOPHYSIQUE - Worldwide Health Risk Database

Health Hazards

062 Country **Ecuador** Region **Tropical South America**

Country Description

Environmental Hazards

Health Precautions

Back to Countries Menu

1. ARTHROPOD BORNE DISEASES

Yellow fever is endemic in the following Provinces: Morona-Santiago, Napo, Pastaza, Sucumbios, and Zamora Chinchipe.

Malaria infected areas: All areas in the provinces along the eastern border and the Pacific coast: Canar Cotopaxi, El Oro, Esmeraldas, Guayas (including Guayaquil), Los Rios, Manabi, Morona-Santiago, Napo, Pastaza, Pichincha, and Zamora-Chinchipe. Quito and vicinity, the central highland tourist areas, and the Galapagos Islands are not risk areas.

Classification WHO C French III

Malaria Prophylaxis

Mefloquine (Lariam®) [If staying less than 2 months] or Chloroquine + Proguanil (Savarine®) [If staying more than 2 months]

Transmission season: Malaria occurs throughout the year.

There is no Japanese Encephalitis.

Transmission season

Plague has been reported in Chimborazo Province.

Cutaneous Leishmaniasis - common	Muco-Cut Leishmaniasis - common
Louse-borne Typhus - occurs	Dengue hemorrhagic fever - occurs
Dengue fever - occurs	Filariasis - occurs
Bartonellosis (Oroya fever) - occurs	Chagas Disease (Am Tryp) - occurs
	Louse-borne relaps fever - occurs
	Sandfly fever - occurs

2. FOOD AND WATER BORNE DISEASES

Cholera officially considered endemic. Infection reported in these provinces: Azuay, Bolivar, Canar, Carchi, Chimborazo, Cotopaxi, El Oro, Esmeraldas, Galapagos, Guayas, Imbabura, Loja, Los Rios, Manabi, Morona, Napo, Pastaza, Pichincha, Sucumbios, Tungurahua, Zamora-Chinchipe.

Dysenteries - prevalent	Typhoid fever - prevalent	Hepatitis A - prevalent
Intestinal Amebiasis - prevalent	Bruceellosis - common	
Echinococcosis - occurs	Schistosomiasis - occurs (Esmeraldas province west coast).	
	Paragonimosis (lung fluke) - occurs	
Ascariasis - occurs	Necator Americanus - occurs	
	Strongyloidosis - occurs	

3. OTHERS

Measles - common	Trachoma - occurs	Tuberculosis - occurs
Diphtheria - common <th>Tetanus - occurs</th> <td></td>	Tetanus - occurs	
Influenza - occurs throughout the year <td>Rabies - Highly endemic and prevalent (especially among dogs, cats and vampire bats)<td></td></td>	Rabies - Highly endemic and prevalent (especially among dogs, cats and vampire bats) <td></td>	
Hepatitis B - common <td>AIDS - common<td>STDs - common</td></td>	AIDS - common <td>STDs - common</td>	STDs - common
	Leprosy - occurs <td>Anthrax - occurs</td>	Anthrax - occurs
	Histoplasmosis american - occurs	

COMPAGNIE GENERALE DE GEOPHYSIQUE - Worldwide Health Risk Database

Health Precautions

062 Country **Ecuador** Region **Tropical South America**

Country Description

Environmental Hazards

Health Hazards

Back to Countries Menu

Obligatory vaccinations (Legally Required to enter the country)

Yellow fever Vaccination & Certificate

Yellow fever vaccination and certificate are legally required for travelers (>1 year old) arriving from a yellow fever "endemic" or "infected" country. Vaccination is recommended for all travelers as yellow fever is endemic.

Meningitis vaccination legally required (obligatory) for pilgrims to Mecca for the annual Hajj

Routine vaccinations (Booster dose)

Diphtheria	Tetanus	Polio
Influenza <td>Measles</td> <td></td>	Measles	

Routine vaccinations to be updated

Recommended vaccinations (The disease occurs in the country)

Yellow fever	Hepatitis A	Rabies	Hepatitis B
Typhoid			
Diphtheria			

Malaria Prophylaxis

Mefloquine (Lariam®) [If staying less than 2 months] or Chloroquine + Proguanil (Savarine®) [If staying more than 2 months]

To Stay Healthy, Do:

- Wash hands often with soap and water.
- Drink only bottled or boiled water, or carbonated (bubbly) drinks in cans or bottles. Avoid tap water, fountain drinks, and ice cubes. If this is not possible, make water safer by BOTH filtering through an "absolute 1-micron or less" filter AND adding Micropure or iodine tablets to the filtered water.
- Eat only thoroughly cooked food or fruits and vegetables you have peeled yourself.
- Remember: **boil it, cook it, peel it, or forget it.**
- If you visit an area where there is risk of malaria, take your malaria prevention medication before, during, and after travel, as directed.
- Protect yourself from insects by remaining in well-screened areas, using repellents and permethrin-impregnated mosquito nets, and wearing long-sleeved shirts and long pants from dusk through dawn.
- To prevent fungal and parasitic infections, keep feet clean and dry, and do not go barefoot.
- Always use latex condoms to reduce the risk of HIV and other sexually transmitted diseases.

To Avoid Getting Sick:

- Don't eat food purchased from street vendors.
- Don't drink beverages with ice.
- Don't eat undercooked ground beef and poultry or raw eggs: Raw shellfish is particularly dangerous to persons who have liver disease or compromised immune systems.
- Don't eat dairy products unless you know they have been pasteurized.
- Don't share needles with anyone.
- Don't handle animals (especially monkeys, dogs, and cats), to avoid bites and serious diseases (rabies, plague,...).
- Don't swim in fresh water. Salt water is usually safer.

What You Need To Bring with You:

- Long-sleeved shirt and long pants to wear while outside whenever possible, to prevent illnesses carried by insects.
- Insect repellent containing DEET (diethylmethyloamide). Unless you are staying in air-conditioned or well-screened housing, use a bed net impregnated with the insecticide permethrin.
- Over-the-counter anti diarrheal medicine to take if you have diarrhea.
- Micropure or iodine tablets and water filters to purify water if bottled water is not available.
- Sun block, sunglasses, hat to avoid heat related illness.
- Prescription medications: make sure you have enough to last during your trip, as well as a copy of the prescription(s).

After You Return Home:

- If you have visited an area where there is risk for malaria, continue taking your malaria medication weekly for 4 weeks after you leave the area.
- If you become ill after your trip - even as long as a year after you return - tell your doctor where you have traveled.

Crew HSE Plan

4.3 The Manual of Permitted Operations (MOPO)

Manual of permitted operations for CGG Pacific

The Manual of Permitted Operations (MOPO) details the limits to which activities may continue when normal safe operating conditions cannot be met.

Crew HSE Plan

5 REMEDIAL PLAN

The Crew HSE Plan is intended to be a dynamic, evolving document updated throughout the life of the operation to which it applies. Therefore, there will always be areas of the Crew HSE Plan that needs improvement, perhaps because of new information about a hazard which needs to be addressed through new or exiting work instructions, or because the operation is moving into an area where little about the hazards is known. Such areas of deficiency within the Crew HSE Plan are recorded along with the methods to be used to ensure these deficiencies are addressed in an ordered manner.

The Crew HSE Plan should be reviewed after changes to the organizational structure, modifications to the facility or because the operation is moving into a new area where little about the hazards is known.

The HSE Advisor ensures the recording and the follow up of all the action points, including those involving action parties external to the crew.

5.1 Action Tracking and Close-Out

Remedial actions has also to take into considerations all audits and accident/incident investigation recommendations and the Crew HSE Plan should be reviewed after an HSE audit or subsequent to an accident/incident where consequences were or may have been significant.

5.2 Remedial Plan

The HSE Advisor under the Party Chief Responsibility maintains the Remedial Action Plan or Action Points Listing.

It includes all actions arising from audits / inspections / incident investigations / safety cards / Meetings and reviews.

It details all actions with a specific number, action party, dead line and status.

It is widely communicated onboard and discussed in Safety Committee Meetings.

Crew HSE Plan

6 STATEMENT OF FITNESS

This part summarizes the main findings of the Crew HSE Plan and lists the major hazards associated with the operation. It ends with a "Statement of Fitness to Operate" signed by the person with overall responsibility for HSE MS within the operation.

6.1 Conclusion

This Crew HSE Plan has set out HSE objectives and has documented the results of a systematic study of the hazards involved in this seismic acquisition.

The hazards have been identified. These identified hazards have been assessed, controlled and recovery measures have been specified in a systematic and thorough manner.

A description of Pacific Titan HSE Management System is presented in part 2. This describes the methods by which the principles of the HSE MS are integrated with a quality management approach to provide a comprehensive management system to organize, control, review and improve all matters relating to Health, Safety and Environment.

A Remedial Action Plan has been developed to reduce some deficiencies. In addition to the four actions listed, the crew implements a permanent Remedial Action Plan system

6.2 Statements

6.2.1 Statement of the Case Holder

- As **PACIFIC TITAN Case** Holder, I am satisfied that this document is technically correct.
- It gives an accurate representation of the controls in place to manage the operation safely.
- The crew confirms its full support for the application of this document and its findings.
- The crew commits itself to the continuing improvement of hazard management, using the **PACIFIC TITAN Crew** HSE Plan as its mean to guide those involved with our business in a consistent and structured manner.
- The crew will continue to have input into the **PACIFIC TITAN Crew** HSE Plan and will be involved throughout its development and review process.
- The crew will fully support any audit and review of its operations.

Party Chiefs of the CGGVERITAS Crew on **PACIFIC TITAN**
(Crew HSE Plan Holder)

HSE Advisor:

Party Chief:

Party Chief:

DATE XXX

Crew HSE Plan

6.2.2 Statement of fitness

CGG PACIFIC TITAN: Given the findings of the application of the hazard management process and the measures already taken, or in hand, to lower the risks associated with this seismic acquisition. It is concluded that the Crew HSE Plan prepared for the offshore seismic acquisition of a 3D **survey** on the behalf of Clients Name to be conducted in Date in the Area demonstrates that:

- There is an HSE MS in place covering all the seismic survey operations, adequate to enable the company to comply with all relevant statutory and company provisions in relation to the operations and any activities in connection with them.
- The operations have been described in the Crew HSE Plan as being HSE management operations. HSE management operations include occupational health, hygiene and safety, environmental preservation. All the activities within each of those operations are described including the hazards that can be encountered during these activities.
- There is an adequate arrangement in place for the audit and review of the HSE Management System at appropriate intervals. An audit schedule including sectional, crew and country management inspections/audits is in place.
- All hazards with the potential to cause a major accident have been identified, assessed, controlled and the plans are in place for recovery in case control is lost.
- Risks have been evaluated and measures have been taken to reduce their impact on personnel and environment affected by those hazards to a level that is as low as practical. Safe work procedures are implemented according to the risks when activities are carried out; these procedures are a practical and acceptable way to reduce these risks.

In view of the above

THE OPERATION IS CONSIDERED SAFE TO OPERATE

VESSEL OPERATION MANAGER

.....

Date