CONTRACT PROJECT SAFETY PLAN

2006 SOUTHERN MARGINS 2D SEISMIC SURVEYS

for

SANTOS LIMITED

M/V Pacific Titan

Multiwave Job Number

6251

"a lighthouse document"

Distribution List

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4	Captain	Pacific Titan
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7	Operation Manager	Swire Pacific Offshore (SPO)
8	Contingency Room	Multiwave
9	Onboard Client Rep.	SANTOS
10	APS VP Marketing and Sales	Multiwave/CGG
11		

Revision Instructions

Rev. no	Date Eff. dd.mm.yy	Doc. Title	Doc. ID	Description of Revision Instructions	Page(s) added	Page(s) deleted
01	29.12.05	Contract Project Safety Plan	CPSP	Draft - skeleton	All	0
02	09.03.06	Contract Project Safety Plan	CPSP	Update		

Revision Authorisation and History

Rev. no	Date Eff. dd.mm.yy	Prepared by	Reviewed by	Authorised by	Signed by
01	29.12.05	Terje Kristiansen			Multiwave
02	09.03.06	Terje Kristiansen	John Hughes-Santos		Multiwave
				Torgeir Nilsen	Multiwave

Purpose

The purpose of this document is to provide all Multiwave Geophysical Company worksites with a single source of references for company standards issued at acquisition level. This document will:

- Fulfil the requirements contained in the Quality Assurance System of Multiwave.
- Act as the “Bridging Document” that interfaces the Quality Assurance Systems of Multiwave and the Client Company.
- Establish a plan for how the company is going to execute the contractual requirements of the seismic programme in the safest, best possible practise and cost-effective manner.
- Reference specific work procedures to support the delivery of essential quality characteristics for the job.
- Communicate the properties of the operations and list QHSE critical activities to be performed in order to execute the planned seismic programs.

Responsibility

It is the responsibility of the nominated holders of this manual to identify the relevant chapters that relate to the work under their control and to ensure all employees understand the procedures related to their job.

Comments and Suggestions

Readers’ comments are of great value to Multiwave in deciding the contents and layout of its documentation.

If you have any comments, no matter how trivial you may think they are, please write them down and return them to the custodian of this manual.

Attn.: Operations Manager in Multiwave **E-mail: operations@mgc.no**

Multiwave Geophysical Company ASA
Damsgårdsveien 125,
N-5162 Laksevåg – Bergen,
NORWAY

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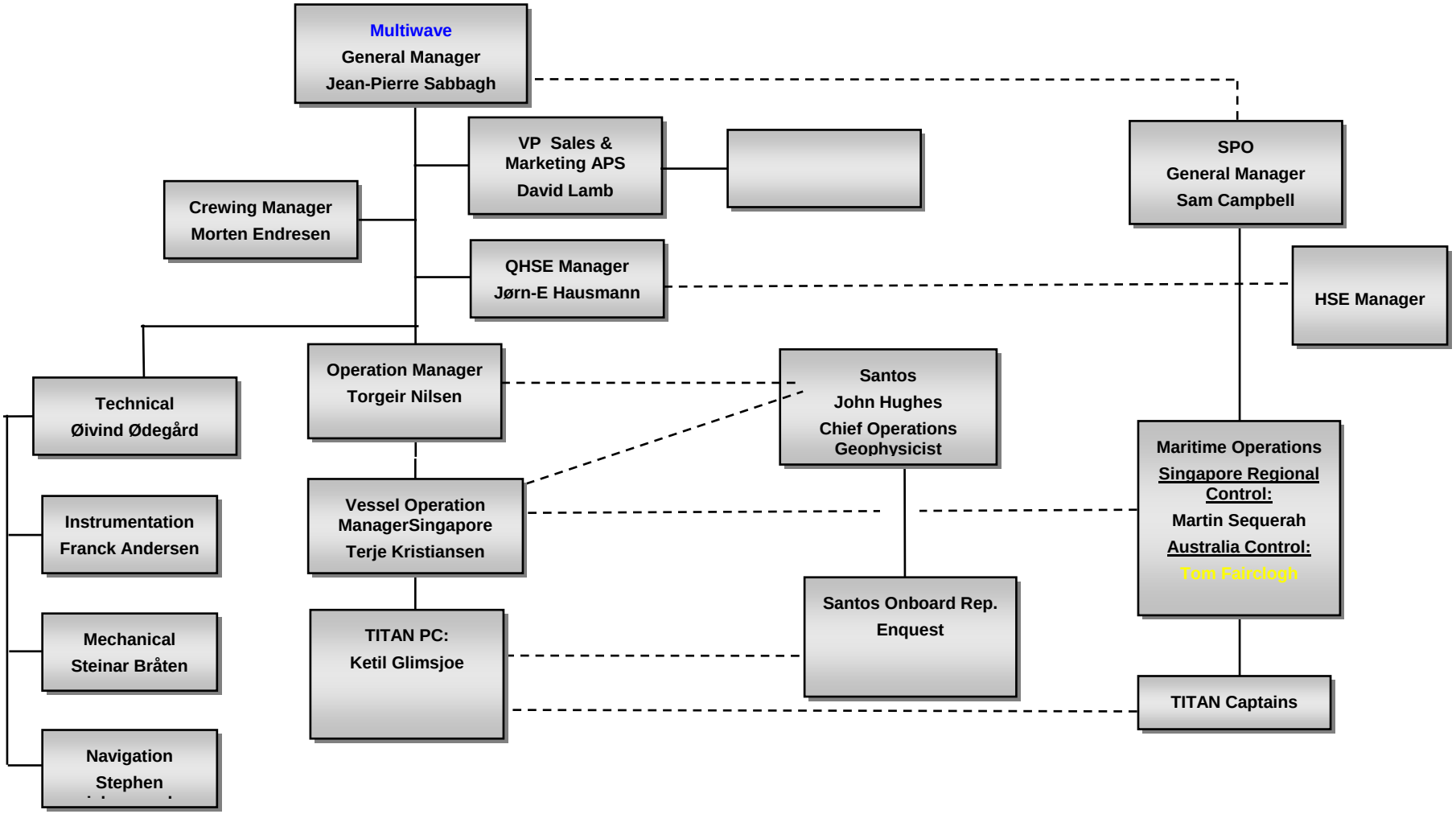
1.0 Summary

Santos is the operator of T/40P, T/33P & T/32P exploration permits on the Southern Margins of Australia and has agreed to manage seismic surveys on behalf of itself and other operators (VIC/P50 – Essential Petroleum Resources) in the area and will use Pacific Titan (Multiwave) to perform the acquisition of approximately 2500 km of 2D seismic data in the Sorell Basins, offshore SE Australia.

In addition to the Santos permits, a survey in VIC/P50 will be performed with the Pacific Titan.

1.1 Operational Organisation



1.2 Vessel Organisation

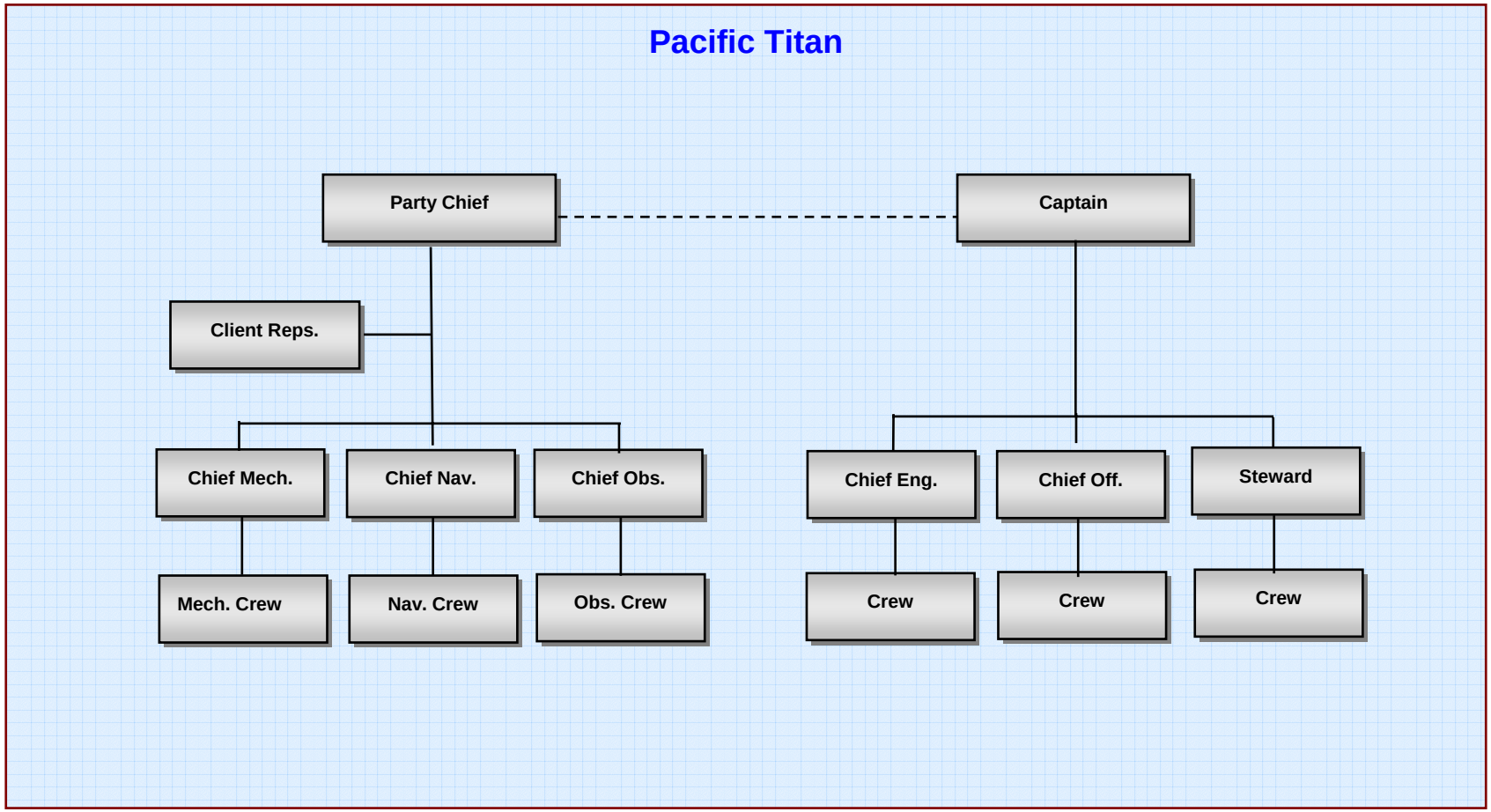


Figure 1-1 Location of the Survey Areas

See page 22-24 for detailed maps

2.0 Contract Management System (CMS)

Multiwave Geophysical Company ASA (MULTIWAVE) provides data acquisition services to the International Oil and Gas Industry. In providing these services the company recognises that its operations may involve hazards and therefore it is the primary and continuing policy of the company to identify all such hazards and minimise the risks associated with them. The Multiwave QHSE system is intended to reduce the level of risk to as low as reasonably practicable.

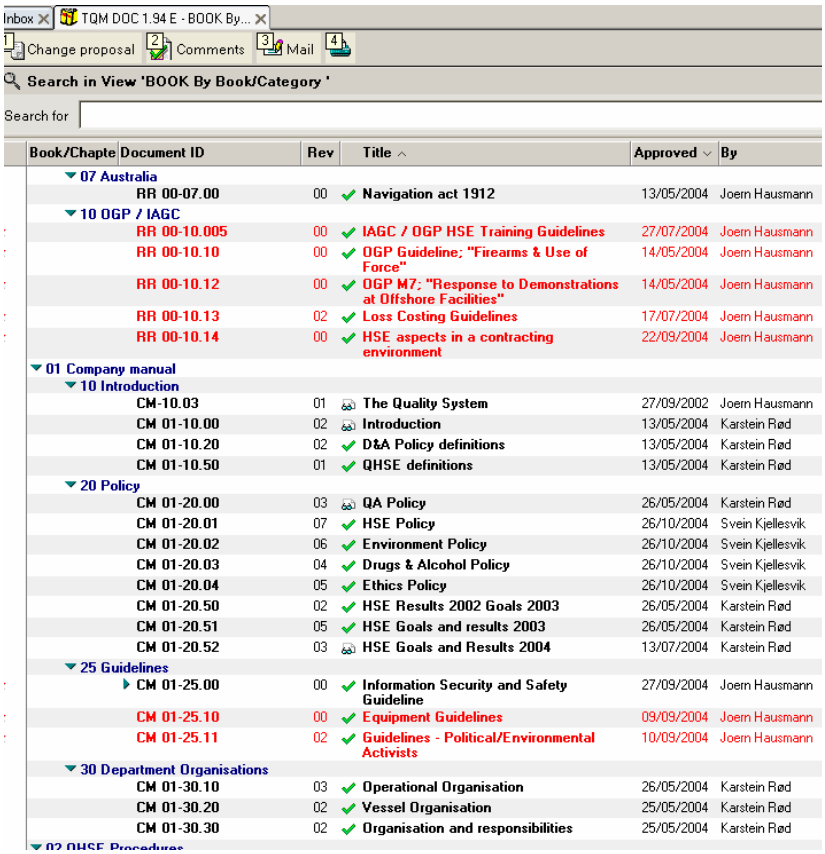
In meeting this objective, the Company is aware of its responsibilities to protect and secure the health and safety of its employees, its sub-contractors and any persons who may come into contact with the company during the course of its activities. In addition, all employees must recognise and take fully into account the effect of our activities on the environment in which we live and work.

In order to provide a structured approach towards achieving our objectives, the company has developed a Safety Manual as part of its total QHSE system. The Safety Manual encompasses all activities connected with health, safety and the environment that contribute towards the establishment of a safe system of work. This manual is a top-level document within the system and provides an overview of all HSE related affairs within Multiwave.

Supporting the manual are Procedures and Work Instructions, which are more specific and detailed.

Health and Safety is an integral part of the daily responsibility of all Managers, Supervisors and Employees. The co-operation and positive contribution of all Employees is essential for the successful implementation of the HSE system and it is a condition of employment.

Example of references from Multiwave's TQM MS



Book/Chapte	Document ID	Rev	Title	Approved	By
07 Australia					
	RR 00-07.00	00	Navigation act 1912	13/05/2004	Joern Hausmann
10 OGP / IAGC					
	RR 00-10.005	00	IAGC / OGP HSE Training Guidelines	27/07/2004	Joern Hausmann
	RR 00-10.10	00	OGP Guideline; "Firearms & Use of Force"	14/05/2004	Joern Hausmann
	RR 00-10.12	00	OGP M7; "Response to Demonstrations at Offshore Facilities"	14/05/2004	Joern Hausmann
	RR 00-10.13	02	Loss Costing Guidelines	17/07/2004	Joern Hausmann
	RR 00-10.14	00	HSE aspects in a contracting environment	22/09/2004	Joern Hausmann
01 Company manual					
10 Introduction					
	CM-10.03	01	The Quality System	27/09/2002	Joern Hausmann
	CM 01-10.00	02	Introduction	13/05/2004	Karstein Rød
	CM 01-10.20	02	D&A Policy definitions	13/05/2004	Karstein Rød
	CM 01-10.50	01	QHSE definitions	13/05/2004	Karstein Rød
20 Policy					
	CM 01-20.00	03	QA Policy	26/05/2004	Karstein Rød
	CM 01-20.01	07	HSE Policy	26/10/2004	Svein Kjellesvik
	CM 01-20.02	06	Environment Policy	26/10/2004	Svein Kjellesvik
	CM 01-20.03	04	Drugs & Alcohol Policy	26/10/2004	Svein Kjellesvik
	CM 01-20.04	05	Ethics Policy	26/10/2004	Svein Kjellesvik
	CM 01-20.50	02	HSE Results 2002 Goals 2003	26/05/2004	Karstein Rød
	CM 01-20.51	05	HSE Goals and results 2003	26/05/2004	Karstein Rød
	CM 01-20.52	03	HSE Goals and Results 2004	13/07/2004	Karstein Rød
25 Guidelines					
	CM 01-25.00	00	Information Security and Safety Guideline	27/09/2004	Joern Hausmann
	CM 01-25.10	00	Equipment Guidelines	09/09/2004	Joern Hausmann
	CM 01-25.11	02	Guidelines - Political/Environmental Activists	10/09/2004	Joern Hausmann
30 Department Organisations					
	CM 01-30.10	03	Operational Organisation	26/05/2004	Karstein Rød
	CM 01-30.20	02	Vessel Organisation	25/05/2004	Karstein Rød
	CM 01-30.30	02	Organisation and responsibilities	25/05/2004	Karstein Rød
02 QHSE Procedures					

2.1 Scope

Safety in the workplace is heavily influenced by legislation and recommendations from inquiries into accidents, incidents and general safety.

The Multiwave QHSE MS uses a process model approach. Access to policies, objectives, organisations and responsibilities are contained within the model, to deliver an integrated approach for HSE and Quality management. The System forms the basis for employee instruction in order to increase the level of understanding of HSE affairs and encourages employees to participate in the process of continuous improvement.

The Seismic Survey will be conducted in line with the following documentation and management practices.

- The Contract covering this Work
- OOGC Geophysical Operations HSE Guideline 60.400.265
- SANTOS Limited Incident Management Plan
- Health, Safety and Environment System of Multiwave Geophysical Company ASA
- Health, Safety and Environment System of Swire Pacific Offshore Ltd.
- This Contract Project Safety Plan (detailing project-specific HSE procedures).

Additionally, Multiwave will adhere to specific SANTOS Limited policies, procedures, guidelines and programs as well as site specific local rules or restrictions put up by authorities.
See attached SANTOS Limited POLICY AND GUIDELINES.

1. All newcomers will receive a guided safety tour on the vessel.
2. HSE Meeting - Bi-monthly
3. Toolbox Meetings - Prior to all critical operational activity
4. Weekly Exercises - Fire Drill, Life Boat Drill or MoB Drill will be performed.
5. Safety-related Incidents and Accidents will be reported to the Client as soon as practically possible.

During mobilisation alongside in Hobart - a full HSE introduction will be given to all crew members on the vessels.

2.2 Multiwave Policy Statements

Multiwave QHSE Policies are posted onboard vessels for all crew to read

Attached in following pages are:

- HSE Policy
- Environment Policy
- Drug and Alcohol Policy

2.2.1 HSE Policy

01.01.2006

HEALTH, SAFETY AND ENVIRONMENT POLICY

It is the Multiwave policy that in the conduct of our activities we undertake to give priority to the health and safety of all persons and the protection of the natural environment.

The company shall define and develop administrative and operating procedures that shall meet or exceed all relevant legal requirements and, or if no such standards exist, be better than the general accepted industry standards.

The Company's Health, Safety and Environmental objectives shall have equal status with our other primary business objectives.

The company is committed to maintaining its position among the leaders in our industry in HSE management, according to the results of major client's HSE monitoring programs, and shall in a pro active way participate together with clients, contractors and other legal authorities in promoting and developing new standards for the industry.

Within the framework of this policy the Company will strive to:

- Prevent all accidents and occupational diseases.
- Promote the health of our employees.
- Prevent damage to the environment.
- Create a healthy and safe work place for our employees and contractors.
- Ensure safe working practices and maintain a high level of safety awareness.
- Develop and maintain personnel training and personal responsibility for HSE.
- Develop and maintain plans for audits and reviews, both internally and externally.
- Develop and maintain plans for risk identification and control.
- Develop and maintain plans for incident investigation and corrective actions.
- Require contractors working on our behalf to comply with our HSE standards.
- Encourage the raising of HSE standards within the industry.

All Company employees are required to become familiar and adhere to the company policies. Each individual employee is also encouraged to suggest changes for improvements by communicating these suggestions internally to the nominated HSE responsible.

Each and every manager is responsible for ensuring that all employees and subcontractors are aware of, and have access to, all policies and procedures as well as all relevant legislative requirements.

Line management is responsible for implementing this policy.

Jean-Pierre Sabbagh

President and CEO

MULTIWAVE

2.2.2 Environment Policy

01.01.2006

ENVIRONMENT POLICY

It is Multiwave Geophysical Company ASA (Multiwave) Policy to conduct its business in a manner that assures optimum protection of the environment. In addition to careful compliance with relevant laws and regulations, efficient use of natural resources and waste reduction are keys to achieving these objectives.

The policy commits the Company to assure regular training to all employees, improve our technology and enlist the cooperation of our suppliers, customer and neighbouring communities to build better environmental practices.

The QHSE responsible will manage all Environmental issues in the company and will act as an advisor to line Departments on matters pertaining to environmental issues. Following objectives are set:

- Identify, develop, implement and maintain and advise the Company on environmental policy standards.
- Identify and, as necessary, develop, implement and maintain methods and techniques for environmental matters.
- Promote the environmental management process, and staff awareness to be pollution conscious and have a positive attitude towards pollution prevention.
- Establish and maintain competence levels.
- Establish effective communication with Regulators, Industry, Non-Governmental Organizations and the Public.
- Specify the importance the Company places on conserving and protecting the environment.
- Define that the President has overriding authority and the responsibility to make decisions with respect to safety and pollution prevention.

The HSE policy statement gives a clear policy on the environment as follows:

- **No harm to people or environment**

The environmental plan identifies an individual project's needs to translate the policy into practical actions. Consistent with the Company's drive for line responsibility for HSE issues, the responsibility for each project is assigned to an appropriate department. These departmental responsibilities are further cascaded and translated into individual employee's tasks and targets.

Jean-Pierre Sabbagh

President & CEO

MULTIWAVE

2.2.3

01.01.2006

DRUG AND ALCOHOL POLICY

Multiwave Geophysical Company's (Multiwave) employees and subcontractors shall not report to work or perform any work, duties or services while under the influence of alcohol, drugs or narcotics.

It is strictly forbidden to distribute, purchase, sell or consume alcohol, drugs or narcotics in the Company's offices and work sites.

The company shall encourage its employees and subcontractors to participate in non-smoking programs. The company shall ensure that all employees are protected from passive smoking influence. All company arrangements, social or business, shall be held in a non-smoking environment.

This policy applies to all persons employed in Multiwave, and to third party personnel and subcontractors engaged in work for Multiwave as follows:

- It is strictly forbidden to consume or have in possession alcohol, drugs or narcotics.
- The President has authority to suspend and remove from the area and if necessary sign off any person found to be violating this policy.
- This policy does not apply to a small and responsible consumption of alcohol at Company sponsored business or social functions or in connection with business travel.
- This policy does not apply to prescription drugs when they are used for their intended purposes as currently prescribed for the person using them, provided that the use of such drugs does not adversely affect the persons ability to perform his duty in a safe and productive manner.
- The company reserves the right to conduct searches of personal belongings without prior announcement.
- The searches or test may include the taking of breath or urine samples for testing to determine the presence of drugs, narcotics or alcohol.
- If a person refuses to submit to a search or test or is found to be violating this policy, shall be subject to applicable, lawful disciplinary action, up to and including termination.

The President is responsible to enforce this policy.

Jean-Pierre Sabbagh

President & CEO

MULTIWAVE

A member of the GGS Group

2.3 Ship Owners onboard vessel QHSE Procedures

2.3.1 Seismic Vessel

Multiwave and Swire QHSE Procedures are mature and are available onboard the seismic vessel for all crew to read.

2.4 QHSE Organisation

Refer to the organisation charts in sections 1.1 and 1.2

2.5 QHSE Onboard Responsibility

In the event of shipboard accidents and emergency situations:

The Master shall take total control of the ship.

The Chief Engineer will take control of all machinery.

The Chief Officer will take control of all deck operations, eg. fire party, clearing away life saving equipment and lifeboats, anchoring, tow lines etc.

The First Officer will assist the Master on the bridge or as otherwise ordered.

The First Engineer will assist the Chief Engineer or as otherwise directed - including taking soundings of tanks, bilges etc.

The Party Chief will take control over the seismic departments and related areas.

The Client representative will assist the Party Chief as reasonably required.

Statements detailing the responsibilities and accountabilities of Multiwave key personnel can be found in the Multiwave QHSE Manual.

2.6 QHSE Planning

Forward QHSE planning is carried out according to Multiwave and Swire QHSE Manuals and Procedures. This Contract Project Safety Plan is a deliverable of the Multiwave QHSE MS.

Responsibility:

Multiwave	Survey Operations
Swire	Maritime Operations of the vessel

2.7 QHSRE Review

QHSE related reports and action points are reported from the vessel to Multiwave via an electronic data-based reporting system called “TQM 9000”. In accordance with Multiwave QHSE procedures, reports are periodically reviewed internally and also with the client at the end of the job.

2.8 QHSE Onboard Meetings

Meetings will be held as defined in the QHSE Manual. All available employees shall attend meetings where agenda's are designed to encourage participation from the employees. Matters of concern can be identified, action taken and feedback provided. Meetings will be utilised to communicate other health and safety related information such as the results of inspections and audits. Minutes are taken, displayed and distributed for reference. The following meetings will be held:

Start-up meeting
General Safety meeting
Toolbox meetings
End of job de-briefing.

2.9 General Reporting

All incidents and accidents shall be reported. Multiwave have adopted the "TQM 9000" system for all incident and accident reporting. All Incident / Accident Reports are to be sent to Multiwave, Ship Owner and to the Client.

The reporting module is directly linked to an improvement module that keeps track of all actions and investigations that are needed.

2.10 Accident / Incident Matrix

Definitions
Accidents and Incidents are defined according to the tables below and shall be reported according to below matrix.

Injury	Environmental Spill	Material Loss/Damage	Production loss	Reporting Requirements
FATAL	>3000 m3	>5 mNOK	>5 mNOK	Immediate Reporting
MAJOR	>500 m3	>1 mNOK	>1 mNOK	Immediate Reporting
SERIOUS	>100 m3	>200 kNOK	>200 kNOK	Reporting within 1 hour
LIGHT	>1 m3	>50 kNOK	>50 kNOK	Reporting within 24 hours
Near Miss	<1 m3	< 50 kNOK	<50 kNOK	Reporting within 48 hours

In the case of Major incidents and above, the decision whether to alert the contingency group lies with the Master for vessel operations and with the Party Chief for other activities.

External Reporting
All incidents that are a possible breach of an environmental legal requirement and/or have the potential to cause significant impact on the environment must be reported and investigated according to legislative requirements and contractor procedures.

Santos Limited, as operator of the Permit will provide written reports on any incidents to

the appropriate authorities and maintain a record of each report and details of any corrective action taken.

The Santos representative will be responsible for ensuring compliance with all external reporting requirements.

Additional Regulatory Reporting

Additional regulatory reporting for the survey includes:

- Petroleum (Submerged lands) Act 1967
- Petroleum (Submerged lands) Acts (VIC, TAS)
- Petroleum Acts (VIC, TAS)
- Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)

2.11 Accident / Incident Reporting and Investigation System

Any incidents or accidents are reported in the "TQM 9000" system. The revision module covers planning, preparation, execution and reporting. Unsafe Act Auditing / Reporting – Multiwave Observation Cards

The risk identification system operated by Multiwave encourages the observation of work environments and practices and discussion between colleagues. The system shall practice a "no blame" culture and allow communication from all levels to top management level directly. **Observation Cards** to be used by all personnel working at Multiwave work sites, shall be easy accessible to all. The Party Manager and the Captain shall assure that information collated by the observation cards are reported throughout the organisation and to relevant clients and subcontractors.

2.12 RAP (Remedial Action Plan)

Actions to follow up as results/findings from Incidents/Accidents, Observation Cards, Audits etc. shall be entered in the RAP listing identifying: Immediate Action, Proposed Corrective Action, Target Date, Status Field & Closure Date.

No items in the RAP listing shall be closed without agreement by all parties involved in the finding, registering, and action discussions.

2.13 Contingency Plans and Emergency Response

Emergency response is described in several documents. The immediate, offshore actions to be taken in the event of emergency, the front-line organization for emergency response, and emergency duties are explained in the Offshore Emergency Response Plan. This document describes the appropriate responses from the actual incident, to the Emergency response Coordinator. The Contingency Manuals of the Ship owners and of Multiwave describe the complimentary actions that would take place in their own ERC's at this time.

Procedures are in place for the following emergency situations (but not limited to):

- Injury or Illness requiring Medevac to hospital (attached)
- Fatal Accident or Illness (attached)
- Vessel emergencies (Contingency manual)

When within the Field perimeters, on-site emergencies on the vessel are handled jointly: by Multiwave and the Ship-owners but the Emergency response Coordinator will be notified in the first instance. They can provide local assistance where appropriate, for example, the use of field helicopters.

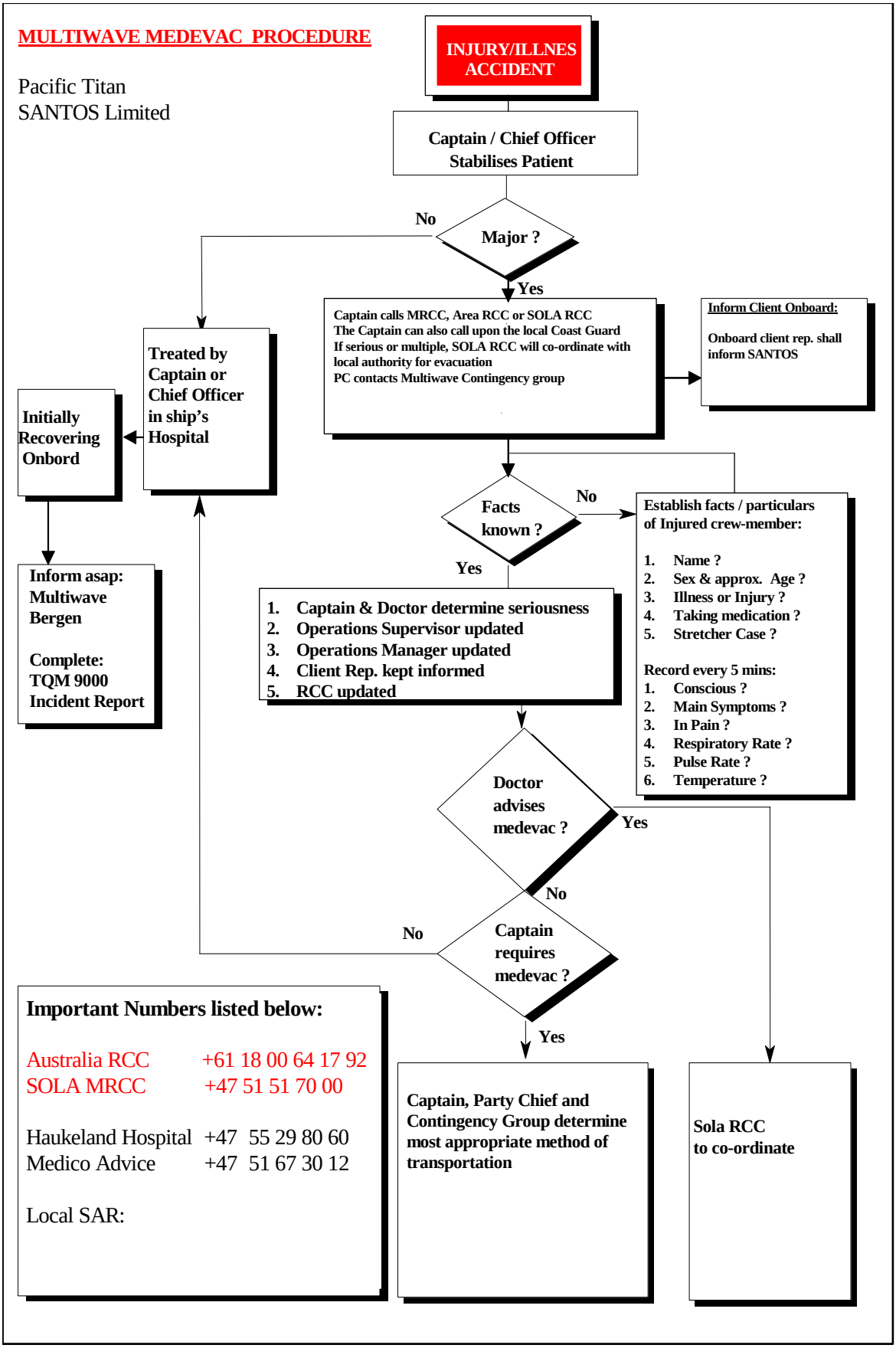
The Master is responsible on-board the vessel for ensuring that the emergency response facilities and materials as specified in the emergency procedures are available and fit for purpose at all times.

The Party Chief is responsible for notifying the Multiwave Contingency Group and the onboard client representative that an emergency situation is developing.

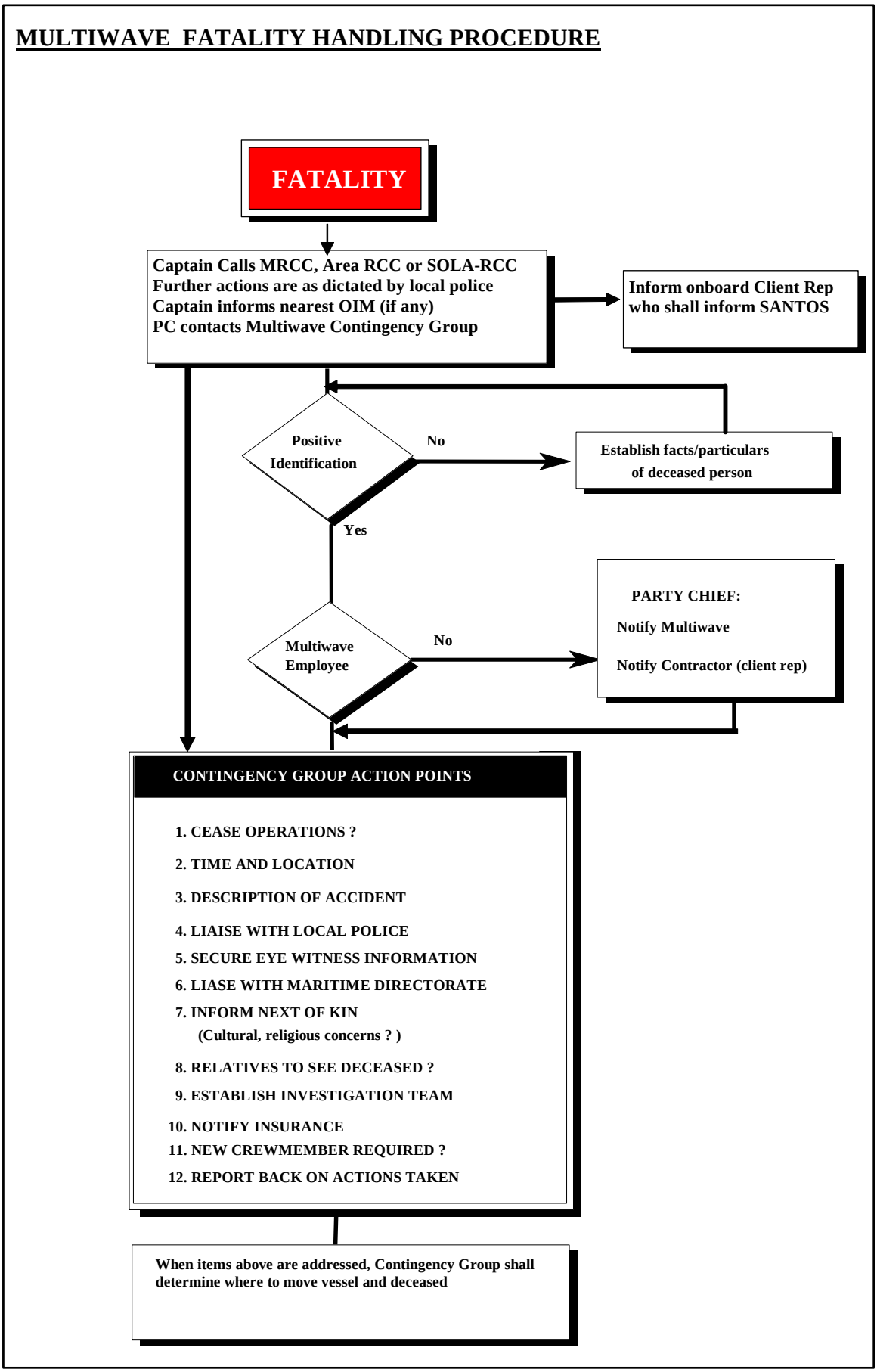
Depending on the seriousness of the situation the Multiwave Contingency Group will convene, normally when the incident is classed fatal or major as per the matrix in section 2.10 above. The Multiwave Contingency group will liaise with the Emergency Response Teams of the Client and Ship-owner as appropriate.

The Multiwave Contingency Group is made up of members of shore management nominated for the purpose. The list of members of the contingency group is kept up to date by the issuing of the latest phone list. The Part Chief should first call Multiwave Operations in an emergency, but if no reply then any member of the Contingency Group can be called. They then become responsible for calling all other members of the Group.

During mobilisation in Hobart a full HSE introduction will be given to all crew members on the vessel.


MULTIWAVE MEDEVAC PROCEDURE
Pacific Titan
SANTOS Limited
INJURY/ILLNES ACCIDENT
Captain / Chief Officer Stabilises Patient
No
Major ?
Yes
Captain calls MRCC, Area RCC or SOLA RCC
The Captain can also call upon the local Coast Guard
If serious or multiple, SOLA RCC will co-ordinate with local authority for evacuation
PC contacts Multiwave Contingency group
Inform Client Onboard:
Onboard client rep. shall inform SANTOS
Treated by Captain or Chief Officer in ship's Hospital
Initially Recovering Onbord
Inform asap:
Multiwave Bergen
Complete:
TQM 9000
Incident Report
Facts known ?
No
Yes
Establish facts / particulars of Injured crew-member:
1. Name ?
2. Sex & approx. Age ?
3. Illness or Injury ?
4. Taking medication ?
5. Stretcher Case ?
Record every 5 mins:
1. Conscious ?
2. Main Symptoms ?
3. In Pain ?
4. Respiratory Rate ?
5. Pulse Rate ?
6. Temperature ?
1. Captain & Doctor determine seriousness
2. Operations Supervisor updated
3. Operations Manager updated
4. Client Rep. kept informed
5. RCC updated
Doctor advises medevac ?
Yes
No
Captain requires medevac ?
No
Yes
Important Numbers listed below:
Australia RCC +61 18 00 64 17 92
SOLA MRCC +47 51 51 70 00
Haukeland Hospital +47 55 29 80 60
Medico Advice +47 51 67 30 12
Local SAR:
Captain, Party Chief and Contingency Group determine most appropriate method of transportation
Sola RCC to co-ordinate

MULTIWAVE FATALITY HANDLING PROCEDURE



3.0 Logistics Description

3.1 Source / Recording Vessel

Vessel details are given in Appendix B

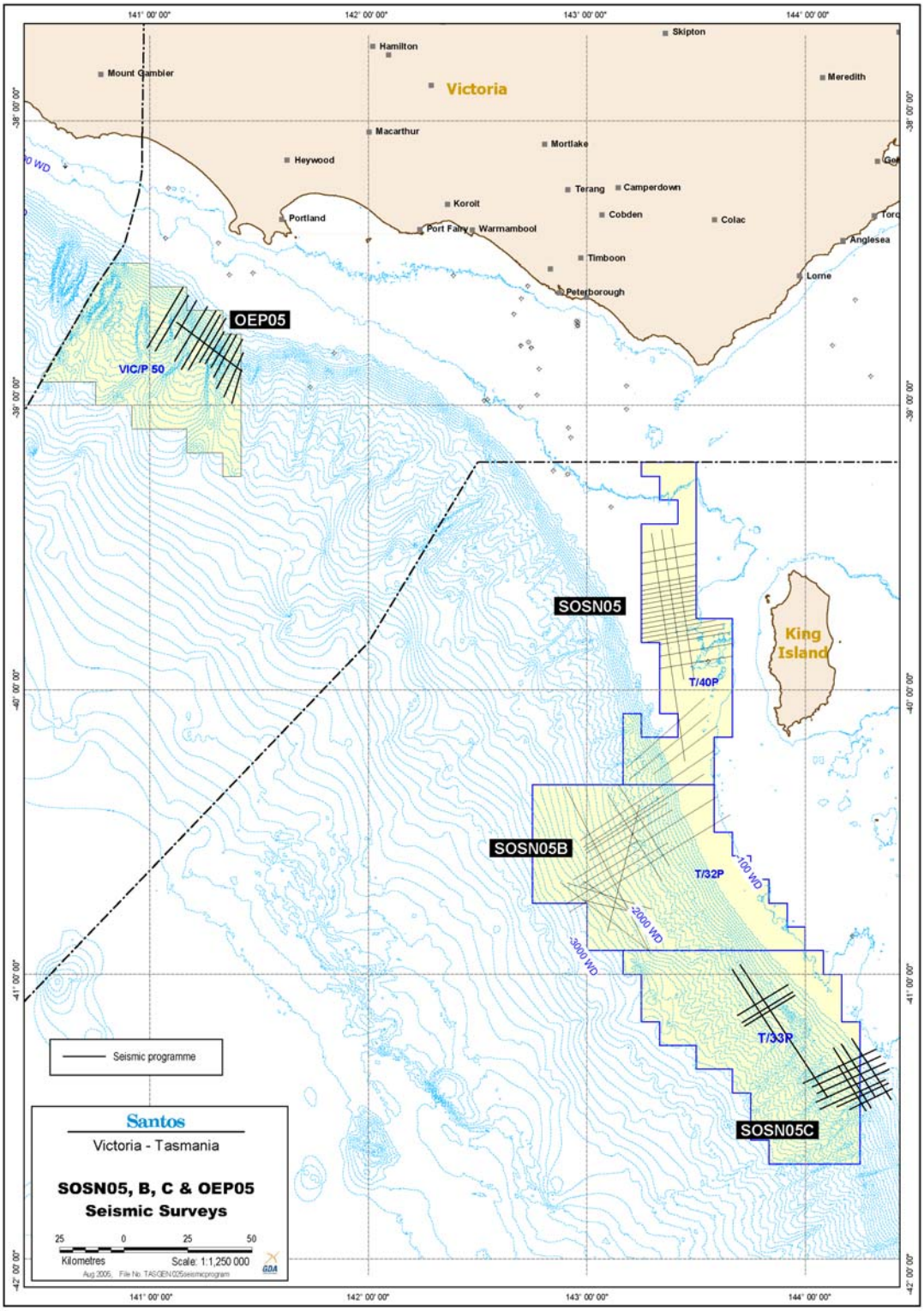
3.2 Support Vessel

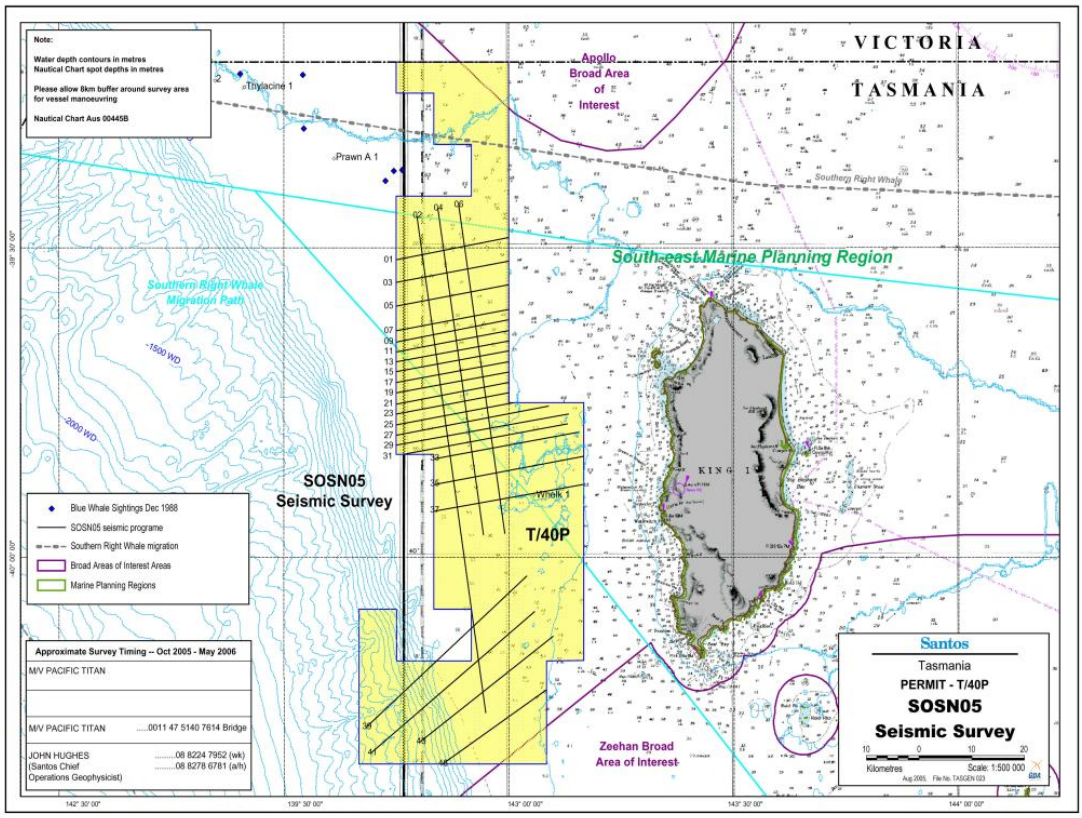
At this stage, it is not envisaged that a support vessel will be required

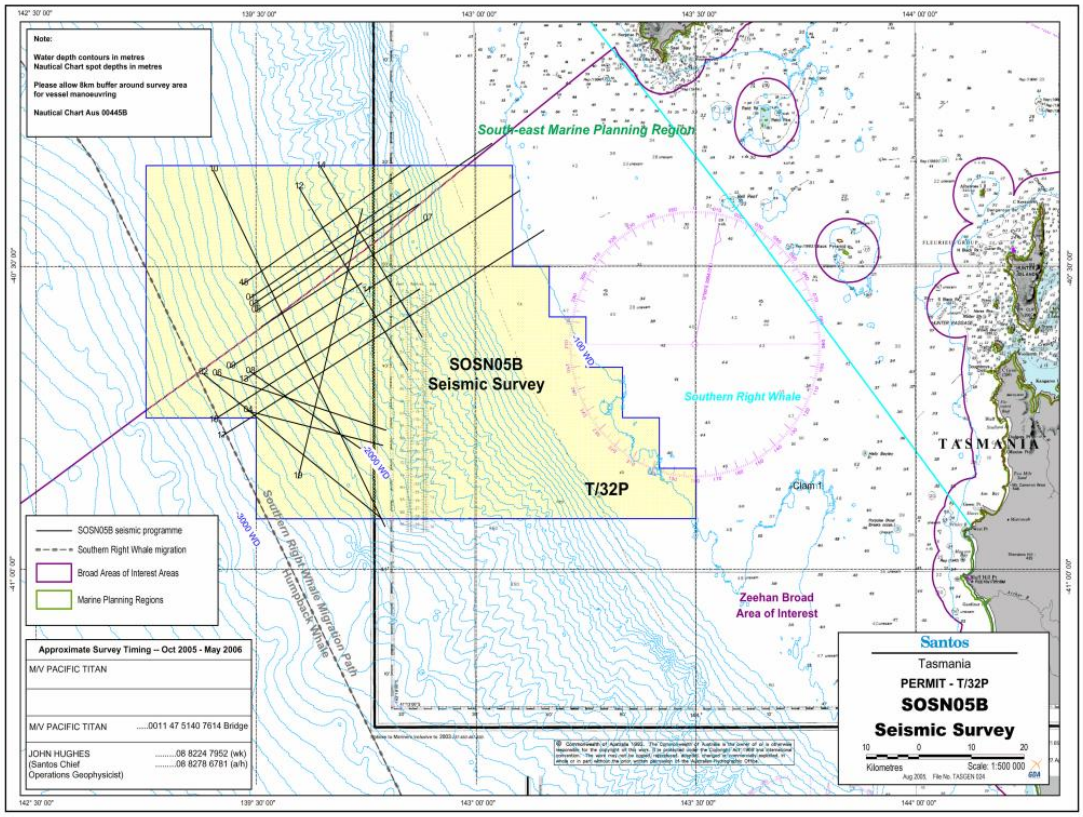
Each operation will be considered on its own merits, and always after an onshore pre-job risk assessment, followed by offshore risk-assessments and toolbox meetings during the day of the operation.

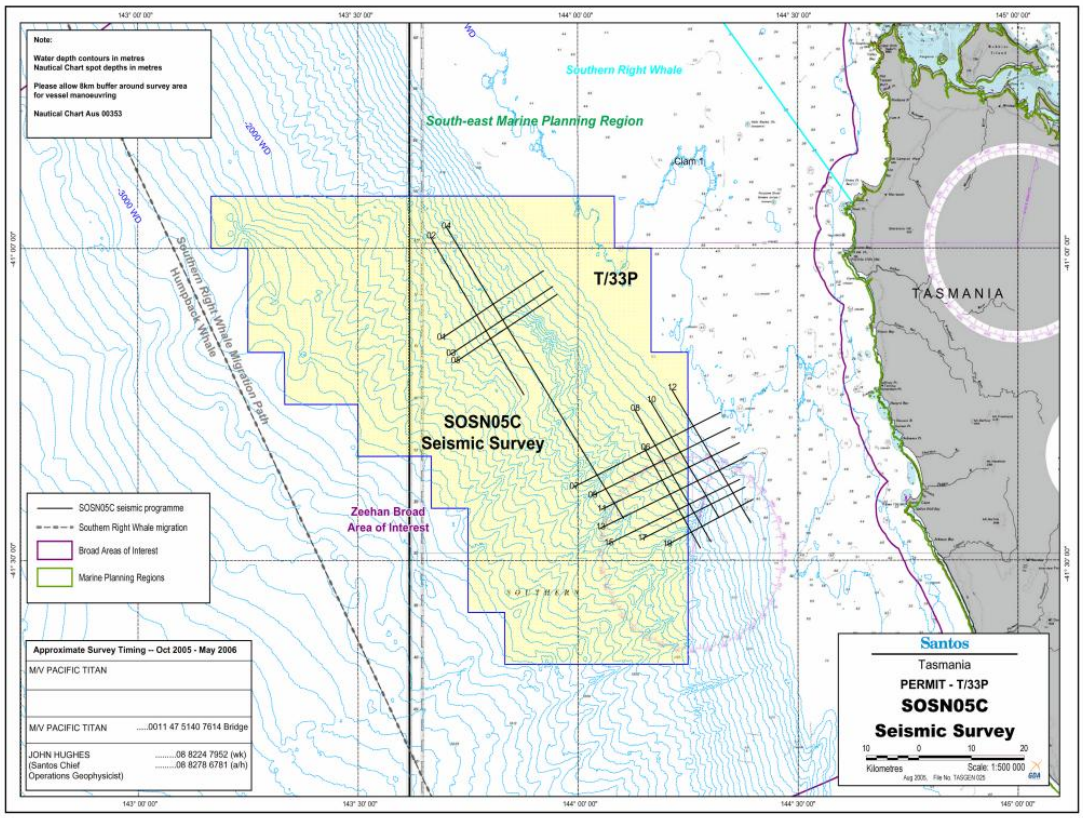
4.0 Survey Information

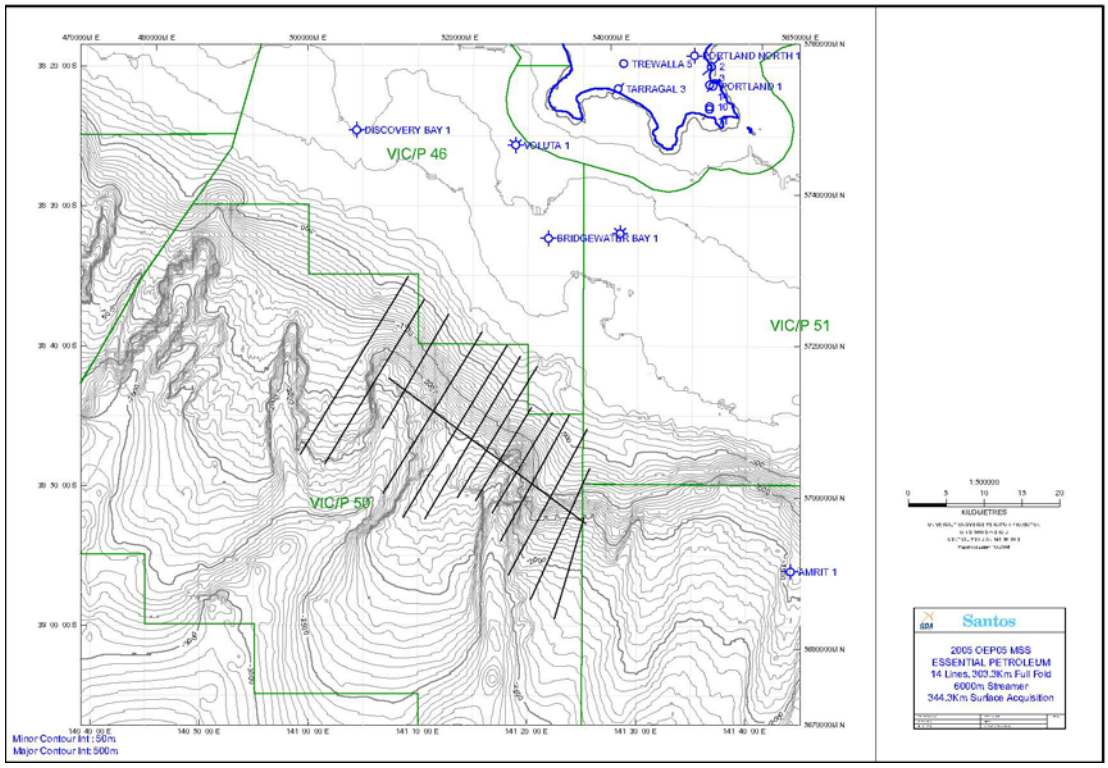
4.1 Area Information




Note:
Water depth contours in metres
Nautical Chart spot depths in metres
Please allow 8km buffer around survey area for vessel manoeuvring
Nautical Chart Aus 00445B
VICTORIA
TASMANIA
Apollo Broad Area of Interest
Thylacine 1
Prawn A 1
Southern Right Whale
South-east Marine Planning Region
Southern Right Whale Migration Path
-1500 WD
-2000 WD
SOSN05 Seismic Survey
Wrasse 1
T/40P
Zeehan Broad Area of Interest
Blue Whale Sightings Dec 1988
SOSN05 seismic programe
Southern Right Whale migration
Broad Areas of Interest Areas
Marine Planning Regions
Approximate Survey Timing -- Oct 2005 - May 2006
M/V PACIFIC TITAN
M/V PACIFIC TITAN .....0011 47 5140 7614 Bridge
JOHN HUGHES (Santos Chief Operations Geophysicist) .....08 8224 7952 (wk) .....08 8278 6781 (a/h)
Santos
Tasmania
PERMIT - T/40P
SOSN05
Seismic Survey
Kilometres
Scale: 1:500 000


Note:
Water depth contours in metres
Nautical Chart spot depths in metres
Please allow 8km buffer around survey area for vessel manoeuvring
Nautical Chart Aus 00445B
South-east Marine Planning Region
SOSN05B Seismic Survey
T/32P
-100 WD
-2000 WD
-3000 WD
Southern Right Whale
Southern Right Whale Migration Path
Humpback Whale
Glam 1
TASMANIA
Zeehan Broad Area of Interest
SOSN05B seismic programme
Southern Right Whale migration
Broad Areas of Interest Areas
Marine Planning Regions
Approximate Survey Timing -- Oct 2005 - May 2006
M/V PACIFIC TITAN
M/V PACIFIC TITAN .....0011 47 5140 7614 Bridge
JOHN HUGHES (Santos Chief Operations Geophysicist) .....08 8224 7952 (wk) .....08 8278 6781 (a/h)
Santos
Tasmania
PERMIT - T/32P
SOSN05B
Seismic Survey
Kilometres
Scale: 1:500 000


Note:
Water depth contours in metres
Nautical Chart spot depths in metres
Please allow 8km buffer around survey area for vessel manoeuvring
Nautical Chart Aus 00353
Southern Right Whale
South-east Marine Planning Region
Clam 1
T/33P
TASMANIA
Southern Right Whale Migration Path
Humpback Whale
SOSN05C
Seismic Survey
Zeehan Broad
Area of Interest
SOSN05C seismic programme
Southern Right Whale migration
Broad Areas of Interest
Marine Planning Regions
Approximate Survey Timing -- Oct 2005 - May 2006
M/V PACIFIC TITAN
M/V PACIFIC TITAN .....0011 47 5140 7614 Bridge
JOHN HUGHES .....08 8224 7952 (wk)
(Santos Chief .....08 8278 6781 (a/h)
Operations Geophysicist)
Santos
Tasmania
PERMIT - T/33P
SOSN05C
Seismic Survey
Kilometres
Scale: 1:500 000


TREWALLA 1
PORTLAND NORTH 1
TARRAGAL 3
PORTLAND 1
DISCOVERY BAY 1
VOLUTA 1
VIC/P 46
BRIDGEWATER BAY 1
VIC/P 51
VIC/P 50
AMRIT 1
KILOMETRES
Santos
2005 OEP05 MSS
ESSENTIAL PETROLEUM
14 Lines,302.3Km Full Fold
6000m Streamer
344.3Km Surface Acquisition
Minor Contour Int : 50m
Major Contour Int: 500m

4.2 Weather Information

Waters are transitional warm to cold temperate, with mean sea surface temperatures varying from 14ºC in winter to 19ºC in summer. The coastline is typically high energy, with high deepwater wave energy, attenuated by a steep offshore-near shore gradient and offshore reefs which provide for moderate to low energy conditions. Tidal range is small ranging from approximately 0.8 to 1.2 meters range.

Information on prevailing weather conditions is available on Navtex receiver onboard. This information should be available during the survey period. Coastal Radio Station broadcasts for weather prognosis/warnings are capable of being received onboard.

More information on prevailing weather pattern is obtainable in the Australia Pilot Vol II, a copy of which is available onboard

4.3 Obstructions and Hazards

4.3.1 Obstructions Summary Shallow area

Charts indicate that there are no known shallow areas or obstructions within the survey area

4.4 Sun Exposure

When working in exposed deck areas or in the work/MOB boat care must be taken to avoid sun burn. PPE including overalls and hats should be worn during such operations to avoid over exposure. In addition sun screen lotions are freely available onboard the Pacific Titan and are part of the work/MOB inventory. Its use is recommended in all operations where exposure to the sun is likely to occur.

4.5 Water Depth

The 2D program is in water depths of greater than 20m with no known surface obstructions

4.6 Seismic Interference

There is no other seismic activity expected in, or adjacent to, the survey areas and as a result no seismic interference is expected.

4.7 Shipping

Major shipping channels are located through the VIC/P50 survey area. The south east marine region in one of the busiest areas for shipping in Australia, with freight and passengers carried between the mainland and Tasmania and between Australian Ports and New Zealand.

4.8 Fishing Activity

Some fishing vessels are anticipated in the area. However they are contactable via VHF channel 16 or mobile phones. They are usually trawlers or vessels using droplines. Prior notice will be given to the Fisheries Cooperatives in the area about this survey. Close cooperation will be implemented to ensure minimal impact on seismic and fishing operations.

4.9 Sharks

Sharks are known to be in the area and have attacked seismic equipment. The work/MOB boat will not be launched (other than an emergency) when sharks have been sighted. Work boat crews should avoid putting brightly reflective items, e.g. tools or wrist-watches, in or near the water during maintenance. If a crew member fell in the water, he would benefit by having no shiny items on his clothing and by refraining from thrashing around unnecessarily.

Waste food disposed at sea will tend to attract sharks to the area. All waste food on Pacific Titan will be incinerated.

4.10 Whaling Activity

Multiwave shall at all times make every effort to minimize the impact of our seismic activity on whales. MGC shall comply with the EPBC Act (1999) and the Whale Protection Act 1980.

Prior to commencement of seismic activities, a visual check for the presence of whales shall be made. Indications of whale activity may be in the form of blows and surface activity resulting in large splashes. Seismic activity shall not begin unless whales are a minimum distance of 3 km from the Pacific Titan.

A sequential build-up of warning pulses (Soft start) shall be made to deter and warn marine fauna immediately before commencement of seismic activity. This would involve gradual increase in the number of airguns fired over a 20 minute period. A whale watch shall be maintained during this warning sequence to establish the presence or absence of whales within the 3 km range.

Once operating, a whale-watch shall be commenced if any whale comes within 3 to 5 km of the Pacific Titan. If a group of whales including a cow/calf pair

approaches or is seen within 3 km of the Pacific Titan, seismic operation shall be stopped. The operation shall not recommence till the cow/calf are greater than the 3 km range. If whale(s) are encountered (not including a cow/ calf pair) within the 3 km of the vessel, seismic operation shall be ceased and shall only be re-commenced when the whale(s) are greater than the 3 km range.

All whale observation shall be recorded on observation log sheets. Notes on such observation sheets can be found in the Environment Plan. On completion of these surveys, a copy of the observation logs shall be sent to the relevant authority.

5.0 Multiwave Hazard Register

5.1 Generic Hazards

The main vessel areas where Hazards and Activities are likely to lead to highest Risks are:

- Back Deck — high pressure, moving equipment, man-over-board, noise etc
- Engine Room — explosion, hot/burning liquids & surfaces, fumes, noise etc
- Compressor Room — compressed air, explosion, hot/burning liquids & surfaces, noise etc
- Small boat work — changing out spares, personnel transfer, etc

The following are the major generic Hazards/Activities that could typically be valid for any seismic survey (extracted from the Hazard Catalogue):

Vessel Area	Activity Description
Engines	Machinery overhaul
Generators	Overhaul of generators, switching between generators
Air guns	Unexpected release of high air pressure from air guns, pipes, hoses, valves etc.
Strong wind and rough sea	Seismic operation in rough seas Walking/Entering ladders and stairs in rough seas
General maintenance	Working with cutting (knives or other tools) / rotating tools
Batteries	Charging, storage and handling of batteries
Lifting & handling	Lifting heavy loads (gun chambers etc)
Wire ropes	Towing, winching, crane operations
Winches	Recovering, winching, deploying
MOB & Work boats	Launching/recovering of boats
MOB & Work boats	Transfer of personnel & equipment
Third party vessels	Use of chartered vessels, chase, supply and crew boats

The colour codes used in the following table are:

QHSE-10-20-02	Multiwave Procedure
SPO 100 Sect 2.7	Swire Procedure
ISM Code	Industry Requirement

5.2 Hazard Catalogue

Hazard Group	Activity/Hazard	Risk	Control measures
PERSONAL SAFETY - HEALTH AND HYGIENE	Stress, fatigue, shift work, overwork and lack of fitness.	Personal injury or death, loss of equipment or vessel	Sufficient crew for safe operation (24 hours) Fitness equipment. Mandatory medical check. QHSE 02-50-50-10.000 SPO 100 Sect 2.7
PERSONAL SAFETY – HEALTH AND HYGIENE	Self-medication	Aggravation of complaint, death	CM- 20-03 Drug & alcohol policy. SPO 100 Sect 2.6
PERSONAL SAFETY - HEALTH AND HYGIENE	1. Food poisoning 2. Cleanliness and Hygiene 3. Water contamination 4. Pests	Individual or all personnel incapacitated - death	Vessel hygiene procedure (ISM Code) SPO 210 Part A Sect 7
PERSONAL SAFETY - HEALTH AND HYGIENE	Infectious and chronic diseases	Individual or all personnel incapacitated - death	Vessel hygiene procedure (ISM Code) SPO 210 Part A Sect 7
PERSONAL SAFETY - HEALTH AND HYGIENE	1. Air pollution 2. Smoking 3. CO - Carbon monoxide 4. Vapours from solvents and cable oil.	Asphyxiation - death, lung cancer, bronchitis, heart disease.	Vessel smoking routines (No smoking areas) QHSE-10-20-02 Permit to work system SPO 100 Sect 2.13
PERSONAL SAFETY - HEALTH AND HYGIENE	Sexually transmitted diseases and AIDS	Genital infections - death	Mandatory medical check. (HSE 20.01 rev 01) SPO 210 Part A Sect 7.16
PERSONAL SAFETY - PROTECTIVE CLOTHING	Unsuitable and unavailable 1. Eye protection. 2. Coveralls. 3. Shoes/boots. 4. Helmets. 5. Ear protection. 6. Safety harnesses. 7. Gloves. 8. Life vests.	Personal injury, fatality	Toolbox meeting Worksite introduction Observation cards X-department inspection SPO 100 Sect 2.11
PERSONAL SAFETY - PROTECTIVE CLOTHING	Exposure to sunlight, UV radiation	Skin Cancers, cataracts, eye damage	Sun brims on hard hats, sun block cream, UV protective safety glasses, UV protective grade long sleeved overalls. (Multiwave CM10.01) SPO 210 Part A Sect 7.17, 7.17A

Hazard Group	Activity/Hazard	Risk	Control measures
PERSONAL SAFETY - LIFTING	Lifting and handling heavy loads	Back injuries, damaged hands or feet and other injuries. Damage to equipment.	On the job training concerning correct lifting & handling. Observation cards. SPO 210 Part A Sect 7.7, 7.7A
PERSONAL SAFETY - ALCOHOL AND DRUGS	Alcohol and drugs	Personal injury and death, damage to equipment/vessel.	CM- 20-03 Drug & alcohol policy SPO 100 Sect 2
PERSONAL SAFETY AND HYGIENE	Noise levels.	Loss of hearing, pain, tenuous	PPE to be used in high level noise areas. SPO 210 Part A Sect 6.9
TRANSPORTATION - SMALL BOATS	Use of local vessels	Multiple fatality, loss of vessel	No personal transportation using small boats unless certified. (02 QHSE Proc) SPO 210 Part D Sect 6.4,6.4A
TRANSPORTATION - SMALL BOATS	Using small MOB and or work boats for: 1. Working on deployed equipment. 2. Personnel or equipment transfer to another vessel Associated hazards: 3. Engine failure, 4. Launch and recovery operations. 5. Fire on boat, 6. Worsening weather.	Multiple fatality by drowning, falling, struck by object, loss of equip., kerosene spill	MOB boat procedure. No planned work boat activities (02 QHSE Proc) SPO 210 Part D Sect 6.4,6.4A
TRANSPORTATION - HELICOPTER OPERATIONS	Flights to and from ships with passengers or goods, manoeuvring near/on ships	Serious injury/fatality (multiple), loss of helicopter, damage to ship	HUET Training SPO 210 Part A Sect 6.5
TRANSPORTATION - HELICOPTER OPERATIONS	Winching passengers and goods	Injury, fatality	N.A.
TRANSPORTATION - AIRLINES	Domestic air carrier hazards	Multiple fatality	Rely on external audits and approval of airlines
VESSEL OPERATIONS - GENERAL	Movement About Vessel	Personal injury/fatality/damage to equipment and vessel	All people instructed to not run. Marking of obstacles. Vessel introduction. Advice on stepping, etc. SPO 210 Part A Sect 6.6
VESSEL OPERATIONS - GENERAL	Oxygen deficiency due to presence of toxic gases (CO2/Halon) or flammable gases	Damage/loss of equipment/vessel	Emergency response procedure. Permit to work in enclosed spaces. SPO 210 Part A Sect 6.1,6.1A
VESSEL OPERATIONS - GENERAL	Security during Port Calls 3rd Party Safety	Loss of property. Injuries. Fatalities.	Procedure QHSE 30.02.02 Port call plan SPO 210 Part A Sect 6.3A

Hazard Group	Activity/Hazard	Risk	Control measures
VESSEL OPERATIONS - RADIO, RADAR AND NAVIGATION	FAILURE OF EQUIPMENT 1. Steering Failure 2. Engine Failure 3. Power Failure	Personal injury/death Damage/loss of vessel	Vessel procedure Control/certification of equipment ISM Code SPO 210 Part A Sect 3
VESSEL OPERATIONS - RADIO, RADAR AND NAVIGATION	Collision with 1. Other seismic craft during dual seismic operations 2. Oil rig during seismic operations 3. Other vessels and objects	Personal injury/death. Damage/loss of own/other vessel/equipment.	Vessel Close pass procedure SPO 210 Part D Sect 2.1,2.2
VESSEL OPERATIONS - GALLEY	1. Hot fat, hot liquids, steam, hot ovens, ranges and pots 2. Poorly stacked/stored materials	Burns, scalds, personal injury/death.	Safe equipment Vessel procedures Worksite introduction X-department inspections SPO 210 Part A Sect 1.12
VESSEL OPERATIONS - ENGINE ROOM	Fuel oil and Lub oil leak	Personal injury/death Loss/damage to equipment/vessel Pollution	Vessel SOPEP plan SPO 201 Part D
VESSEL OPERATIONS - CRANES AND ASSOCIATED LIFTING EQUIPMENT	Unsafe use of cranes and associated lifting equipment.	Personal injury/death Damage to equipment/vessel	Certification of all lifting equipment. Operator approved by captain. SPO 210 Part A Sect 4.3
VESSEL OPERATIONS - PORTABLE LADDERS, SCAFFOLD AND STAGES.	Unsafe use of ladders, scaffold and staging.	Personal injury/death Damage/loss of equipment	Work introduction Toolbox meeting PTW for working at heights SPO 210 Part A Sect 6.1C
VESSEL OPERATIONS - HAZARDOUS MATERIALS	Hazardous substances (including paints, chemicals and acids).	Personal injury and death, damage to equipment and vessel	Vessel procedure for handling of hazardous substances Protection against hazardous substances part of all relevant procedures SPO 210 Part A Sect 6.12
VESSEL OPERATIONS - MAINTENANCE	Misuse and abuse of hand tools and portable electric, pneumatic and hydraulic tools. Risks to personnel in workshops.	Injury to personnel, fatality, damage to equipment	Procedure QHSE 50-30-04 Tools, Equipment and Machinery SPO 210 Part A Sect 3.15, 6.8
VESSEL OPERATIONS - MAINTENANCE	Welding, Cutting and Burning	Destruction of part/all vessel. Personal injury and death. Continual when hot work carried out.	Procedure QHSE 50-30-04 Tools, Equipment and Machinery. SPO 210 Part A Sect 6.1 Permit to Work

Hazard Group	Activity/Hazard	Risk	Control measures
VESSEL OPERATIONS - MAINTENANCE	Machinery overhaul	Personal injury, death	Vessel procedure SPO 210 Part A Sect 3.7
SEISMIC OPERATIONS - AIRGUNS AND COMPRESSORS	Sudden release of high air pressure from air guns, compressors, tanks, pipes, hose lines, valves and fittings	Serious injury, fatality if untreated	Procedure: QHSE-50-30.03 Certification and Maintenance of High Pressure Air system SPO 210 Part D Sect 6
SEISMIC OPERATIONS - AIRGUNS AND COMPRESSORS	Explosion due to combustible fluids in high pressure system or high temperatures caused by compression ignition	Serious injury due to high pressure air release, possibly leading to a fatality	Vessel procedure ISM SPO 210 Part D Sect 6
SEISMIC OPERATIONS - AIR GUN HANDLING	Deployment and Recovery: 1. Gun floats suspended from two wires, 2. Damaged wire ropes, 3. Working on pressurised single strings during maintenance, 4. Unguarded umbilical, 5. Noise, 6. Deploying guns, 7. Guns swinging onboard	Injury to head, ears, body and feet, bruising, crush injuries, drowning, damage to equipment.	Appropriate PPE Worksite introduction Procedures: Deployment & recovery of gun string SPO 210 Part D Sect 6
SEISMIC OPERATIONS - STREAMER HANDLING	Deployment and Recovery of back deck equipment by crane or winches (tail buoys and paravanes, etc.)	Lacerations and bruises, crush injuries, drowning, hypothermia, damage to equipment	Appropriate PPE Worksite introduction Procedures: Deployment & recovery of tail buoys QA 30-40-20.05
SEISMIC OPERATIONS - STREAMER HANDLING	Deployment and Recovery - 1. Unguarded Streamer Reels, 2. Attaching and detaching 'birds', 3. Streamers moving on deck when turning, iv) rapid recovery of streamers during testing, 4. High voltage on streamers, 5. Waves sweeping up back deck	Bruising, head injuries, broken limbs, internal injuries, hypothermia and drowning	Appropriate PPE Worksite introduction Procedures: Deployment & recovery of streamers QA30-40-20.05 and 02 QHSE 30-40.06
SEISMIC OPERATIONS - OILS	Kerosene: 1. General Hazards, 2. Filling streamer sections	Nausea/headaches/burns, fire leading to partial /total destruction of ship	MSDS Datasheet QHSE-20-50-10.000 Product information - Isopar M Protection against hazardous substances part of all relevant procedures.

Hazard Group	Activity/Hazard	Risk	Control measures
SEISMIC OPERATIONS - HAZARDOUS MATERIALS	1. Battery charging, 2. Lithium batteries, 3. Sundry chemicals	i) Acid burns/injuries to eyes, ii) fire/explosion, iii) explosions and fires	QHSE-20-50.000 Handling and storage of Lithium Batteries SPO 210 Part A Sect 6.12
SEISMIC OPERATIONS - WORKING ON DEPLOYED EQUIPMENT	Working on deployed equipment: 1. Streamers, 2. Tail buoys	Injury to person, multiple hypothermia and drowning, loss of workboat	No in-sea maintenance.
SEISMIC OPERATIONS - INSTRUMENT ROOM	Multiple electrical equipment Smoking Soldering Working Area	Personal injury, damage to equipment, fire damage, loss of ship	No Smoking Area Permanent installations Separate electrical workshop.
EMERGENCY PROCEDURES - LIFE SAVING AND PROTECTIVE CLOTHING	Lack of Flotation Devices	Death by hypothermia, drowning	Periodic control of lifesaving equipment SOLAS Life vest included in maintenance system AMOS SPO 311 Part A Sect 2.3
EMERGENCY PROCEDURES – SURVIVAL AT SEA	Abandonment	Multiple death by drowning, hypothermia and injuries	Vessel emergency procedure and drills. SOLAS MULTIWAVE CS 20 SPO 201 Part A Sect 2
EMERGENCY PROCEDURES – MAN OVERBOARD PROCEDURES	'Man overboard'	Hypothermia/death by drowning/possible further loss on launching MOB boat	Vessel emergency procedure and drills MULTIWAVE CS 20 SPO 201 Part A Sect 15
EMERGENCY PROCEDURES – MARINE FIRE PROTECTION AND PROCEDURES	Fire outbreak anytime	Personal injury, death, Lack of response leading to death and loss of ship	Vessel emergency procedure and drills MULTIWAVE CS 20 SPO 201 Part A Sect 6 & 7
VESSEL OPERATIONS – MARINE FIRE PROTECTION AND PROCEDURES	Fire hazards – General	Personal injury/death Loss/damage to vessel/equipment	Fire detectors. Vessel emergency procedure and drills MULTIWAVE CS 20 SPO 201 Part A Sect 6 & 7

Hazard Group	Activity/Hazard	Risk	Control measures
NATURAL HAZARDS - WEATHER	Rough Seas/High Winds causing:- 1. Difficult handing of small boats, and equipment during recovery (guns, doors, streamers, tail buoys); (ii) gun and streamer stress; 2. Seas breaking over back deck; 3. Movement of unsecured items; 4. Distorted LAT's	Multiple fatality by drowning, falling, struck by object, equipment loss or damage	Vessel extreme weather procedure. Weather evaluation part of all procedures involving deployment. SPO 210 Part A Sect 2.11
ENVIRONMENTAL IMPACT - WILDLIFE AND HABITAT	Impairment of wildlife and habitat, fish stock disturbed.	Reduction of wild life in the area, death of wildlife	QHSE-30-40.20 Soft start of energy sources procedure Comply with client instructions and area specific requirements JNCC Guidelines SPO 201 Part D Sect 5.2
COMMUNICATIONS - BREAKDOWN	Communication problems	Injury, fatality, damage and loss of vessel	One working language (English) employment requirement to understand English. All communication in working language. (01 Company Manual) SPO 201 Part A Sect 2.8 - 2.10

6.0 Appendices

6.1 Appendix A Emergency Contact and Communication Numbers

6.2 Appendix B Vessel Particulars

6.3 Appendix C Contract Work Order

6.4 Appendix D QHSE MS Interface Matrix

6.5 Appendix E Santos Limited - HSE Requirements

6.6 Appendix F Compliance with Statutory Regulations

6.1 Appendix A Emergency Contact and Communication Numbers

AusSAR Tel: +61 2 6230 6811
(+61 2 6230 6880)
SOLA MRCC Tel: + 47 51 51 70 00

	24 HOURS		
General Medical/Rescue Advice	**Tel**	**Fax**	**Contact Nos.**
Main Norwegian SAR	+47 51 51 70 00		
Rogaland Radio (MEDICO)	+47 51 68 36 01		
Haukeland Hospital (MEDICO)	+47 55 97 50 00		
Telemedical AdviceCentre(TMAC) Australia	+61 74053 5419		

M/V Pacific Titan	Tel/Fax	E-mail
Bridge	+47 51 40 76 14	Pacific.titan@swireships.com
Instrument Room	+47 51 40 76 11	
Seismic Office	+47 51 40 76 13	
PC Cabin	+47 51 40 76 12	pc.titan@mgc.no
PC Mobile	+47 95 14 54 92	
Iridium Bridge	+881631852293	
Inmarsat phone	+870 356 304 510	
Inmarsat fax	+870 356 304 511	

Multiwave Geophysical Company **Head office, Bergen - Norway**		**Phone**	**Mobile**	**E-mail**
EMERGENCY NUMBER 24 hrs		**+47 55 39 59 57**		
CONTINGENCY ROOM		**+47 56 11 31 08**		
Switchboard		**+47 56 11 31 00**		mgc@mgc.no
Telefax		+47 56 11 31 01		
Jean-Pierre Sabbagh	CEO	+47 56 11 3133		jpsabbagh@mgc.no
Torgeir Nilsen	Operations VP	+ 47 56 11 3115	+ 47 95492045	Torgeir.nilsen@mgc.no
Terje Kristiansen	**Operations Singapore**	**+65 6338 3476**	**+65 8188 6211**	terje.kristiansen@mgc.no
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Jørn-Erik Hausmann	QHSE Manager	+47 56 11 31 16	+47 95 88 19 39	joern.hausmann@mgc.no
Øyvind Ødegård	Tech. Manager	+47 56 11 31 03	+47 93248853	oyvind.odeggaard@mgc.no
Franck Andersen	Inst. Manager	+47 56 11 31 04	+47 48 15 33 62	franck.andersen@mgc.no
Stephen Isherwood	Nav. Manager	+47 56 11 31 13	+47 90 27 36 73	stephen.isherwood@mgc.no
Kurt leivestad	Mech. Manager	+47 56 11 31 07	+47 91 81 72 46	kurt.leivestad@mgc.no

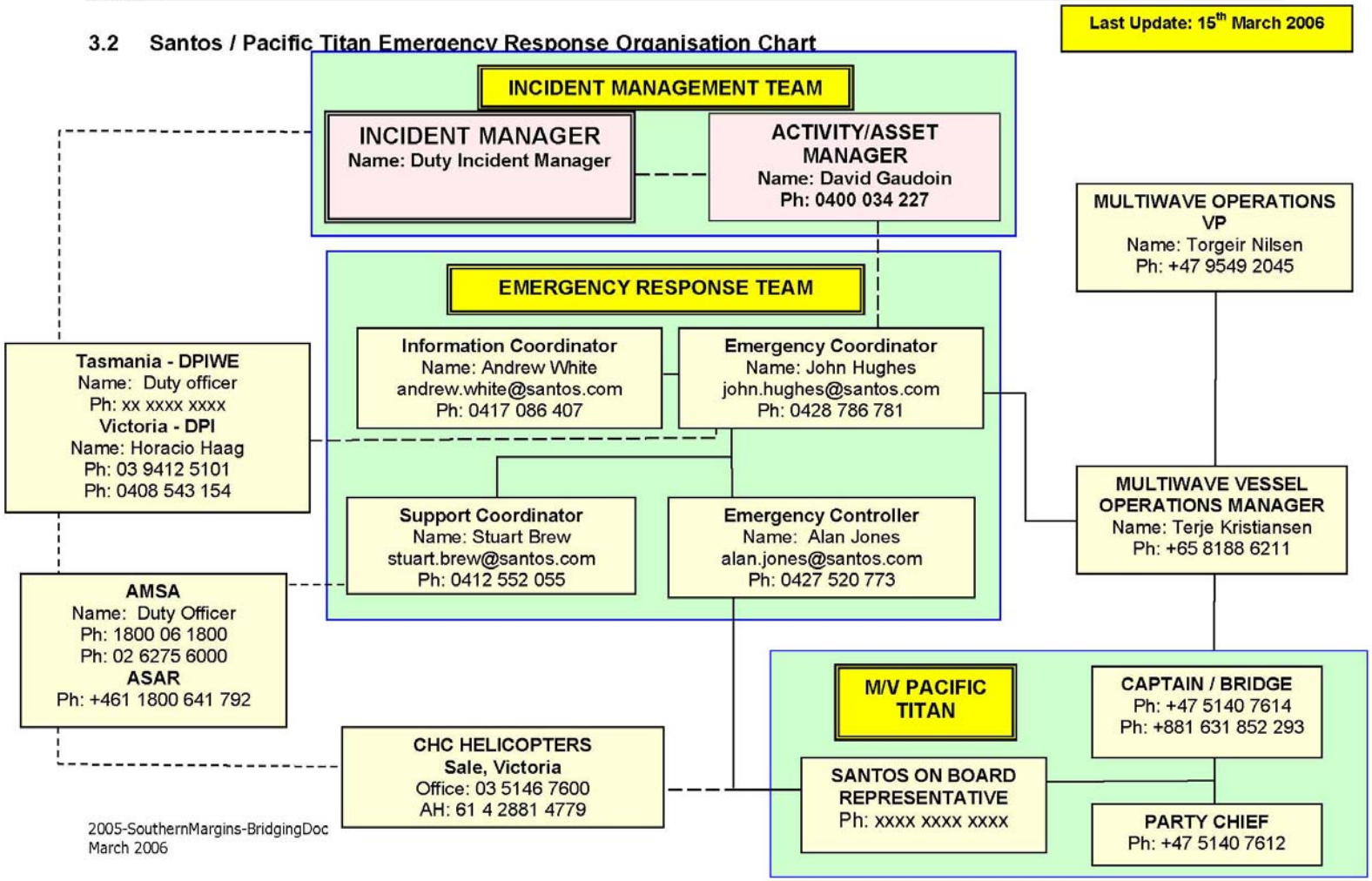
SANTOS	**Fixed Phone**	**FAX**	**Mobile**	**Mail**
John Hughes	+61 8 8224 7952	+61 8 8224 7258	+61 428 786 781	john.hughes@santos.com
Alan Jones	+61 8 8224 7303	+61 8 8224 7258	+61 427 520 773	alan.jones@santos.com
Stuart Brew	+61 8 8224 7625	+61 8 8224 7258	+61 412 552 055	stuart.brew@santos.com
Andrew White	+61 8 8224 7260	+61 8 8224 7258	+61 417 086 407	andrew.whte@santos.com
David Gaudoin	+61 8 8218 5631	+61 8 8218 5932	+61 400 034 227	david.gaudoin@santos.com

Swire Pacific Offshore Ltd. Singapore	Fixed Line	Mobile	Email
Singapore Regional Control:			
Colin Payne General Manager	+65 6396 6485	+65 9011 7873	colin.payne@swire.com.sg
Martin Sequerah Operations Executive	+65 6294 3088 ext 603	+ 65 6755 7655	martin.sequerah@swire.com.sg
Yusoff Bin Bahari Technical Manager	+65 6546 0509	+65 9666 6178	yusoff.bahari@swire.com.sg
Australia Control:			
Duncan Telfer General Manager	+61 8 9430 5434	+61 411 430669	dtelfer@spopty.com.au
Tom Fairclough Operations Manager	+61 8 9430 5434	+61 8 9430 7849	tfailclough@spopty.com.au
John Nash Technical Manager	+61 8 9430 5434	+61 412 923 509	jnash@spopty.com.au
Steve Harris Designated Person Ashore	+61 8 9430 5434	+61 412 928 275	sharris@spopty.com.au

Agent in Singapore	Tel	Fax	Contact Nos.
Salvin Far East Pte Ltd **300 Beach Road** **#31-06A The Concourse** **Singapore 199555**	+65 6396 5070	+65 6396 5069	+65 9818 7013
Email Addresses: operations@sfe.com.sg			

Agent in Australia		Fax	Contact Nos.
BEAUFORT Shipping Agency Company	Phone:	Fax: +618 9964 1201	

3.2 Santos / Pacific Titan Emergency Response Organisation Chart



6.2 Appendix B Vessel Particulars

Vessel Information

Description :	6,400 BHP Seismic Survey Vessel
Classification :	A1 (E) Seismic Research
	AMS ACCU
Built :	Japan, 1982,
	Conversion later in Seattle
Flag:	Singapore
Call Sign:	9V5935
IMO No. :	8208385

Dimensions

Length, overall:	64.5 m
Length BP:	55.2 m
Breadth, moulded:	18.5 m
Depth, moulded:	6.0 m
Summer Draft:	5.18 m
GRT:	3211.0
NRT:	963.0

Machinery

Main engines:	4 x 1,600 BHP, 6Z-ST Total 6,400 BHP Propellers in Kort Nozzles
Bow Thruster:	420 BHP Yanmar 6LAAL-DTN 5 tonnes thrust, CP propeller
Rudders:	Trailing Flap
Generator:	3 x 280 kW Yanmar 6LAAL-DTN
Speed:	4 x engines,
	max: 12.0 kts/14 tons/day
	service: 10 kts/10 tons/day
	2 x engines: 9.0 kts/9 tons/day

Electronics

Radar:	Kelvin Hughes Nucleus 6000A ARPA
Secondary Radar:	JRC JMA 3210 Daylight
GPS:	Furuno GP 30
Echo Sounder:	Simrad ED-162
Communications:	G.M.D.S.S. Skanti SSB,VHF,Inmarsat C 456304540 / 456304550
Weather Fax:	Furuno 207
Satcom B:	NERA Inmarsat phone/fax
	Tel (874) 335 385 510
Vsat:	Instrumentroom +47 51 40 76 11
	Party Chief +47 51 40 76 12
	Chiefs office +47 51 40 76 13
	Bridge +47 51 40 76 14
High Speed data link:	NERA Inmarsat system:
	Te l(873) 335 385 510
	Fax (873) 335 385 511

Miscellaneous:

Fire monitoring and detection to all work areas

USCG approved sewage treatment plant.

Incinerator, macerator and compactor.

Six man inflatable Manoverboard boat on quick release davit FRC / davit Port side

LSA equipment for 45 persons excluding survival suits.

Foam deluge system covering streamer winches, streamer storage reels and helideck.

P.A. System

Stainless steel gun deck.

Helideck rated for Bell 212 or equivalent with lights.

Seismic Particulars

Streamer and Sensors Details

Item	description	type	amount	remark
Streamer	Solid seal			
Depth Control	Digicource	5011	40	Located every 300 m along the streamer
Buoyancy		Isopar M		
Retrievers		Concorde	12	1 every 900 meters
Streamer skin	Polyurethane	3.3mm		
Hydrophones	NH-95-250			
Section Length	150 m			
Section diameter	50 mm			
Lead-in	350 m			
Group Length	12.5 m			
No of hydrophones per group	16			256 nF Group capacitance 17.4 V/bar sensitivity
Max number of channels	2000			12.5 m @ 2ms
Telemetry data link	Dual twisted quarte	AWG 22		
Aux. Data link	4 twisted pair	AWG 22		
Power lines	Dual	AWG 14		
Connectors	28 points	AWG 16		

Recording System Details

Item	description	type	amount	remark
Acquisition	Solid Seal	Sercel-Solid	1	Max 10 000 channels
Format	SEG D Vs1	Demultiplexed		
Recording	3590 cartridge	IBM computer	3	
Computer	Sun	Blade 1000	2	
Bird Controller		Digicource		
Graphic user interface	Unix	X11 Ultra 5		
Terminal	Sun	21”	2	
Sampling				¼, 1/2, 1, 2, 4 ms
Aux channels			36	Max 255
Plotter	24”	Veritas	1	On-line
Printer	A4			Label
Printer	A4			Logs, tests etc.
Network	UNIX			Ethernet

Seismic QC Details

item	description	type	amount	remark
Online Qc	SEAPRO QC Vs 4.0	Sercel	1	Online seismic QC, fully integrated with recording system.
Offline Qc	ProMAX	Landmark	1	Brute stacks, etc
Plotter	24”	Veritas	1	
Computer	Sun	Blade 2000		
Terminals	Sun	21”	2	
Graphic user interface	Unix	X11 Ultra 5		
Remote	X terminal			Sat.link
Network	UNIX			Ethernet
Product options		High resolution seismic record display. Pre-filtering of seismic data. Attribute calculation. First break picking. Signal to noise ration Seismic trace energy. Noise level. Seismic trace frequency analysis. Single trace displays. Attribute db generation.		

Navigation Details

item	description	type	amount	remark
Navigation online	Concept	Spectra		
Navigation offline	FGPS	Seispos		
Work Stations	PC workstations	Shuttle	2	
Network	Ethernet	100 Mbit		TCP/IP
PC workstation	Shuttle			
Printer	HP			Network to 12”
Compasses	Digicource	5011		Every 300 meter along the streamer
Streamer positioning	RGPS	Various	1	Geotrack, Tracks
Source Positioning	RGPS	Various	3	Geotrack, Tracks
Acoustics	N/A			
Acoustics	N/A			
Data logging	UKOOA	P2/94 P1/90		3590, CDrom, Online hard disk
Echo Sounder	Simrad	EA600		12 KHz & 200 KHz
Gyro	Simrad HS 50			GPS Gyro
Autopilot	Robertson	AP9 Mk III		
Steering	Robtrac	STS500		
Helmsman Steering display	Spectra	Shuttle		

Source and Mechanical Department Details

item	description	type	amount	remark
Guns	Long Life	Bolt		4 arrays 6 gun positions per sub-array
Hanging Plates	Multiwave design	Multiwave		
Chambers	40 – 300 cu.in.			
Cluster	2 gun cluster	Bolt	12	2 and 3 clusters on per sub-array
Near field hydrophones	2540	I/O		3 per sub-array
Depth/pressure Sensors	2527B	I/O		3 per sub-array
Source	Varying configuration	Multiwave / Bolt	Single /dual	Typical: 90-110bar output
Compressors	Frick	TDSB 355	3	Capacity 3 x 2000 cu.ft/min
	Aerial	JGA4	3	
	Caterpillar	Prime mover	3	1 for ea. set of Frick/Aerial
Source controller	Gunlink 3000	Seamap		32 guns, expandable
Solenoid Power Supply	Gunlink 3000	Seamap		25 ms fire pulse width
Deflector	Multiwave	6 foils	2	
Gun Winches	MPD	Dual/single	2 * 3	Slip-ring, Air
Streamer winches	MPD	Single	1X2	Each 8000 m (50 mm)
Streamer winches	MPD	Single	1X2	Each 8000 m (50 mm)
Spooling Device	MPD	Linear	4	Spooling on each streamer winch
Tow Points	ODIM	Flexible	3	
Winch Control	MPD		2	Hydraulic

6.3 Appendix C Contract Work Order

SURVEY INFORMATION

Seismic Vessel:	=	Pacific Titan
Proposed Port of Mobilization:	=	Hobart
Estimated Data Acquisition Days:	=	30

ACQUISITION PARAMETERS

MGC JOB Number:	=	6251
Record Length:	=	8 sec
Sample Rate:	=	2 msec
Nominal Fold:	=	
Recording Filters:	=	2 Hz 6 dB/Oct (Or out)
	=	206 Hz 276 dB/Oct
Streamer length:	=	6000
Streamer depth:	=	7m
Near trace offsets:	=	100-130m

ENERGY SOURCE ARRAY

Energy Source Type:	=	Air guns, Bolt 1500 LL and 1900 LLX
No of Energy Sources:	=	1
Shot Interval:	=	25.0 metres
Energy Source Volume:	=	3040 cubic inches
Energy Source Pressure:	=	2000 psi
Energy Source Depth:	=	5 metres
Energy Source Separation:	=	n/a
Energy Source Length:	=	14.7 m
String Separation:	=	10 meters
Number of Strings per Source:	=	3 strings
Number of Guns per String:	=	

PROJECTION & NAVIGATION

Primary System	=	DGPS SkyFix SPOT with Multifix4
Secondary System	=	DGPS SkyFix Inmarsat with Multifix4
Spheroid	=	
Semi major axis	=	
Semi minor axis	=	-
Inverse flattening (i./f)	=	
Datum	=	
Projection	=	
Latitude of origin	=	
Central meridian	=	
False Easting	=	
False Northing	=	10 000 000
Scale factor	=	0.9996
WGS-84 to local datum transforms:		
Dx	=	0.0
Dy	=	0.0
Dz	=	0.0
Rx	=	0.0
Ry	=	0.0
Rz	=	0.0
Ds	=	0.0

6.4 Appendix D QHSE MS Interface Matrix

PROJECT QHSE-MS INTERFACE MATRIX

Where policies or procedures are indicated, the shaded box takes precedence by agreement between Santos, Multiwave, and Swire.

Subject	Reference	Swire	MULTI WAVE	SANTOS
SAFETY				
Permit to work	OM, Sec 2, 2.2 / SPO 210 Part A Sect 6.1	X	X	
Observation Card	CPSP		X	
Personal Protective Equipment	01 HSE Manual / SPO 210 Part A Sect 6.1	X	X	
Man Over Board	CM, 4 & 5/ SPO 201 Part A Sect 15	X		
Manual /Mechanical handling	Mechanic 03-05-01/ SPO 210 Part A Sect 7.7, 7.7A	X	X	
Transfer of Personnel and Equipment at Sea.	SPO 210 Part D Sect 6.4,6.4A	X		
Waste Management	MARPOL / ISM/SPO 201 Manual	X		
Offshore Emergency Response	Contingency manual	X	X	
Operation and Inspection of lifting Equipment	OM,Sec.2, 2.9 / SPO 210 Part A Sect 4.3	X		
Accident /Incident Reporting	TQM 9000 / SPO 201 Part A Sect 5.5	X	X	X
Emergency Drills	OM,Sec.2, 2.14 / SPO 201 Part A Sect 2	X		
HSE Meetings	01 HSE Manual / SPO 210 Part A Sect 6.17	X	X	
Maintenance and Operation of Hydraulic Systems	SPO 210 Part A Sect 3.7	X		
HSE Routine Reporting	01 HSE Manual / SPO 210 Part A Sect 5.5	X	X	
Hazard Register	01 HSE Manual / SPO 210 Part A Sect 6.12		X	
Hazard Identification and Risk Assessment	SMS Interface doc. SPO 210 Part A Sect 6.15		X	X
Adverse weather Policy and Simultaneous Ops	01 HSE Manual / SPO 210 Part A Sect 2.11	X	X	
GENERAL OPERATIONS				
Launch & Recovery of Fast Rescue Craft	OM,Sec.2, 2.10 / SPO 210 Part D Sect 6.4,6.4A	X		
Responding to 3rd Party Groups		X		
Helicopter Operations	OM,Sec.2, 2.11.SPO 210 Part A Sect 6.5	X	X	
Close Run Operation	SMS Interface doc. SPO 210 Part D Sect 2.1, 2.2	X	X	
HEALTH				
Drug and Alcohol Policy	HSE Manual / SPO 100 Sect 2.6	X	X	
Noise Guidelines	Statutory Req.SPO 210 Part A Sect 6.9	X		X
Medevac	CM, 4 & 6 / SPO 201 Part A Sect 17	X	X	
ENVIRONMENTAL				
Oil Spill Response	SOPEP/CM 4 & 14 / SPO 201 Part D	X		X
Environmental Protection Marine Operations	MARPOL/SOPEP/ Garbage Plan / SPO 201 PartD, SPO Garbage Management Plan	X	X	X

6.5 SANTOS HSE REQUIREMENTS

HSE Management System Requirements

1.0 Contractor HSE Management System

The Contractor must have HSE incorporated into their documented Management System (eg in policies, standards, procedures, equipment, operational controls) such that HSE risks are managed to meet the Contractor's HSE Policy/Policies. As a minimum the Contractor's Management System must ensure compliance with the HSE Requirements detailed in the Contract unless agreed otherwise by the Company.

Representatives of the Company and Contractor should meet prior to Contract Award to agree which HSE Requirements in the draft Contract must be complied with. The Contractor must make available for Company review, prior to Contract Award, documentation sufficient to establish that these agreed HSE Requirements in the draft Contract can be complied with. This must include a documented Management System (including operational controls.)

The Contractor must supply Santos with the following along with their tender:

- Current WorkCover Registration Number (if applicable) and Industry Rating
- For the 24 months preceding the work and if relevant to the Work: Total Recordable Case Frequency (TRCF); breaches of HSE legislation, regulation and licence conditions; threats of prosecution, or actual prosecutions over HSE matters; and number of workers compensation claims.
- Any accrediation of relevant management systems (eg ISO 14001).

2.0 Contractor HSE Policy and Commitment

The Contractor must have a strong commitment to HSE, and must have a written HSE Policy or Policies, signed and actively supported and endorsed by the Contractor's management. The HSE Policy or Policies must, as a minimum, have the objectives of improving HSE performance, complying with legal requirements and avoiding or minimising as far as reasonably practicable HSE risks. The Contractor must widely disseminate its HSE Policy/Policies and ensure that they are understood among employees.

The Contractor must promote amongst all personnel a healthy lifestyle and an awareness of, and responsibility for, safety and the environment.

The Contractor must take all necessary precautions related to or arising out of the performance of the contract in order to protect the work, the personnel, property of Santos, Contractor and all third parties and the environment.

3.0 HSE Risk Management

The Contractor and the Company must identify all foreseeable HSE risks prior to commencement of the Work, assess their risk level and manage them to meet the Contractor's HSE Policy/Policies. Industry Codes and Australian Standards must be complied with to manage risks unless the HSE Requirements and Codes are in conflict, in which case the latter applies, subject to the law.

To assist in determining environmental risks the Company will determine relevant environmental characteristics of the area, which may require baseline environmental monitoring or research prior to the Work commencing. Relevant stakeholders must be consulted by the Company to assist with this.

Company requirements for control of likely HSE risks ("HSE management requirements") must be provided in draft Contracts. The Contractor must comply with these HSE management requirements unless the Company agrees otherwise.

The Contractor must have a system in place to continually review HSE risks and Controls during the Work to ensure they reflect changes to the Work, the hazards, risks, technology and personnel.

4.0 HSE Legal and Other Requirements

The Company and Contractor must identify HSE legal requirements (including international and local) for the Work and must manage the Work to achieve compliance with these. The Company will obtain and renew all necessary regulatory HSE approvals, licences and consents and, with the Contractor, must manage the work to achieve compliance.

Both Company and Contractor must regularly review legal HSE requirements to ensure they are updated to reflect changes to the Work and personnel.

5.0 HSE Objectives and Improvement

The Contractor must continually measure and improve HSE performance. Objectives and indicators must be set, reviewed regularly and performance reported to Santos.

6.0 HSE Operational Controls

The Contractor must have operational controls that ensure compliance with the HSE Requirements included in the Contract. The Contractor must have a system in place to continuously review HSE relevant operational controls to reflect changes to the Work and personnel. The Contractor must have a system in place to ensure changes to operational controls do not adversely affect HSE performance.

The Company has the right to reject any equipment it deems unfit, unsafe or inadequate for the Work.

7.0 Emergency Plans

The Contractor must, with the assistance of the Company, identify emergency situations for which contingency planning is required and must develop, implement and where feasible rehearse prior to the Work, Emergency Plans that covers the situations. The Plans must manage the HSE risks and environmental effects of all emergency situations.

8.0 Subcontractors

The Contractor must ensure subcontractors are required to undertake, and do undertake, work in accordance with the HSE Requirements detailed in the Contract. The Contractor must be responsible for all work, acts and defaults of any subcontractor as fully as if the Contractor committed the work, act or default.

9.0 Organisation, Responsibility, Resources and Documentation

The Contractor must define its organisation and responsibilities for meeting HSE Requirements. The Contractor's Line Supervisors must be made responsible for HSE performance and compliance with HSE Requirements. The Contractor must designate an employee as an HSE Adviser for the Work who must monitor implementation of all HSE Requirements. Such personnel must be made aware of their responsibilities in writing.

Contractor must allocate adequate personnel and financial resources to meet HSE Requirements.

The Contractor and Company must, prior to the Work, document the following for use on site and in order to assist in obtaining regulatory approval. An HSE Plan may be used to document most of these.

- Contractor's HSE Policy/Policies;
- Environmental characteristics of the area of the Work;
- Foreseeable HSE hazards, their risk level and management
- HSE legal requirements and management to achieve compliance;
- HSE objectives;
- Operational controls relevant to HSE;
- Subcontractor HSE management;
- Contractor and Company HSE organisation and responsibility, documentation and resourcing requirements;
- Communication and meeting requirements;
- HSE training and induction requirements; and,
- HSE auditing requirements

10.0 Communication and Meetings

The Contractor must have a system in place that allows employees, subcontractors and stakeholders to report their recommendations for improvement to HSE performance. The Contractor must communicate HSE management and responsibilities to employees and subcontractors.

HSE meetings must be held at least weekly, with all crew on the vessel attending at least once a month, to discuss HSE incidents and HSE Requirements. Copies of meeting minutes must be sent to the Company.

The Contractor must ensure a Job Hazard Analysis is undertaken for any part of the Work involving significant HSE risks or any time there is an HSE question about immediate tasks.

11.0 Training and Induction

The Contractor must ensure that training, induction and competency allow employees and subcontractors to fulfil their HSE responsibilities for the Work. The Contractor must keep a record of Contractor and subcontractor personnel HSE competency.

12.0 HSE Monitoring and Reporting

The Contractor and Company must create a communications scheme showing lines of reporting and method of reporting of HSE performance at all levels within the Contractor's organisation, to the Company and to external parties.

The Contractor's HSE incident reporting and response system must be compatible with E&P Forum standards. The system must ensure HSE incidents and near misses are promptly reported, investigated and remedial action taken to prevent re-occurrence.

The Contractor must notify the Company of HSE incidents promptly. At the minimum the Contractor must provide the Company with a weekly report with HSE incident statistics, including cause and remedial action taken, and signed off by the Contractor's Work Manager.

The Company prior to the start of Work will supply the Contractor with a definition of an HSE incident, the computerised Incident Management System or suitable forms, and processes for reporting incidents, near misses and investigation information to the Company. At a minimum an HSE incident is one that infringes or appears to infringe HSE legal requirements.

The Company and the Contractor must undertake environmental monitoring after an environmental incident caused by the Work that may have significantly impacted the environment to determine any actual impact. Environmental effects not approved by regulatory authorities must be remediated to their pre-impact state as far as reasonably practicable

13.0 HSE Audit and Review

The Contractor must have a system that allows implementation of HSE Requirements to be accurately measured.

The Contractor must regularly review its compliance with HSE Requirements and those of its subcontractors, identify improvements and report on these to the Company.

The Contractor must allow representatives of the Company to audit the Contractor's/ Subcontractor's performance of the Work against HSE Requirements at any reasonable time. The Contractor must allow the Company access to Contractor administrative office, site, equipment, personnel involved and records when requested for the purposes of auditing HSE performance against these HSE Requirements. The Contractor has the right to have an appointed official present during such an audit. The Company must discuss draft audit findings with the Contractor who has a right to written reply prior to finalisation of the audit report.

The Contractor may provide the Company with any HSE audits relevant to the Work to assist in proving compliance with these HSE Requirements.

HSE Management Requirements

Offshore Seismic Operations

Issue	**HSE Management Requirement**
Aircraft Operations	Operational controls must cover: - chartered aeroplanes and helicopters - categories and circumstances under which transfer of personnel and/or equipment is acceptable, and - Required training. **Operational procedures must cover:** - **types of aircraft** - **Logistics such as scheduling, security checks, issuing of passenger lists, load sheets, monitoring of the operations and instructions given to staff in safety and procedures of aircraft operations.**
Alcohol and Drugs	Operational controls must regulate the use of alcohol and drugs according to a Policy mutually agreed between the Contractor and the Company.
Chemicals and Hazardous Materials	A Chemicals and Hazardous Materials Management Plan must be in place for the Work which includes an inventory. Chemicals and hazardous materials must be chosen that avoid environmental effects or have an impact on the environmental that is as low as reasonably practicable. Management of chemicals and hazardous materials must be implemented on the seismic vessel taking into account relevant regulatory requirements and environmental considerations. Procedures must cover control, handling, storage, transportation and disposal (see waste management section) of chemicals and hazardous materials. Management must include:- • Use of low HSE impact chemicals and materials as far as practicable (eg recyclable/ biodegradable). Hazardous chemicals are only to be used if there is no non-hazardous alternative. • Material Safety Data Sheets (MSDS) and handling procedures for all hazardous materials and chemicals available on site. MSDSs must, where possible, document environmental risks • Segregated and contained storage areas for chemicals and hazardous materials • A barrel rack with spill containment tray underneath for the storage of chemical barrels • Containers and tanks clearly labelled with contents and name of company that owns or uses them and inspected for signs of deterioration (especially cable oil and fuel). • Operators trained in handling each chemical and its hazards • Appropriate absorbent material and spill cleanup equipment available on site • Biodegradable lubricants and rust inhibitors on towed equipment. • Use low toxicity water based cable fluid as far as practicable.
Ozone Depleting Chemicals	**Non-ozone depleting substances must be used as far as practicable, especially in fire extinguishers and refrigerants. Freon use is prohibited.**
Emergencies	Procedures must include, but not be limited to: • Evacuation or abandonment of vessels/helicopter • Medevac • Person overboard • Fire protection and fire response • Rescue or workboat emergency recovery • Chemical spills from vessel • Diesel or bunker fuel spill

	• Seismic cable fluid spill • Loss of seismic cable section or other equipment

Issue	**HSE Management Requirement**
Emergencies (cont)	An Emergency Response Coordinator with prior spill response training must be designated at all times. Vessel evacuation plans must be clearly displayed around the vessel(s). An OSCP must be developed and implemented covering hydrocarbon and chemical spills from the survey. As a minimum it must include: • oil spill trajectory prediction based on local met-ocean conditions • identification of marine and coastal environments that may be impacted by an oil spill • identification of internal and external emergency organisations, responsibilities and resources (human, equipment and material) for oil spill response, and up to date call out details. • spill response and cleanup strategies (offshore and shoreline) The OSCP should be regularly reviewed at training or HSE meetings.
Equipment	Operational procedures must be in place covering the preparation, launching, operation and recovery of all equipment, including work boats and rescue craft. Procedures must cover HSE precautions.
Field Communications	Each operational unit (such as geophysical vessels, support vessels, work boats etc) must have a means of communicating with the geophysical vessel. The geophysical vessel must have a means of communicating with the Contractor's local site office and with the Company's local office. Back up and alternative communication equipment must be available if the primary systems should be ineffective. Communications must be regularly tested. In case of emergency, procedures must be in place so that a representative of the Contractor can be contacted outside normal office hours. A communications network diagram must be produced and prominently displayed at key locations on the vessel(s), showing the primary and secondary communication pathways. A record of all communications with third party vessels must be maintained in the ship's logbook.
Health and Fitness	The Contractor and the Company must ensure that employees engaged in the survey are medically fit for offshore employment. If requested by the Company, the Contractor must arrange for the Contractor's nominated medical officer to approve the assignment, on medical grounds, of Contractor personnel. The Contractor must arrange for the regular medical examination of personnel exposed to occupational risks at potentially harmful levels for evidence of occupational disease or injury.
Housekeeping	The Contractor must ensure good housekeeping is maintained continuously throughout the survey. All areas must be kept clear of debris, dirt and loose objects. All gear must be properly stowed and repaired. Access and emergency exits must be kept clear. Sufficient fire resistant waste bins must be provided on the vessel(s). The deck areas and walkways, particularly those from which launching and recovery of equipment takes place, must be treated with non slip surfaces, and walkways must be kept clear of all hazards and obstructions.

Hygiene	**The Contractor must ensure that its personnel maintain high standards of hygiene for food handlers clothing, food preparation and storage, drinking water, living quarters, toilet facilities, washing facilities and ventilation.**
Life Saving Appliances and Arrangements	The vessel(s) must be appropriately equipped for its class with life saving appliances complying with, and in accordance with the 1974 International Convention for the Safety of Life at Sea (SOLAS) including amendments. In addition the following requirements must be met.

Issue	**HSE Management Requirement**
Survival craft	**Whether or not lifeboats are fitted, life rafts must be provided such that the aggregate capacity of the life raft(s) must accommodate at least 200% of the total number of berths on board. These life rafts must have launching arrangements such that the total capacity on either side of the vessel is sufficient to accommodate the total number of berths on board. All life rafts are to be fitted with hydrostatic releases.** Lifeboats, engines, life rafts, launching appliances (including hydrostatic releases) must be regularly maintained and tested, and boat engines run. The Contractor must provide the Company with a schedule of such maintenance and testing prior to the survey. Where rigid lifeboats are provided, the preferred type is the Totally Enclosed Motor Propelled Survival Craft (TEMPSC). Where possible it is recommended that lifeboats be distributed equally on each side of the vessel.
Life Jackets	Life jackets are to be provided for 200% of the total number of berths on board. Life jackets must be placed so as to be readily accessible in domestic areas, the work place and muster points and their position and donning instructions must be clearly displayed. Life jackets must be worn in situations where risk exists, including when - deploying or retrieving air guns - in small craft - when on deck in heavy seas.
Survival Suits	Where operational conditions demand their use, the Contractor must provide sufficient survival suits of appropriate sizes for all persons on board. These survival suits must be placed so as to be readily accessible in domestic areas, the work place and muster points and their position and donning instructions must be clearly displayed.
Life rafts for person overboard	An emergency person overboard life raft must be provided in the optimum position to clear trailing gear. This position must be readily accessible, and convenient for launching directly overboard.
Rescue Boats	A rescue boat with nominated crew(s) must be readily available for immediate launching while survey operations are taking place. The rescue boat engine(s) must have a documented maintenance programme. A water jet propelled rescue boat is preferred.
Exercises and Drills	The Master of a vessel is responsible for undertaking drills as required. Abandon ship and fire drills must take place as required by law but at least twice a month. All personnel must be trained in Person Over Board procedures. A person overboard drill must take place each month in favourable weather conditions and when the trailing gear does not pose a hazard to the safety of the rescue boat and crew, preferably in sheltered waters. Under no circumstances must anybody enter the water to simulate a victim. Only dummies should be used. Details of these drills must be logged,

	together with the time taken to be ready for launching the rescue boat. Back up procedures must be the same as for workboat usage. A fire drill must occur within 24hrs of leaving Port. Any foam fire system must be tested every three months.
Safety Harnesses	The Contractor must provide safety harnesses approved to suitable International Standards, with suitably positioned safe attachment points, for personnel working in areas where there is a danger of them either falling or being dragged overboard (eg deployment and retrieval of air guns). Harnesses must be provided on the stern of vessels.

Issue	**HSE Management Requirement**
Maintenance	The Contractor must ensure all equipment and structures, both fixed and temporary, receive regular routine maintenance. This must ensure that the safety of personnel who are responsible for operating the equipment is not jeopardised. Particular attention must be paid to handrails, safety chains and bars, access ladders and raised platforms. Copies of all test maintenance certificates relating to cranes, derricks, lifting beams, pulley blocks and lifting gear must be held by the Contractor and made available to the Company upon request. Maintenance logs of all mechanical equipment must be available to the Company upon request.
Medical Equipment	The Contractor must provide suitable facilities, medical equipment and first aid equipment. Medical supplies and first aid kit control list must be professionally reviewed to an appropriate level periodically. A list of medical supplies and regularly maintained inventory must be available for inspection on site.
Occupational Health, Safety and Welfare	The following requirements must be met.
Noise	Regions of high noise in the work place must be identified, assessed, measured and controlled. Those people working in high noise areas must have their individual exposure to noise monitored, medically assessed and recorded. Measures to reduce general noise levels must be incorporated into the design of work equipment and work areas. This may include a refuge where noisy machinery can be monitored without the use of hearing protection. Where the use of hearing protection is mandatory , supervisors must make regular checks to enforce its use.
Visual Display Units	VDUs must be positioned and be of a size to be easily visible from the working position with minimal repetitive head movement. The illumination of the work area and VDU must be designed to minimise annoying reflections. Each work area must be assessed for suitable ergonomic design so that the operators are able to maintain a suitable and comfortable posture. Set tasks must be assessed and monitored in order to minimise prolonged and repetitive exposure, which may result in occupational injury.
Respiratory Problems	Respiratory protection must be available in areas with a high level of airborne contaminants. These may include canister respirators, dust masks or the use of positive pressure breathing apparatus.
Asbestos	Where asbestos has been used for construction or insulation, there must be an assessment of health risks carried out by a competent organization and suitable control and monitoring programme established. Where asbestos material are to be removed or modified, this must be carried out to an approved code of practice in order to minimize the risk of exposure.
Oil Spill Prevention	Equipment, personnel and procedures to prevent spills must be in place on

	the vessel, including:- • contained storage areas for oil and chemicals • Containment around areas and equipment where oil and chemicals are used, in particular cable reel and cable storage areas and cable deck. Such areas must drain into a holding tank where the cable oil can be stored for a period of time • Decks to be kept free of oil, grease and chemicals • Drip trays under machinery • Seismic fluid cables regularly checked for leaks • Measures to prevent cable fluid leaks due to shark bites. • Where possible avoid the use of tape to patch holes and fasten weights on cables. Appropriate methods must be used to ensure tape remains attached. Where possible use weights that don't require tape. • Appropriate absorbent material and oil spill containment and cleanup equipment available .

Issue	**HSE Management Requirement**
Oil Spill Prevention (cont)	• Scuppers must be closed in the event of oil spill to prevent oily water from deck being discharged to the ocean • Spills must be cleaned up immediately in an environmentally acceptable manner (eg using absorbent material) • Efficient oil water separator in vessel bilge to treat bilge water and contaminated deck wash down. • Maintenance of air gun system components to prevent oil spills • Cable sections being drained, filled or flushed with cable oil must be contained within the drip tray area. • Small boats must carry oil-absorbing packs for use in cleaning up small spills.
Rig refuelling	Ideally the vessel will be fuelled in port and will not require refuelling on the survey. Vessel refuelling must be done according to an operational procedure that prevents spills including: • A Job Hazard Analysis prior to refuelling, • Checking of valves, • constant visual supervision with radio contact between supply vessel, observers and other personnel involved, including someone checking fuel tank levels, • No refuelling in weather conditions where rupture of the fuel line is a reasonable possibility, • Dry break couplings, • Fail safe fittings, • Drip trays in the appropriate locations. • Stop all hot work • Sufficiently long transfer hoses to allow vessels to move around • Fenders • Times and quantities logged • Only during daylight hours
Personal Protective Equipment	The Contractor must supply its personnel and subcontractor personnel, where required in connection with the safe performance of the survey, with adequate personal protective equipment that must be maintained in good condition or routinely replaced. The equipment must be worn on all relevant occasions as indicated by operational procedures and instructions. The Contractor must ensure that all personnel and visitors set an example when on board.
Prophylactics and immunizations	The Contractor must seek medical advice on whether immunisations and prophylactics should be provided, and provide them if recommended by the

	advice.
Public Relations	**The Contractor must have public relations capability and procedures as part of the Emergency Plans that comply with the Santos Media Communications Plan.**

Issue	HSE Management Requirement
Quarantine	**Introduction of unwanted marine/freshwater species must be prevented. Procedures must be implemented that follow Australian Quarantine Inspection Service (AQIS) guidelines for ballast water, including:** • **only take clean water on-board (no sediment)** • **do not take water from an area where there is an outbreak of disease(s) or from shallow water (50m) or from estuarine areas if the survey is in marine waters** • **record details where water is taken on** • **don't release ballast water if possible, otherwise attempt to sequentially change water during journey, ideally in deep ocean (1000m depth)** • **implement mechanisms to prevent the loading or discharge of contaminated ballast water** • **clean anchors and chains regularly**
Fire Protection	The Contractor must provide necessary fire detection and extinguishing equipment and other safety equipment approved to Australian standards and must maintain this equipment. Up to date records of all equipment must also be maintained. First aid boxes, stretchers and eye wash stations must be allocated to each vessel or independent sub-unit of the operation and must be of a size and composition suitable for the number of persons involved. An internationally approved fire and smoke detection system based on the self-monitoring principle must be installed in the accommodation and adjacent areas. The smoke detection system must be designed to rapidly detect the onset of fire in areas covered by the detectors and must include both audible and visual alarms where appropriate. The Contractor must supply appropriate Fire Extinguishing equipment for the protection of all parts of the vessel. Dedicated fixed systems must be provided for compartments housing the streamer sections, flammable materials, equipment and spares and other associated compartments where it is justified by the fire hazard potential and the importance of the contents to geophysical/survey operations. Fire extinguishers must be clearly labelled as to the type of fire that each is suitable for. The number of breathing apparatus for fire fighting must be assessed and must at least meet the requirements of SOLAS. **The Contractor must provide safe storage for flammable substances. No substance with a low flash point must be used for cleaning purposes.**
Safety Equipment	All safety equipment must be strategically positioned around the vessel and be readily accessible by all personnel on board. Locations of such equipment must be clearly marked. All persons must have a basic knowledge of how to operate the equipment and the procedures to be followed in the event of fire. Operational controls must include the provision and use of harnesses, work and survival suits, stating when their use is mandatory.
Seismic Vessel Presence	The presence of the vessel must cause the least possible impact to mariners and other beneficial users of the area. If heavy shipping traffic is expected a radio and radar watch on shipping traffic and fishing vessels must be maintained.
Physical disturbance	If used, the vessel anchor must avoid damaging sensitive environments such as corals. Detailed bathymetry maps must be used where necessary.

Smoking	The Contractor and Company shall adopt as far as practicable living conditions on the vessel(s) that are free from the adverse effects of tobacco smoke.

Issue	**HSE Management Requirement**
Specialist tasks	Operational Procedures must be developed for: • welding, cutting and burning • confined space entry • working aloft • cranes and lifting devices • electrical, communications, radar and navigation equipment. • Lithium battery exposure to seawater
Survey Route/Timing	While the location and timing of a survey route are constrained by geological, technical and commercial factors, environmental considerations must form an important input into the location and timing of the survey route. Routes and timing must be planned in a manner that avoids or minimises environmental effects as far as practicable. In particular: • Avoid disturbance to significant wildlife breeding, spawning, feeding, birthing, migration and important natural processes and seasons of significance to other resources users. • Allow sufficient notification for other resources users to move equipment if necessary. • As far as practicable, minimise the period of disturbance to any one area and avoid protracted surveys in one location. • Align tracklines to avoid significant effects to ecosystems
Coral	As far as practicable, seismic timing and route must avoid disruption to coral spawning and recruitment times and locations.
Fishing	As far as practicable, seismic timing and route must avoid disruption to important fishing seasons
Turtles	As far as practicable, seismic surveys must avoid times and locations when turtle breeding, nesting, hatching or congregation could be affected. Surveys at the end of the nesting season are preferable to surveys at the start of the season. Use relevant environmental map for details.
Marine Mammals	As far as practicable, seismic surveys must avoid locations and times when marine mammal migration, breeding and congregation could be affected, especially whales.
Tools and Equipment	All plant, tools and equipment must be maintained in operable condition and all authorised users of the plant, tools and equipment must be competent and where necessary licensed and certified. Potentially dangerous equipment must be protected against illegal use. A permit to work system must be in place covering as a minimum the use of hot work equipment, confined space work and the use of tools aloft. No equipment must be left in the area of the survey without approval of the Company.

Trailing Gear, Position Keeping, Deployment and	**Trailing gear positioning and retrieval systems must be able to cope with the maximum static and dynamic forces that could be experienced during normal operations. They must also be able to cope with the increase dynamic forces that occur during deployment and retrieval. Operational limits must be set and where possible strain gauges must be used to**

Retrieval System	**ensure that the equipment is being used within its design limits. Only approved components must be used. There must be a formal maintenance programme that must include routine inspections, testing and replacement schedules of all major components in the system.** When designing the system the Contractor must consider the effects of the failure of components and thereby limit the risk of minor failure triggering a series of catastrophic events. Weak links must be included in the system to help protect key components and associated equipment. No unauthorised repair or modification must be allowed. All controls must be well positioned, clearly marked and consistent in their operation. All switches and control levels must automatically return to the off position if released. Deployment and retrieval of all trailing gear must be fully supervised by an experienced crewmember. The deployment and retrieval system must only be operated by properly trained personnel. **Towed surface equipment must be visible to other vessels (eg tail buoy fitted with radar reflector and light). All steps must be taken to avoid loss of any equipment or materials to sea.**
Training and Competency	**HSE training for personnel on the vessel must be in line with the IAGC Safety Training Guidelines for Geophysical Personnel and the following requirements. In particular:**
HSE Induction	On arrival all personnel must immediately be given an HSE induction that includes - a safety tour of the vessel - vessel layout - location and operations of safety equipment, first aid, alarm points and muster station - explanation of emergency procedures and safety requirements including fire and abandon ship procedures. - Company HSE incident reporting requirements - Any new or location specific HSE procedures and controls - The location of documents/maps detailing HSE Requirements, HSE legal requirements, OSCP and environmental characteristics of the area. Documented evidence of completion by personnel must be maintained.
Santos Incident Reporting	If being used, Santos Site Supervisors must be trained in the use of the OABU HSE Incident Reporting Forms or Santos IMS system if available.
Fire Fighting	A Fire Chief and assistant and fire fighting team or teams must be designated at all times and provided with the necessary training in shipboard fire fighting including the use of self-contained breathing apparatus (SCBA).
Boat Driver selection	**Vessel Masters and personnel will be appropriately trained, accredited and experienced to be able to complete the Work.**

Issue	**HSE Management Requirement**
Small Boats	All personnel crewing a small boat shall receive training in the use of radio, emergency equipment, repair procedures, use of buoyancy aids and in water survival techniques. In each small boat a minimum of two persons must have attended a course in small boat handling which includes the recovery of a person overboard. The launch and recovery crew must receive training and be practiced in the use of the launching equipment prior to their involvement in a small boat operation. Person Over Board boats should not be used as a routine standby rescue boat.
Emergency Plans, Sea Survival and First Air	Personnel involved in emergency plans must be trained sufficiently prior to start of work to fulfil their responsibilities. 75% of all personnel on board must have been trained in safety and survival at sea. At least two crewmembers must have been trained in advanced first aid.
Transfer of personnel at Sea	Operational controls must detail reasons when transfer of personnel and equipment at sea by boat and helicopter is acceptable, including compassionate leave. Personnel must not be transferred to and from the vessel at sea to shore unless agreed to do so by the Contractor and Company.
Vessels	The vessel must be built to the requirements of a Company recognised International Classification Society and/or government and must have valid certification issued. The Contractor must maintain all certificates and ships documents, in full force and effect, through out the Survey and these must be available on the vessel. The vessel must be in a seaworthy condition and must be in every way fit for the survey.
Vessel Crew	The Vessel Master is responsible for the overall safety of the ship and all those on board. The Master, vessel officers and crews must have valid licences as required by the size and class of the vessel. All relevant certificates and documents must be available on the vessel. The Master must carry out his/her duties with the utmost diligence during day and night as required by the Contract and shall render all customary assistance to the vessel's crew and equipment. The safety of the vessel, crew, cargo and equipment, as well as safe manoeuvring of the vessel and trailing equipment must at all times be the ultimate responsibility of the Master. The Master and the officer on watch must be proficient in the English language. The Contractor must make available sufficient qualified personnel to assist the fulfilment of the Master's responsibilities.
Waste Management	Site waste management must include a Waste Management Plan and compliance with the following:

Discharges to Sea	**No waste, including spills, are to be disposed directly overboard from vessel, subject to the following:** • Where permitted by the government regulator, discharge is allowed of comminuted sewage and food, grey water (showers, washing, cooling water), uncontaminated (as far as practicable) deck washdown wastes and bilge water with less than 30ppm oil in water. It is preferable that sewage pass through a sterilisation and processing treatment prior to discharge, in which case treatment efficiency must be maintained. • Regulatory permission will be determined as part of approval of the seismic survey. It is likely that the above discharges will be permitted unless the well is close to sensitive environmental resources. If not permitted, wastes must be contained and returned to shore for recycling or treatment and disposal. Closed drains and skimmer tanks for deck washdown will then be required. • Staged discharges of waste are preferred to achieve optimum dispersal.

Issue	**HSE Management Requirement**
Solid and Hazardous Waste	**On vessel(s):** • Choose materials to avoid or minimise the creation of solid and hazardous wastes • Use recyclable and biodegradable materials where possible • Hazardous wastes such as waste chemicals, batteries, lube oils and other hazardous wastes must be segregated, safely stored and labelled for return to shore, recycling and/or treatment and disposal as appropriate. • Solid domestic waste must segregated, collected in clearly labelled containers for return to shore and proper disposal • The number of waste containers used must be recorded. • Used/spilt cable oil should be recycled on board using separators or sent ashore using correct containers for disposal or recycling • Cable skin materials (o-rings etc) must be properly disposed of.
Air Emissions and Energy use	**Emissions from fired machinery must be minimised and fuel use efficiency optimised through adherence to manufacturers' schedules and regular maintenance of the exhaust systems.**
Wildlife Protection	If necessary, develop and implement special procedures to protect significant wildlife populations during seismic operations. They may include:- • spotting reports of endangered species • specifying routes and/or operating procedures which minimise impact on wildlife
Vessel speed	Keep vessel speeds low (10knts) to allow wildlife time to avoid collision with the boat and streamers.
Helicopter flight paths	Flight paths must avoid impacting wildlife through noise disturbance and downdraft. Where possible avoid nature reserves and islands to avoid disturbing wildlife populations.
Light pollution	Use lights and light guards that do not disorientate wildlife, especially turtle hatchlings, if there is a foreseeable risk that they could be significantly impacted.
Propeller strike	Small vessels should be fitted with propeller guards to prevent striking wildlife.
Seismic Source	Use low energy acoustic sources such as compressed air guns. Discharge a

and Warning Shots	low pressure, short warning shot at the beginning of each line just prior to high pressure data acquisition as a means of warning off marine animals in the vicinity of the vessel.
Wildlife Spotter	In areas where encounters/collisions with wildlife are a significant possibility, a spotter must be on watch, with night vision glasses if appropriate.
Wildlife Encounters and Reporting	Report the presence and behaviour of whales and dugongs spotted during operations to Santos using the daily report. If a whale or dugong is spotted within 1km of the vessel, data acquisition must cease until greater than 1km away.
Workboat Usage	Operational controls must include types of workboats, in-sea repairs and categories and circumstances under which transfer of personnel and/or equipment is acceptable.
Working in Bad Weather	Operational controls must specify waves, wind, visibility and temperature limits at which critical activities will be permitted.

6.6 COMPLIANCE WITH STATUTORY REGULATIONS

(PART 1 - THE CONTRACTOR)

In addition to any other requirement of the Agreement, the **Contractor** shall comply and take all reasonable efforts to ensure that the **Contractor's** Personnel comply with the requirements of the provisions of all Acts of the Parliament of the State and Commonwealth, and with the lawful requirements of public, municipal and other authorities in any way affecting or applicable to the performance of the Services. In particular, to the extent the Services are performed in offshore areas, the **Contractor** shall comply with the following Acts as amended from time to time and directions:

STATUTE

Petroleum (Submerged Lands) Act 1967 (Commonwealth)

Petroleum (Submerged Lands) Acts (VIC,SA,TAS)

Petroleum Acts (VIC,SA,TAS)

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

DIRECTION

Petroleum (Submerged Lands) (Management of Environment) Regulations 1999

Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996

Petroleum (Submerged Lands) Regulation Schedule -Specific Requirements as to Offshore Petroleum Exploration and Production - 1995

Without limiting the generality of the foregoing the **Contractor** shall ensure that:

(a) any **Contractor's** items to be supplied or furnished by it hereunder shall comply with the requirements and standards of all laws, regulations and directions;

(b) each person employed by the **Contractor** (either directly or indirectly through a subcontractor or third party) is familiar with the Schedule and emergency response manuals to the extent relevant to that person's employment or purpose at the worksite upon arrival at the worksite or prior to the performance of any work or services as the case may be and that each person will observe and comply with, the requirements applicable to the area of operation while at the worksite during the performance of the Services; and

(c) provide confirmation that each person referred to in (b) above confirms in writing in a form provided by Operator that he has been made familiar with the requirements of the Schedule and an undertaking that he will so comply.

The **Contractor** shall ensure that each subcontractor provides to the Operator an undertaking to comply with the "Specific Requirements" on the form in Part 2 or other approved Form.

Dated this _____ day of _____ 2004

For and on behalf of the **Contractor**:

(Signature)	(Name of authorised signatory)

(PART 2 - SUBCONTRACTORS)

Name of **Contractor** _____

Name of Subcontractor _____

Subcontract Services _____

The undersigned is a subcontractor to the **Contractor** for the performance of the Subcontract Services for Operator and hereby confirms that it and its personnel are familiar with the requirements of the follow statutes and regulations to the extent that those requirements apply to the Subcontract Services:

STATUTE

Petroleum (Submerged Lands) Act 1967 (Commonwealth)

Petroleum (Submerged Lands) Acts (VIC,SA,TAS)

Petroleum Act (VIC,SA,TAS)

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

DIRECTION

Petroleum (Submerged Lands) (Management of Environment) Regulations 1999

Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996

Petroleum (Submerged Lands) Regulation Schedule -Specific Requirements as to Offshore Petroleum Exploration and Production - 1995

Dated this _____ day of _____ 2004

For and on behalf of the Sub-**Contractor**:

_____ _____

(Sub-**Contractor**'s name) (Name of authorised signatory)

_____

(Signature)

(PART 3 - PERSONNEL)

The undersigned acknowledge that on the date shown in the column beside their signature he/she has been instructed as to the content of and need to comply with:

1. the Direction from the Minister of the need to comply with the Schedule;

2.

STATUTE

Petroleum (Submerged Lands) Act 1967 (Commonwealth)
Petroleum (Submerged Lands) Acts (VIC,SA,TAS)
Petroleum Acts (VIC,SA,TAS)
Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

DIRECTION

Petroleum (Submerged Lands) (Management of Environment) Regulations 1999
Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996
Petroleum (Submerged Lands) Regulation Schedule -Specific Requirements as to Offshore Petroleum Exploration and Production - 1995

and

3. any emergency response manuals, safety plans and environmental plans relevant to his/her employment.

A photocopy of this page is to be forwarded to the Designated Representative in Adelaide once a month.

NAME (PRINT)	EMPLOYER'S NAME	JOB DESCRIPTION	DATE	SIGNATURE

(PART 4 - MANHOURS REPORT FORM)

The attached document (forming part of this Agreement) is to be completed for each month that work is performed for the Operator and returned to the Operator: Attn: …….. by the 8th day of the month following a period of services rendered.

MONTHLY INCIDENT SUMMARY

Employer Name _____

Tenement Number _____ **Facility Name (Site)** _____

Recording Period _____ _____ **ONSHORE/OFFSHORE**

MONTH YEAR (Please Circle Appropriate Description)

Employees Hours Worked _____ **Contractor Hours Worked**_____ **Support Vessel Marine Crew Hours Worked** _____

A. Reportable Lost Time and No Lost Time Injuries (Provide a brief description on the reverse of the form in the boxes allocated)

Incident Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Date dd/mm/yy										
Facility type (enter code)										
Breakdown Agency (AS CODE) AS1885.1-1990										
Mechanism of injury (AS CODE) AS1885.1-1990										
Nature of Injury/Disease (AS CODE) AS1885.1-1990										
Bodily Location (AS CODE) AS1885.1-1990										
Injury Classification										

Employment Arrangements										
Number of calendar days lost										
Number of working days lost										
Alternative Duties (Days)										

Facility Type				**Injury Classification**		**Type of Occurrence**	
Fixed Platform	FP	Construction Platform	CP	Fatality	FT	Serious Spill	S
Service Platform	SP	Mobile Drilling Unit	MO	Lost Time Injury	LTI	Serious Damage	D
Helicopter	AV	Marine Vessel	MV	Medical Treatment	MT	Serious Escape or Ignition	I
Fixed Wing Aircraft	FW	Administration	AD			Serious Near Miss	N
Drilling Operations Onshore	DO	Seismic Operations Onshore	SO	**Employment Arrangements**			
Production & Processing Onshore	PO	Construction Onshore	CO	Direct Employee	E	Contract Employee	C

Date	Name	Description of Incident

B. Other Reportable Occurrences

Date	Description of Occurrence	Breakdown Agency Code	Type of occurrence