



**ENVIRONMENT PLAN
EXECUTIVE SUMMARY**

SANTOS SOUTHERN MARGINS – SORELL BASIN (T/35P AND T/36P) 3D SEISMIC SURVEY

Prepared for:

Santos Limited

Prepared by:

Coffey Natural Systems

January 2008

1341_2_v1

The Santos logo is displayed in a blue, serif font. It consists of the word "Santos" in a bold, italicized style.

CONTENTS

ENVIRONMENT PLAN	1
EXECUTIVE SUMMARY	1
1 EXECUTIVE SUMMARY	1
1.1 The Proponent	1
1.2 The Proposal	1
1.3 Stakeholder Consultation	1
1.4 Environmental Impact Assessment, Management and Mitigation	3
1.5 Contact Details	7
Tables	
ES1 Summary of environmental impact assessment results	4
Figures	
ES1 Location of survey areas of Southern Margins T/35P & T/36P 3D Seismic Surveys	2

1 EXECUTIVE SUMMARY

1.1 The Proponent

Santos Limited (Santos) is the proponent for the Southern Margins – Sorell Basin (T/35P and T/36P) 3D Seismic Survey.

Santos is a major Australian energy company with its headquarters in Adelaide, and is the largest producer of natural gas for the Australian market supplying all mainland States and Territories. The core business of the company is oil and gas exploration and production with interests in every major Australian petroleum province. Santos is also the operator for permit areas in the Northern Territory and Western Australia.

1.2 The Proposal

Santos proposes to acquire approximately 446 km² of three dimensional (3D) marine seismic data within Petroleum Exploration Permit T/35P and 252 km² in Petroleum Exploration Permit T/36P. The surveys will be undertaken entirely within Commonwealth waters in the Sorell Basin off the northwest (T/35P) and west coast (T/36P) of Tasmania, in water depths ranging from 140 to 1,800 m and 110 to 160 m for T/35P and T/36P respectively (Figure ES1).

The T/35P seismic survey is scheduled to occur over approximately 34 days (including 10 days weather standby) and T/36P survey is scheduled to occur over 19 days (5 of which are weather standby days), from January 2008 through to March 2008. This Environment Plan covers the activities undertaken as part of the seismic survey.

The surveys will be conducted using PGS Geophysical Company's 'Pacific Explorer', a purpose-built 3D seismic survey vessel. The vessel will travel along grid-lines at an average speed of 4.5 knots (approximately 8.3 km per hour) and the sound sources will be triggered at regular 18.75 m intervals. Six streamers of 6 km in length and 100 m apart towed at a depth of approximately 7 m will carry hydrophones to capture the reflected sound.

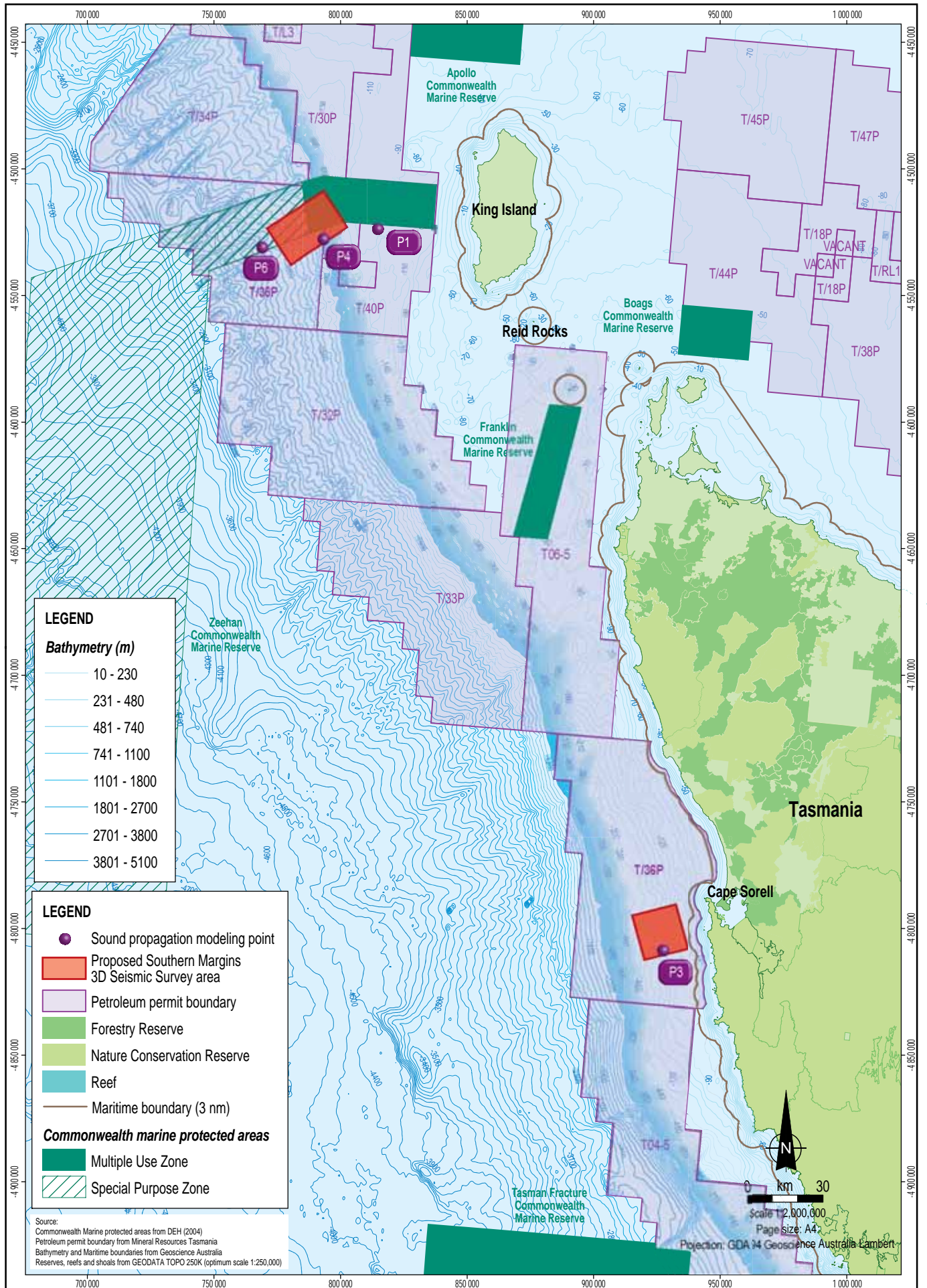
1.3 Stakeholder Consultation

In the course of planning the proposed seismic exploration program, Santos has undertaken a consultation program with relevant stakeholders in the region to identify regulatory processes, potential environmental issues and management requirements. Santos will undertake ongoing consultation to ensure the seismic survey management arrangements and communications are in place.

Stakeholders of relevance to the T/35P and T/36P Seismic Surveys include:

Commonwealth Government

- Department of the Environment and Water Resources (DEW).
- Department of Industry, Tourism and Resources (DITR).
- Australian Fisheries Management Authority (AFMA).
- Border Protection Command.
- Australian Maritime Safety Authority (AMSA).



LEGEND

Bathymetry (m)

10 - 230
231 - 480
481 - 740
741 - 1100
1101 - 1800
1801 - 2700
2701 - 3800
3801 - 5100

LEGEND

- Sound propagation modeling point
- Proposed Southern Margins 3D Seismic Survey area
- Petroleum permit boundary
- Forestry Reserve
- Nature Conservation Reserve
- Reef
- Maritime boundary (3 nm)

Commonwealth marine protected areas

- Multiple Use Zone
- Special Purpose Zone

Source:
 Commonwealth Marine protected areas from DEH (2004)
 Petroleum permit boundary from Mineral Resources Tasmania
 Bathymetry and Maritime boundaries from Geoscience Australia
 Reserves, reefs and shoals from GEODATA TOPO 250K (optimum scale 1:250,000)

Tasmanian State Government

- Department of Infrastructure, Energy & Resources (DIER).
- Department of Primary Industries and Water (DPIW).

Commercial fishing groups

- Commonwealth Fisheries Association.
- Seafood Industry Victoria.
- Tasmanian Fishing Industry Council (TFIC).
- Tasmanian Abalone Council (TAC).
- South East Fishery Association.
- Tasmanian Rock Lobster Fishing Association.
- South East Non-Trawl Fishing Industry Association.
- South East Trawl Fishing Industry Association.

Consultation and information dissemination has been, and will continue to be, undertaken through a range of media including:

- Meetings with regulators.
- Meetings with TFIC and TAC.
- Correspondence with key stakeholders.
- Provision of detailed project maps.
- Communication of schedule to fishing operators.
- Information notices placed in fishing industry publications.
- Provision of detailed seismic brochure.

Consultation with commercial fishing groups will follow APPEA and DEW Guidelines where applicable.

1.4 Environmental Impact Assessment, Management and Mitigation

The main potential environmental hazards associated with the seismic surveys include:

- High intensity sound discharge.
- Physical presence of the vessel.
- Waste discharge.
- Ballast water discharge.
- Hydrocarbon and/or chemical spills.

The Environment Plan provides a detailed assessment of potential impacts. The key points of the assessment, and management and mitigation measures are summarised in Table ES1 below. For the summary risk ranking shown in Table ES1, there are a total of 10 environmental risk assessments, seven of these were assessed as having low risk and three assessed as having a moderate risk.

Table ES1 Summary of environmental impact assessment results

Impact Assessment	Management and Mitigation	Risk Ranking
<p>Acoustic discharge: High Intensity sound discharges Pathological damage to hearing systems or other organs.</p>	<p>The timing of the T/35P and T/36P seismic surveys coincides with blue whale activity. DEW management guidelines for seismic vessels will be implemented. Highly unlikely cetaceans will be within 2 km of an active acoustic source, due to the implementation of soft start procedures. Highly unlikely cetaceans would be exposed for sufficient duration to cause hearing damage.</p>	<p>Low</p>
<p>Acoustic discharge: High Intensity sound discharges Behavioural / lifecycle change to cetaceans. Complete avoidance by whales at some levels. Cetaceans may implement avoidance measures.</p>	<p>Stand off or avoidance measures not expected to cause gross changes in behaviour or normal activities. DEW management guidelines for seismic vessels will be implemented. Highly unlikely whale will be within 2 km of an active acoustic source, due to implementation of soft start procedures.</p>	<p>Moderate</p>
<p>Acoustic discharge: High Intensity sound discharges Behavioural change to pinnipeds.</p>	<p>Surveys will not occur during known nesting / breeding season. Surveys will remain distant from known breeding or nesting areas. Soft start requirements to minimise impacts to cetaceans will also minimise potential impacts on any transient seals in the survey areas.</p>	<p>Low</p>
<p>Acoustic discharge: High Intensity sound discharges Behavioural / lifecycle change to fish species. Potential pathological effects. Behavioural changes and startle response.</p>	<p>Behavioural changes likely to be localised and temporary (alarm, avoidance, tighter schooling). Any 'flight' response likely to be localised and short term. Effects of seismic on larval fish and invertebrate populations negligible compared to total population sizes and natural mortality rate for eggs and larvae. Impacts will be limited to the duration of the surveys (approximately 34 and 19 days including potential standby time for T/35P and T/36P surveys respectively). Soft-start procedures will prevent sudden exposure. No direct contact with Zeehan Commonwealth Marine Reserve upwelling canyon structures and soft-start procedures will prevent sudden exposure to marine life.</p>	<p>Low</p>
<p>Vessel travelling through permit area: Physical presence of the vessel Behavioural change to marine animals.</p>	<p>Possible behavioural changes in response to the physical presence of the vessel are considered to be similar, although less intense, than those associated with sound discharges.</p>	<p>Low</p>

Table ES1 Summary of environmental impact assessment results (cont'd)

Impact Assessment	Management and Mitigation	Risk Ranking
<p>Vessel travelling through permit area: Physical presence of the vessel Collision with marine mammals causing death or injury.</p>	<p>Due to size and speed of vessel, noise generated by engines and acoustic array, considered that animals would be able to easily avoid the vessel. DEW management guidelines for seismic vessels will be implemented. Highly unlikely a whale will be within 2 km of an active acoustic source, due to the implementation of soft start procedures.</p>	<p>Low</p>
<p>Vessel travelling through permit area: Physical presence of the vessel Interference to fishing or third party activities. Potential exists to temporarily exclude fishing activities during the surveys. May require minor modification to the course of third party vessels during the surveys. Adverse impacts will be localised and short term.</p>	<p>Possible that commercial fishing vessels operating in survey areas during time of surveys, although fishing activity expected to be limited. Possible that shipping operators wish to travel through the survey areas during time of surveys, although permit area is approximately 20 km from major shipping lane in the region. Consultation strategy shall be in place to advise of the location and schedule of the seismic surveys and to ensure that any impacts on other users are minimised. Seismic Contractor shall remain vigilant for fishing and other commercial vessels during the surveys. Utilise radars and satellite navigation systems to ensure sufficient warning of other vessels approaching the survey areas and establish communications to avoid conflict. Record of consultation with commercial fisheries groups shall be kept and made available to regulatory authorities upon request. AMSA will be formally contacted regarding the surveys and standard maritime safety procedures will be adopted.</p>	<p>Moderate</p>
<p>Vessel travelling through permit area: Routine waste discharges to sea Changes to water quality. Minor changes to water quality and nutrient level that are short term and localised. Minor changes to feeding patterns of fish species. Low level contamination or toxic effects to fish species and plankton.</p>	<p>Dilution and decomposition will reduce nutrient levels over time. No discharge to sensitive environments (i.e. within 12 nm of any land, in areas of environmental sensitivity or shallow waters). All other waste shall be retained onboard for appropriate disposal on-shore. Waste discharges limited to food scraps and sewage. Sewage treated prior to disposal offshore and food scraps shall be macerated (<25 mm). Disposal will conform to the requirement of MARPOL Annex IV.</p>	<p>Low</p>
<p>Vessel travelling through permit area: Ballast water discharges. Introduction of foreign organisms. Foreign organisms may compete with native species, introduce disease or modify local ecological processes.</p>	<p>Ballast water will not be discharged or exchanged during the surveys. Ballast water will be managed in strict accordance with the AQIS guidelines.</p>	<p>Low</p>

Table ES1 Summary of environmental impact assessment results (cont'd)

Impact Assessment	Management and Mitigation	Risk Ranking
<p>Vessel travelling through permit area: Physical presence of the vessel</p> <p>Contamination of marine environment. Pathological effects to fish larvae and ingestion by marine organisms. Smothering of marine flora and fauna. Contamination of landforms.</p>	<p>Streamers are segmented and each segment contains a synthetic gel-solid, designed not to leak if streamers holed, cut or severed.</p> <p>Cable reel, cable storage area and cable deck will be contained.</p> <p>Seismic cables will be fit for purpose, not outside design life and regularly checked for leaks.</p> <p>Where possible, cable weights will be used that do not require tape. The use of tape for patching holes in cables will be avoided or appropriate methods used to ensure tape remains attached.</p> <p>Oil spill repose procedures detailed in the Shipboard Oil Population Emergency Plan (SOPEP).</p> <p>All necessary oil spill contingency equipment shall be maintained to ensure it is functional and accessible.</p> <p>Major event resulting in large release of fuel not considered likely.</p> <p>At sea refuelling, if required, will be undertaken in accordance with standard procedures and will only occur when sea states allow for safe transfer operations. In adverse conditions refuelling will be undertaken in port.</p>	<p>Moderate</p>

In summary, the offshore seismic surveys are located in Commonwealth waters of eastern Bass Strait. The transient nature and short duration of the surveys (34 days for T/35P and 19 days for T/36P) means that the activity has a low to moderate impact on the marine environment.

Stakeholders have been consulted, especially fishing groups, and mitigation measures have been put in place to manage interaction with whales that may be present at the time of the surveys.

Detailed management and mitigation measures that will be followed during the project are provided in the Environment Plan. The implementation strategy for the Environment Plan specifically details the measures needed to ensure that the environmental performance objectives and standards are met, and identifies:

- Systems, practices and procedures.
- Specific roles and responsibilities.
- Employee training.
- Monitoring, auditing and recording requirements.
- Emergency response planning.
- Consultation with government and stakeholders.

1.5 Contact Details

Please direct all queries, comments or requests for a copy of the approved T/35P and T/36P 3D Seismic Survey Environment Plan to:

Mr. Nick Fox

Senior Environmental Advisor

Santos Limited

Ground Floor, Santos Centre

60 Flinders Street, Adelaide, 5000

Telephone: (08) 8116 5151

Email: nick.fox@santos.com