



**ENVIRONMENT PLAN
EXECUTIVE SUMMARY**

SANTOS SOUTHERN MARGINS – GIPPSLAND BASIN (VIC/P55) SEISMIC SURVEY

Prepared for:

Santos Limited

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Santos

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1 EXECUTIVE SUMMARY

1.1 The Proponent

Santos Limited (Santos) is the proponent for the Southern Margins 3D Seismic Survey – Gippsland Basin, VIC/P55.

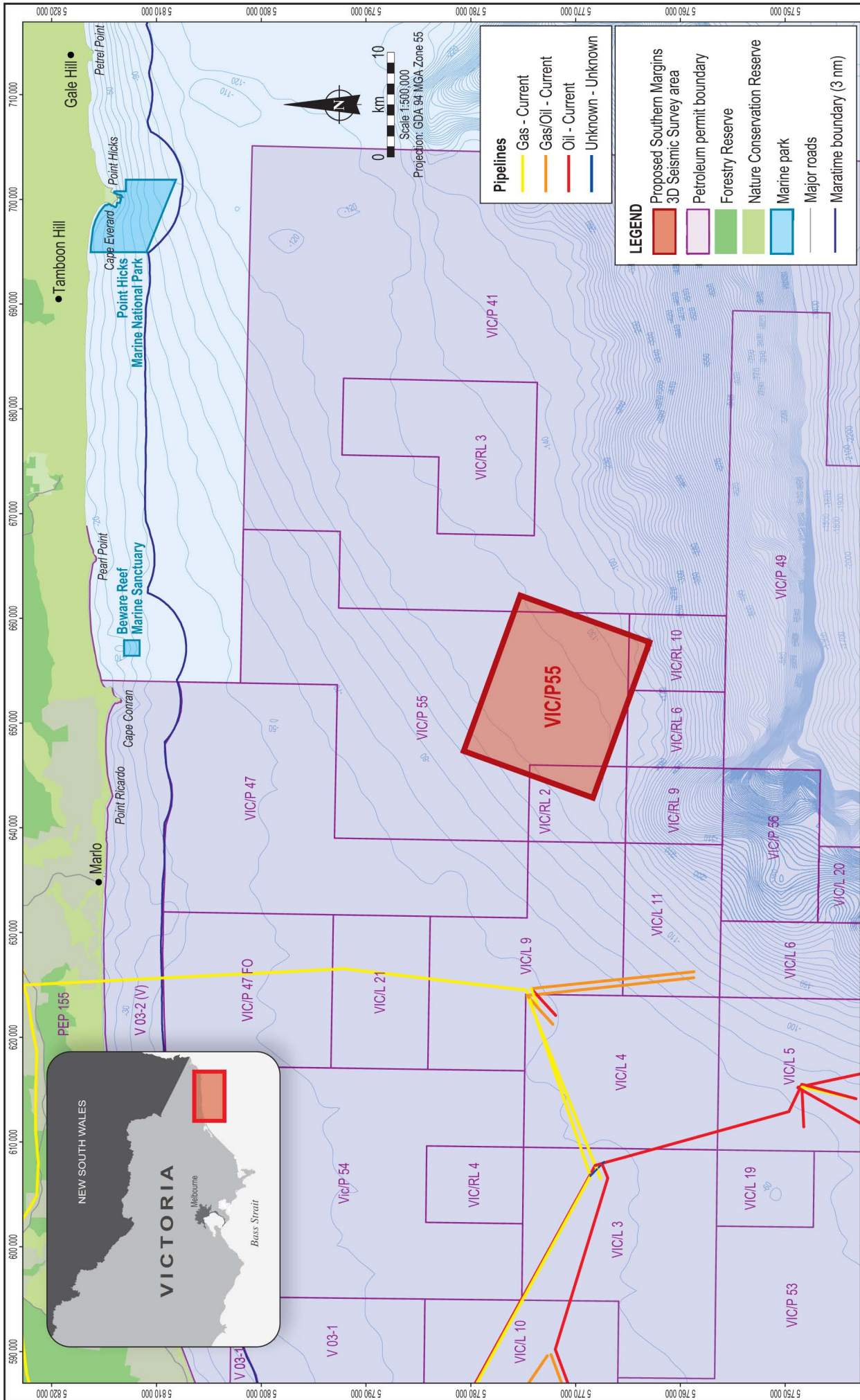
Santos is a major Australian energy company with its headquarters in Adelaide, and is the largest producer of natural gas for the Australian market supplying all mainland States and Territories. The core business of the company is oil and gas exploration and production with interests in every major Australian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

1.2 The Proposal

Santos proposes to acquire 208 km² of three dimensional (3D) marine seismic data in Petroleum Exploration Permit VIC/P55. The survey will be undertaken entirely within Commonwealth waters in the Gippsland Basin of eastern Bass Strait, in water depths ranging from 90 to 160 m (Figure ES1).

The seismic survey is scheduled to occur over approximately 18 days (including 4 days weather standby) commencing in early November 2007. This Environment Plan covers the activities undertaken as part of the seismic survey.

The survey will be conducted using PGS Geophysical Company's 'Pacific Explorer', a purpose-built 3D seismic survey vessel. The vessel will travel along the 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. The acoustic source for this survey will be towed immediately behind the vessel at a depth of 6m. Six streamers of 6 km in length and towed at a depth of approximately 7m will carry hydrophones to capture the reflected sound.



| | | | | | | |
|--|----------------------------------|--|---------------------------------------|---------------|---|--------------------------|
| Source: Bathymetry and Maritime boundaries from Geoscience Australia Reserves, reefs and shoals from GEODATA TOPO 250K (optimum scale 1:2500,000) | coffey natural systems | Job No: 1341 File Name: 1341_04_ES_ES01_HB | Santos Ltd Environment Plan | Santos | Location of survey area of Southern Margins Vic/P55 3D Seismic Survey | Figure No: ES1 |
|--|----------------------------------|--|---------------------------------------|---------------|---|--------------------------|

1.3 Stakeholder Consultation

In the course of planning the proposed seismic program, Santos has to date undertaken extensive consultation 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 VIC/P55 3D Seismic Survey include:

Commonwealth Government:

- Department of the Environment and Water Resources (DEW).
- Department of Industry, Tourism and Resources (DITR).
- Australian Fisheries Management Authority (AFMA).

Victorian State Government:

- Department of Primary Industries (Minerals and Petroleum Regulation Branch).
- Department of Primary Industries (DPI) Fisheries.

Commercial fishing and other groups:

- Commonwealth Fisheries Association.
- Victorian Scallop Industry Association.
- Seafood Industries Victoria.
- South East Non-Trawl Fishing Industry Association.
- Lakes Entrance Fishermen's Cooperative.
- 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.
- Briefings with individual fishers.
- Meetings and correspondence with key stakeholders.
- Invitation for public comment on the EPBC referrals via the DEW website.
- Provision of detailed survey maps.
- Daily schedule communications to fishing operators.
- Vessel communication systems with maritime traffic.

Consultation with commercial fishing groups will follow APPEA and DEW Guidelines where applicable. Santos has engaged the services of a locally-based fisheries consultant who has undertaken consultation with the relevant fishers on an ongoing basis since then and will continue to do so until the survey is completed.

1.4 Environmental Impact Assessment, Management and Mitigation

The main environmental hazards associated with the seismic survey 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. The summary risk ranking is shown in Table ES1, there are a total of 10 environmental risk assessments, 7 of these were assessed as having low risk and 3 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 discharge Pathological damage to hearing systems or other organs of marine fauna.</p> | <p>The timing of the Southern Margins 3D seismic survey coincides with blue and humpback whale activity in the area Department of Environment and Water Resources management guidelines for seismic vessels (DEW 2007a) will be implemented. Soft start procedures implemented; highly unlikely cetaceans will get to within 2km of active acoustic source.</p> | Low |
| <p>Acoustic discharge: High Intensity sound discharge Behavioural / lifecycle changes to cetaceans. Avoidance measures.</p> | <p>Department of Environment and Water Resources management guidelines for seismic vessels (DEW 2007a) will be implemented (for details see Appendix A). Soft start procedures implemented; highly unlikely cetaceans will get to within 2km of active acoustic source.</p> | Moderate |
| <p>Acoustic discharge: High Intensity sound discharge impacting pinnipeds Behavioural changes.</p> | <p>The survey will occur during known nesting/breeding season. The survey will remain distant from known breeding or nesting areas (Beware Reef – approximately 35 km from survey). Soft start requirements to minimise impacts to cetaceans will also minimise potential impacts on any transient seals in the survey area.</p> | Low |
| <p>Acoustic discharge: High Intensity sound discharge impacting fish species Behavioural / lifecycle changes and startle response. Possible pathological effects.</p> | <p>Behavioural changes likely to be localised and temporary (alarm, avoidance, tighter schooling). 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 survey (approximately 18 days including potential standby time). Soft-start procedures will prevent sudden exposure.</p> | Low |

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 injury or death.</p> | <p>Due to the size and speed of the vessel, the noise generated by engines and the acoustic array, it is considered that animals would be able to easily avoid the vessel. Department of Environment and Water Resources management guidelines for seismic vessels (DEW 2007a) will be implemented.</p> | <p>Low</p> |
| <p>Vessel travelling through permit area: Physical presence of the vessel Behavioural changes to marine mammals.</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. Department of Environment and Water Resources management guidelines for seismic vessels (DEW 2007a) will be implemented.</p> | <p>Low</p> |
| <p>Vessel travelling through permit area: Physical presence of the vessel Reduction in fish catches or interference with fishing activities likely to be localised and short term. May require minor modification to the course of third party vessels during the survey.</p> | <p>A consultation strategy shall be in place to advise of the location and schedule of the seismic survey and to ensure that any impacts on other users are minimised. The Seismic Contractor shall remain vigilant for fishing and other commercial vessels during the survey. Utilise radar and satellite navigation systems to ensure sufficient warning of other vessels approaching the survey area and establish communications to avoid conflict. A 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 survey and standard maritime safety procedures will be adopted.</p> | <p>Moderate</p> |
| <p>Vessel travelling through permit area: Routine waste discharges to sea 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>No discharge to sensitive environments (i.e. within 12 nm of any land, in areas of environmental sensitivity or shallow waters). 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. All other waste shall be retained onboard for appropriate disposal on-shore.</p> | <p>Low</p> |
| <p>Vessel travelling through permit area: Ballast water discharge. Introduction of marine pests, introduction of disease or change in local ecological processes.</p> | <p>Ballast water will not be discharged or exchanged during the survey. 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: Accidental fuel and oil spills</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>Oil spill response procedures are detailed in the contractor Shipboard Oil Pollution Emergency Plan (SOPEP).</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>Waste oil or any inseparable bilge water will not be discharged offshore.</p> | <p>Moderate</p> |

In summary, the offshore seismic survey is located in Commonwealth waters of eastern Bass Strait. The transient nature and short duration of the survey (18 days) 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 survey.

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 request for a copy of the approved VIC/P55 3D Seismic Survey Environment Plan to:

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