

Santos Limited

Otway 3D and VIC/RL7 Seismic Surveys

Environment Plan
Executive Summary



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Prepared by:
Enesar Consulting Pty Ltd
126 Trenerry Crescent Abbotsford Victoria Australia 3067
p 61-3-9418 0600 f 61-3-9418 0650
e office@enesar.com.au www enesar.com.au

Principal	David Gwyther
Associate	Greg Terrens
Consultant	Victoria Alivanoglou
Draftsperson/graphic designer	Hanna Blaszkiewicz
WP/DTP	Jill O'Neil
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Executive Summary

The Proponent

Santos Limited ('Santos') is the operator for VIC/P44 on behalf of joint venture partners Mittwell Energy Resources Pty Ltd (25%) and Peedamullah Petroleum Pty Ltd (25%).

Santos will be acting as agent operator for VIC/RL7 on behalf of BHP Petroleum.

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, Victoria and Tasmania.

The Proposal

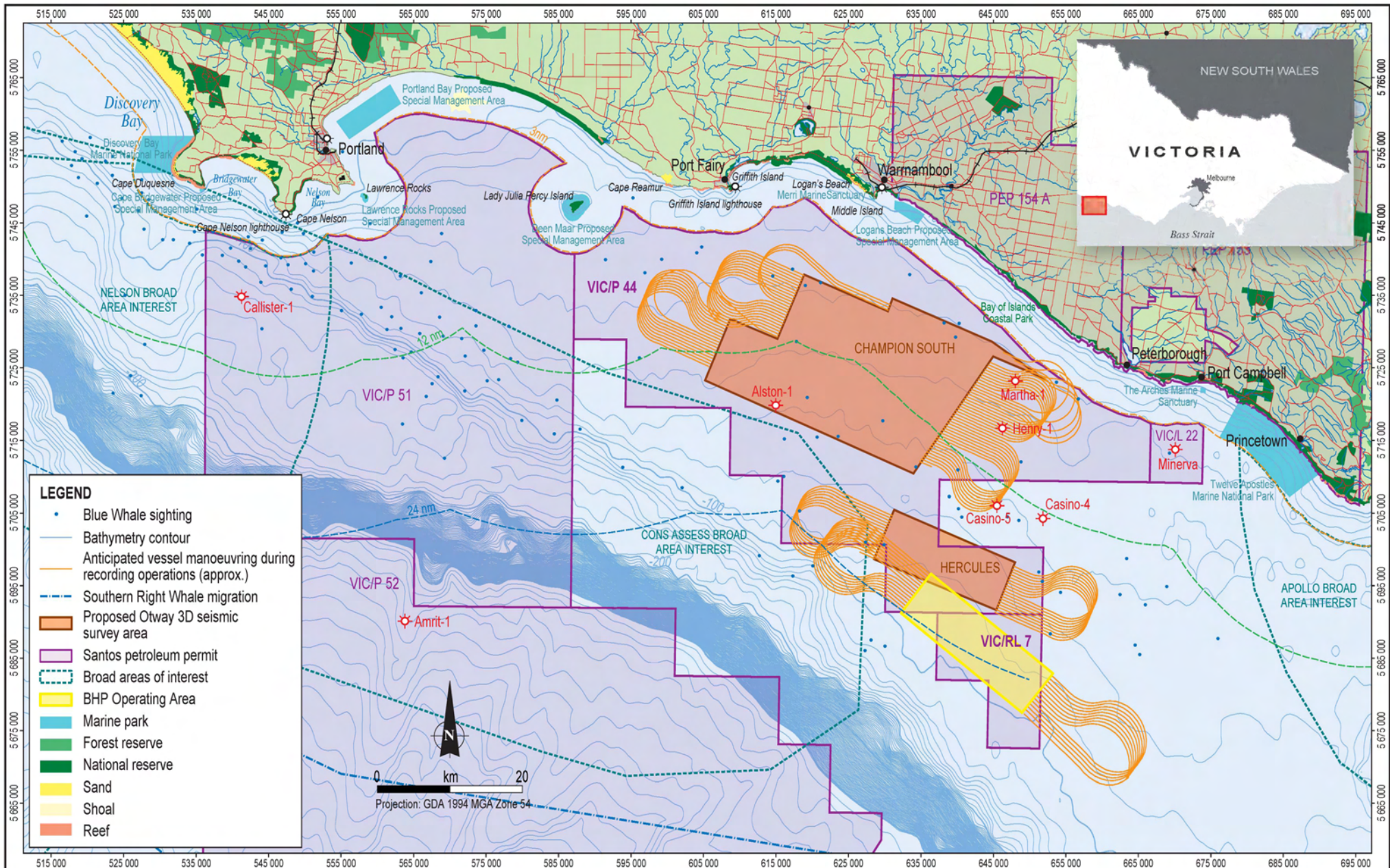
Santos Limited ('Santos') proposes to acquire approximately 725 km² of three-dimensional (3D) marine seismic survey data, within Victorian Petroleum Permit Area VIC/P44 in the offshore Otway Basin, western Victoria. This project is referred to as the Otway 3D Seismic Survey.

As an extension to this survey, Santos will be acting as agent operator for BHP Petroleum for the proposed acquisition of approximately 185 km² of 3D marine seismic data within Victorian Retention Lease VIC/RL7, also located within the Otway Basin, western Victoria. Both surveys are shown on Figure ES1.

The duration of the Otway 3D Seismic Survey will be approximately 33 days, 10 of which are weather standby days, during the period May to June 2007. Data acquisition for the VIC/RL7 extension to this survey will occur immediately after June 2007 for approximately 11 days, including 3 weather standby days. The precise commencement and completion dates are dependent upon vessel availability and weather conditions.

Both surveys will be undertaken using the WesternGeco seismic survey vessel 'MV Western Trident'. The Otway 3D Seismic Survey is located approximately 10 km west of Warrnambool and 19 km southeast of Port Fairy, in water depths ranging from approximately 50 m to 90 m. The VIC/RL7 extension to this survey is located approximately 39 km northeast of Peterborough and 41 km north northeast of Port Campbell, in water depths ranging from approximately 70 m to 110 m.

The vessel will tow twelve hydrophone cable streamers each 5,000 m long, with a total streamer spread of 700 m and a sail line spacing of approximately 400 m. The hydrophone cable streamers travel about 6 m below the sea surface controlled by mechanical devices called 'birds' to maintain the travel depth, and prevent the equipment from making contact with the seabed. The vessel will be required to make all turns outside of the proposed exploration area at the completion of each transect pass, due to the required turning circle of the vessel with cables in tow and the need to obtain full seismic coverage of the exploration area.



- LEGEND**
- Blue Whale sighting
 - Bathymetry contour
 - Anticipated vessel manoeuvring during recording operations (approx.)
 - Southern Right Whale migration
 - Proposed Otway 3D seismic survey area
 - Santos petroleum permit
 - Broad areas of interest
 - BHP Operating Area
 - Marine park
 - Forest reserve
 - National reserve
 - Sand
 - Shoal
 - Reef

0 km 20
 Projection: GDA 1994 MGA Zone 54



Job No:
1305
 File No:
1305_02a_ES01_HB

Santos Ltd
 Environment Plan



Location of survey areas

Figure No:
ES1

A support vessel will be on station to ensure that in the event of loss of power (or other malfunction), streamers are recovered immediately and not allowed to sink or wash inshore. A smaller scout vessel or vessels will also be used for warning smaller boats, scouting potential hazards, streamer cable maintenance and minor logistics.

Where the survey vessel is required to turn outside the VIC/P44 permit area and VIC/RL7 retention lease, access authority will be obtained from all other relevant permit holders.

Background

Seismic exploration is undertaken to map the subsurface geology of an area and enable identification of potential petroleum reservoir rocks, such as sandstones. Marine seismic surveys are conducted using a specialised seismic survey vessel towing an acoustic source airgun and one or more hydrophone detector cables towed behind the vessel. During a seismic survey, the acoustic pulse is directed downwards to the seabed and reflected from the boundaries separating the rock layers in the subsurface, and the reflected signals are recorded by many hydrophones towed in a cable several kilometres long. This is a key step in exploration for hydrocarbons and there is currently no other method that has sufficient resolution to identify rock structure beneath the surface.

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 Otway 3D and VIC/RL7 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).

Victorian State Government:

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

Commercial fishing and other groups:

- Portland Professional Fishermen's Association.
- Warrnambool Fishermen's Association.
- Port Campbell Rock Lobster Fishermen's Association
- Seafood Industries Victoria.
- Deakin University (Warrnambool) blue whale research group.

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

- Meetings with regulators.
- 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 fishers 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.

Environmental Impact Assessment

A referral for the Otway 3D Seismic Survey under the EPBC Act was submitted to the DEW (Referrals and Assessment Section) for assessment on 23 March 2007 (Referral 2007/3367). The DEW determined on 26 April 2007 that the project was not a controlled action, subject to implementation of conditions in the manner specified.

A referral for the VIC/RL7 extension to this survey under the EPBC Act was submitted to the DEW (Referrals and Assessment Section) for assessment on 9 May 2007 (Referral 2007/3443). The DEW determined on 6 June 2007 that the project was not a controlled action, subject to implementation of conditions in the manner specified.

The components of seismic surveys and survey-related activities that could result in environmental and social impacts include:

- High intensity sound discharges.
- Physical presence of seismic vessel.
- Waste discharge.
- Hydrocarbon and/or chemical spills.
- Exhaust emissions.

The environmental and social issues related to these activities include:

- Disturbance to marine fauna causing:
 - Changes to behavioural ecology of species (feeding, breeding, migration patterns).
 - Physical damage (i.e., lethal effects, pathological damage, injury).
 - Low level contamination/toxicity of marine fauna.
- Disturbance to benthic habitats:
 - Damage and/or destruction of seafloor habitats and palaeo-environments from anchoring, grounding and accidental loss of streamers and associated equipment.

- Low level contamination/toxicity of benthic habitats.
- Changes in water quality.
- Interference with shipping, boating and fishing in the area.
- Interference with oil and gas production infrastructure (existing or under construction).
- Introduction of exotic marine species.
- Emissions to air as a result of exhaust emissions from vessels.

The effects of acoustic signals have been well researched in the scientific literature. The Environment Plan provides a detailed assessment of the potential impacts. The salient points of the assessment are summarised below.

Marine Fauna

- The surveys will be conducted between May to June 2007, potentially coinciding with the end of the blue whale summer migration period in south-west Victoria, the arrival of southern right whales at Logans Beach and the arrival of humpback whales. Logan's Beach, Warrnambool, approximately 13 km to the north of the survey area, is an important calving and nursery area for southern right whales. The survey will start in the area nearest to shore to precede the arrival of southern right whales, and then work progressively further offshore.
- Department of the Environment and Water Resources guidelines for managing interactions between offshore seismic operations and larger cetaceans will be applied, including the employment of trained whale observers on board and in aircraft. All whale sightings will be reported to the DEW.
- Impacts to marine fauna (including fish, invertebrates and larvae) from the air source discharge are unlikely outside of the immediate vicinity of the source (i.e., 1-5m). Most species display some avoidance behaviour by moving laterally or into deeper water.
- Potential for fuel or oil spills is negligible.
- The surveys are scheduled for a 33 day period (10 of which are weather standby days) and an 11 day period (3 of which are weather standby days), representing a temporary and low risk.
- Inspection of hull anti-fouling records and inspection of streamers will occur.

Navigation Safety

- The period of any displacement of local traffic will be limited to the short duration of the surveys.
- A support vessel will conduct reconnaissance ahead of the survey vessel and will be in attendance in case of loss of power to main vessel.

- The hydrophone cables will be tracked via GPS to monitor their location (assisting retrieval if one or more become severed).
- All vessel operations will be conducted in compliance with the Australian Maritime Safety Authority (AMSA) Offshore Support Vessel Code of Safe Working Practice (OSV Code), which includes regular Notices to Mariners and standards for radar monitoring and vessel communications.
- Watch will be maintained on the survey vessel for other craft.
- The vessel will undergo anti-fouling of the hull. Verification of this will be provided by the survey contractor, who will advise when anti-fouling paint was last applied.

Waste Discharge

- Sewage and putrescible wastes will be treated and disposed in Commonwealth waters in accordance with MARPOL regulations.
- Any spills will be recorded in a wastes and emissions log, reported to Santos and regulatory authorities advised in accordance with regulatory requirements.
- Survey vessel will not take on or discharge ballast water.

Small Volume Spill

- An Oil Spill Contingency Plan (OSCP) and Emergency Response Manual will be provided for the vessel and staff will be appropriately trained in its execution and in the use of oil spill response equipment.
- No at-sea refuelling is planned for the survey. Port refuelling operations will be monitored by the vessel's Master or First Officer.

Commercial Fisheries

- Marine species are commercially harvested from the Otway 3D Seismic Survey area. The commercial fisheries present within the survey area include the southern rock lobster fishery, the giant crab fishery, the abalone fishery, the south east fishery, the southern squid jig fishery and the eastern tuna and billfish fishery.
- Some deep-water species may be fished by trawling in the survey area.
- The seismic vessel may interfere with commercial fisheries by disrupting fishing vessels and commercial catches.
- Regular communication with fishing groups and provision of coordinates of survey area to fishermen will minimise potential impacts to commercial fishing activity.

Recreation and Tourism

- The seismic vessel will not significantly impact on visual amenity (i.e. sightseeing).
- Interference to boating, surfing, diving, snorkelling and swimming activities is unlikely but may occur. The recommended operating buffer of 1,500 m advised for surfing, diving, snorkeling and swimming will be enforced.

In summary, the seismic exploration programs proposed will not result in detrimental impacts to populations of marine fauna or commercial fisheries in the vicinity of the survey area.

Contact Details

Please direct all queries, comments or request for a copy of the approved Otway 3D and VIC/RL7 Seismic Surveys 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