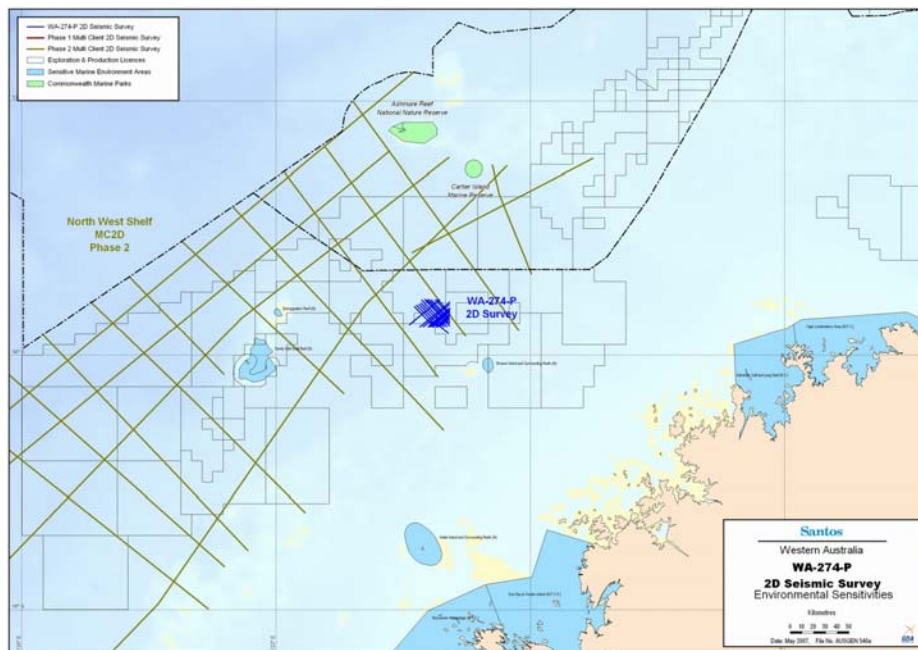


Summary

Environment Plan



2D Seismic Program

Permit
WA-274-P

Santos

June 2007

Executive Summary

The Proponent

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.

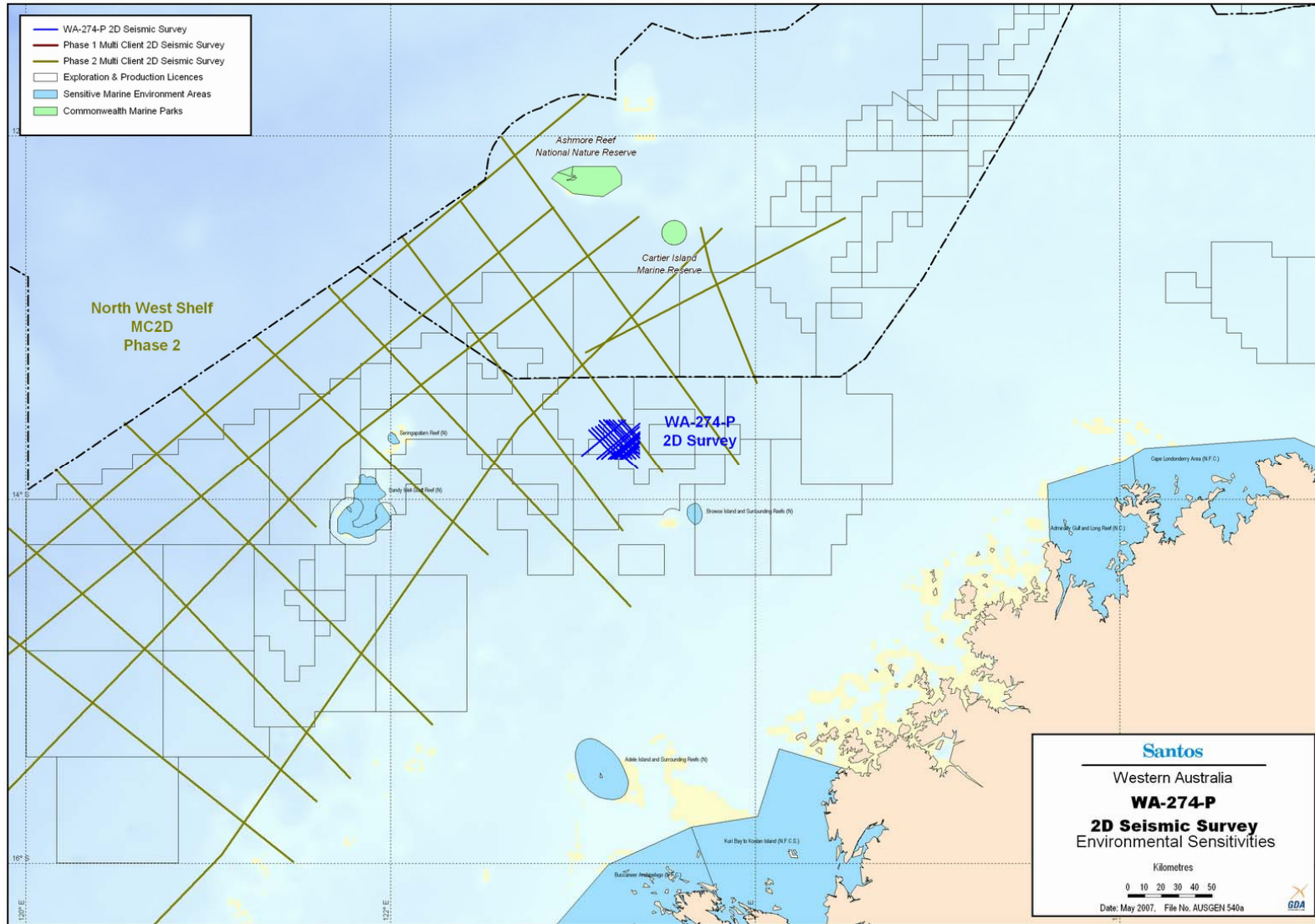
The Proposal

Santos Limited (Santos) is the operator of petroleum exploration permit WA-274-P located in Commonwealth waters off the northern coast of Western Australia, approximately 430 km north of Broome. On behalf of the joint venture participants, Santos plans to acquire a total of 545 kilometres (23 lines) of two dimensional (2D) seismic data in the permit area WA-274-P. The survey area is approximately 35km north east of Scott Reef and 130km south of Ashmore Reef. The purpose of the seismic survey is to delineate potential sub-surface oil and gas deposits and assist in determining whether any such deposits contain economically recoverable quantities of oil or gas.

Data will be acquired by PGS Geophysical using either the seismic survey vessel M/V Orient Explorer or M/V Akademik Fersman towing a marine acoustic source (consisting of 4 individual arrays totalling 2980 Cuin) and single streamer (hydrophone cable) up to 8km in length. The proposed survey will be conducted between approximately 220 to 280km from the coast in an area of ocean where water depths are between 250 and 530m.

The proposed survey is scheduled to occur for approximately 8 days (including 2 days weather standby time) commencing in mid May 2007. The precise commencement and completion dates will be dependent on vessel availability and weather conditions.

The proposed seismic survey is an extension of the PGS Geophysical MC2D Survey (see Figure 1). This survey is being operated under an approved Environment Plan, "PGS Geophysical Deep Water Northwest Shelf Australia MC2D Survey".



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, consultation with relevant stakeholders in the region to identify regulatory processes, potential environmental issues and management requirements has been undertaken. Santos will ensure appropriate seismic survey management arrangements and communications are in place.

Stakeholders of relevance to the 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).

Western Australian State Government:

- Department of Industry and Resources (DoIR).

Commercial fishing and other groups:

- Onslow Prawn Managed Fishery.
- Wet Line Fishing.
- Pilbara Demersal Finfish Managed Fishery.
- Northern Shark Fisheries.
- Northern Demersal Scalefish Managed Fishery.
- Nickel Bay, Broome and Kimberley Managed Fisheries.
- Pearl Oyster Managed Fishery.
- Mackerel (Interim) Managed Fishery.
- Beche-de-mer Managed Fishery.
- North-west slope trawl.
- Skipjack Tuna (Western).
- Southern Blue Fin Tuna.
- Western Tuna and Billfish Fishery.
- Western Deepwater Trawl.
- Western Australian Fishing Industry Council.
- Recfishwest.

- Western Australian Game Fishing Association.
- Northwest Game Fishing Association.

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

- Meetings and correspondence with key stakeholders.
- Provision of detailed survey maps.
- Daily schedule communications to fishing operators.
- Vessel communication systems with maritime traffic.

Environmental Impact Assessment

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

- A Humpback whale population (Group IV) is known to migrate between Antarctica and the Kimberley region along the coast of Western Australia. It is apparent that a large proportion of the whale population use the Kimberley as a migratory end-point and calving ground. The whales leave Antarctica in May, reaching the Kimberley region from late July, and commencing the southern migration in late August to early September (Jenner & Jenner, 1995 and Jenner *et al*, 2000). Variations of up to three weeks can be observed due to climatic conditions and abundance of food sources.

Information collected by Coast Watch pilots and recent research (Jenner & Jenner, 1995 & Jenner *et al*, 2000) has indicated that the waters from Cape Leveque to Adele Island and then on to York Sound are the focal point of humpback whale calving activity. The period of peak northern migration into the calving grounds (northern extent of migration) is during the last week of July (Jenner 2000). The survey area is located approximately 100km north of the calving grounds.

- 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 survey is scheduled for an 8 day period, 2 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 survey.
- 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 regular 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 Seismic Survey area.
- 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 program proposed by Santos 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 WA-274-P Seismic Survey Environment Plan to:

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