INFORMATION SHEET

Otway Basin 3D Multi-client Marine Seismic Survey

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TGS is proposing to undertake a three-dimensional (3D) multi-client marine seismic survey (MSS) in the Otway Basin, in Commonwealth waters offshore of Victoria and Tasmania.

In accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009, TGS are preparing an Environment Plan (EP) for the survey for assessment by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

TGS welcomes your feedback on the proposed survey activity

PROPOSED ACTIVITY

Marine seismic surveying is used to improve the understanding of subsurface geology in marine environments. During marine seismic surveys, seismic data is acquired using a purpose-built seismic survey vessel towing an acoustic source and multiple cables of hydrophones, also known as streamers. Streamers are towed with a tail buoy, radar reflectors and lights to mark the end of the array. The streamers will be up to 9 km long to adequately record the necessary information. Both the source and streamers are towed beneath the surface of the water (Figure 1). Acoustic energy from the acoustic source is detected by the streamers and recorded on board the vessel. The recorded signals are then processed to provide information about geological formations below the seabed.

When recording the data, the seismic vessel traverses the survey area along a series of pre-determined sail lines at a speed of approximately 4 - 5 knots (7.5 – 9.5 km/hr). The level of acoustic emissions can be adjusted to provide low-power 'soft start' or 'fauna alert' procedures, at any point during the survey or maintenance operations.

Support vessels will work with the seismic vessel to assist in communicating with other vessels that have entered the area of operations and to support the overall operations, such as providing food and supplies.



 Table 1 on the following page provides a summary of the Otway Basin 3D Multi-client MSS.



SURVEY AREAS

The proposed Otway Basin 3D Multi-client MSS comprises the following areas (Figure 2):

- An operational area (OA) the largest area where all survey activities must take place within, e.g. maintenance, refuelling, vessel manoeuvring and streamer deployment; and
- An *acquisition area* (AA) smaller area within the OA where seismic data is acquired. This is the only area where the active source can be used at full power.

The AA includes areas where prospective clients may be interested in acquiring seismic data in the foreseeable future. It includes the space where data acquisition may occur, plus additional space for the survey vessel to "run-in" to or "run-out" of sail lines while the acoustic source is active.

During 3D seismic data acquisition, the seismic vessel travels back and forth along pre-determined parallel sail lines which are acquired in a "race track" pattern within the AA, where the vessel turns at the end of each sail line and returns in the opposite direction along a different sail line. Sail lines will be orientated approximately parallel with the seabed contours (approximately north-west/south-east).

The AA includes water depths between approximately 510 m and 5,650 m, therefore, the acoustic source will not be operated in shallower continental shelf waters during 3D seismic data acquisition.

In addition, up to five single 2D lines may be acquired to "tie-in" to existing geophysical data in the region. The 2D tie-in lines will be acquired approximately perpendicular to the seabed contours (approximately south-west/north-east). Each tie-in line will be up to a maximum of 150 km in length (less than a day of acquisition time). The tie-in lines will overlap with 3D data acquisition in the AA; however, one of the 2D tie-in lines may need to extend onto the continental shelf. Consequently, a '2D Tie-line Active Source Area Extension' is included in addition to the AA (also included within Figure 2). Operation of the acoustic source in the 2D Tie-line Active Source Area Extension will be limited only to a single 2D tie-in line. At the shallowest point, this 2D Tie-line Active Source Area Extension is approximately 115 m.

The broader OA includes space required for vessel turns and other vessel operations that may be required beyond the extent of the AA. It includes waters depths from approximately 95 m to 5,650 m.

Earliest commencement	1 October 2023 (pending regulatory approvals, environn	nental sensitivities and vessel availability).
Estimated completion	Pending acceptance by NOPSEMA, the EP will be valid until 30 September 2027.	
Estimated survey duration	Total acquisition is 400 days over 5 year period, however maximum of 200 days per year. Allows flexibility to accommodate adverse weather, equipment maintenance etc.	
Water depth	Predominantly 510 m to 5,650 m, reducing to approximately 115 m for a single 2D tie-line within the Active Source Area Extension (see Figure 2).	
Vessels	One purpose-built seismic survey vessel, plus additional support vessels. Vessel details have not yet been confirmed.	
Acoustic array	Acoustic source 3,500 in ³ with maximum of 14 streamers up to 9 km length.	
Survey vessel speed	Approximately 4 – 5 knots (7.5 – 9.5 km/hour).	
Dimensions of towed equipment	Approximately $8 - 10$ km length and approximately 800 m $- 1.6$ km wide.	
Area of avoidance	3 nautical miles requested around the survey vessel and streamers.	
Proximity to key locations	Location	Approximate Distance to OA
	Portland (VIC)	48 km
	Warrnambool (VIC)	61 km
	Arthur River (TAS)	85 km
	King Island (TAS)	39 km
	Robe (SA)	64 km

Table 1 – Otway Basin 3D Multi-client MSS Summary



Figure 2 – Location of the proposed Otway Basin 3D Multi-client MSS

ENVIRONMENTAL PERFORMANCE

TGS has a reputation for implementing high standards of environmental protection in environmentally sensitive areas to mitigate and minimise impacts on the surrounding marine environment and stakeholders. TGS is committed to working with all interested parties to ensure concerns and risks are identified and reduced to as low as reasonably practicable before activities begin and throughout the project duration.

A summary of key environmental management measures associated with the Otway Basin 3D Multi-client MSS are summarised below. These management measures will be implemented as a minimum. Additional management measures may also be identified during relevant person engagement and development of the EP.

FLORA AND FAUNA SENSITIVITIES

TGS has undertaken a thorough analysis of marine flora and fauna sensitivities in the Operational Area through the development of the EP, enabling TGS to identify and incorporate control measures to account for these sensitivities and minimize potential environmental risks. Multiple whale species (Blue, Southern Right, Sei and Fin) in particular, have been identified in the early analysis as being some of the key sensitivities in the area. The EP has focused on these species and introduced additional control measures to minimise disturbance as a result of the proposed seismic activities.

There will be two dedicated Marine Mammal Observers (MMOs) onboard the survey vessel who will visually monitor precaution zones and observation zones, during daylight hours in accordance with the Environment Protection and Biodiversity Conservation Act. There will also be Passive Acoustic Monitoring (PAM) operating 24 hours a day to detect any marine mammals in the vicinity of the survey vessel. Mitigation measures such as restricting survey operations in certain areas at certain times of peak mammal activity, extended shut down zones, soft start procedures and adaptive management procedures (such as relocation should more whales be detected in an area than is expected) will be implemented to minimize any potential for disturbance to whales during the survey.

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FUEL SPILL MITIGATION AND RESPONSE

As part of the environmental planning and approval process, TGS has conducted a modeling study to identify the area of potential impact from an accidental fuel spill from the seismic vessel fuel tank. This helps TGS identify measures for:

- preventing a spill occurring;
- · planning how best to respond to an incident to minimise the impact of a spill occurring; and
- identifying whom to notify should a spill occur.

It is important to note, the modelling is highly conservative and provides the maximum potential area for a spill to reach resulting from a collision with another vessel, using multiple spill locations within the OA. This type of event has a very low likelihood of occurring and has never occurred within Australian waters. However, TGS use the fuel dispersal model to identify the environment that may be affected (EMBA) (Figure 3) and guide whom they may need to consult about the proposed survey.

Modern seismic vessels mitigate the risk of fuel spills via physical design features such as double hull configuration and having multiple compartmentalized fuel tanks of reduced size instead of one large fuel tank. The vessel that will be contracted for this project will have these features and will have worked in Australian waters previously.

The seismic vessel provider has safety procedures in place and documented actions to take if an incident were to occur. As a subcontractor of TGS, the vessel provider also has to comply with TGS' rigorous QHSE standards and commitments made within the Environment Plan which forms part of the regulatory approval process. At least one support vessel will work alongside the seismic vessel during the survey.

Concerned parties should note that the EP also provides an Oil Pollution Emergency Plan (OPEP) which is a legal requirement for all seismic vessels of a certain size to develop and implement. The OPEP provides detailed measures and procedures for preventing and responding to a seismic vessel fuel oil spill.



Figure 3 – Accidental fuel dispersion modelling showing environment that may be affected (EMBA)

KEY CONTROL MEASURES

INTERACTIONS WITH FISHERIES

- Seismic data acquisition in water depths less than 500 m will be limited to a single 2D tie-in line to minimise interaction with most fisheries.
- Fisheries relevant persons will be notified four weeks prior to commencement of the survey, providing the location and expected timing.
- Daily look-ahead reports, detailing upcoming survey activities within the next 48 hours, will be emailed to fisheries relevant persons who register for this service.
- Fisheries relevant persons will be notified upon completion of the survey.

UNDERWATER NOISE

- TGS will implement precaution zones, pre-start observations and soft-start, low-power and shut-down procedures in accordance with EPBC Policy Statement 2.1 – Interaction with whales.
- Marine fauna observers will be present on the survey vessel throughout the survey duration.
- Operation of the seismic source in water depths < 500 m will be limited to a few hours for a single 2D tie-in line.
- Subject to the outcomes of acoustic modelling and further assessment, additional control measures and adaptive management procedures will be considered.

INTERACTIONS WITH MARINE FAUNA

- Vessels will not exceed a speed of 6 knots or actively approach within the caution zone of a cetacean in accordance with EPBC Regulations 2000 - Part 8 Division 8.1.
- Strict caution zones and speed restrictions also apply for marine turtles.
- Tail buoys on streamers will be designed to reduce the risk of entrapment.

INTERACTION WITH OTHER MARINE USERS

- Notice to Mariners and notification to the AMSA Joint Rescue Coordination centre (JRCC) will be issued prior to survey commencement.
- Vessels will maintain appropriate lighting, signals, navigation and communication at all times, in compliance with the *Navigation Act* 2012 and associated Marine Orders.
- Tail buoys on streamers will be fitted with lights and radar reflectors.
- At least one support vessel will accompany the survey vessel during seismic operations.

VESSEL MANAGEMENT

- Vessel emissions, discharges and waste management will comply with the requirements of the International Convention for the Prevention of Pollution from Ships (MARPOL), the Protection of the Sea (Prevention of Pollution from Ships) Act 1983 and associated Marine Orders.
- Vessels will manage ballast water in accordance with the Australian Ballast Water Management Requirements and the *Biosecurity Act 2015*.
- TGS will implement an Oil Pollution Emergency Plan (OPEP) for the duration of the survey.
- All vessels will have Shipboard Oil Pollution Emergency Plans (SOPEPs).

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FURTHER CONSULTATION

WE WANT TO HEAR FROM YOU

We are contacting you because our assessment of values and sensitivities show there may be overlap with areas that are important to you. Therefore, we would like to understand the following:

- Do you have any functions, interests or activities that may be affected by the proposed activities to be carried out under the Environment Plan?
- Do you want to meet with TGS, either in person or via video conference to discuss the proposed activities to be carried out under the Environment Plan?

OUR COMMITMENT

- TGS is committed to maintaining regular communication with all relevant persons throughout the duration of the survey and works with communities in a transparent manner. This will be supported with the supply of 48-hour operational detail lookahead plans which will be distributed every 24 hours, with notification being provided to relevant persons during operations.
- If you wish to receive these notifications or specific information regarding this survey, please advise as soon as possible.

YOUR FEEDBACK

TGS is seeking your feedback regarding this proposed activity before making a formal EP submission to NOPSEMA. If you would like to comment on the survey, request additional information, or meet with us to discuss the survey, please contact us as soon as possible.

All communications will be logged, assessed and acknowledged with a response, and incorporated into the EP. In accordance with regulatory requirements, full copies of correspondence with relevant persons will be provided to NOPSEMA. However, this information and any other information determined to be sensitive will not be made public. Relevant persons are advised to inform TGS if any information provided is confidential and not to be published in the EP.

In addition, once the EP is submitted to NOPSEMA, it will be published on the NOPSEMA website for a 30day public comment period. TGS will provide relevant persons with a notification of the commencement of the public comment period.

TGS would like to acknowledge the Traditional Custodians of the land and sea country in which the Otway Marine Seismic Survey will be carried out. We recognise their continuing connection to the land, waters and culture. We pay our respects to their Elders past, present and emerging.

If you would like to provide comment or request further information on the Otway Basin 3D Multi-client MSS, please contact TGS:

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FREQUENTLY ASKED QUESTIONS

Q. WHAT IS A 'MULTI-CLIENT' SEISMIC SURVEY?

Seismic surveys are conducted on either a multiclient or proprietary basis. Proprietary surveys are acquired for an individual petroleum titleholder, and the coverage of the survey is usually limited to the titleholder's petroleum permit area. In contrast, multi-client surveys are acquired by a geophysical survey company and are generally collected over larger areas where there may be future interest in oil and gas prospects.

Geophysical companies (in this case, TGS) collect the data which is then licensed to multiple clients (i.e. multiple titleholders). Although multi-client surveys may cover large areas, a key advantage of a multi-client seismic survey is that the data may be acquired by a single seismic survey, and so fewer seismic surveys are likely to be required in the region.

Q. WILL THE SEISMIC SURVEY OCCUR OVER THE ENTIRE EP AREA?

The defined Acquisition Area (AA) and Operational Area (OA) represent the maximum area where TGS will apply for permission to acquire the Otway Basin 3D Multi-client MSS. The actual survey area that will be surveyed will depend on the level and areas of interest received from petroleum titleholders in the region, and if TGS are engaged to acquire seismic data on their behalf. Therefore, there may be areas within the OA that are never surveyed, but the EP and relevant person consultation consider the maximum area for the purposes of environmental management.

When specific survey areas are confirmed, the areas and proposed commencement dates will be communicated to relevant persons.

Q. WHAT HAS TGS DONE TO AVOID ENVIRONMENTALLY SENSITIVE AREAS?

TGS has made a conscious effort to limit survey overlap with the continental shelf and shallow nearshore waters. The 3D AA does not extend into waters shallower than 510 m; only one 2D tie-in line will require the use of the acoustic source in shallower waters. The decision was made to limit activities to deeper, offshore waters in order to reduce the potential effects on marine fauna and commercial fisheries in nearshore waters.

Q. WHAT MARINE FAUNA MIGHT BE AFFECTED?

A number of whale and dolphin species occur in the region. These include pygmy blue whales, which are typically present in the region to forage during the summer and autumn. The presence of the Bonney Upwelling provides nutrient rich waters, and the continental shelf is known as a biologically important area for the foraging by this species. The AA has been designed to minimise overlap with these foraging areas.

Coastal and continental shelf waters also support species such as southern right whales, fur seals, sea lions and little penguins. However, given that the AA is limited to waters greater than 510 m water depth, limited disturbance to these species and their habitats in nearshore waters is expected.

Various fish and shellfish species may also be present in the survey area, including commercially significant fish species, rock lobster and giant crab. Potential impacts to these species and stock recruitment will be considered in the EP.

Acoustic modelling and a detailed impact assessment will be undertaken to understand the potential impacts to marine fauna and identify appropriate management measures.

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FREQUENTLY ASKED QUESTIONS

Q. WILL COMMERCIAL FISHERIES BE AFFECTED?

The OA and AA have limited overlap with commercial fisheries. Most commercial fishing activity occurs on the continental shelf and along the continental shelf break, which lie on the periphery of the AA and OA. While many fishing activities will be avoided, there is still the potential for some interaction with some State-managed fish, rock lobster and giant crab fisheries, the Commonwealth Trawl Sector, and the Southern Bluefin Tuna Fishery, in the event that the seismic vessel operates near the edge of the continental shelf. TGS will consult with commercial fishing groups to improve understanding of these fisheries and identify suitable measures to manage impacts.

Q. HOW WILL INTERACTIONS WITH FISHERIES BE MANAGED?

It is TGS's intention to carry out the Otway Basin 3D Multi-client MSS in a manner that does not interfere with fishing or the resources of the sea, to a greater extent than is necessary.

However, it is acknowledged that there is the potential for the survey to interact with fishing activities.

TGS cannot restrict fishing access to the survey area and will consider concurrent operational planning options with commercial fishers. TGS will also provide notifications to fishers prior to the commencement of the survey as well as regular updates during survey activities. Open radio communications will also be maintained with fishing vessels.

Q. WILL TGS COMPENSATE FISHERS FOR INTERRUPTION TO THEIR FISHING ACTIVITIES?

TGS believes that commercial fishers and fishing charter boat operators should not be unfairly disadvantaged by the Otway Basin 3D Multi-client MSS.

Should fishers be genuinely impacted by the Otway Basin 3D Multi-client MSS, TGS will consider claims on a case-by-case basis.

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