NOPSEMA
Australia's offshore energy regulator

INVESTIGATION REPORT

NOPSEMA Investigation – Schlumberger Australia Pty Ltd Otway Basin 2D Marine Seismic Survey

Investigation details

Activity:	Otway Basin 2D Marine Seismic Survey
Titleholder:	Schlumberger Australia Pty Ltd
Date investigation commenced:	17 June 2021
Lead Investigator:	[redacted]
Investigation team:	[redacted]
Investigation number:	IVT10524

Report distribution

Position	Company
Records management	NOPSEMA
	DAWE

Revision status

Rev	Date	Description	Prepared by	Reviewed by
A	31-01-22	Internal draft	[redacted]	[redacted]
B	7-Feb-22	Draft for discussion DAWE	[redacted]	[redacted]
0	8	Interim Report	[redacted]	

Table of contents

Background

On 28 November 2019, Schlumberger Australia Pty Ltd (SLB) were granted, upon their application, three "Petroleum Special Prospecting Authorities" under sub-section 235(a) of the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act), by a delegate of the National Offshore Petroleum Titles Administrator. Each Petroleum Special Prospecting Authority (title) covered geographical areas, known as "blocks", in the offshore areas of the States of South Australia, Tasmania and Victoria.

There are several key environmental sensitivities within the title areas, including "biologically important areas" (BIAs) for foraging of blue whales. BIAs are spatially defined areas that are particularly important for the conservation of protected species and where aggregations of individuals of a species are known to display biologically important behaviour such as breeding, foraging, resting or migration (Blue whale conservation management plan, Commonwealth of Australia, 2015).

On 11 November 2019, a delegate of NOPSEMA, gave SLB notice of their decision to accept SLB's environment plan (EP) for the Otway Basin 2D Marine Seismic Survey (activity) under sub-regulation 11(1)(c) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Environment Regulations). The decision to accept this EP was subject to limitations that prevented seismic activity (i.e., discharging of airguns) within the BIAs for the Pygmy Blue Whale (PBW) and required measures to be implemented to limit anthropogenic noise in these BIAs (Figure 1).

A pre-survey compliance monitoring inspection of the Otway 2D MSS was undertaken by NOPSEMA in December 2019. During this inspection, inspectors concluded substantial improvements would be needed to ensure that the limitation imposed on the acceptance of the EP would be met and issued recommendations to SLB in a formal inspection report. SLB provided responses to these recommendations in the form of additional control measures and the implementation of these control measures was also the subject of this investigation.

SLB conducted the activity between 15 January 2020 and 10 April 2020 and provided NOPSEMA with an environmental performance report and a marine mammal monitoring report to detail their environmental performance for the activity as required by Regulation 26C. The reports included an outline of the marine mammal detections (by marine mammal observers and passive acoustic monitoring) during the survey as well as the mitigation measures that were implemented in response to these detections.

Regulation 25A of the Environment Regulations provides that the operation of an EP ends (i.e. is no longer in force) when a titleholder notifies NOPSEMA that the relevant activity authorised by the EP has ended, and NOPSEMA accepts the notification. SLB submitted regulation 25A notice on 30 November 2020 and given the current state of this investigation, it yet to accept the notification.

In response to the submission of SLB's 25A notice, NOPSEMA wrote to SLB on 1 March 2021 requesting further information and clarification in relation to compliance with the EP. In particular, NOPSEMA requested information regarding control measures implemented by SLB in order to comply with the limitation imposed by NOPSEMA to manage impacts of seismic activity on pygmy blue whales. On 12 March 2021, SLB provided NOPSEMA with information in response to that request. The material provided by SLB included a map which displayed the position of the seismic acquisition lines and the marine mammal monitoring report[1].

[1] Seiche Environmental – Marine Mammal Monitoring Report – Seabird 2D Seismic Survey – Otway Bason, Australia (12 May 2020).

Given the "whale sightings" reported in the Seiche Environmental Marine Mammal Monitoring Report and some indications that the survey vessel entered the BIAs for the PBW, NOPSEMA decided to commence a Level 3 Investigation to determine whether SLB complied with petroleum environmental laws and clarify whether the seismic vessel had discharged airguns inside the BIAs for the PBW.

Ordinarily, NOPSEMA would be able to exercise the environmental management inspection / investigation powers under schedule 2A of the OPGGS Act to conduct an inspection of SLB's regulated business premises. However, the Petroleum Special Prospecting Authority issued to SLB expired on 26 May 2020, meaning that, from 27 May 2020, SLB ceased to be "the registered holder of a petroleum title", within the meaning of clause 2 of schedule 2A of the OPGGS Act. Consequently, NOPSEMA obtained a monitoring warrant issued under sub-section 32(2) of the *Regulatory Powers (Standard Provisions) Act 2014* (RP Act) on 25 May 2021.

During the investigation, NOPSEMA CEO appointed Geoscience Australia (GA) and National Offshore Petroleum Titles Administrator (NOPTA) technical staff as 'NOPSEMA Inspectors' under the OPGGS Act to analyse navigational files and map spatial data collected under warrant. NOPTA provided the final spatial information needed to complete the Level 3 investigation on 7 Jan 2022.

Level 3 Investigation Scope

NOPSEMA initiated a level 3 investigation to:

1. Ascertain in detail the areas where seismic acquisition took place consistent with requirements of the in-force EP, NOPSEMA's imposed conditions and limitations and other legislative requirements;
2. Understand the actions taken undertaken by SLB in response to the high abundance of PBWs within and adjacent to the acquisition area and whether these actions were appropriate;
3. Determine whether the actions taken in response to NOPSEMA's recommendations from inspection 2101 were implemented effectively; and
4. Discern whether the survey was implemented in a manner that was not inconsistent with the blue whale Conservation Management Plan (CMP), a recovery plan under the EPBC Act.

Investigation execution:

Following the issue of the Investigation Brief to SLB on 10 June 2021, an investigation commenced led by [redacted] and supported by [redacted] (NOPSEMA Inspectors) on 17 June 2021. Technical support was provided by NOPSEMA Environment Officer, [redacted].

NOPSEMA inspectors collected, and reviewed information obtained under the warrant including:

- 17 June 2021 (A785782)
- 23 June 2021 (A789172)
- 19 August 2021 (A798645)
- 24 August 2021 (A801048)
- 6 August 2021 (an email thread (A803148) [redacted] (SLB) and [redacted] regarding specific sightings inside the BIA).
- 19 August 2021 (an email thread (A803149) – [redacted] (SLB) and [redacted] regarding additional information required for the investigation).

Data was provided voluntarily by SLB to the NOPSEMA inspectors after the expiry of the monitoring warrant on 25 August 2021. This data was collected on:

- 26 August 2021 (A801049)
- 20 September 2021 (A804065) including follow up responses and additional voluntary information.
- 18 November 2021 Missing Navigational and Observer logs for sequences 080-089 (A824634)

All evidence collected under warrant can be located in the SLB investigation file in NOPSEMA's Objective system.

NOPSEMA Inspectors, with support of internal technical expertise, have analysed the evidentiary material collected and have made a series of conclusions which are detailed below. NOPSEMA Inspector's recommendations, a summary of findings to support the conclusions and recommended lines of further investigative inquiry are also provided below.

Background to support interpretation of conclusions and reasons

A BIA buffer was established around the BIA as an area where additional management measures based on a 'higher likelihood of observing the whales during the foraging season'. Specific control measures were in place that related to the BIA buffer including EPSs135, 564 and 108 (see section 2 of this report).

Permanent threshold shift (PTS) and temporary threshold shift (TTS) are considered to be injury associated with certain doses of noise which vary between taxa. For cetaceans, behavioural disturbance thresholds are a proxy for displacement of blue whales from foraging areas. Thresholds for TTS and behavioural disturbance in low frequency cetaceans have been used to predict the distances at which noise levels may injure or displace whales from foraging (refer to Guidance on Key Terms of the Blue whale CMP and Blue Whale CMP FAQs). The shutdown zone for blue whales and southern right whales was 10km within the BIA buffer zone.

The EP predicted that by utilising the 7 km TTS threshold distance from the initial Sound Transmission Loss Modelling (STLM) for the inshore parts of the Operational Area, and applying the extensive suite of control measures detailed within Section 3.4.7.3 of the EP no blue whale will be exposed to TTS levels within the blue whale BIA (EP, p403).

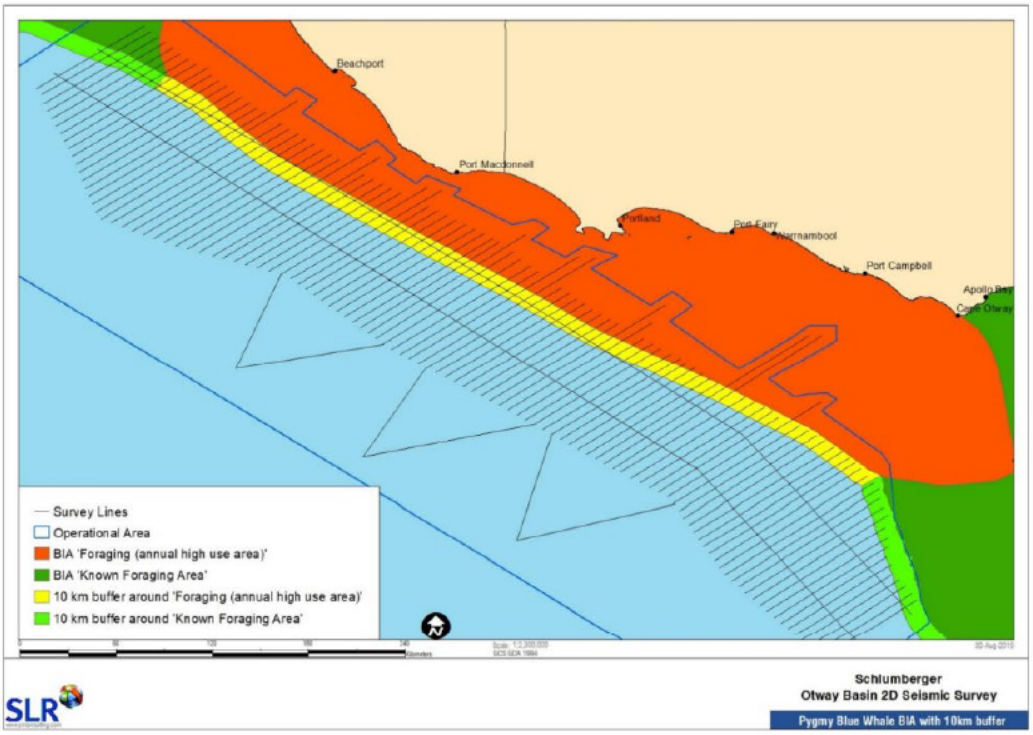


Figure 1 – Map extracted from accepted EP showing the proposed seismic lines with ingress into the BIAs for blue whales. On the basis that SLB was unable to demonstrate that the underwater noise impacts of the survey could be managed to acceptable levels in the BIA, NOPSEMA imposed a condition excluding the discharge of seismic airguns inside the BIA. The map also illustrates the 10km behavioural disturbance buffer within which additional control measures were required in order to provide confidence that blue whales would not be injured or displaced while foraging.

A 10 km Observation zone for pygmy blue whales and southern right whales required a shut-down if these species were detected. Within a 4 km zone, any whale species detected required a shut-down.

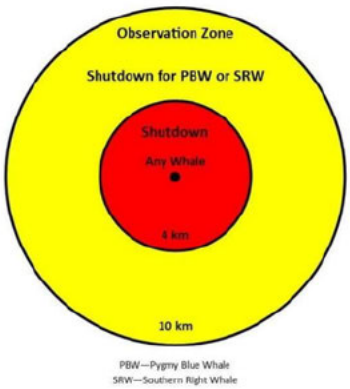


Figure 7 Inside the 10 km buffer zone

For operations outside of the buffer zone, the Observation zone was 3 km. If a pygmy blue whale or a southern right whale were detected in that zone, acquisition was shut-down. Within the 2 km zone, any whale species required a shut-down.

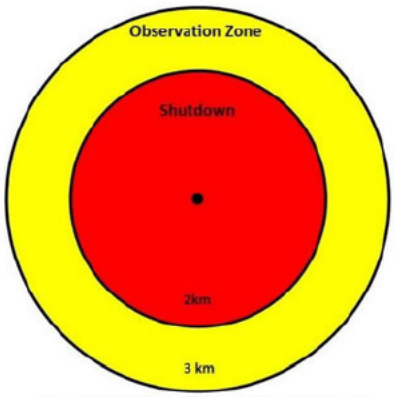


Figure 8 Outside the BIA and 10 km buffer zone

Figure 2 – Shut down and observation zones for the Otway 2D MSS showing that a 10km shutdown was required for blue whales within the BIA buffer to prevent displacement from foraging.

Conclusion and reasons for those conclusions

1	**Requirement – Limitation imposed on acceptance of EP:** *No discharge of seismic airguns in the pygmy blue whale biological important areas (BIAs) (including the Bonney Upwelling Key Ecological Feature) from 1 November 2019 to 30 April 2020; and implement measures that limit anthropogenic noise in BIAs for the duration of the activity so that any blue whale continues to utilise the area without injury, and is not displaced from a foraging area.*
1.1	**Conclusion** NOPSEMA Inspectors suspect a breach of Regulation 7(1)(b) by undertaking the activity in a manner that is contrary to the limitation imposed on acceptance of the EP (11/09/2019). There is potential that this alleged breach of Regulation7(1) of the Environment Regulations may have resulted in injury and/or displacement of a blue whale (listed endangered) within a defined foraging area during a critical life stage.
1.2	**Reasons for conclusion** Reasons to support conclusion 1 are provided below: 1. The seismic airgun array was discharged inside PBW BIAs contrary to the EP limitation: • there were 31 lines that extended into the PBW BIAs (based on navigational and spatial data analysis) with airguns discharged over a total estimated distance of ~16km within the BIAs. • Of these, 5 lines involved discharge of the airgun at full power and 26 seismic lines involved at least 300 m of air gun discharge within the BIAs. • These findings were based on the Geoscience Australia (GA) and NOPTA analysis and mapping of P190 and P294 files provided by SLB. 2. SLB did not implement measures that limited anthropogenic noise in BIAs for the duration of the activity so that any blue whale was able to utilise the foraging area (BIAs) without injury and was not displaced: • There were 14 blue whale sightings inside the BIA within the zones of injury and / or displacement[2] (seismic vessel sightings 75, 71, 68, 67, 66, 76, 92, 53; support vessel sightings 49, 46, 45, 76) (Figure 3) while the seismic source was operated at full power within 10km buffer (Figure 5). These whales were sighted during full power operations of lines 18, 55, 64, 64, 74, 78, 82, 52, 53, 57, 74, 78 (Figure 4). Despite the above finding, seismic acquisition took place within the 10 km behavioural disturbance buffer for the BIAs

[2] Zones of injury and displacement have been based on STLM modelling undertaken specific to the survey based on a seabed composition analysed specific to the shelf slope setting where the defined BIAs are located. (Appendix A, in force EP).

and up to the BIA boundaries for all seismic lines that were acquired in the direction of the BIAs (Figure 5). By doing this, sound extended into the BIA at levels that are predicted to injure and / or displace blue whales from foraging (Figure 3).

- There were 101 blue whales visually detected and not acoustically detected for the duration of the survey (Marine Mammal Monitoring Report SeaBird 2D Seismic Survey Otway Basin, Australia, V1, 12 May 2020, section 4.4). The seismic survey operations continued on a 24 hour basis despite whale monitoring information being collected during the survey that indicated PAM was not effective in detecting blue whales for the purposes of informing an appropriate management response (e.g. acoustic source shut-downs) to prevent injury and displacement from foraging.
- Despite there being no reliable means to detect blue whales to instigate control measures at night due to the PAM system not being effective at detecting blue whales, seismic operations took place in the BIA buffer at night-time (Marine Mammal Monitoring Report SeaBird 2D Seismic Survey Otway Basin, Australia, V1, 12 May 2020, Appendix D) for the duration of the survey.
- NOPSEMA ascertained that noise attenuated into the BIA at levels that have been modelled to cause injury and displacement from foraging with no mitigation measures available during non-daylight hours or low visibility operations (Figure 3).
- A survey line (104 OB2D-0105P1-104) was acquired along the boundary of the BIA during which a blue whale instigated shut down took place in response to an adult and calf sighting (Navigational Log, line 104 date 31 March 2020 and 1 April 2020). During this seismic line there was ~ 12 hrs of nighttime operations where noise would have attenuated into the BIAs (Figure 3 and Figure 4) for a large portion of this seismic line at levels that could injure or displace blue whales from foraging without any ability to detect whales for mitigation purposes.
- The Seiche MMO PAM Final Report concluded that *"Visual observations from the support vessel, MV No Limitation, were extremely limited in times of poor weather conditions. With the vessel being small in size and conditions being poor 86% of the time during the survey, it was not conducive to effective marine mammal monitoring, particularly when the vessel was in the trough of a wave and poor conditions rendered the best vantage point (fly deck) unsafe"* (p.55). As an example, there were five consecutive days were MMOs reported moderate to poor visibility between 5-10 February 2020 (Marine Mammal Monitoring Report SeaBird 2D Seismic Survey Otway Basin, Australia, V1, 12 May 2020, Appendix A and B). Despite this limited visibility, seismic operations continued throughout this period including in the BIA buffer without effective acoustic or visual detection methods that were required to inform management.
- Based on whale sightings overlaid with the zones of injury/displacement (defined by predicted received sound levels), it is estimated that 14 blue whales may have been injured or displaced within the BIAs during the survey (Figure 3). This estimation does not account for any whales that were present within the zones of impact which were not detected during night-time operations, low visibility conditions or protracted surface intervals (long dive periods).

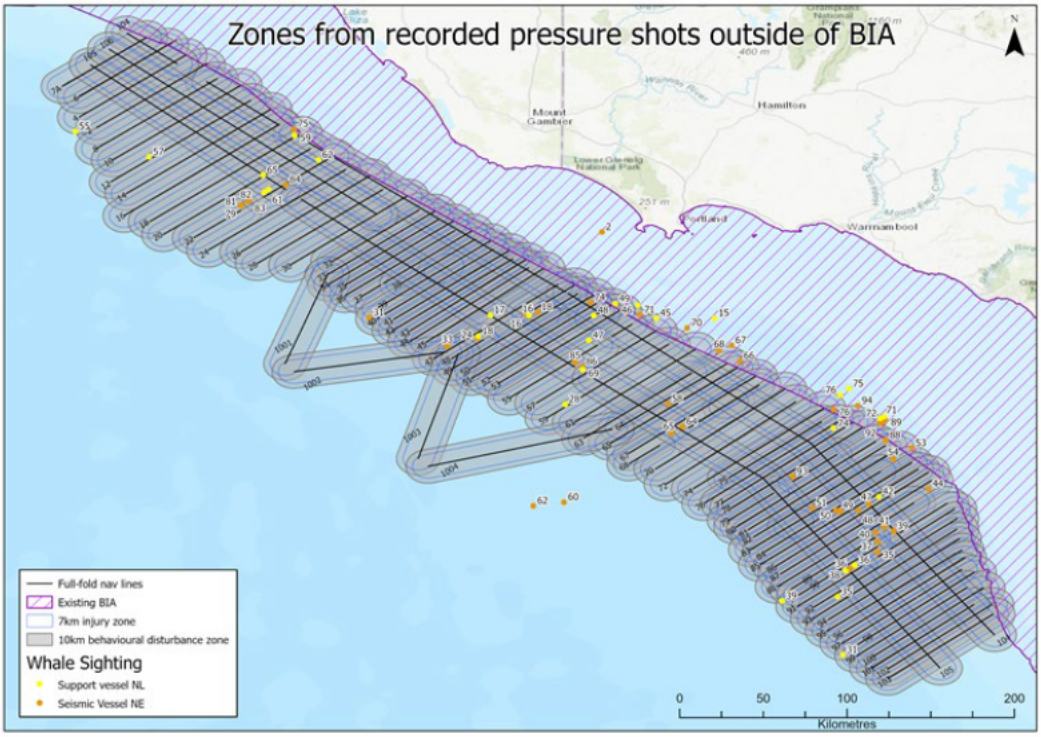


Figure 3. Orange points are blue whale sightings from the seismic vessel, yellow points are blue whale sightings from the support vessel either 10 km ahead or behind the seismic vessel. Black lines indicating full power of the seismic source up to the BIA boundary with noise emissions encroaching the BIA above levels known to cause injury and/or behavioural disturbance (based on internationally accepted thresholds and sophisticated modelling). Zones of impact based on modelling outputs from a 3D model that has been validated in the field.

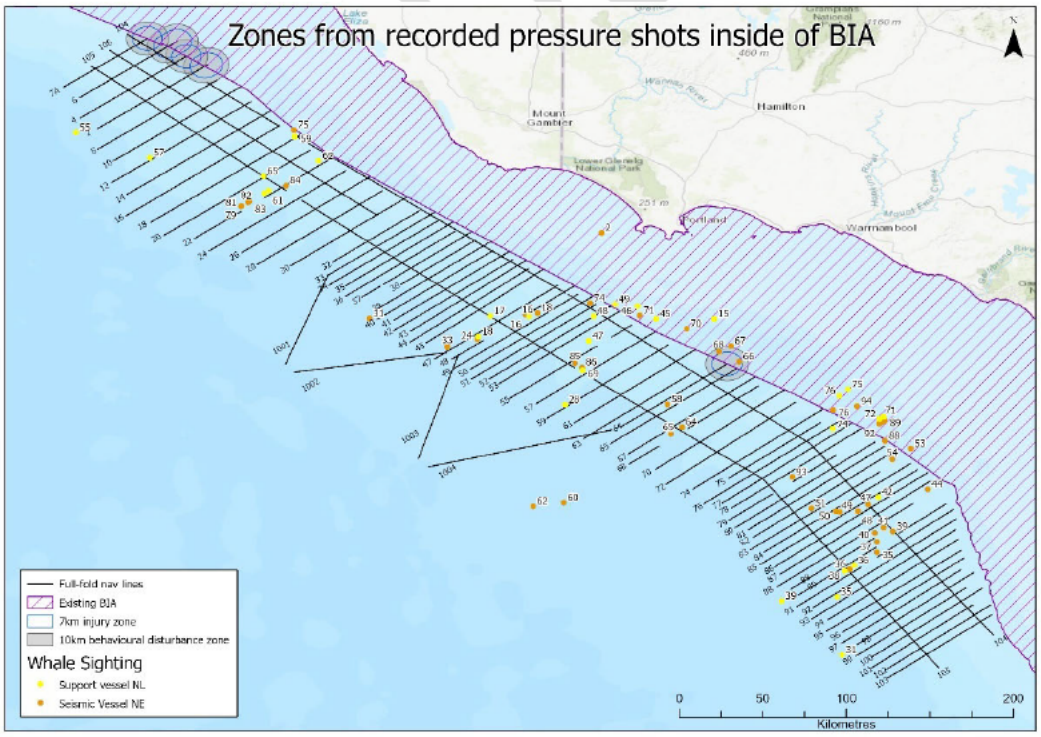


Figure 4 Black lines indicate full power acquisition, some of which do not appear to correspond to a shutdown. The mapped zones of injury and behavioural disturbance are for those seismic lines here full power took place inside the BIAs.

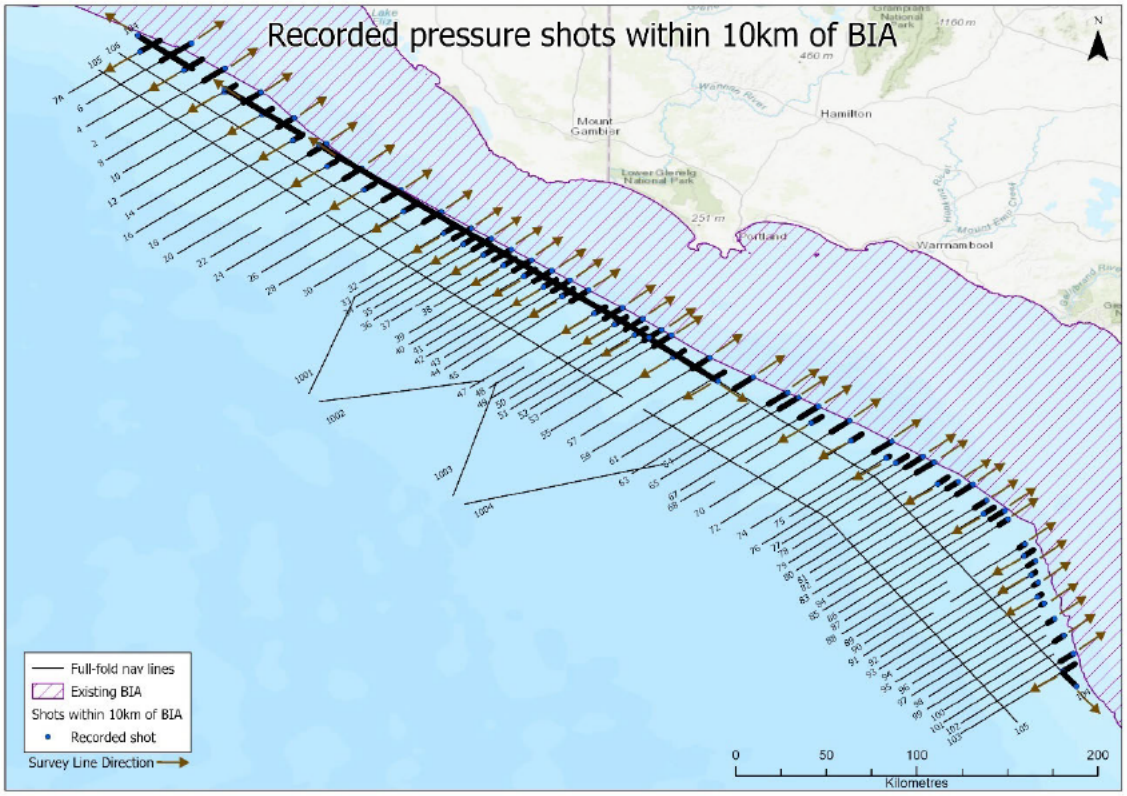


Figure 5 Recorded full pressure shots within the 10km BIA buffer some of which occurred during night time without the ability to detect blue whales to enable management

1.3 **Recommended lines of inquiry for L4 investigation**

- The root cause(s) for seismic air gun discharge in the BIAs.
- Understand why there were no further management measures implemented to prevent injurious and behavioural disturbance noise levels in the BIAs as required by the condition / limitation.
- Whether necessary shutdowns and re-start procedures were implemented correctly i.e., any whale within 10km of the seismic vessel should have triggered an airgun shutdown inside the BIA buffer.
- Whether the support vessel operated ahead of or at the tail of the seismic vessels in order to detect whales within the BIA and BIA buffer.

2 **Requirements – In force EP Environmental Performance Standards (EPS)**

- *EPS 135 in the in force EP requires: No seismic operations will occur in the Bonney Upwelling Zone, blue whale BIA and 10 km behavioural disturbance buffer during the month of February.*

	• *EPS 54: No seismic operations will occur in the Bonney Upwelling Zone, blue whale BIA and 10 km behavioural disturbance buffer during the month of February, on account of this being the month of peak blue whale abundance in this critical foraging habitat (Gill et al., 2011).* • *EPS 41: When the streamer and acoustic array are deployed, the seismic vessel will comply with the EPBC Policy Statement 2.1 (Part A) to reduce any potential for interactions with marine mammals.* • *EPS 108: At night or other times of low-visibility (i.e., observations cannot extend to 3+ km from the acoustic source, or the 10 km observation zone when the acoustic source is active within the blue whale BIA and 10 km buffer), start-up may commence according to the A3.2 Soft-start procedure:* - *Provided that there have not been ≥3 whale instigated shut-down situations during the preceding 24-hour period; or* - *If operations were not previously underway during the preceding 24 hours, the vessel has been in the vicinity (~10 km) of the proposed start-up position for at least two hours (with good visibility conditions) within the preceding 24-hour period and no whales were sighted.*
2.1	**Conclusion** NOPSEMA Inspectors suspect a breach of Regulation 7(1)(a) by undertaking the activity in a manner that is contrary to the EP. Based on the sample of evidence examined by inpsectors, the above EPSs have not been complied with.
2.2	**The reasons to support conclusion** • February was determined to be the month when the number of blue whales are likely to be at their highest in this important foraging habitat (Gill et al., 2011). However, based on the evidentiary material provided, it appears that seismic operations took place in the 10km BIA buffer in the month of February (Party Chief Reports (bridge logs) 01/02/2021 and 02/02/2020 indicate that line acquisition took place inside BIA buffer). On further inquiry SLB admitted that this control measure and associated EPS was removed through a management of change process (MOC). This finding indicates that the activity was undertaken contrary to EPS 135 and 54. • Following a sighting of a blue whale on 18 March 2020 inside the BIA buffer, soft starts of the seismic airgun commenced 6 minutes after the sighting without applying the requirement to observe the whale moving out of the area of impact (10 km) or waiting a period 30 mins without another sighting before commencing soft starts (Nordic Explorer DPR 18 March 2020). This finding indicates that the activity was undertaken contrary to EPS 41. • There were three blue whales observed from No Limitation (support vessel) on 26 Jan 2020 (Sightings 15 and 16), and eight observed from the Nordic Explorer (seismic vessel (sightings 16 and 18)) though none of the sighted whales were detected acoustically from either vessel. Night-time operations were still undertaken on 26 January (2020-01-

	26_Seabird_Daily_Report__1.2_Ver.2). This finding indicates that the survey was undertaken contrary to EPS108. • There were three whale sightings on 1 March that should have resulted in a shutdown though a shutdown was not implemented. In addition, for sighting 41 (Nordic Explorer) a soft start commenced when it should have been delayed as whales were sighted within the 4 km shutdown range. Night time operations were undertaken that night (1652 h to 2400 h) despite whales being present within the shutdown zone (within the preceding 24 hour period (Nordic Explorer DPR 1 March 2020). This finding indicates that the activity was undertaken contrary to EPS 41 and EPS 108. • There were five sighting events and three shutdowns on 3 March 2020, yet acquisition resumed during the night (2048 h until 2400 h; Nordic Explorer DPR 3 March 2020). This finding indicates that the activity was undertaken contrary to EPS 108. • There were three mitigation actions implemented in response to blue whale sightings on 8 April 2020 within the preceding 24 hr period (12 individual whales including 2 mother calf pairs were sighted), yet night-time operations were undertaken between 1805 h and 2128 h that night (2020-08-04 Daily report LQC). This finding indicates that the activity was undertaken contrary to EPS 108.
2.3	**Recommended lines of inquiry for L4 investigation** • The adequacy of the MOC process used to remove the control measure of no operations in the BIA buffer during the month of February (EPS 135). • The implementation of EPSs that relate to whale observation, shut down and re-start procedures noting that only a sample of these were examined during this L3 investigation.
3	**Requirement** Reg 8(1) Operations must not continue if new or increased environmental risk identified (1) A titleholder commits an offence if: (a) the titleholder undertakes an activity i) after the occurrence of: any significant new environmental impact or risk arising from the activity; or any significant increase in an existing environmental impact or risk arising from the activity; and (b) the new impact or risk, or increase in the impact or risk, is not provided for in the environment plan in force for the activity.
3.1	**Conclusion** NOPSEMA inspectors suspect a breach of Regulation 8(1) by continuing operations when there was an increased impact or risk, that is not provided for in the environment plan in force for the activity. By continuing the activity, the titleholder has potentially undertaken an action that had potential for a significant adverse impact on blue whales at a critical life stage and has acted in a manner that is inconsistent with the blue whale CMP.

3.2	**The reasons to support conclusion** • The EP predicted TTS distance of 48 km within the deepest parts of the Operational Area (Table 59, EP). The evaluation of the impacts to blue whales presented in the in force EP determined that the majority of sightings of blue whales between Cape Jaffa and Cape Otway (i.e. within the Operational Area) occur in water depths ≤200 m (Gill et al., 2011 and Figure 26 'Distribution of Blue Whale Sightings, 2002 – 2007' (p164)). The EP also documented that the vast majority (97%, n~1,400) of blue whale sightings have occurred in water depths less than 200 m (see Section 7.2.2.2.5, re information from Expert 6) and concluded that blue whale distribution during the Otway Basin 2DMC MSS is expected to be largely inshore of the survey lines. • The MFO reports indicate there was a total of 58 blue whale sighting events recording 101 blue whales most of which occurred in water depths of 200m or deeper and recorded outside of the BIA within the 10 km maximum observation range that could be achieved in good conditions with <u>two</u> vessels. The last estimate of this population was between ~680 and 1600 individuals (McCauley et al. 2010). Noting that this population utilises two main feeding grounds and likely a portion of the population uses each, this number of animals could be as much as 6-15 % of the animals that utilise this feeding area. • During the survey, it became evident that a higher than expected number of blue whales were being sighted outside the BIA (refer to Jan, Feb MFO reports). Based on the evidence collected and examined, SLB did not consider that the higher than anticipated number of blue whales outside of the BIA resulted in an increase in the portion of the blue whale population at risk of injury and displacement during foraging. • The predicted impact range for injury to blue whales in the in-force EP within the BIA was 7 km for areas inside the BIAs and BIA buffer. However, the predicted range for injury in deeper waters outside the BIA was larger at between 28 and 48 km from the source (according to modelling presented in the EP (section 7.2.2.1.8, p.402-404)). Consequently, for operations outside of the BIA, the range to injury, or zone of impact, could extend as far as 48 km, well beyond the 10 km range within which 64 whales were observed. • Based on the information collected and examined, shutdown mitigation measures were only implemented for 9 of the 64 sightings of blue whales outside the BIA and buffer although: - blue whale foraging outside of the BIA and BIA buffer was indicated by MFOs (sighting 68, Nordic Explorer, MFO daily report 16 March 2019); and - potential for injury was modelled as far as 48 km from the source (Table 59, EP Rev 4). • The Seiche MFO-PAM Final Report concluded that "While blue whales were the main species visually detected during the day, the lower likelihood of their acoustic detection through the night made mitigation ineffective during periods of darkness and/or bad visibility conditions." This finding indicates that MFOs were aware of the ineffectiveness of detection platforms during the survey (p.55).
3.3	**<u>Recommended lines of inquiry for L4 investigation</u>**

	• Why SLB continued to survey without re-evaluating the need for additional control measures when a large number of blue whales (64) were sighting outside of the BIA and buffer. Consider interviewing the [redacted]. • Whether or not the MFOs communicated to SLB that there were significant numbers of whales and ineffective detection methods. Consider interviewing [redacted]. • Why SLB did not consider the EP required revision in accordance with Reg 17(6). • How significant is the portion of blue whales that were likely disturbed / impacted – consider advice from Blue Whale Study or another independent expert.
4	**Requirement** <u>Titleholder response to recommendation 2101-1:</u> *In the event that there are more than three blue whale sightings within the BIA buffer in the preceding 24 hours during the Otway Basin 2DMC MSS, and these sightings have not been detected by the PAM system on either the seismic vessel or support vessel, SLB will implement adaptive management measures.* *If the PAM system is not considered effective, no night time operations within the BIA buffer zone will be allowed until a time that the PAM system can be validated effective for use in detecting blue whales, and the validation requirements are to be in accordance with the approved EP.* *If these adaptive management measures are implemented, night time operations will only be allowed outside of the BIA buffer until a time that PAM has been validated effective for detecting blue whales.* *The reason that the PAM system does not detect blue whales that are sighted by the MMOs could be due to the fact that they are not vocalising. Should vocalising blue whales be detected both visually and acoustically by the PAM system, that will also initiate the adaptive management measures to be implemented and remove the limitation of no night-time operations within the blue whale BIA buffer zone.* *These adaptive management measures will be in place from the outset of the Otway Basin 2DMC MSS and implemented for the duration of the survey.*
4.1	**Conclusion** NOPSEMA undertook a pre-survey inspection of SLB Otway 2D MSS in December 2019 to examine SLB's preparedness arrangements for the survey. During an inspection of the activity in December 2020, SLB made a commitment in response to recommendation 2101-1 which was raised to require SLB to develop an adaptive management process to address whale detections if PAM was not effective (A712364). NOPSEMA inspectors concluded that SLB did not integrate the above commitment into the management procedures and processes for the Otway Basin 2D MSS and subsequently SLB has not

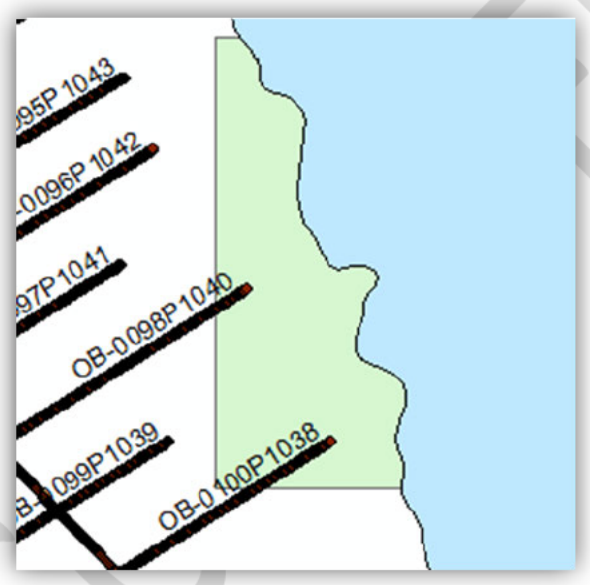
	complied with this commitment. Based on the widespread blue whale sightings during the survey, it is likely that blue whales could have been present within 10km of the seismic source during night time operations inside the BIA and BIA buffer therefore increasing the probability of blue whale injury and / or displacement from a foraging area.
4.2	**Reasons for conclusion** • PAM was not considered effective for blue whale detections as PAM was unable to detect any blue whale presence despite the presence of 101 blue whales from 58 sighting events, and a further 23 unidentified large whales being observed during the survey (Seiche MFO-PAM Final Report, Table 14 & 15). The only detection method available to SLB during the survey was visual observation from the seismic vessel and single support vessel. • Based on the information within the MFO daily reports and Appendices A and B of the Seiche Environment Report, there were three blue whales observed from No Limitation on 26 Jan 2020 (Sightings 15 and 16), and eight observed from the Nordic Explorer (sightings 16 and 18). These sightings resulted in a shut down and were not detected acoustically. According to SLB's response to recommendation 2101-1, from this point forward there should have been no further night time operations within the BIA buffer and should not have resumed night time operations 'until a time that PAM has been validated effective for detecting blue whales'. • The seismic survey had continued on full power throughout the MSS up to the BIA boundary (i.e. within the 10 km BIA buffer) during the night and in low visibility conditions following the four sightings on 26 January 2021 that were not detected acoustically. This included line 104 which ran near parallel to the BIA boundary. NOPSEMA questioned why SLB did not implement adaptive management within 10km of the PBW BIAs given the large number of blue whale sightings and the absence of a detection method for night-time operations. SLB responded by claiming that PAM was validated for sperm whales and therefore considered validated for blue whales. NOPSEMA inspectors responded by clarifying that PAM had not been validated as effective for detecting blue whales given there was not a single acoustic detection of blue whales although there had been 101 individual blue whales visually detected over the course of the survey.
4.3	**<u>Recommended lines of inquiry for L4 investigation</u>** • Whether the above control measure (committed to in response to NOPSEMA recommendation 2101-1) was integrated into SLB management system and procedures. If not, why not and who was responsible? • Who determined that PAM had been validated as suitable for blue whale detections enabling the survey to continue throughout the night in the BIA buffer? • Did MMOs communicate the significant number of whales SLB and express concern? Consider interview [redacted] that were present on both the Nordic Explorer and the No Limitation.

	• Interviews with [redacted] to determine what advice was provided and to who in relation to PAM validation for the purpose of blue whale detection.
5	**Potential contravention of the EPBC Regulations 2000**

5.1	**Requirements**
	EPBC Regulation 8.05 of the EPBC Regulations 2000 requires that a vessel must:
	• Maintain a caution zone of 150 metres for a dolphin and 300m for a whale
	• Operate the vessel of a constant speed of less than 6 knots
	• Make sure that the vessel does not approach closer than 50 m to a dolphin or 100m to a whale
	• Make sure that the vessel does not restrict the path of the cetacean
	• Make sure the vessel is not used to pursue the cetacean.
	
	EPBC Regulation 8.06 of the EPBC Regulations requires that a vessel must:
	• If a calf appears within an area that means the vessel is then within the caution zone of the calf, the person:
	  • must immediately stop the vessel; and
	  • must: (i) turn off the vessel's engines; or (ii) disengage the gears; or (iii) withdraw the vessel from the caution zone at a constant speed of less than 6 knots.
	
	Section 229B of the EPBC Act
	The Australian Whale Sanctuary was established in 2000 to help protect whales, dolphins and porpoises within the Commonwealth marine area. It includes all marine areas beyond the Coastal Waters of each state (beyond 3 NM) out to the edge of Australia's EEZ (to 200 NM).
	(1) A person is guilty of an offence if: (a) the person takes, trades, keeps, moves or interferes with a cetacean; and (b) the cetacean is in: (i) the Australian Whale Sanctuary (but not the coastal waters, or a part of the coastal waters, of a State or the Northern Territory for which a declaration under section 228 is in force); or (ii) waters beyond the outer limits of the Australian Whale Sanctuary.

5.2	**Conclusion** There is reasonable suspicion that the MV No Limitation undertook actions that were in contravention of Regulation 8.05 and 8.06 of the EPBC Regulations. Further information on whether this action was undertaken at the direction of SLB, a third party contractor or at the discretion of [redacted] remains unknown. It is also not clear whether engines were cut or gears were disengaged. Interviews with [redacted] are likely to be needed in order to understand the extent of potential non-compliances.

5.3	**Reasons to support conclusion** NOPSEMA inspectors examined the evidentiary information collected during the inspection and made the following finding: • On four occasions in January 2020 (26th, 27th, 28th and 29th Jan) the support vessel was released from 'guard duty' to 'investigate' whale sightings in an attempt to obtain validation of the passive acoustic monitoring cetacean detection method. The support vessel changed direction to transit to a location where whales were sighted and deployed the PAM cable. • On 26 January, there were three sighting events and three times the support vessel appeared to have been asked to alter course to try for a PAM validation (1223 h, 1545 h and 1800 h). A behavioural avoidance response was documented during the third encounter that ended with the whale diving and disappearing. • On 29 January 2020 the support vessel transited to an area where blue whales were sighted and the PAM cable was deployed in an attempt to acoustically detect blue whales. The support vessel was within 80m of the blue whales and appeared to stay with the whales for 3 hours. • One of blue whale sighting on 26 January was initially thought to be one animal when observed from support vessel, but was subsequently confirmed by seismic vessel to be a mother and calf pair (sighting at 1223 h). The third sighting of the day (1800 h) was also observed to be an adult and juvenile whale (NL sighting 16, within 300 m at 1800 h based on JNCC [redacted] observation table) which is also the sighting event that appears to have resulted in an avoidance response based on the [redacted] daily report for 26 Jan 2020). There is no record to verify that the vessel attempted to disengage or turned off engines in this encounter. On 19 August 2021 NOPSEMA inspectors questioned whether there was a permit under the EPBC Regulations that the [redacted] was operating under that enabled the support vessel to remain within close proximity to a listed species for a protracted period (i.e. 80m for 3 hrs). SLB responded by claiming that at no point during the survey did the vessel follow or approach whales to acquire a PAM validation. NOPSEMA inspectors noted that this response does not align with the daily logs in the [redacted] reports (for 26-29 January 2020) and JNCC sighting datasheet. SLB also confirmed that there was no EPBC permit to exempt SLB / vessel contractors from complying with EPBC Regulations.
5.5	**Recommended lines of inquiry for L4 investigation** • Understand who directed the PAM operators to approach whales for a PAM validation • Information from MV No Limitation Logs to determine whether engine was cut or gears disengaged during encroachment into whale exclusion area. Consider interviewing the [redacted] on duty 26 - 29 Jan 2020.
6	**Section 242 OPGGS Act**

	A petroleum access authority authorises the registered holder, in accordance with the conditions (if any) to which the authority is subject, to carry on, in the authority area, the operations specified in the authority.
6.1	**Conclusion** SLB undertook a petroleum activity in title T-49P without obtaining a petroleum access authority from NOPTA.
6.2	**Reasons to support conclusions** • There are two lines which crossed into permit T/49P: OB-0098P1040 and OB-0100P1038, and LINE OB-0098P1040. • There are 77 shots which are with the T/49P permit. • The SP ranges are 9862-9786. • The length of the line in title is ~1.9km. • In the image below the shot-points highlighted in blue have no pressure values recorded.  Figure 6 - 77 full pressure airgun shot points were recorded inside T-49P confirming that full acquisition took place in another title without an access authority (Figure 6).
6.3	**Recommended lines of inquiry for L4 investigation** • Liaison with NOPTA to determine whether NOPTA would like to be involved in the investigation (noting NOPSEMA inspector appointments are still in place).

Inspectors Recommendations

- Escalate to a Level 4 Investigation to ascertain the full extent of the offences and degree of culpability (if civil or criminal prosecution is potentially warranted).
- Utilise information sharing provisions (section 695X OPGGS Act) to share a copy of the interim investigation report and associated evidence with DAWE for consideration in context of potential EPBC Act/EPBC Regulation contraventions.

Abbreviations

BIA	Biologically important area defined in Blue whale CMP and National Conservation Values Atlas
CMP	Conservation management plan
EP	In force environment plan
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
EPBC Regulations	Environmental Protection and Biodiversity Conservation Regulations 2002
MFO	Marine fauna observer
MOC	Management of change process
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Administrator
OPGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act 2006
OPGGS(E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
PAM	Passive acoustic monitoring
PBW	Pygmy blue whale
PTS	Permanent threshold shift

RON	Representative of NOPSEMA
RP Act	Regulatory Powers (Standard Provisions) Act 2014
SLB	Schlumberger Australia Pty Ltd
TTS	Temporary threshold shift