Environment Plan Summary

Quoll

3D Marine Seismic Survey

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Searcher Seismic

Document Status

Version	Purpose of Document	Orig	Review	Review Date	Release Approval	Issue Date
Draft A	*Draft for Internal Review*	*WarChi*	*GreTer*	*24.6.15*		
Draft B	*Draft for Internal Review*	*WarChi*	*PauMil*	*25.6.15*		
Rev 0	*Final for Submission*	*WarChi*	*PauMil*	*25.6.15*	*PauMil*	*25.6.15*

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Acronyms and Abbreviations

3D	Three dimensional
AHS	Australian Hydrographic Service
AMSA	Australian Maritime Safety Authority
CA	Combat Agency
DFaT	Department of Foreign Affairs and Trade
DMP	Department of Mines and Petroleum
DoF	Department of Fisheries
EP	Environment Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MSS	Marine Seismic Survey
NATPLAN	Australian National Plan for Maritime Environmental Emergencies
NOPSEMA	National Offshore Petroleum end Environmental Management Authority
NOPTA	National Offshore Petroleum Titles Administrator
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPGGS(E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
RCC	Rescue Coordination Centre
SOPEP	Shipboard Oil Pollution Emergency Plan
WAFIC	Western Australian Fishing Industry Council

1.0 Introduction

Searcher Seismic Pty Ltd (Searcher) proposes to undertake a three-dimensional (3D) marine seismic survey (MSS), the Quoll 3D MSS, within petroleum permit AC/P 55, southern Bonaparte Basin. The Quoll 3D MSS is considered to be a petroleum activity under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) and is subject to the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS(E) Regulations), which require an Environment Plan (EP) in relation to the Quoll 3D MSS be accepted prior to commencing the activity. Searcher has developed an EP for the Quoll 3D MSS, which has been accepted by the National Offshore Petroleum end Environmental Management Authority (NOPSEMA) on 16 June 2015. This EP summary is intended to inform the public about the Quoll 3D MSS and demonstrate that the survey is carried out in accordance with the OPGGS(E) Regulations.

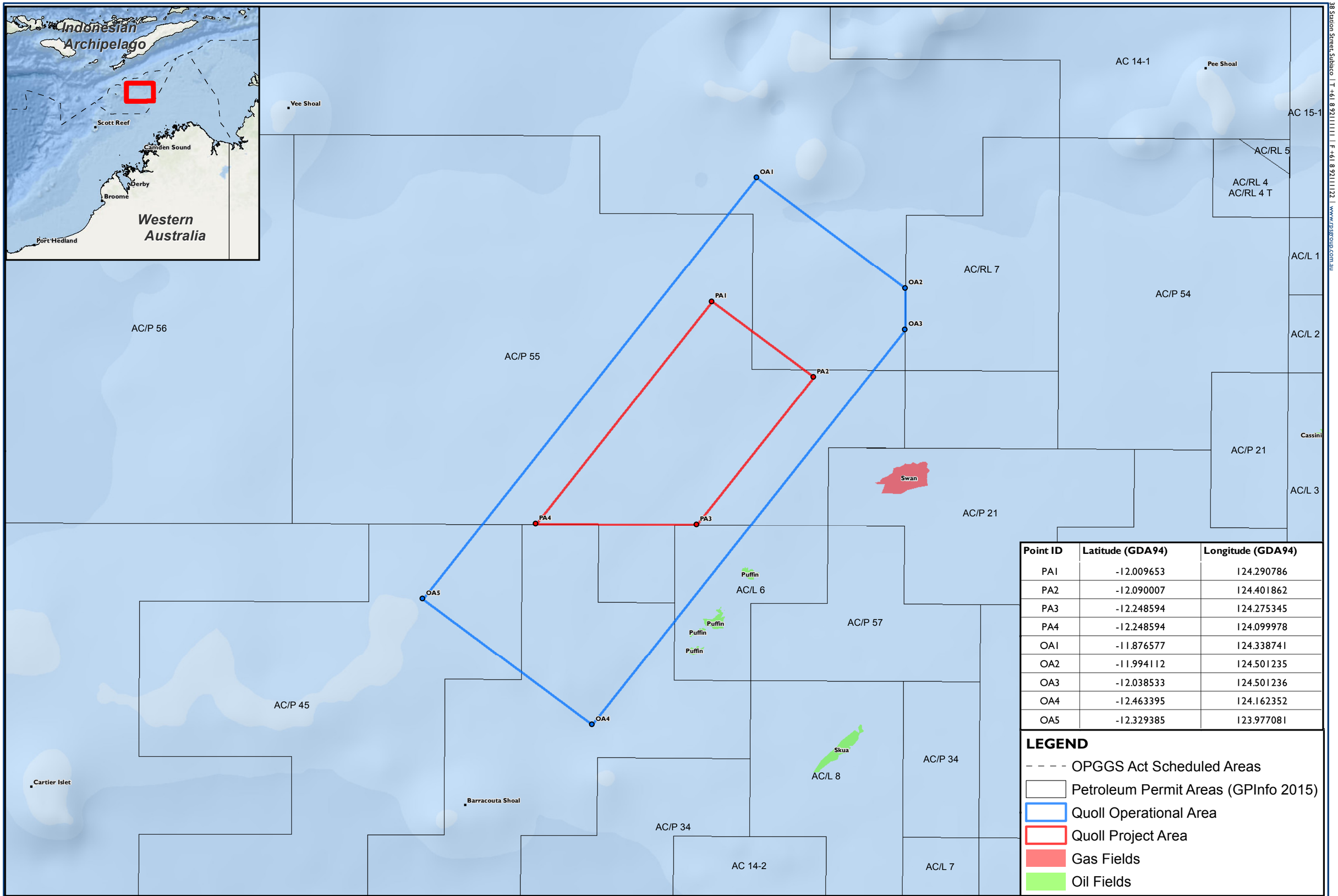
2.0 Location of the Activity

The area over which seismic data will be acquired covers approximately 419 km^2 located entirely within permit area AC/P 55, southern Bonaparte Basin, which lies in the Timor Sea off northern Western Australia. Water depths in the project area range from approximately 60 to 120 m. The project area is bounded by the coordinates listed in Table 2-1 and is shown in Figure 2-1. Seismic data acquisition will be restricted to the project area, with the operational area shown in Figure 2-1 providing a buffer for activities such as line turns and lead ins. The output of the seismic array will be reduced during line turns and will be shut down for turns longer than two hours.

Table 2-1: Coordinates of Quoll Project Area (GDA94)

Point ID	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
PA1	-12.009653	124.290786
PA2	-12.090007	124.401862
PA3	-12.248594	124.275345
PA4	-12.248594	124.099978

The Quoll 3D MSS lies entirely within Commonwealth waters, within the outer Sahul Shelf region of the Timor Sea, approximately 50 km east of Cartier Island (Figure 2-1). The nearest point on the Australian mainland from the project area is Cape Bougainville, approximately 260 km to the south-east, and the nearest town is Derby, approximately 560 km south of the project area. To the north of the operational area lies the Indonesian Archipelago, with Rote Island lying approximately 185 km north-west of the project area.



Point ID	Latitude (GDA94)	Longitude (GDA94)
PA1	-12.009653	124.290786
PA2	-12.090007	124.401862
PA3	-12.248594	124.275345
PA4	-12.248594	124.099978
OA1	-11.876577	124.338741
OA2	-11.994112	124.501235
OA3	-12.038533	124.501236
OA4	-12.463395	124.162352
OA5	-12.329385	123.977081

LEGEND

- OPGGS Act Scheduled Areas
- Petroleum Permit Areas (GPInfo 2015)
- Quoll Operational Area
- Quoll Project Area
- Gas Fields
- Oil Fields

RPS

Job Number: N1500201
Doc Number: 008
Date: 18.06.15
Scale: 1:400,000 @ A3
Created by: WC
Source: Searcher 2014, GPInfo 2015, ESRI 2015

GDA 1994 MGA Zone 51

0 5 10 20 30 40 km

Figure 2-1

Quoll 3D MSS Project and Operational Areas

38 Station Street, Subiaco | T +61 8 9211 1111 | F +61 8 9211 1122 | www.rpsgroup.com.au

3.0 Description of the Receiving Environment

3.1 Physical Environment

The operational area is situated on the Ashmore Platform, which lies on the western edge of the Bonaparte Basin, Timor Sea. The depths in the project area range between 60 and 120 m. Sediments in the operational area consist of silty sands, which may be interspersed by areas of sedimentary rock. Beyond the shelf break, the continental slope into the Timor Trough has a steep gradient, with depths >2,000 m at the base of the trough.

There are a number of islands, subtidal reefs, banks and shoals in the vicinity of the Quoll 3D MSS operational area, the closest of which (Vulcan Shoal) lies 40 km to the south of the Quoll 3D MSS operational area. The relatively shallow depths of these features (compared to surrounding deeper waters) supports benthic primary producers such as zooxanthellate corals and algae, along with as well as bare sand and coral rubble habitat (Heyward et al. 1997, Skewes et al. 1999a, 1999b). Such communities support a range of biota including reef fish and sea snakes (Skewes et al. 1999a).

The Timor Sea region experiences two distinct seasons – the north-west (summer) monsoon (November to March) and the south-east (winter) monsoon (April to September), with a short transitional period between each season (Pinceratto 1997). Most rainfall is restricted to the relatively short summer monsoon period and is associated with storm activity (Commonwealth of Australia 2002). Winds during the summer monsoon are typically westerly to north-westerly and humid; while during the winter monsoon winds are typically drier south-easterlies which originate from over the Australian mainland (Pinceratto 1997).

Surface currents show a strong seasonal component and are linked to the seasonal monsoonal winds. Tides in the region are semi-diurnal (two high and two low tides each day), with tidal currents of 0.6 and 0.2 m/s for spring and neap tides, respectively (Pinceratto 1997).

3.2 Biological Environment

Pelagic habitats in the vicinity of the Quoll 3D MSS host phytoplankton, zooplankton, and pelagic organisms. Given the oceanography of the operational area, pelagic communities in the vicinity of the operational area are expected to be broadly represented in the region. Planktonic biota support larger pelagic organisms such as fishes, which in turn support fauna such as seabirds.

The majority of benthic habitats in the vicinity of the operational area of the Quoll 3D MSS consist of unconsolidated sandy sediments. Such habitats are well represented in the broader region (Pinceratto 1997; Smith et al. 1997), with sediment infauna communities in the region dominated by polychaetes and crustaceans.

The region hosts a range of marine species such as fishes, sharks, rays, cetaceans and seabirds. A search of Quoll 3D MSS operational area using the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool indicated that threatened and migratory species considered to be matters of national environmental significance may occur in the region, including:

- four species of shark
- one species of ray

- six species of turtle
- seven species of cetacean
- six species of seabird.

Two biologically important areas overlap the Quoll 3D MSS operational area:

- whale sharks – foraging
- seabirds – foraging.

3.3 Values and Sensitivities

3.3.1 Protected Areas

Two Commonwealth Reserves lie within the vicinity of the operational area (distances from the Quoll 3D MSS operational area in brackets):

- Cartier Island Commonwealth Marine Reserve (44 km to the west)
- Ashmore Reef Commonwealth Marine Reserve (77 km to the west).

3.4 Socio-economic Environment

3.4.1 Heritage

There are no known culturally significant values (e.g. indigenous heritage, national or international heritage properties, historic shipwrecks etc.) within the immediate vicinity of the Quoll 3D MSS operational area.

3.4.2 Fishing

Management areas for several Commonwealth (Australian Fisheries Management Authority (AFMA)) and Western Australian (Department of Fisheries (DoF)) commercial fisheries overlap the operational area of the Quoll 3D MSS (Table 3-1). Historically, commercial fishing effort in the vicinity of the operational area (i.e. the oceanic shoals offshore ecosystem fisheries management unit) has been considered to be low (DoF 2014) and interactions with commercial fishers during the Quoll 3D MSS are considered to be unlikely.

Table 3-1: Managed Fisheries that Overlap the Quoll 3D MSS Operational Area

Fishery Management Agency	Managed Fishery
AFMA	North-West Slope Trawl Fishery
AFMA	Southern Bluefin Tuna Fishery
AFMA	Western Skipjack Fishery
AFMA	Western Tuna and Billfish fishery
DoF	North Coast Prawn Managed Fisheries
DoF	Northern Demersal Scalefish Fishery
DoF	Mackerel Managed Fishery
DoF	North Coast Shark Fishery

The area subject to the Australia–Indonesia Memorandum of Understanding regarding the Operations of Indonesian Traditional Fishermen in Areas of the Australian Fishing Zone and Continental Shelf – 1974 (1974 MOU Box) lies approximately 24 km to the west of the Quoll 3D MSS operational area.

Recreational fishing effort in the vicinity of the Quoll 3D MSS is expected to be very low given the distance from mainland Australia.

3.4.3 Shipping

A review of the Australian Maritime Safety Authority (AMSA) Vessel Tracking Data spatial data set (AMSA 2015) covering the Quoll 3D MSS operational area indicated that relatively low density commercial shipping may transit the operational area. However, the operational area does not cover a recognized high density shipping route, with the main international shipping routes over 200 km to the west of the operational area.

Of note are the planned decommissioning activities on the Puffin field during 2015, which lies approximately 18 km east of the Quoll 3D MSS operational area. To date the schedule for these activities has not been finalised, however consultation with Sinopec O&G Australia (Puffin) P/L (Sinopec) has indicated their intention to undertake decommissioning in 2015. Decommissioning of the Puffin field is expected to result in increased commercial shipping activity in the vicinity of the Puffin field. Sinopec have not raised any objections to the Quoll 3D MSS to date during Searcher's negotiation for access authority to Permit AC/L 6.

3.4.4 Tourism

Given the distance from the Australian mainland and emergent features such as Ashmore Reef, tourism in the vicinity of the Quoll 3D MSS is not expected to occur. Recreational boating in the vicinity of the Quoll 3D MSS may consist of cruising yachts sailing between northern Australia and Indonesia. Such vessels may be present in very low numbers, with data indicating there were zero and 12 yachts recorded at Ashmore Reef in August in 2001 and 2002, respectively (Russell et al. 2004).

3.4.5 Petroleum

The Quoll 3D MSS will acquire seismic data in the project area within AC/P 55, but will undertake associated activities (i.e. soft starts, run-outs and turns) within a larger operational area which will run across several permit areas. The permit areas within and immediately adjacent to the operational area are listed in Table 3-2. There are no operating platforms within the operational area.

Table 3-2: Operators and Titles with Permits that Overlap the Quoll 3D MSS Operational Area

Permit Titles	Titleholders
AC/P 55	Finder No. 13 P/L
AC/P 45	Finder No. 11 P/L
AC/L 6	Sinopec O&G Australia (Puffin) P/L
AC/RL 7	PTTEP Australasia (Ashmore Cartier) P/L

4.0 Description of the Activity

4.1 Survey Vessel

Searcher proposes to conduct the Quoll 3D MSS using a purpose built seismic survey vessel, the *BGP Explorer*. The *BGP Explorer* has current certification/registration consistent with International Maritime Organisation requirements for a vessel of this size and purpose, including International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 (MARPOL) requirements.

The vessel has implemented and tested the Shipboard Oil Pollution Emergency Plan (SOPEP), in accordance with Regulation 37 of Annex 1 of MARPOL. The vessel carries a maximum number of 49 people on-board.

The *BGP Explorer* proposes to use a Marine Gas Oil (MGO) fuel and does not utilise heavy fuel oil.

No refuelling or crew transfers at sea are planned during the activity due to the relatively short duration of the acquisition program.

4.2 Seismic Data Acquisition

The *BGP Explorer* will traverse a series of sail lines in the project area at speed between four and five knots. As the vessel travels along the survey lines, a series of acoustic pulses, generated by an airgun array, will be directed down through the water column and seabed. The released sound is attenuated and reflected at geological boundaries and the reflected signals are detected using sensitive hydrophones arranged along a number of cables (streamers) towed behind the seismic vessel. The reflected sound is then processed to provide information about the structure and composition of geological formations below the seabed in an attempt to identify hydrocarbon reservoirs. The number of lines to be acquired is yet to be finalised, however will be sufficient to cover the project area shown in Figure 2-1.

At the end of each survey line, the vessel will turn with a sufficiently large arc to avoid letting the streamers sink to a depth where there is a risk of entanglement with seabed features. The seismic source will be powered down to the lowest power setting when not collecting data (i.e. on line turns) and will fire a single airgun for line turns of less than two hours duration. For longer line turns in excess of two hours, the source will be shut down and soft start procedures would be followed once the vessel reaches the next new line.

Hydrophones used to detect reflected sound energy impulses will be mounted in an array of four solid streamers that will be towed behind the survey vessel. The streamers will have a maximum active length of 4,500 m and they will be towed with a separation of 100 m between each streamer, resulting in a total streamer spread of 300 m. The streamers will be towed at a depth of between 6 and 9 m. Each streamer will be fitted with a clearly visible tail buoy to maintain depth and facilitate identification of the streamer. All tail buoys will be fitted with turtle guards to reduce the risk of entanglement of marine fauna. The streamers will be fitted with self-inflating Streamer Recovery Devices at regular distance intervals along each streamer that will return them to the surface in the event they sink below a predefined depth.

4.3 Timing of the Activity

The Quoll 3D MSS is expected to take 16 days and will occur between July and December 2015, pending vessel availability. Seismic data will be acquired over a 24-hour period, with shut-downs as required. Should the timing of the activity be altered beyond this period, Searcher will contact all identified relevant stakeholders to provide updated information on the revised timing of the Quoll 3D MSS.

5.0 Assessment of Environmental Risks and Impacts

Searcher's risk management process is based on the principles, framework and processes defined by the International Standards Organization (ISO) 31000:2009 Risk Management – Principles and Guidelines. These are described in Searcher's Risk and Hazard Management Procedure HSE-PRO-01, which was applied during the assessment of the environmental impacts and risks associated with the Quoll 3D MSS. The environmental risk identification and assessment process for the Quoll 3D MSS consisted of the following:

- Establish the context:
  - determine the characteristics, nature and scale of the Quoll 3D MSS
  - review the existing physical, biological and socio-economic environment
  - identify and review the relevant legislation, conventions and other requirements that may apply
- Identify the risks:
  - identify and review all of the credible sources of environmental risk that may arise during routine and non-routine operations in relation to the Quoll 3D MSS. This was primarily done during an environmental hazard identification (EnvID) workshop involving operational staff and environmental scientists experienced in assessing environmental risk.
- Analyse and evaluate each of the identified risks as follows:
  - determine the inherent level of risk by:
    - determining the consequence of each risk with no controls in place on the existing environment was determined (i.e. the inherent consequence)
    - determining the likelihood of each risk becoming realised with no controls in place was then determined (i.e. the inherent likelihood)
    - determine the inherent risk based on the inherent consequence and likelihood
  - identify and apply control measures to reduce consequence and likelihood by considering:
    - relevant codes and standards
    - industry good practice
    - engineering judgement
    - risk based analysis
    - company values
    - societal values
  - determine the residual level of risk by:
    - determining the consequence of each risk with the identified controls in place on the existing environment (i.e. the residual consequence)
    - determining the likelihood of each risk becoming realised with the identified controls in place (i.e. the residual likelihood)
    - determine the residual risk based on the residual consequence and likelihood
  - assess the residual risk to determine (given the nature and scale of the activity) if Searcher consider the risk to be:
    - as low as reasonably practicable (ALARP)
    - acceptable
  - continue to apply controls to each of the identified risks until the risk was deemed to be ALARP and acceptable.

5.1 ALARP and Risk Acceptability

When applying additional controls during the risk assessment process, a risk was considered to be managed to ALARP if:

- the cost (e.g. time, expense) associated with implementation of additional controls was grossly disproportional to the environmental benefit
- the additional controls were impractical to implement without jeopardising the Quoll 3D MSS objectives or viability
- the additional controls had the potential to generate additional environmental impacts
- an additional control introduced adverse operational, safety and / or health issues.

Following the risk assessment process, Searcher's senior management reviewed the risks, impacts and control measures to determine whether a risk was acceptable. The process of acceptance was based upon:

- Searcher's internal context (i.e. consistency with Searcher's policies, values and standards)
- legislative requirements (including laws, policies, standards, conventions)
- the principles of ecologically sustainable development
- the particular values and sensitivities potentially affected by activities associated with the Quoll 3D MSS
- stakeholder expectations
- application of all relevant industry best practice measures.

All of the environmental hazards, potential impacts and risks, and the control measures in place for the Quoll 3D MSS are shown in Table 5-1.

Table 5-1: Hazards, Potential Environmental Impacts and Risks and Control Measures for Routine and Non-routine Operations

Hazard	Impacts and Risks	Inherent Risk			Controls	Residual Risk		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Risks from Routine Operations								
Artificial light spill	Disorientation, attraction or repulsion of sensitive marine fauna disruption to natural behavioural patterns and cycles.	Unlikely	Minor	Acceptable	External lights directed onto deck / work areas. External vessel lighting is to be minimised where possible while maintaining appropriate lighting for safe navigation, in compliance with the *Navigation Act 2012* and Chapter 5 of the SOLAS Convention.	Unlikely	Minor	Acceptable
Atmospheric emissions	Temporary, localised decrease in air quality	Rare	Minor	Acceptable	On board maintenance program implemented for all engines and equipment. Reduced emission engine design. The survey vessel will have a valid International Air Pollution Prevention Certificate and corresponding Australian legislation. Use of low sulfur MGO (or lighter) grade of fuel oil for main engines	Rare	Minor	Acceptable
Deck and bilge water drainage	Localised, short duration decrease in water quality (toxicity to marine fauna).	Possible	Minor	Acceptable	All routine discharges to be made while the vessel is underway. Deck drains in place with drain scuppers in place and scupper plugs available. No routine discharges to be made within 12 NM of land. Oil–water separator on board consistent with MARPOL Annex 1 Regulation 15 requirements (<15 ppm hydrocarbons in discharge water), with all bilge water treated prior to discharge. Separated oil to be stored on board and disposed of onshore at an appropriate waste management facility. Vessel will hold a valid International Oil Pollution Prevention Certificate	Unlikely	Minor	Acceptable
Interference with other marine users	Temporary displacement of other marine users.	Possible	Moderate	Acceptable	Access agreements will be agreed with oil and gas titleholders. AMSA RCC to be notified of survey vessel movements and intentions to allow for survey activities to be included in AMSA navigation warnings. Other users to be advised of any items lost overboard that may pose a navigational hazard. Qualified bridge crew maintaining adequate bridge watch, monitoring vessel position and depth at all times during the activity. Stakeholder consultation process consistent with OPGGS (E) Regulations implemented prior to, during, and after the survey. Survey vessel will be compliant with Marine Orders Part 30: Prevention of Collisions (Issue 8) and Marine Orders Part 21: Safety of navigation and emergency procedures, Issue 8. Tail buoys clearly marked to identify streamer(s). The AHS advised of the survey details (survey location, timing) at least three weeks prior to mobilisation and following demobilisation for issue of Notice to Mariners. Vessel to maintain appropriate lighting, navigation and communication at all times in accordance with SOLAS requirements.	Unlikely	Minor	Acceptable
Introduction of marine species from biofouling and ballast water	Increased maintenance of vessels and marine infrastructure. Alteration of natural ecological processes. Competition, predation or displacement of native species.	Possible	Moderate	Acceptable	Adherence with National Biofouling Management Guidance for the Petroleum Production and Exploration Industry Biofouling considered a potential IMS to be reported to relevant government agency and treated in accordance with agency instructions (e.g. killed with a biocide). No discharge of ballast water (unless in an emergency) Routine cleaning and inspection of all wet equipment (e.g. airgun array, streamers, workboats) as required during the activity. Unplanned ballast water exchanges to be consistent with Australian Ballast Water Management Requirements. Use of freshwater ballast Vessel to have a certified recent antifouling coating on the hull which is in sound condition.	Rare	Moderate	Acceptable
Sewage, grey water and putrescible waste discharge	Localised, short duration decrease in water quality (increased nutrients, turbidity and biological oxygen demand).	Possible	Minor	Acceptable	All routine discharges to be made while the vessel is underway. Functional food scraps comminutor / macerator on board that can reduce particle size to <25 mm, consistent with MARPOL Annex V and vessel Garbage Management Plan. Functional sewage treatment system on board that complies with Regulation 9 of MARPOL Annex IV No routine discharges to be made within 12 NM of land. Storage / holding facilities on board for all routinely discharged wastes. Use of biodegradable detergents in galley and laundry Vessel to hold a valid International Sewage Pollution Prevention (ISPP) Certificate. Vessel will implement a Garbage Management Plan consistent with requirements of MARPOL Annex V.	Unlikely	Minor	Acceptable

Hazard	Impacts and Risks	Inherent Risk			Controls	Residual Risk		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Underwater noise from operation of seismic source	Physical injury to auditory tissues or other air-filled organs. Hearing loss; temporary threshold shift or permanent threshold shift. Direct behavioural effects through disturbance or displacement and consequent disruption of natural behaviours or processes, e.g. migration, resting, calving. Indirect behavioural effects by impairing/masking the ability to navigate, find food or communicate or by affecting the distribution or abundance of prey species.	Possible	Serious	Tolerable	Array designed to direct sound energy downward to reduce horizontal energy spreading. Avoid simultaneous seismic surveys, with time share operations implemented if required. EPBC Act Policy Statement to be applied to whale sharks. Implementation of EPBC Act Policy Statement 2.1 Part A – Standard Management Procedures Low power zone for implementation of EPBC Act Policy Statement 2.1 increased from 1 to 2 km. Monitoring for marine fauna to be carried out continuously during all seismic survey activities conducted in daylight hours. Relocation of survey activities (if feasible) if three shutdowns within 24 hours are recorded within an area (~10 km radius). Select smallest practicable seismic array capable of meeting survey objectives Vessel crew are inducted in their responsibilities as required regarding vessel / marine fauna interactions.	Unlikely	Moderate	Acceptable
Underwater noise from vessel operations	Indirect behavioural effects by impairing/masking the ability to navigate, find food or communicate or by affecting the distribution or abundance of prey species. Direct behavioural effects through disturbance or displacement and consequent disruption of natural behaviours or processes, e.g. migration, resting, calving.	Possible	Minor	Acceptable	Interaction between vessels and cetaceans will be consistent EPBC Regulations 2000 – Part 8 Division 8.1 (Regulation 8.04) – Interacting with cetaceans. On-board maintenance program implemented for all engines and equipment.	Unlikely	Minor	Acceptable
Risks from Non-routine Operations								
Collision with or entanglement of marine fauna	Potential injury to, or death of, marine fauna.	Possible	Moderate	Acceptable	Interaction between vessels and cetaceans will be consistent EPBC Regulations 2000 – Part 8 Division 8.1 (Regulation 8.04) – Interacting with cetaceans. Implementation of EPBC Act Policy Statement 2.1 Part A – Standard Management Procedures Monitoring for marine fauna to be carried out continuously during all seismic survey activities conducted in daylight hours. Vessel crew are inducted in their responsibilities as required regarding vessel / marine fauna interactions. Tail buoys fitted with turtle guards. All entangled fauna recovered to be released into the sea.	Unlikely	Moderate	Acceptable
Loss of oily wastes / chemical spills	Localised, short duration decrease in water quality (increased nutrients, turbidity and biological oxygen demand). Localised, short duration decrease in water quality (toxicity to marine fauna).	Rare	Minor	Acceptable	All hydrocarbons / chemicals stored on deck to have secondary bunding in place. Compliance with MARPOL Annex I Regulation 37 (as implemented under Australian legislation) – vessel to implement SOPEP. Deck drains in place with drain scuppers in place and scupper plugs available. Deck equipment using hydrocarbons (e.g. winches) to have secondary spill containment in place (e.g. channelling on deck) Minor oil / lubricant spills will be mopped up immediately with absorbent materials, with used sorbent material disposed of onshore as hazardous waste. Oil–water separator on board consistent with MARPOL Annex 1 Regulation 15 requirements (<15 ppm hydrocarbons in discharge water), with all bilge water treated prior to discharge. OPEP to be implemented in the event of an oil spill. Separated oil to be stored on board and disposed of onshore at an appropriate waste management facility. Solid or gel filled streamer(s) to be used. Spill kits available on board for responding to small (<80 L) spills. Vessel will hold a valid International Oil Pollution Prevention Certificate	Rare	Minor	Acceptable
Loss of solid hazardous / non-hazardous wastes	Potential injury to, or death of, marine fauna. Localised, short duration decrease in water quality (toxicity to marine fauna). Localised disturbance to/loss of benthic habitat and associated biota in the area disturbed.	Rare	Minor	Acceptable	All non-hazardous and hazardous solid wastes to be returned to shore for disposal by a licensed waste management contractor. Any lost equipment or wastes will be recovered where safe and practicable to do so. Compliance to MARPOL 73/78 Annex V Regulation 10.2 (waste storage and segregation) and 10.3 (garbage record book). Garbage Management Plan to be implemented, with crew informed of responsibilities outlined in the plan. Hazardous materials to be stored in appropriate storage on board (e.g. chemical store). Hazardous wastes materials will be handled and stored in accordance with the corresponding MSDS. Other users to be advised of any items lost overboard that may pose a navigational hazard. Suitable storage for recyclable / non-recyclable wastes on board survey vessel consistent with Garbage Management Plan.	Rare	Minor	Acceptable

Hazard	Impacts and Risks	Inherent Risk			Controls	Residual Risk		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Oil spills	Temporary displacement of other marine users. Injury to or death of marine organisms from physical effects from hydrocarbons (e.g. smothering). Injury to or death of marine organisms from acute and/or chronic toxicity to marine and intertidal biota from hydrocarbons.	Rare	Major	Tolerable	Adequate financial assurance arrangements in place to cover liability associated with hydrocarbon spill scenario.	Rare	Serious	Acceptable
					All fuel tanks can be isolated and contents transferred between them.			
					AMSA RCC to be notified of survey vessel movements and intentions to allow for survey activities to be included in AMSA navigation warnings.			
					Compliance with MARPOL Annex I Regulation 37 (as implemented under Australian legislation) – vessel to implement SOPEP.			
					No refuelling at sea during the activity.			
					OPEP to be developed for the activity, including testing arrangements and crew inductions.			
					OPEP to be implemented in the event of an oil spill.			
					Qualified bridge crew maintaining adequate bridge watch, monitoring vessel position and depth at all times during the activity.			
					Survey activities to be undertaken only during suitable weather conditions.			
					Survey vessel will be compliant with Marine Orders Part 30: Prevention of Collisions (Issue 8) and Marine Orders Part 21: Safety of navigation and emergency procedures, Issue 8.			
					The AHS advised of the survey details (survey location, timing) at least three weeks prior to mobilisation and following demobilisation for issue of Notice to Mariners.			
					Use of low sulfur MGO (or lighter) grade of fuel oil for main engines			
					Vessel to maintain appropriate lighting, navigation and communication at all times in accordance with SOLAS requirements.			
Seabed disturbance	Localised disturbance to/loss of benthic habitat and associated biota in the area disturbed.	Rare	Minor	Acceptable	Any lost equipment or wastes will be recovered where safe and practicable to do so.	Rare	Minor	Acceptable
					No routine anchoring during the activity.			
					Operational procedures for deployment / recovery of towed equipment.			
					Redundant propulsion systems on board survey vessel available in the event of propulsion loss.			
					Redundant tow point present on streamer to retain streamer in the event of primary attachment failure.			
					Streamer will be cleaned when biofouling presents a significant risk to streamer integrity.			
					Tail buoys clearly marked to identify streamer(s).			

6.0 Summary of Environmental Management Approach

6.1 Environmental Performance Outcomes, Performance Objectives and Measurement Criteria

For each of the credible sources of environmental risk identified during the risk assessment for the Quoll 3D MSS, Searcher has developed one or more environmental performance outcomes. Additionally, Searcher has developed environmental performance standards and measurement criteria for each of the controls detailed in Table 5-1, which will be used to determine the environmental performance of the Quoll 3D MSS.

6.2 Implementation Strategy

6.2.1 Environmental Management System

Searcher has an Integrated Management System which will be implemented to manage all activities undertaken under the Quoll 3D MSS EP. The Integrated Management System incorporates a HSE Management System and a Quality Management System that are compliant with the requirements of AS/NZS 4801:2001, Occupational Health and Safety Management System, OHAS 18001:2007 – Occupational Health and Safety Advisory Services, ISO 14001:2004 – Environmental Management Systems, and ISO 9001:2008 Quality Management System Requirements. The elements and structure of the Integrated Management System are described in Figure 6-1.

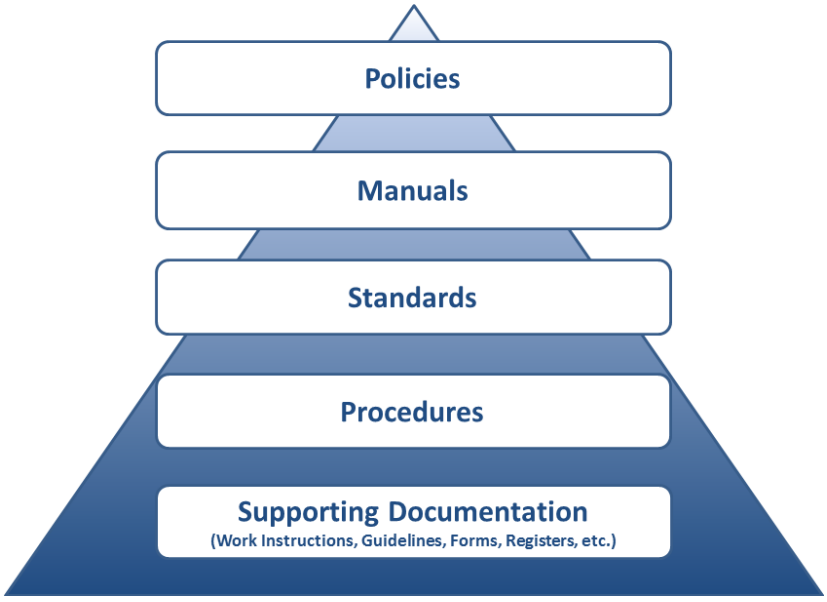


Figure 6-1: Searcher Integrated Management System Documentation Structure:

6.2.2 Vessel Specific Policies, Plans and Procedures

BGP employs its own policies and the *BGP Explorer* follows vessel specific plans and procedures that Searcher will monitor for compliance as part of their process for implementing the Searcher Integrated Management System.

6.2.3 Roles and Responsibilities

The accepted EP for the Quoll 3D MSS has a clearly defined chain of command outlining the relationships between roles that are responsible for implementing the EP. Each of the roles is described, along with the responsibilities of each role.

6.2.4 Training and Competencies

All personnel will be made aware of their responsibilities under the EP and will be competent to undertake them. This will be achieved through:

- inductions – all staff will participate in a project specific induction which provides information on the implementation of the EP
- training and drills – all staff to have recognised qualifications and experience relating to their role during the Quoll 3D MSS and will be required to participate in onboard drills.

6.3 Monitoring, Auditing, Non-Conformance

Searcher will monitor a range of parameters during the Quoll 3D MSS, including the measurement criteria for the controls outlined in Table 5-1. To assist in assessing the environmental performance of the Quoll 3D MSS, Searcher will monitor the parameters outlined in Table 6-1.

Table 6-1: Summary of Routine Parameters Monitored during the Quoll 3D MSS EP

Parameters	Commitment	Record	Responsibility
Presence of Marine Organisms on Hull or in Ballast Water			
Biofouling	Vessel hull and submersible equipment to be free from biofouling prior to and during the survey.	Vessel inspection report / Pre-mobilisation checklist Photographic evidence Biofouling Record Book Vessel documentation observed by the SEA	Vessel Master Searcher QC Representative SEA
Ballast water exchange	No ballast water exchange during survey, OR In the event of an emergency, ballast water discharge > 12 NM from nearest land.	Ballast Water Record Book / Summary Vessel documentation observed by the SEA	Vessel Master SEA
Light and Underwater Noise Emissions			
Noise from seismic source	Seismic data acquisition carried out in accordance with EPBC Policy Statement 2.1, including marine fauna observations, soft starts, etc.	MFO Report SEA report Incident report DotE reporting forms	MFO SEA
Artificial light spill	Vessel to maintain appropriate lighting with external lights directed onto deck / work areas.	Vessel documentation observed by the SEA Photo evidence	SEA
Routine Discharges to Sea			
Sewage / grey water discharge	Compliance with MARPOL 73/78 regarding sewage / grey water discharges (if discharged treated sewage >3 NM of nearest land; and untreated sewage >12 NM of nearest land).	Vessel GMP Vessel documentation observed by the SEA Waste manifest Incident reports	Vessel Master SEA
Putrescible wastes	Compliance with MARPOL 73/78 regarding putrescibles discharges (if discharged, unmacerated wastes >3 NM of nearest land; and unmacerated >12 NM of nearest land).	Garbage Record Book Vessel GMP Vessel documentation observed by the SEA Waste manifest Incident reports	Vessel Master SEA
Deck drainage (oily water, bilge water discharges)	Compliance with MARPOL 73/78 regarding oil content of discharge water (<15 ppm).	Oil Record Book Vessel documentation observed by the SEA Incident reports	Vessel Master SEA

Release of Pollutants from Vessel Engines and Machinery			
Vessel emissions	MGO diesel fuel used during survey.	Bunkering records Vessel documentation observed by the SEA	Vessel Master SEA
Loss of Containment of Oily Wastes / Chemicals and Solid Hazardous / Non-hazardous Wastes			
Oily wastes / chemicals Small oil spills on deck	Compliance with MARPOL 73/78 regarding oil content of discharge water (<15 ppm). Hydrocarbons / chemicals stored on deck and equipment using hydrocarbons are adequately bunded.	Vessel documentation observed by the SEA MSDS SOPEP Incident reports	Vessel Master SEA
Solid hazardous and non-hazardous wastes	Compliance with MARPOL 73/78 for a vessel waste management, including segregation of hazardous wastes and spill response equipment appropriate to the type and volume of waste will be provided at waste storage areas.	Garbage Record Book Vessel documentation observed by the SEA MSDS Incident reports	Vessel Master SEA
Marine Fauna Interaction			
Cetacean and whale shark sightings	Adherence to Part 8 EPBC Regulations regarding distance of vessel from cetaceans.	MFO and SEA Reports MFO and SEA certificates of competency	MFO SEA
	Details required on the Whale and Dolphin Sighting Reports (DotE).	MFO Report containing sighting records	MFO
	Record of visual checks undertaken before the deployment of equipment and actions taken if whale sightings within 3 km of vessel during seismic data acquisition. Daily log of survey acquisition by SEA.	MFO Report containing sighting records SEA Report	MFO SEA Vessel Party Chief

Searcher audited the *BGP Explorer* prior to commencing the Quoll 3D MSS against the criteria in the International Marine Contractors Association Common Marine Inspection Document. Searcher will develop a Compliance Register that will serve as an audit tool for activities to evaluate compliance with the Quoll 3D MSS EP environmental performance standards and measurement criteria. The Compliance Register will list all of the performance outcomes, control measures, performance standards and measurement criteria that apply to each identified potential environmental impact.

All observed non-conformances with the control measures outlined in this EP would be managed in accordance with Searcher's non-conformance procedure. Corrective and preventative actions are implemented to ensure lessons learned are disseminated.

6.4 Review of Environmental Performance

The Searcher Seismic QC Representative will review all Daily Survey Reports, Incident and Near Miss Reports, Non-conformance and Opportunity for Improvement Forms during the activity. Based on the review of these documents, Searcher will review existing control measures and, if required, implement additional measures to ensure that environmental risks associated with activities under the Quoll 3D MSS EP continue to be managed to ALARP.

The review of environmental performance for the Quoll 3D MSS will be included in the activity close-out report. This report will contain sufficient detail to allow Searcher to determine whether the performance outcomes in the EP have been achieved. The close-out report will also document any non-compliances, incidents and corrective actions implemented during the activity and will be provided to NOPSEMA.

7.0 Oil Pollution Emergency Response Arrangements

An Oil Pollution Emergency Plan (OPEP) appropriate to the nature and scale of the activity and the credible spill scenarios identified has been developed for use in the unlikely event of an oil spill during the Quoll 3D MSS. The OPEP is suitable for all credible spill scenarios identified during the risk assessment, including a worst case scenario (the loss of the entire contents of the largest fuel tank onboard – approximately 60 m^3). As the *BGP Explorer* uses MGO grade marine fuel or lighter (e.g. marine diesel), the OPEP is intended to deal with relatively light oils (i.e. not crude or heavy fuel oils).

The OPEP incorporates the *BGP Explorer* SOPEP, and interfaces with the Australian National Plan for Maritime Environmental Emergencies (NATPLAN). The OPEP implements a tiered response strategy based on two levels of spill, with the response proportional to the nature and scale of a hydrocarbon spill (Table 7-1).

Table 7-1: Summary of Spill Levels Classification for the Quoll 3D MSS

Indicative Spill Size	**Level 1**	**Level 2**
	Small (0–10 tonnes)	**Medium (10–1,000 tonnes)**
Possible Incident	Partial loss of fuel tank due to accidental discharge or partial rupture.	Spill due to vessel collision or human error.
Potential for Social/Environmental/ Economic Damage	Low (Not Significant)	Moderate (local or short term significance)
Agency (Resources Mobilised)	Survey Vessel (*BGP Explorer*)	Survey vessel (*BGP Explorer*) National (AMSA) International (possibly)

In the event of an oil spill, implementation of the OPEP will:

- attempt to eliminate or control the source of the spill
- monitor and evaluate the spilled oil to assist in response planning (including operational and scientific monitoring as required)
- mobilise resources as required to respond to the spill.

In developing the OPEP, Searcher has liaised with the Australian Maritime Safety Authority (AMSA), which will act as the Combat Agency (CA) in the event of a spill. AMSA will direct and lead the spill response arrangements and monitoring requirements in the event of an oil spill as described in the OPEP and NATPLAN.

Searcher will test the implementation of the OPEP, with any deficiencies rectified and opportunities for improvement considered. Testing will consist of:

- reviewing the oil spill risk assessment and managing the risk to ALARP
- confirming the capacity of the response agency (AMSA) to act as the CA for the Quoll 3D MSS
- confirming with the CA the availability of suitable response equipment
- checking lines of communication in the OPEP are available for use in the event of a spill
- conducting drills on the implementation of the SOPEP prior to commencing the survey, and during the activity on a regular basis.

8.0 Consultation

Searcher has developed an ongoing, iterative consultation process in relation to activities carried out under the Quoll 3D MSS EP. This process is a tiered system that provides for:

- stakeholder mapping to identify relevant persons in relation to the scope of the Quoll 3D MSS
- initial consultation with all identified stakeholders during preparation of the Quoll 3D MSS EP which included provision of an information sheet describing the nature and scale of the proposed activity
- an unbiased merit assessment of stakeholder objections or claims raised during the initial consultation, including
- provision of responses to stakeholders addressing their objections or claims
- a second round of consultation where a response has not been received and/or acknowledged by a stakeholder
- a framework for ongoing consultation.

8.1 Consultation Already Undertaken

A list of the stakeholders consulted to date, along with their response, Searcher's assessment of the merits of any claims or objections raised, along with Searcher's response is provided in Table 8-1.

8.2 Ongoing Consultation

Searcher welcomes feedback on the Quoll 3D MSS and invites submissions from relevant persons to be made at any time. Searcher commits to ongoing consultation with stakeholders, particularly fishing peak bodies and individual licensed fishers. Searcher facilitates this process by:

- continuing to identify and engage with relevant persons at all times until the completion of the activity
- encouraging stakeholders to provide feedback at any time during the Quoll 3D MSS
- providing sufficient information on the Searcher website to allow relevant persons to make an informed assessment of the Quoll 3D MSS and its impacts to their functions, interests and activities
- providing a number of mechanisms by which relevant persons can provide feedback, including:
  - a website portal link that is available through the duration of Quoll 3D MSS, including a linked feedback form
  - email
  - written correspondence.

If Searcher becomes aware of the potential to affect a relevant person's functions, interests or activities at any time during the Quoll 3D MSS that was not identified prior to commencing the activity, Searcher will immediately attempt to contact and consult with the relevant person. Searcher will provide sufficient information to allow the relevant person to make an informed decision as to how the activity may affect them and will address any concerns or claims raised during such consultation.

If consultation identifies a new environmental risk not identified in the Quoll 3D MSS EP, or an increase in the residual risk of an already identified risk, Searcher will immediately inform NOPSEMA under Regulation 17(6) for revision of an EP and introduce additional control measures to ensure the risk is managed to ALARP and is acceptable.

Table 8-1: Summary of Key Stakeholder Concerns and Assessment of Merit during Preparation of the Quoll 3D MSS EP

Stakeholder	Relevance to Quoll 3D MSS	Date and Type of Consultation	Stakeholder Response	Merit Assessment / Action
Australian Customs and Border Protection Service (Coast Watch)	Vessels may operate in the vicinity of the activity	8 Dec 2014 (email)	No response	Searcher will advise in the event of changes to the nature and scale of the activity.
Australian Fisheries Management Authority (AFMA) (Commonwealth)	Commonwealth Fisheries Management Agency	8 Dec 2014 (email)	AFMA recommends Searcher consult with stakeholders associated with all the fisheries in the area that can be identified by the Australian Marine Spatial Information System website tool. AFMA would appreciate being informed of any changes.	Searcher contacted fisheries and fisher stakeholders as requested. No specific issues were identified by AFMA.
Australian Government Department of Foreign Affairs and Trade (DFAT)	Department responsible for liaising with the Indonesian Government over areas that overlap jurisdictions i.e. the Perth Treaty area.	2 Dec 2014 (email request)	NOPTA submitted a Treaty Area request to the DFAT and Trade as per Searcher's request. DFAT notified NOPTA of the official start of the Treaty notification.	Official start of the Treaty notification went through on 18 December 2014 (minimum three months prior to survey activities required). Access Authorities /Special Prospecting Authorities approvals and instruments granted on 23 April 2015.
Australian Hydrographic Service (AHS)	Responsible for issuing Notices to Mariners and maintaining nautical charts	8 Dec 2014 (email)	No response	Searcher will notify the AHS/AHO at least two weeks prior to the start of the activity for promulgation of related notice to mariners.
Australian Maritime Safety Authority (Nautical Advice) (Commonwealth)	Commonwealth Marine Safety Management Agency	8 Dec 2014 (email)	Noted that the survey vessel must remain vigilant during survey operations for other shipping, and that the survey should not put other vessels at unacceptable navigational risk. Requested that AMSA RCC be notified of the activity (vessel details, start and end dates, operational area) prior to commencing the activity. Requested that AHS be notified of the activity at least two weeks prior to commencing the activity in order to update notice to mariners. Requested that Searcher provide AMSA with comments / lessons learned regarding interactions with commercial shipping following the activity.	Searcher has implemented a number of controls to reduce the impacts and risks associated with interactions with other marine users. Searcher will notify the AMSA RCC and the AHS at least two weeks prior to commencing the activity. Searcher will consult with AMSA following the activity to provide a summary of interactions with commercial shipping during the Quoll 3D MSS.

Australian Maritime Safety Authority (Emergency Response Division)	Maritime management agency	8 Dec 2014 (email)	Provided vessel-tracking chart in survey area. Advised commercial shipping will be encountered and instructed measures to manage vessel traffic including maintaining communications between survey vessel and support vessel, using appropriate day shapes, lights, streamers, reflective tail buoys, etc. Maintain visual and radar watches at all times. Advised to contact AMSA RCC prior to survey to provide vessel details and area of operation and also to contact AHS at least two weeks prior to survey to raise Notice to Mariners	Searcher has included AMSA shipping traffic data in the EP for the period of the survey between April and July and has addressed in the risk assessment. Searcher will contact AMSA RCC for Australian coastal waters broadcasts before operations commence. The AHO will be notified in advance at least two weeks prior to the start of the activity.
Commonwealth Fisheries Association	Industry group representing commercial fishers in Commonwealth fisheries	8 Dec 2014 (email)	No environmental issues raised	Searcher will advise in the event of changes to the nature and scale of the activity.
Department of Communications	Regulator for submarine communications cables	8 Dec 2014 (email)	No environmental issues raised	Searcher will advise in the event of changes to the nature and scale of the activity.
Department of Defence (Support Group) (Commonwealth)	Contact point for Australian military, which may be active in the operational area	8 Dec 2014 (email)	No environmental issues raised	Searcher will advise in the event of changes to the nature and scale of the activity.
Department of Foreign Affairs and Trade		8 Dec 2014 (email)	No environmental issues raised	Searcher will advise in the event of changes to the nature and scale of the activity.
Department of the Environment		8 Dec 2014 (email)	Activity is beyond DotE jurisdiction, NOPSEMA is relevant regulatory authority.	
Department of Mines and Petroleum (DMP) (Western Australia)	State regulator for petroleum activities	8 Dec 2014 (email)	Noted that the Quoll 3D MSS lies within NOPSEMA's jurisdiction. Requested that DMP be advised one week prior to commencing the activity and within one week following completion of the activity.	Searcher will provide notification of survey commencement one week prior to commencing data acquisition and again within one week following completion of the activity. Searcher will advise in the event of changes to the nature and scale of the activity.

Department of Fisheries (Western Australia)	State Fisheries Management Agency	19 Nov 2014 (email) 4 Dec 2014 (email) 18 Dec 2014 (email)	Provided letter with comment outlining requirements for: Consultation: consult with Western Australian Fishing Industry Council (WAFIC), Recfishwest, the Pearl Producers Association and individual licensed fishers. Request that Searcher identifies full range of mitigation strategies in the EP. Requests that Searcher uses minimum required acoustic energy. Requests further information on specific dates and exclusion zones. Fishing Activities in the area: Letter provides general information on type of fishing interests in the Quoll 3D MSS operational area. Fish Spawning: Letter provides information on spawning times for various species and requests that Searcher specifically includes mitigation strategies for minimising impact on fish activities and spawning. Letter includes potential measures. Biosecurity: Vessel managers and operators to minimise the risk of translocating pests and diseases by cleaning vessel hulls, sea chests and niche areas before each voyage. Letter outlines the department's policy for reporting suspected or confirmed pests/diseases.	Searcher is in the process of responding to the DoF and will address all concerns raised by the DoF before survey commencement: Searcher has consulted with WAFIC, Recfishwest and the Pearl Producers Association. Consultation with relevant individual licensed fishers will be ongoing as MSS details are defined. Searcher will use minimum required acoustic capacity for the survey to minimise impacts to fish stocks, larvae and all other noise-sensitive marine biota. Searcher cannot avoid all fish spawning periods, as some cover the entire year. Biofouling issues have been addressed in the EP in relation to controlling IMS. The risk of introducing IMS is low as the *BGP Explorer* and seismic equipment will be working in WA waters immediately prior to the Quoll 3D MSS. Searcher also note that prior to entry into Australian waters, the *BGP Explorer* was inspected by a Western Australian DoF approved Invasive Marine Species Inspector from 16 to 17 February 2015 whilst dry docked in Singapore.

9.0 Contact Details

The details of Searcher's nominated liaison person are:

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