Referral of proposed action

Project title: **Ceduna 3D Marine Seismic Survey, Great Australian Bight**

1 Summary of proposed action

1.1 Short description

BP Exploration (Alpha) Limited (BP) proposes to undertake the Ceduna three-dimensional (3D) marine seismic survey across petroleum exploration permits EPP 37, EPP 38, EPP 39 and EPP 40 located in the Great Australian Bight (GAB). The proposed survey area is located in Commonwealth marine waters of the Ceduna sub-basin, between 1000 m and 3000 m deep, and is about 400 km west of Port Lincoln and 300 km southwest of Ceduna in South Australia.

The proposed seismic survey is scheduled to commence no earlier than October 2011 and to conclude no later than end of May 2012. The survey is expected to take approximately six months to complete allowing for typical weather downtime. Outside this time window, metocean conditions become unsuitable for 3D seismic operations. The survey will be conducted by a specialist seismic survey vessel towing a dual seismic source array and 12 streamers, each 8,100 m long.

1.2 Latitude and longitude

The proposed survey area is shown in Figure 1 with boundary coordinates provided in Table 1.

Table 1. Boundary coordinates for the proposed survey area (GDA94)

Point	Latitude	Longitude
1	35°22'15.815"S	130°48'50.107"E
2	35°11'50.810"S	131°02'16.061"E
3	35°02'37.061"S	131°02'15.972"E
4	35°24'55.520"S	131°30'41.981"E
5	35°14'38.653"S	131°42'16.982"E
6	35°00'47.460"S	131°41'40.052"E
7	34°30'09.196"S	131°02'44.991"E
8	34°06'27.572"S	131°02'11.557"E
9	33°41'24.007"S	130°31'04.931"E
10	33°41'25.575"S	130°15'22.936"E
11	34°08'47.552"S	130°12'34.972"E
12	34°09'16.169"S	129°41'03.591"E
13	34°18'22.970"S	129°29'32.951"E

1.3 Locality and property description

The proposed seismic survey will take place in the permit areas for EPP 37, EPP 38, EPP 39 and EPP 40. The survey area is in Commonwealth marine waters ranging in depth from 1000 to 3000 metres, in the Ceduna sub-basin. The proposed survey area at its closest point is approximately 400 km west of Port Lincoln and 300km south-west of Ceduna, in South Australia (Figure 1).

1.4 Size of the development footprint or work area (hectares)

Overall the proposed survey will acquire 3D seismic data over an area of approximately 12,500 km^2. On any given day the vessel will cover approximately 67 km^2 of the total survey area, sailing back and forth within predetermined zones typically no more than 20 km wide (Figure 2).

Vessel turning activities during normal operations will take place within a 15 km buffer zone at the northwest and southeast ends of the proposed survey area, representing a total operational area of 17,780 km^2 (Figure 2). Although the vessel may at times be outside this area, e.g. during transit periods, poor weather or for helicopter crew changes, no data acquisition will be conducted outside of the proposed survey area. The seismic source will also be powered down during vessel turns.

1.5 Street address of the site

Not applicable

1.6 Lot description

The proposed seismic survey will take place in Commonwealth waters of the Ceduna sub-basin within the permit areas for EPP 37, EPP 38, EPP 39 and EPP 40, administered by the Department of Primary Industries and Resources South Australia (PIRSA), as the Designated Authority on behalf of the Joint Authority.

1.7 Local Government Area and Council contact (if known)

Not applicable – the proposed survey will be in offshore Commonwealth waters.

1.8 Time frame

The proposed seismic survey is scheduled to commence no earlier than October 2011 and to conclude no later than end May 2012.

1.9	**Alternatives to proposed action**	X	No. Evaluation of existing datasets has pointed to the need for a new survey with different parameters to image the targeted geological objectives. BP as the operator of EPP 37, EPP 38, EPP 39 and EPP 40 is undertaking its nominated work requirements for these petroleum exploration permits.
			Yes, you must also complete section 2.2

1.10	**Alternative time frames etc**	X	No. Detailed analysis of the GAB sea state has highlighted a strictly defined 3D acquisition season. Global experience suggests that outside this season, acquisition quality becomes unacceptable and health, safety and environmental (HSE) risks increase significantly (Section 3.3 (j)). BP as the operator of EPP 37, EPP 38 and EPP 40 is required to undertake the proposed activity during 2011/2012, depending on regulatory approvals.
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).
1.12	**State assessment**	X	No. Proposal is located wholly in Commonwealth waters.
			Yes, you must also complete Section 2.4
1.12	**Component of larger action**	X	No. The seismic survey is a stand-alone exploration activity. Future actions will be subject to separate approvals as required.
			Yes, you must also complete Section 2.6
1.13	**Related actions/proposals**	X	No
			Yes, provide details:
1.14	**Australian Government funding**	X	No
			Yes, provide details:
1.15	**Great Barrier Reef Marine Park**	X	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

2.1 Description of proposed action

The proposed survey will image the seabed and subsurface geology of the survey area through the acquisition of 3D seismic data. The survey will be undertaken using a specialised survey vessel, towing seismic equipment in a north-westerly or south-easterly direction along pre-planned parallel lines, 720 m apart, within the proposed survey area (Figure 2). The survey vessel will acquire seismic data over an area of approximately 12,500 km^2, with the vessel operating 24 hours a day. The survey will be undertaken over an operational area of 17,780 km^2 which include the survey area as well as a 15 km buffer zone at the northwest and southeast ends of the survey area to allow for activities such as vessel turns and soft-starts.

The proposed seismic survey has been scheduled to acquire approximately two seismic lines per day, with the vessel covering approximately 67 km^2 of the total survey area each day.

The seismic source for the proposed survey will comprise a dual seismic source array with a total capacity of 4130 cubic inches (cu in) and an operating pressure of 2000 psi. The seismic array will be towed astern of the vessel at a depth of approximately 7 m. Seismic reflections from subsurface layers will be detected by hydrophones inside 12 streamers approximately 8100 m in length, towed behind the survey vessel at depths of approximately 9 m.

The seismic sources will be fired alternately every 25 m or approximately 10 seconds, generating a theoretical sound energy level (SEL) of 229 dB re 1μPa^2.s. This is a theoretical value corresponding to the sound exposure level 1 m from an equivalent point source that would produce the same received levels at long range as the real seismic source. Because the seismic source extends over a large area (20 m x 15 m), it is not possible to have a single point which is 1m from all elements of the array so the actual value will be lower than the theoretical one. The sound propagation decay has been modelled by Curtin University of Technology's Centre for Marine Science and Technology (CMST) (Section 3.1 (d)) which demonstrates that even when measured from the most northerly point of the survey, noise levels at the shelf break (200 m isobath) will have decayed to around 124 dB re 1μPa^2.s which is within the range of ambient sea noise reported in the literature (Richardson et al 1995; APPEA 2004).

The vessel will not anchor at sea unless required to in an emergency. Any port calls during the survey will likely be conducted at Port Lincoln, Ceduna, Adelaide, Fremantle or Geelong.

Two support vessels will be used for logistic, safety and equipment management support. There will be no vessel-to-vessel refuelling during the proposed survey. As the survey vessel has a fuel endurance of approximately 100 days, it is planned to only refuel once in port during the survey period. The support vessels will be in port more frequently and will refuel accordingly.

2.2 Alternatives to taking the proposed action

Not applicable. BP is the operator of EPP 37, EPP 38, EPP 39 and EPP 40 and the activity relates to our nominated commitments in relation to these petroleum exploration permits granted under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth) (OPGGS Act).

2.3 Alternative locations, time frames or activities that form part of the referred action

Not applicable. BP is the operator of EPP 37, EPP 38, EPP 39 and EPP 40 and the activity relates to our nominated commitments in relation to these petroleum exploration permits granted under the OPGGS Act.

2.4 Context, planning framework and state/local government requirements

BP, as the operator of EPP 37, EPP 38, EPP 39 and EPP 40, is seeking to undertake its nominated work requirements for these petroleum exploration permits, which includes the acquisition of 3D seismic data.

In addition to the requirements of the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth) (EPBC Act), all survey operations will be conducted in accordance with relevant legislation, in particular the requirements of the OPGGS Act. Environmental aspects of the seismic survey will also be assessed and managed in accordance with the requirements of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Cth) (OPGGS (E) Regulations). This will include submission of an Environment Plan (EP) for assessment and approval by the Designated Authority, in this case the Department of Primary Industries and Resources South Australia (PIRSA) and the implementation of strict procedures for all aspects of the survey that involve potential environmental risk.

Vessel and sea-going operations during the survey will adhere to all relevant Australian and international laws, treaties, other legislative measures and agreements.

The proposed survey area overlaps the Benthic Protection Zone (BPZ), a component of the Great Australian Bight Marine Park (GABMP). The GABMP is established and managed under both Commonwealth and South Australian legislation. Certain activities undertaken in the GABMP must comply with the applicable Commonwealth and South Australian legislation and also the following management plans:

- Great Australian Bight Marine Park Management Plan (SA) which was adopted in 1995; and
- Great Australian Bight Marine Park Management Plan (Commonwealth waters) Management Plan 2005 – 2012.

The BPZ was established to protect a representative transect of the continental shelf and slope off the South Australian coast. It is 20 nautical miles (Nm) (37 km) wide and extends about 200 Nm (370 km) from the GABMP to the boundary of Australia's Exclusive Economic Zone.

Exploration activities are permitted within the BPZ under the provisions of the EPBC Act with the permission of the Governor-General. Requisite approvals will be sought for the portion of the survey area overlapping with the BPZ prior to the commencement of survey activities within this area.

The EBPC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, September 2008 (DEWHA, 2008b) is also relevant to the proposed survey and will be applied to the operations where appropriate.

The seismic survey will also be conducted under the direction of, and in accordance with, BP's Health, Safety, Security and Environmental policy.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

BP is preparing an Environment Plan (EP) for the proposed seismic survey which will be submitted to PIRSA for approval in accordance with the OPGGS (E) Regulations. The EP describes and assesses all aspects and potential impacts of the activities in a risk-based context. It also includes detailed survey environmental management measures, environmental performance objectives, roles and responsibilities and reporting requirements. A summary of the EP will be made publicly available following acceptance by PIRSA.

Consultation with relevant Commonwealth and state stakeholders, such as fishing authorities, commercial operators and environment groups is ongoing and will be addressed as part of the EP risk assessment process. Preliminary feedback is given in Section 2.6.

2.6 Public consultation (including with Indigenous stakeholders)

BP has consulted extensively with stakeholders regarding the proposed survey, which included meeting with key interested groups such as the Conservation Council of South Australia (CCSA), Australian Southern Bluefin Tuna Association (ASBTIA), Great Australian Bight Industry Association (GABIA), and relevant State and Federal Government departments and agencies. In addition, BP also

outlined its plans to a wider group which included local shires, fishing interests, and environmental NGOs. The full list is set out in Table 2.

Table 2. Stakeholders consulted by BP regarding the Ceduna 3D Marine Seismic Survey

Commonwealth and State Regulatory Agencies	
Australian Bureau of Agricultural and Resource Economics and Sciences	South Australian Department of Primary Industries and Resources
Australian Maritime Safety Authority (AMSA)	National Offshore Petroleum Safety Authority
South Australian Department of Environment and Natural Resources	State and Federal Parliamentarians
Australian Fisheries Management Authority (AFMA)	Australian Department of Resources, Energy and Tourism
Australian Department of Sustainability, Environment, Water, Population and Communities	
Fishing Interests	
Australian Southern Bluefin Tuna Industry Association (ASBTIA)	Sustainable Shark Fishing
Holders of Commonwealth Small Pelagic Concessions	Seafood Council SA
Commonwealth Fisheries Association	Wildcatch SA
Great Australian Bight Industry Association (GABIA)	South East Trawl Fishing Industry Association
Local Authorities	
City of Port Lincoln	Town of Ceduna
Flinders Ports	Resource Assessment Group
District Council of Lower Eyre Peninsula	Eyre Regional Development Board
Conservation Interests / NGOs / Research	
Deakin Whale Ecology Group	South Australian Museum
Whale and Dolphin Conservation Society	Conservation Council of South Australia
Wilderness Society	Greenpeace Australia
WWF Australia	South Australian Research and Development Institute
Australian Conservation Foundation	Australian Marine Conservation Society
CSIRO	Geoscience Australia (GA)
Indigenous Interests	
Yalata Aboriginal Community, Ceduna	Port Lincoln Aboriginal Community

BP will continue its consultation before, during and after the proposed survey. Nevertheless, sufficient feedback has been gathered to form a robust view of the principal issues, which cover the following:

- General concerns (and in some cases opposition) to petroleum exploration in the GAB pending greater assurances that the proponent, industry and regulatory system can prevent, and in a worst case adequately respond to, an uncontrolled release of hydrocarbons such as in the cases of the Montara well blow out, or the Deepwater Horizon accident in the Gulf of Mexico. These

concerns will be most relevant to any future exploration drilling proposal, and BP anticipates addressing them thoroughly at that time.

- Comments were submitted about the perceived impact of seismic surveys upon the marine environment, especially upon marine mammals, fish populations and benthos. These comments have been addressed in this referral (Sections 3.1 (d), 3.1 (e), 3.1 (f), 3.2 (c), 3.3), and in greater detail in the EP submitted to PIRSA as required under the OPGGS (E) Regulations.

- Comments were submitted about the physical interaction of the survey with other activities, including both fishing fleets and general shipping lanes. These comments have been addressed in this referral (Section 3.3), and in greater detail in the EP submitted to PIRSA as required under the OPGGS (E) Regulations.

- Specific concerns were submitted about the potential economic impact of seismic surveys upon fisheries, especially the Southern Bluefin Tuna Fishery. These concerns relate to the risk that the survey will disrupt both their migration to and presence in the GAB, and consequently could affect the catch and also the annual stock assessment survey conducted by CSIRO. These concerns have been addressed in this referral (Section 3.3 (j)), and in greater detail in the EP submitted to PIRSA as required under the OPGGS (E) Regulations.

- Other stakeholders expressed either indifference to the survey (due to the remoteness of its location from them) and in some cases support for it due to the potential economic benefits it could bring to locations such as Ceduna, Port Lincoln and the Eyre Peninsula more broadly.

Consultation will continue throughout the approval, planning and execution stages of the proposed survey to ensure that all stakeholders having expressed an interest are kept informed and that any impacts of the proposed survey are minimised to as low as practicable.

2.7 A staged development or component of a larger project

The proposed seismic survey is not part of a larger action. Any future activities will be the subject of separate EPBC Act referrals and OPGGS Act approvals, if required.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

Matters of national environmental significance occurring in or around the proposed survey area are discussed in the following sections. Figure 3 shows the environmental sensitivities of the GAB region.

3.1 (a) World Heritage Properties

Description

There are no World Heritage Properties in or adjacent to the proposed survey area. The closest World Heritage area is the Australian Fossil Mammal Sites (Naracoorte), located onshore approximately 840 km east of the proposed survey area.

Nature and extent of likely impact

Due to the distance between the proposed survey area and the nearest World Heritage Property, no direct or indirect impacts will occur.

3.1 (b) National Heritage Places

Description

There are no National Heritage Places in or adjacent to the proposed survey area. The nearest National Heritage site is the Whale Bone Area and the Point Fowler Structure, Fowlers Bay Conservation Reserve (designated places of archaeological significance), located approximately 260 km north-east of the survey area.

Nature and extent of likely impact

Due to the distance between the proposed survey area and the nearest National Heritage Place, no direct or indirect impacts will occur.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

There are no Wetlands of International Importance in or adjacent to the proposed survey area. The closest site is the Coorong and Lower Lakes Ramsar site, located approximately 655 km east to north-east of the proposed survey area.

Nature and extent of likely impact

Due to the distance between the proposed survey area and the nearest Ramsar site, no direct or indirect impacts will occur.

3.1 (d) Listed threatened species and ecological communities

Description

There are no threatened ecological communities reported to occur within the proposed survey area. There are 18 threatened species listed on the EPBC Act Protected Matters Database (search conducted on 13/04/2011) that may occur within the proposed survey area (Table 3).

Table 3. Threatened Species that may occur within the proposed survey area.

Species Type	Scientific Name	Common Name	Status
Birds	*Diomedea exulans (sensu lato)*	Wandering albatross	Vulnerable
	Diomedea exulans amsterdamensis	Amsterdam albatross	Endangered
	Diomedea exulans exulans	Tristan albatross	Endangered
	Diomedea exulans gibsoni	Gibson's albatross	Vulnerable
	Phoebetria fusca	Sooty albatross	Vulnerable
	Thalassarche cauta cauta	Shy albatross	Vulnerable
	Thalassarche chrysostoma	Grey-headed albatross	Endangered
	Thalassarche melanophris	Black-browed albatross	Vulnerable
	Halobaena caerulea	Blue petrel	Vulnerable
	Macronectes giganteus	Southern giant-petrel	Endangered
	Macronectes halli	Northern giant-petrel	Vulnerable
	Pterodroma mollis	Soft-plumaged petrel	Vulnerable
Mammals	*Balaenoptera musculus*	Blue whale	Endangered
	Eubalaena australis	Southern right whale	Endangered
	Megaptera novaeangliae	Humpback whale	Vulnerable
Reptiles	*Caretta caretta*	Loggerhead turtle	Endangered
	Chelonia mydas	Green turtle	Vulnerable
	Dermochelys coriacea	Leatherback turtle	Endangered

In addition to the species listed below, BP has extended the assessment to species listed under the EPBC Act that have been raised as a potential concern during the consultation process or that are known to occur in the wider region. These include:

- Orange roughy (*Hoplostethus atlanticus*)
- Southern bluefin tuna (*Thunnus maccoyii*)
- Great white shark (*Carcharodon carcharias*)
- School shark (*Galeorhinus galeus*)
- Australian sea-lion (*Neophoca cinerea*)
- Sei whale (*Balaenoptera borealis*)
- Fin whale (*Balaenoptera physalus*)

Further details regarding distribution, habitat range, and ecology for each species listed above are given below.

Fish

Both the orange roughy and the southern bluefin tuna are listed under the EPBC Act as conservation dependent species, due to overfishing (DEWHA, 2008a; DSEWPaC, 2010).

The orange roughy is a deep sea fish occurring throughout the waters of the Atlantic, Pacific and Indian Oceans. They are commonly found in waters 700 m to 1000 m deep, over steep continental middle and lower slopes and oceanic ridges (DEWHA 2008a). In Australia, the orange roughy can be found in waters from central New South Wales through to southern Western Australia, including Tasmania (DEWHA, 2008a).

Orange roughy are caught in the Great Australian Bight Trawl Sector (GABTS) as a bycatch, with a total bycatch limit of 50 tonnes per annum, in water depths < 750 m. An additional 200 tonnes is set aside as a research catch allowance that can be caught in specified zones accessible only by scientific permit holders.

They form aggregations in and around geologic structures, such as undersea canyons and seamounts, where water movement and mixing is high (DEWHA, 2008a). In particular, they occur around seamounts and ridges south of Australia (DEWHA, 2008a). It is thought that the orange roughy aggregates and spawns in winter in canyons (Murray Canyons) and shelf break off Kangaroo Island approximately 500 km south-east of the proposed survey area at its closest point, as orange roughy eggs have been sampled in high densities in the area (DEWHA 2008a). In Australian waters, the orange roughy spawns over two to three weeks in winter, typically starting in mid-July. Fish are thought to travel up to 200 km to join spawning aggregations (DEWHA, 2008a).

It is anticipated that this species is unlikely to be present in large numbers in the proposed survey area due to the depths (>1,000m) encountered in the area.

The southern bluefin tuna (SBT) is a large, fast swimming, pelagic fish. SBT are found throughout the southern hemisphere mainly in waters between 30 and 50^{o}S. The only known breeding area is in the Indian Ocean, between Indonesia and the northwest coast of Australia, where breeding takes place from September to April each year. The eggs are estimated to hatch within two to three days and over the next two years attain sizes of approximately 15 kilograms. Juveniles migrate south down the west coast of Australia. During the summer months (December-April), they tend to congregate near the surface in the coastal waters off the southern coast of Australia and spend their winters in deeper, temperate oceanic waters (CCSBT, undated).

Globally, the main method used for catching SBT is longline fishing (CCSBT, undated). However, the Australian component of the fishery mainly uses the purse seine method. The SBT global total allowable catch (TAC) for the 2010 and 2011 fishing seasons is 9,449 tonnes, 80% of the previously allocated global TAC (CCSBT, undated).

An SBT stock assessment survey is conducted annually by CSIRO to assess the status of the SBT fishery. This is addressed in detail in Section 3.3 (j).

It is anticipated that this species may be present in the proposed survey area.

Sharks

The great white shark is widely, but sparsely (Cavanagh et al 2003), distributed throughout temperate and sub-tropical regions in the northern and southern hemispheres (Norman 2005, Bruce et al 2005). It is primarily found in the coastal and offshore areas of the continental and insular shelves and offshore continental islands (Cavanagh et al 2003, Bruce et al 2005). However, the extent of their migration and location of aggregation areas is unknown (CITES, *Undated*). The great white shark is most abundant near pinniped colonies (Cavanagh et al 2003), in particular along the shelf waters of the GAB. The Head of Bight, approximately 200 km north of the proposed survey area, is known as an important nursery and feeding area (DEWHA 2007, DEWHA 2008a). In addition, the Neptune Islands, Dangerous Reef, and the Pages (near Kangaroo Island) in South Australia, as well as Fowlers Bay are areas where encounters are more frequent (Cavanagh et al 2003, DEWHA 2008a). It is therefore expected that this species may occur within the proposed survey area.

The school shark is widely distributed in temperate waters off southern Australia (Cavanagh et al 2003), and in seas of the northern and southern hemispheres (DEWHA 2010b, IUCN 2010). In southern Australia, it is found in waters up to 800 m in depth (Cavanagh et al 2003). This shark uses shallow sheltered bays, estuaries and inlets as nursery areas (DEWHA 2010a, Cavanagh et al 2003). The school

shark undertakes extensive migrations (IUCN 2010, Cavanagh et al 2003) of up to 1400 km in southern Australia (DEWHA 2010a).

School sharks are widely distributed in temperate waters, primarily between southern New South Wales and southern Western Australia (Last and Stevens, 2009). They are a demersal species which inhabit the continental and insular shelves; however, they have also been recorded on the upper slopes to deepwater offshore (Last and Stevens, 2009). School sharks often form small schools predominantly of the same sex and age group (Last & Stevens 1994) and undertake extensive migrations, primarily to mate (McLoughlin 2007). Inshore areas are particularly important as birthing and nursery sites (DEWHA 2010a). Known pupping areas of significance to this species are found around Tasmania, particularly in the south-east, and in Victoria (DEWHA, 2010a). Shark pups are born in spring/early summer after a gestation period of approx. 12 months (Cavanagh et al 2003). Due to their wide distribution, the distance offshore of the proposed survey area and the absence of known critical areas within the survey area, it is expected that this species will not be found in significant numbers within the proposed survey area.

Birds

Twelve species of birds listed as endangered or vulnerable on the EPBC Act Protected Matters Database may occur within the proposed survey area. These species include several albatross and petrel species.

Albatross species listed in Table 3 have a widespread distribution throughout the southern hemisphere. They feed mostly on cephalopods (squid and octopus), fish and crustaceans, diving for their prey. The maximum dive depth recorded for albatross species is 12.5 m (ACAP 2007). Albatrosses usually nest on isolated islands. Albatross species forage across the ocean for food. They undertake no annual migration, but disperse widely after breeding. No breeding colonies or nesting areas for any of the albatross species listed in Table 3 are located near the proposed survey area (ACAP 2007).

Petrels species listed in Table 3 are marine species that are widely distributed throughout the southern hemisphere. They nest on isolated islands and breed on sub-Antarctic and Antarctic islands. Outside the breeding season, petrels disperse widely and move north into subtropical waters. The southern giant-petrel feeds on krill, squid, fish, other small seabirds, and marine mammals (AAD 2008), as do other petrel species (DEWHA 2010a) listed in Table 3. No breeding colonies or nesting areas for petrel species listed in Table 3 are located within or adjacent to the proposed survey area (DEWHA 2008a).

Mammals

Five species of mammals listed as endangered or vulnerable on the EPBC Act Protected Matters Database may occur within the proposed survey area.

- The humpback whale is found in Australian Antarctic waters and Commonwealth offshore waters, and has been sighted in all State waters. Humpback whales primarily feed on krill in Antarctic waters south of about 55°S. The nearest known humpback whale resting area is in Flinders Bay on the south coast of Western Australia, approximately 1,350 km to the west of the proposed survey area (Jenner et al. 2001).

  The humpback whale undertakes annual migration between its summer feeding grounds in the cold waters of Antarctica to its winter breeding and calving grounds in sub-tropical and tropical inshore waters (Jenner et al. 2001). Humpback whales migrate up the eastern and western coasts of Australia and do not often travel into the GAB (DEH 2005b, Vang 2002). The northern migration on the south-east coast starts in April and May while, on the west coast, it occurs towards early June. The west coast southern migration then peaks, in the south-west, around November and December, while the east coast southern migration peaks in October and November. Humpback whales have been seen in early winter in the GAB, particularly at the Head of Bight and near Kangaroo Island.

  The proposed survey is scheduled to occur outside of the period when humpback whales are likely to be found within the proposed survey area. Therefore, it is expected that no to very low numbers of humpback whales may occur during the survey.

- There are two recognised subspecies of blue whale in Australian waters: the true blue whale of the southern hemisphere *Balaenoptera musculus intermedia*, and the pygmy blue whale *Balaenoptera*

musculus brevicauda. Both are listed as Threatened under the EPBC Act.

Both subspecies of blue whale are found in waters surrounding Australia with mainly the true blue whale being sighted in the waters off Australia's Antarctic Territory, south of 60°S, while pygmy blues are usually found north of 55°S. Both pygmy and true blue whales feed on krill, with the true blue feeding mostly in Antarctic water and the pygmy blue feeding taking place in more temperate waters. The closest recognised feeding area is located 95 km from the survey area, along the shelf break to the west and south of Kangaroo Island, extending north-west along the 200 m isobath (Morrice et al. 2004, DEWHA 2008a). During summer/autumn, true blue whales feed mainly in the Antarctic. Pygmy blues are not generally found in the Antarctic, and are known to feed during summer/autumn in upwellings (productive areas) of temperate latitudes. They are known to travel significant distances within their summer feeding grounds in search of krill (possibly up to 300 km/day) with possibly some movements to the Sub-Tropical Convergence (STC) Zone around 40°S. Therefore, most sightings that occur between late spring to autumn to the north of the proposed survey area are believed to be pygmy blue whales (DEWHA 2008a).

Blue whale migration patterns are similar to those of the humpback whale, with the species feeding in mid to high latitudes (south of Australia) during the summer months and moving to temperate/tropical waters in the winter for mating and breeding. However, blue whale migration is oceanic and no specific migration routes have been identified in the Australasian region (DEWHA 2008a).

Due to the distribution range of the true blue whale, it is unlikely that any individual of this sub-species will be encountered during the survey period. However, as the proposed survey will overlap with the feeding period for pygmy blue whales, it is expected that some individuals of this sub-species may be encountered during the proposed survey. However due to the location of the survey area (southward of the 200 m isobath), it is unlikely that the survey area represent a significant habitat for this sub-species, and only very few individuals would be expected to be seen during the survey period.

- The southern right whale is distributed in the southern hemisphere, typically between 20°S and 60°S. This species is present on the Australian coast between May and November, and is primarily found off southern Western Australia and far west South Australia. The closest calving areas to the proposed survey are at the Head of Bight, South Australia (Figure 2), approximately 200 km north of the survey area. The Head of Bight is a significantly important aggregation area for the Australian southern right whale population, where up to half of the population gathers (DEH 2006, DEWHA 2008a). They are present in this area between June and October (DEH 2006). Twilight Bay, Fowlers Bay and Encounter Bay are other known calving areas in the region (DEWHA 2008a). Information regarding migration is limited (DEWHA 2010a), but it is thought that this species may be found throughout the survey area at any time of the year in low numbers.

During the last decade, five seismic surveys have been conducted in and around the proposed survey area. Whale sightings made during these surveys are summarised in Table 4.

Table 4. Marine mammal sightings recorded during previous seismic surveys in the GAB

Survey Name	Timeframe	Location	No of whale sightings	No. of blue & southern right whale sightings	Approx Sightings/ week
Flinders 2D	20 Dec 2000 - 31May 2001	Overlapping Ceduna 3D MSS	6	1	<1
Duntroon 2D	5 Dec 2003 - 9 Dec 2003	Continental edge and slope	9	6	13
Whidbey 2D	15 Dec 2004 - 01 Jan 2005	Continental edge and slope	25	1	10

Trim 3D	22 Feb 2006 – 21 Mar 2006	Overlapping Ceduna 3D MSS	0	0	0
BightSPAN 2D	April 2009 - July 2009	Overlapping Ceduna 3D MSS	9	1	<1

Table 4 shows that the number of whale sightings in the deeper waters where the proposed survey will be carried out is very low in comparison with the number of sightings recorded on those surveys straddling the continental edge and slope.

It is also interesting to note that even though high numbers of pygmy blue whales were sighted during the Duntroon 2D survey conducted in December 2003, only 1 pygmy blue whale was sighted during the Whidbey survey conducted in December 2004. This observation is also confirmed by aerial surveys conducted in December 2003 and December 2004 over almost identical survey tracks (Gill, pers. comm). A total of 48 pygmy whales in 39 sightings were recorded in 2003 whereas only 5 pygmy blue whales were recorded in 2004. These observations, along with other observations made during previous aerial surveys (Gill, pers. comm), indicate that pygmy blue whales can move significant distances within their feeding grounds from the Head of Bight to Bass Strait over short periods of time during the summer months.

While the Australian sea-lion, sei and fin whales are not identified in the EPBC Act Protected Matters Database search as occurring within the proposed survey area, they are listed as a threatened species present in the region.

- The Australian sea-lion is only found in southern and south-western Australia. The species hauls-out (rests) and breeds on rocks and sandy beaches on sheltered sides of islands, although some small colonies exist on the Australian mainland. It breeds on at least 73 islands and at several mainland sites within southern Australia, including Dorothy Island and Pearson Isles, approximately 240 km east of the proposed survey area (IUCN 2008). Other aggregation areas for this species include Kangaroo Island and Point Labatt (Reeves et al. 2002), 500 km south-east and 320 km east of the proposed survey area respectively, as well as the Head of Bight and Nuyts Archipelago, approximately 200 km from the proposed survey area (DEWHA 2008a).

  Australian sea-lions feed on the continental shelf off southern Australia, up to 30 km offshore and most commonly in depths of 20 m to 270 m (Shaughnessy 1999; Reeves et al. 2002; DEH 2008). They eat a wide variety of prey, including fish, small sharks, invertebrates, cephalopods (i.e. octopus, squid) and occasionally seabirds.

  Australian sea-lions are the only seal species that does not breed annually. The interval between breeding seasons is 17.6 months, and breeding seasons are not synchronised between colonies (DEH 2008). The duration of the breeding season on Kangaroo Island has been recorded to last up to nine months (Reeves et al. 2002).

  As the proposed survey area is at least 240 km from the nearest known sea-lion colony, it is anticipated that very low numbers of Australian sea-lions may be encountered during the survey.

- The sei whale is a wide-ranging species that favours temperate, deep, offshore waters. Sei whales have been infrequently recorded in Australian waters, but have been sighted recently on the continental shelf in the waters off Kangaroo Island, south-east of Port Lincoln (DEWHA, 2008a), approximately 500 km east and of the proposed survey area. It is thought that the sei whale has a similar migration pattern to other baleen whales, from high latitude feeding grounds in summer to low latitude breeding and calving grounds in winter, however information regarding movements of sei whales is limited (DEWHA 2008a).

  Due to its distribution range, the sei whale is anticipated to occur in the proposed survey area, albeit in low numbers.

- The fin whale is widely distributed in temperate waters of the southern and northern hemispheres, between latitudes 20-75°, in the Arctic and Antarctic Oceans. Areas of high productivity (upwelling)

and interfaces between mixed and stratified waters may be important feeding areas of this whale species. In Australia, sightings of fin whales were confirmed in coastal waters in the proposed survey area region, but available information suggests that the species is more commonly present in deeper water (DEH 2005a).

As the proposed survey area is approximately 500 km from the nearest upwelling zone, located south of the Kangaroo Island (DEWHA 2008a), it is unlikely that fin whales will be present within and around the proposed survey area in significant numbers.

Reptiles

Three species of reptiles listed as endangered or vulnerable on the EPBC Act Protected Matters Database may occur within the proposed survey area.

- The loggerhead turtle is globally distributed in subtropical waters (Limpus 2008), including those of eastern, northern and western Australia (DEWHA 2010). They can, however, be found in temperate waters (DEWHA 2010), and have been infrequently recorded in South Australia (Limpus 2008), including northern Spencer Gulf waters and north-east of Kangaroo Island (DENR 2004). Western and eastern Australia are the main nesting locations (Limpus 2008). Loggerheads are carnivorous, feeding primarily on benthic invertebrates in depths ranging from near-shore to 55 m (DEWHA 2008b). Loggerhead turtles undergo extensive migration distances of greater than 1,000 km (Limpus 2008). They forage in tidal and subtidal habitats (Limpus 2008), reefs, seagrass beds and bays (DEWHA 2010), on benthic invertebrates (DEWHA 2010) such as molluscs and crabs (Limpus 2008). The probability of encountering this species in the proposed survey area is low.

- The green turtle is distributed in subtropical and tropical waters of the northern and southern hemispheres (Limpus 2008b, DEWHA 2010). However, individuals have been known to stray in temperate waters (DEWHA 2010) such as northern Spencer Gulf and north-eastern Kangaroo Island (DENR 2004). Most green turtles migrate for distances less than 1,000 km, following no given path (Limpus 2008b). Mature turtles settle in tidal and sub-tidal habitat such as reefs, bays and seagrass beds (Limpus 2008b, DEWHA 2010). Green turtles' diet consists mainly of seagrass and algae (Limpus 2008b, DEWHA 2010). Due to habitat preference and distribution, green turtles are unlikely to be encountered within the proposed survey area.

- The leatherback turtle is widely distributed throughout tropical, subtropical and temperate waters of Australia in both the northern and southern hemispheres (DEWHA 2010), including in oceanic waters and continental shelf waters along the coast of Southern Australia (Limpus 2009). Leatherbacks visit the Nuyts Archipelago, Port Douglas, Mount Dutton Bay (in late summer) and north-eastern Kangaroo Island (DENR 2004). However, nesting sites for this species along the South Australian coastline are unknown (Limpus 2009). The species feeds on soft-bodied invertebrates, including jellyfish (Limpus 2009). This species may therefore be encountered within the proposed survey area.

Nature and extent of likely impact

Given the water depths and absence of shallow bathymetric features in the proposed survey area and the management measures to be implemented for all environmental aspects of operations (Section 4), the proposed seismic survey is unlikely to have a significant effect on any Threatened species or their habitat. In particular, noise generated during seismic activities is expected to decay rapidly away from the source, and fall within the range of ambient noise levels at the continental shelf.

Ambient noise is comprised of natural sounds created by marine life, oceanographic and meteorological processes and human activities such as routine shipping. Examples of sounds in the marine environment are provided in Table 5. Sound carries well underwater due to the incompressibility of water; the marine environment is therefore very noisy (Richardson et al., 1995; Nedwell et al., 2007). According to Nedwell et al. (2007), marine fauna has become relatively insensitive to sound due to the high levels of sound in the marine environment. Specific sounds will only be audible to fauna when they are at least 20 dB above background levels (Turnpenny and Nedwell, 1994; Nedwell et al., 2007).

Table 5. Example sound intensities and frequencies (APPEA, 2004)

Source	Sound intensity and pressure (dB re 1 uPa @ 1m)	Frequency
Undersea earthquake	272	50Hz
Seafloor volcanic eruption	> 255	Varied
Lightning strike on sea surface	250	Varied
Seismic acoustic source	230 – 255	< 200 Hz
Sperm whale clicks	Up to 235	100 – 30,000 Hz
Bottlenose dolphin click	Up to 229	Up to 120,000 Hz
Ship sound (close to hull)	200	10 –100 Hz
Breaching whale	200	20 Hz
Blue whale vocalisations	190	12 – 400 Hz
Ambient sea sound	80 – 120	Varied

Fish

Fish may suffer direct physical damage if they are a few metres away from the seismic source operating at full power (Gausland 2000, McCauley et al. 2003). Studies found that close passes (as close as 45 m) of an array with measured SEL of up to 190 dB re 1 μPa^2.s did not damage the hearing sensitivity of caged hearing specialist reef fish (Hastings et al 2007). The majority of fish within the proposed survey area would be pelagic species and highly mobile (e.g. tuna). Such animals are more likely to move away from the source if the sound levels become uncomfortable to them (McCauley et al 2000), and highly unlikely to be injured by the sound source. Demersal species, such as the orange roughy, may be less likely than pelagic species to move away from the sound sources due to territorial behaviour and site fidelity. However, since the survey is being conducted in water depths in excess of 1,000 m, the sound sources are unlikely to be injurious to any fish near the seabed.

Behavioural changes by fish may occur at greater distances from the seismic source (e.g., up to several kilometres; McCauley *et al.*, 2000). These behavioural changes have been demonstrated to be only localised and temporary, with displacement having insignificant repercussions at a population level (McCauley, 1994). It has also been shown that when disturbances are removed, fish return to normal behaviour in a few tens of minutes (Wardle et al., 2001; Pearson et al., 1992).

Furthermore, it is known that trawlers and other vessels traverse this area on a regular basis. Trawlers generate sounds of up to 158 dB re 1µPa (third octave level) with energy concentrated around 100 Hz (Richardson et al., 1995). These levels of sound have not been reported to affect the fish in any way.

Studies suggest that bluefin tuna do not detect sounds over 1000 Hz (Song et al. 2006). Tuna do have limited hearing, best within the 200-800 Hz range (Iversen 1967, cited in Sara et al. 2007) whereas the seismic source is tuned to produce most energy in the 0-200 Hz range. CMST has modelled the maximum SEL (dB re 1μPa^2.s) from the three locations at the 1000 m and 200 m isobaths and these results are summarised in Table 6.

Table 6. Modelled Source Energy Levels (SEL) received at the 200 m and 1000 m isobaths

Modelled Location	Tx1		Tx2		Tx3	
Isobath	200 m	1000 m	200 m	1000 m	200 m	1000 m
SEL (dB re 1μPa^2.s)	124	160	110	130	100	120

As seen in Table 6 and Figure 4, the highest SEL at the 200 m isobath will be approximately 124 dB re 1μPa^2.s, which is within the range of typical ambient noise levels in the marine environment. It is

therefore unlikely that sounds generated by the seismic source will affect fish in the GAB, including schools of tuna aggregating in the shallow waters of the continental shelf.

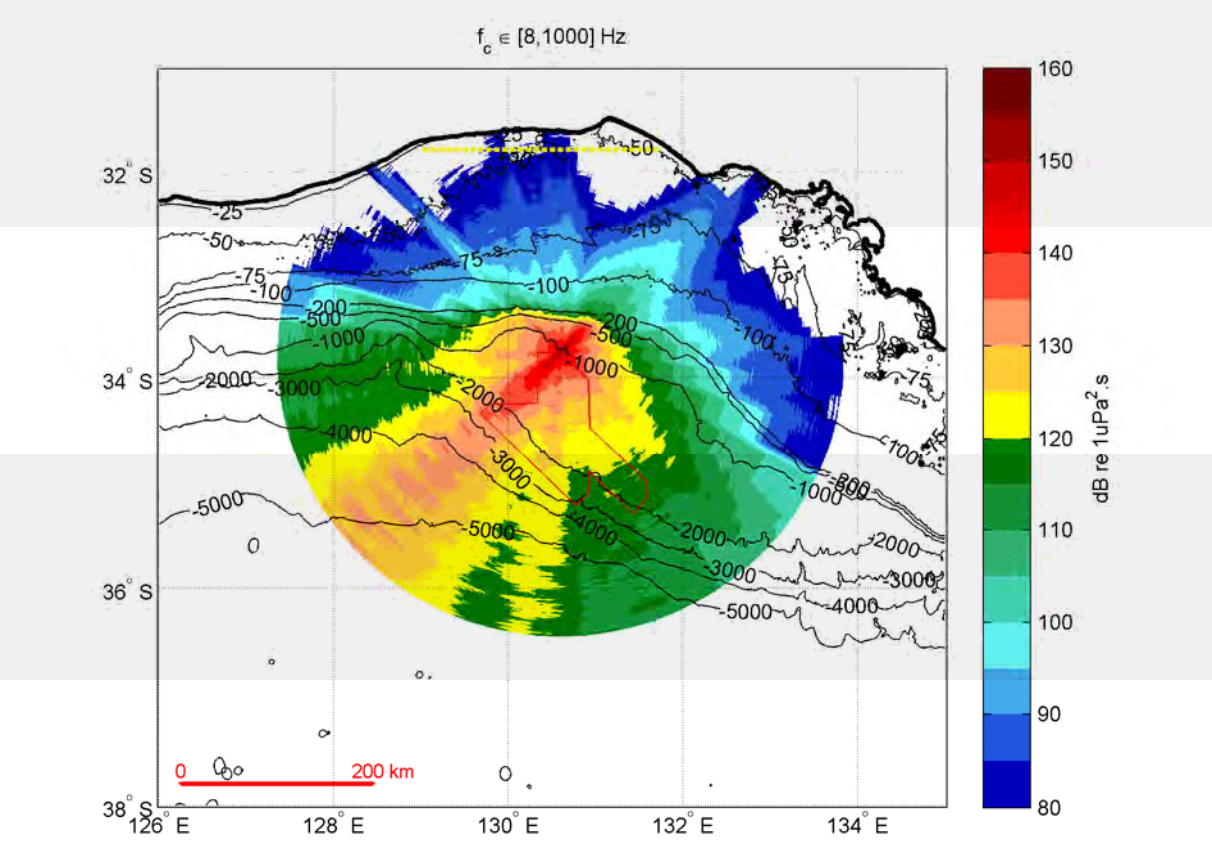


Figure 4: Maximum received sound exposure level at any depth (SELmax) - Tx1, for the full frequency range (8Hz to 1000Hz)

Fish eggs and larvae may also be at risk if present very close to the seismic source. There is a very low risk of injury to any life stage (eggs to adults), during or after exposure to a seismic source in normal operational use (Turnpenny and Nedwell 1994). Furthermore the number of eggs affected by the seismic activities would be very small compared to the overall population size and natural mortality rates (McCauley, 1994). The survey vessel will be constantly moving at 4.0-5.0 knots and therefore any given location will only be affected by the sounds for a short period of time.

Sharks

Limited research has been conducted on shark response to marine seismic surveys. Sharks are known to be highly sensitive to low frequency sound between approximately 40 and 800 Hz, and retreat immediately if the intensity of a sound is increased by 20 dB re 1µPa (Myrberg 2001). Given their distribution and habitat preference, low numbers of sharks are expected in the proposed survey area and any likely impacts would be limited to avoidance of survey vessels, resulting in temporary displacement. The survey will, therefore, have minimal effect on sharks or their normal movements through the region.

Birds

It is likely that the above listed species of seabirds will occur within the proposed survey area; however, it is not anticipated that the seismic survey will have any impact on any species of seabird, due to their mobility and distance between the proposed survey area and any significant nesting or feeding sites for seabirds in the region.

Mammals

The proposed survey is scheduled outside the period during which high numbers of southern right whales are likely to occur within the proposed survey area. Known aggregation and calving areas are located approximately 200 km away from the proposed survey area. However, the proposed survey area

is located close to known feeding areas and the proposed survey may overlap with periods when pygmy blue whales are present in the region. Therefore, moderate numbers of these species may be present in the proposed survey area.

Baleen whales communicate using low frequency sounds (7 Hz to 22kHz) (Southall et al 2007) and are therefore considered to be sensitive to low frequencies associated with seismic surveys (DEWHA 2008c). Aspects of the program that may affect whales (e.g., vessel movements and noise associated with seismic source discharges) will be transitory at any given location and will potentially involve only very temporary and localised exposure.

Physical damage to the auditory system of baleen whales (Temporary Threshold Shift; TSS) may occur at noise levels of 186 dB re 1 μPa^2.s, although TTS may occur at lower sound levels if exposed to multiple shots (DEWHA 2008c). The CMST noise modelling results showed that these noise levels would only be reached within less than 200 m of the source for all locations modelled. Figure 5 shows this for the location closest to shore, Tx1.

Because of the good swimming ability of marine mammals and their avoidance of either the vessel or the seismic source array, it is highly unlikely that any marine mammals will be exposed to levels likely to cause pathological damage (McCauley 1994).

Noise associated with seismic sources used during seismic surveys can cause significant behavioural changes in whales (McCauley 1994). Behavioural responses to seismic sounds include swimming away from the source, swimming towards the source, rapid swimming on the surface and breaching (McCauley et al. 1998; 2003). The level of noise at which a response is triggered varies between species and even between individuals within a species (Richardson et al. 1995). Stone (2003) suggests that different groups of cetaceans adopt different strategies for responding to acoustic disturbance from seismic surveys with baleen whales displaying localised avoidance.

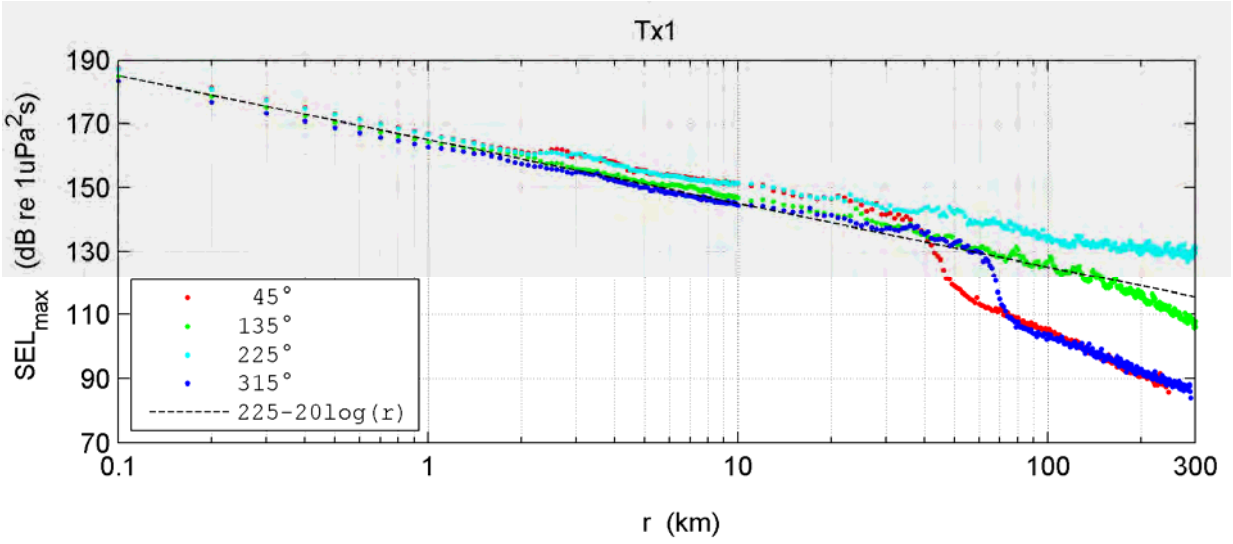


Figure 5: SEL_{max} along principal axes of source array for location closest to shore, Tx1 (CMST 2011).

CMST modelled the propagation of underwater sound from a specified seismic source at three locations in the proposed survey area. The modelling results indicated that sound levels inshore of the survey are strongly attenuated by propagation up the continental slope, resulting in received SEL near the coast that are below 90 dB re 1μPa^2s and levels at the Head of Bight that are below 85 dB re 1μPa^2s (CMST 2011). Therefore the effects on southern right whales in the known aggregation and calving areas at the Head of Bight are likely to be negligible due to the received SEL being in the range of ambient noise levels.

Blue whales in the Bonney Upwelling are thought to be sensitive to seismic activity, maintaining distances of greater than 17 km from the operating source (Gill 2005). However, blue whales were sighted within 2.4 km of active source and cow/calf pairs (considered most sensitive of whale

aggregations) were recorded within 7.1 km of operating source (Morrice et al. 2004). Studies found that migrating humpback whales responded similarly (McCauley et al. 2000). As modelled by CMST, the received SEL in the feeding area to the east of the proposed survey area are also in the range of ambient noise levels and are unlikely to affect any marine mammals feeding in the area.

Given the low likelihood of whale sightings in the area (Table 4) BP will conduct the survey in accordance with the Standard Management Procedures set out in the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, September 2008 (DEWHA 2008b). Such measures will include the following:

- 30 minute pre-operational watch
- 3 km precautionary zone
- 30 minute soft start
- Continual marine mammal watch throughout the period when the seismic sources are operating
- 2 km low-power zone
- 500 m shut down zone.

Despite the low likelihood of sighting whales, BP proposes an additional management measure in order to enable monitoring that would increase the knowledge base of this lightly studied area. This entails providing two dedicated Marine Mammal Observers (MMOs) during cetacean migration periods, i.e. from October to January (southern right whales and blue whales) and April to May (southern right whales) (to the closest scheduled crew change). These MMOs will be on the main vessel in order to observe the behaviour and characteristics of any whales that occur within sighting distance of the vessel, as well as ensuring that the standard management measures are implemented during the survey. Outside of these periods, trained survey crew will manage interactions between cetaceans and the survey.

With these measures in place, the likely impacts on marine mammals will be low. The combination of these procedures will reduce the risk of animals being in close proximity to the seismic source on full power and therefore reduce the likelihood of physical injury. The use of MMOs will also aid in the sighting and identification of whales and, combined with the low power zone and shut down zone, reduce the risks of significant behavioural effects and potential nutritional stress on the whales when near to potentially significant annual feeding area.

Similarly, with the management procedures in place and the expected avoidance behaviour of large cetaceans, risks of collision and entanglement are low. The remaining effects are likely to be associated with short-term and reversible avoidance behaviour of the vessel and the seismic source.

Reptiles

Studies (McCauley 1994) found that the best hearing range for marine turtles is between 100 and 700 Hz, which overlaps with the maximum frequency range of a seismic array impulse. Studies indicate that marine turtles may begin to show behavioural responses to an approaching seismic array at received sound levels of approximately 166 dB re 1 µPa (rms), and avoidance at around 175 dB re 1 µPa (rms) (McCauley et al. 2003). This relates to a behavioural response at approximately 2 km, and avoidance at approximately 1 km (McCauley et al. 2003).

Marine turtles could suffer physical damage if the seismic source is operated with turtles less than 30 m away. Where arrays are already operating, marine turtles are expected to implement avoidance measures before entering zones where physical damage might occur. Moein et al. (1994) studied short-term exposure of loggerhead turtles to seismic pulses and, although immediate hearing was affected, longer-term hearing was not.

Considering the low numbers of marine turtles expected in the proposed survey area, and the distance between the proposed survey area and known breeding and nesting sites, impacts on marine turtles are expected to be very low.

3.1 (e) Listed migratory species

Description

There are 23 migratory species listed on the EPBC Act Protected Matters Database (search conducted on 06/07/2010) that may occur within the proposed survey area (Table 7).

Table 7. Migratory species that may occur in the proposed survey area

Species Type	Scientific Name	Common Name
Sharks	*Lamna nasus*	Porbeagle
Birds	*Diomedea amsterdamensis*	Amsterdam albatross
	Diomedea dabbenena	Tristan albatross
	Diomedea exulans (sensu lato)	Wandering albatross
	Diomedea gibsoni	Gibson's albatross
	Macronectes giganteus	Southern giant-petrel
	Macronectes halli	Northern giant-petrel
	Phoebetria fusca	Sooty albatross
	Thalassarche cauta (sensu stricto)	Shy albatross
	Thalassarche chrysostoma	Grey-headed albatross
	Thalassarche melanophris	Black-browed albatross
Mammals	*Balaenoptera bonaerensis*	Antarctic minke whale
	Balaenoptera edeni	Bryde's whale
	Balaenoptera musculus	Blue whale
	Caperea marginata	Pygmy right whale
	Eubalaena australis	Southern right whale
	Megaptera novaeangliae	Humpback whale
	Lagenorhynchus obscurus	Dusky dolphin
	Orcinus orca	Killer whale
	Physeter macrocephalus	Sperm whale
Reptiles	*Caretta caretta*	Loggerhead turtle
	Chelonia mydas	Green turtle
	Dermochelys coriacea	Leatherback turtle

In addition to the species listed below, BP has extended the assessment to the mako shark, listed under the EPBC Act, which is known to occur in the wider region.

Sharks

The mako shark is widely distributed in temperate and tropical waters (IUCN 2010) of the northern and southern hemispheres (Cavanagh et al 2003), including waters of South Australia (DEWHA 2010). It inhabits coastal, oceanic waters at least 500 m deep, although it is occasionally found where the continental shelf narrows (IUCN 2010). The diet of mako sharks consists mainly of fish and cephalopods (octopus and squid) (IUCN 2010). They can make extensive movements of up to 3,400 km and appear to use offshore continental waters as nursery areas (IUCN 2010). Consequently, juvenile and adult mako sharks may be encountered in the survey area.

The porbeagle shark is widely distributed through temperate and cold-temperate waters of the northern and southern hemispheres (Cavanagh et al 2003, IUCN 2010). In Australia, their distribution

is centred on waters off south, south-western and south eastern Australia (DEWHA 2010; IUCN 2010). This species is commonly found on continental shelves and can migrate short to moderate distances (IUCN 2010). The porbeagle shark feeds mostly on fish and cephalopods (squid and octopus) (IUCN 2010). Due to its habitat preference and distribution, this species is likely to be present in the proposed survey area.

Birds

See Section 3.1 (d) for information relating to albatrosses and petrels.

Mammals

- See Section 3.1 (d) for information relating to humpback, blue, fin, sei and southern right whales.

- The Bryde's whale is considered as a pelagic species which occurs in temperate to tropical waters, both oceanic and inshore. The coastal form of Bryde's whale appears to be limited to the 200 m depth isobar, while the offshore form is found in deeper water (500 to 1000 m). There is no evidence of large-scale movements of the inshore form of Bryde's whales; however, the offshore form of Bryde's whale may migrate seasonally, heading towards warmer tropical waters during the winter (DEWHA, 2008a). No area of significance for this species has been recognised along the southern coastline of Australia. The nearest known area of aggregation for this species is the Abrolhos Islands, approximately 1,500 km north-west of the proposed survey area, at its closest point (DEWHA, 2008a).

  It is therefore anticipated that only low numbers of this species are likely to be present within the proposed survey area during the proposed operations.

- The killer whale has a broad global distribution, being found in all world oceans, from the Arctic and Antarctic regions to warm, tropical seas. Not much is known about killer whale migration; however, it is believed that they undertake seasonal migration depending on food supply. No areas of significance for this species have been recorded within Australian waters. However, it is likely that killer whales may be found in close proximity to pinniped colonies (Bannister et al. 1996).

  As the proposed survey area is located more than 200 km from the main pinniped colonies found in the region, it is anticipated that low numbers of killer whales may be encountered during the proposed survey.

- The sperm whale is found from Arctic to tropical waters. Sperm whales are usually found in deep offshore waters. Males are found in higher latitudes and migrate towards lower latitudes for mating. Females, calves, and juveniles remain in the warmer tropical and sub-tropical waters of the Indian Ocean all year round (DEWHA 2008a). The closest aggregation (feeding area) is to the south-east of Kangaroo Island, approximately 500 km south-east of the proposed survey area (Bannister et al. 1996, DEWHA 2008c).

  As the proposed survey area is near to potential feeding areas for this species, it is anticipated that this species may be encountered during the proposed survey.

- The Antarctic minke whale is found throughout the southern hemisphere from 55°S to the Antarctic ice edge during summer and undertakes extensive migration to breeding grounds at mid-latitudes (between 30°S and 10°S) in winter. The distribution of the Antarctic minke whale is thought to be mainly oceanic, beyond the continental shelf break. Antarctic minke whales have been recorded from all states, but not the Northern Territory (DEWHA 2008a), with sightings recorded off Kangaroo Island and the Eyre Peninsula, approximately 500 km south-east and 370 km east of the proposed survey area, respectively (Bannister et al. 1996).

  The proposed survey is scheduled to occur outside the period within which Antarctic minke whales are likely to be present within the proposed survey area. It is therefore anticipated that very low numbers of individuals may be encountered during the proposed survey.

- The dusky dolphin is found in temperate and subantarctic waters of the southern hemisphere,

from about 55°S to 26°S. This species is primarily found in inshore waters for most of year, but may seek offshore colder waters in summer. Dusky dolphins occur across southern Australia from Western Australia to Tasmania, with sightings recorded near Kangaroo Island, approximately 500 km south-east of the proposed survey area; however, no areas of significance to this species are known to occur in Australian waters. This species undertakes seasonal movements in Australia. It is suggested that some of these movement patterns may be linked to the position of the Subtropical Convergence and ENSO events (DEWHA, 2008a).

As the proposed survey area is located near potential feeding areas for this species, it is anticipated that dusky dolphins may be encountered during the proposed survey.

- The pygmy right whale is found throughout temperate and subantarctic waters of the Southern Hemisphere, between the latitudes 30°S and 52°S. Year-round strandings indicate that this species is not migratory, and is present in Australian waters throughout the year (DEWHA 2008a); however, it may undertake seasonal movements as areas of coastal upwelling events, as well as the Subtropical Convergence, appear to be important factors for the distribution of this species. Areas of significance for this species are believed to be Kangaroo Island and the Eyre Peninsula, approximately 500 km south-east and 370 km east of the proposed survey area, respectively (Bannister et al. 1996).

  As this species is present all year round in Australian waters, and the proposed survey area is near potential feeding areas for this species, it is anticipated that pygmy right whales may be encountered within the proposed survey area.

Nature and extent of likely impact

Sharks

See Section 3.1 (d) for details regarding potential impacts of proposed activities on sharks.

Birds

See Section 3.1 (d) for details regarding potential impacts of proposed activities on migratory bird species.

Mammals

The survey area is unlikely to represent important habitat for listed threatened and migratory mammals that may occur in the region (Table 8).

Table 8. Summary of areas and periods of significance for migratory mammal species that may occur within the proposed survey area.

Species	Location	Significance	Period
Southern right whale	Head of Bight	Calving/aggregation area	June to October
Blue whale Sperm whale Fin whale Sei whale	South-west to South-east of Kangaroo Island	Feeding area	November to May
Pygmy right whale	South-west to South-East of Kangaroo Island	Feeding area	All year round
Antarctic minke whale	South-west to South-East of Kangaroo Island	Feeding area	July to August
Killer whale	Near pinniped colonies (Kangaroo Island, Point Labatt, Head of Bight, Nuyts Archipelago)	Feeding area	All year round

Effects of noise on southern right whales aggregating and calving at the Head of Bight as well as effects on feeding marine mammals have been addressed in Section 3.1 (d).

Other aspects of the seismic program may affect individuals that may be present within the proposed survey area (*e.g.*, vessel movements). However, these will be transitory at any given location and involve only very temporary and localised potential exposure, either through collision risk or effects from the sound source.

Given the low likelihood of whale sightings in the area (Table 4) BP will conduct the survey in accordance with the Standard Management Procedures set out in the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales, September 2008 (DEWHA 2008b). Such measures will include the following:

- 30 minute pre-operational watch
- 3 km precautionary zone
- 30 minute soft start
- Continual marine mammal watch throughout the period when the seismic sources are operating
- 2 km low-power zone
- 500 m shut down zone.

Despite the low likelihood of sighting whales, BP proposes an additional management measure in order to enable monitoring that would increase the knowledge base of this lightly studied area. This entails providing two dedicated Marine Mammal Observers (MMOs) during cetacean migration periods, i.e. from October to January (southern right whales and blue whales) and April to May (southern right whales) (to the closest scheduled crew change). These MMOs will be on the main vessel in order to observe the behaviour and characteristics of any whales that occur within sighting distance of the vessel, as well as ensuring that the standard management measures are implemented during the survey. Outside of these periods, trained survey crew will manage interactions between cetaceans and the survey.
Furthermore, smaller toothed cetaceans do not hear low frequencies as well as larger whales. They are therefore considered less susceptible to adverse effects from low-frequency seismic sound (McCauley 1994).

Potential effects from the proposed seismic survey on listed migratory cetacean species are likely to be limited to temporary and highly localised disturbance, resulting in temporary displacement of small numbers of animals to adjacent areas. Given the hearing sensitivities and mobility of cetaceans, it is unlikely they would be at risk of collision with vessel(s) or entanglement with the towed equipment.

Reptiles
See Section 3.1 (d) for details regarding potential impacts of proposed activities on reptiles.

3.1 (f) Commonwealth marine area

Description

The proposed seismic activities will be undertaken on the continental shelf and slope and abyssal plain in Commonwealth marine waters. Water depths vary from 1000 m to 3000 m within the proposed survey area. There are no submergent lands, shoals or reefs in the proposed survey area (Figure 3).

However, the proposed survey area overlaps the Benthic Protection Zone (BPZ) of the GABMP (5,220 km^2 of the total survey area).

Nature and extent of likely impact

The proposed action involves a seismic survey in waters ranging between 1000m and 3000m m deep, more than 200 km from the mainland at its closest point. The survey area does not contain habitat of particular significance to any species of marine fauna, but is located near potential important feeding sources for large cetaceans such as blue, fin and sei whales. Sources of likely impact to Commonwealth marine areas are limited to the generation of underwater noise, the routine discharge of grey water, the potential risks associated with an accidental oil spill in relation to the survey vessel and the exclusion of other users from the survey area.

The management measures that will be used during the survey will reduce the risks from routine aspects of the survey. Any routine discharges and emissions of sounds will not have a significant effect on the Commonwealth marine area given the extensive area remaining unaffected and generally deep water in which seismic acquisition will be conducted. If any accidental spill occurs as a result of survey vessel operations, management plans implemented by the seismic contractor will ensure the effects are minimised. Any small quantities of oil or chemicals that may be released from survey vessel operations will widely disperse and the volatile components evaporate.

The BPZ of the GABMP was established to preserve a representative sample of benthic flora/fauna and sediments, extending across the continental shelf and down the slope into deeper waters (Environment Australia, 1999). Due to the water depths found within the proposed survey area, it is unlikely that the proposed seismic activities will have a significant impact on benthic flora and fauna of the BPZ. Furthermore, no routine discharge or disposal will be undertaken within 25 km of the GABMP.

3.1 (g) Commonwealth land

Description

Not applicable. There will be no land based activities as part of the proposed survey.

Nature and extent of likely impact

Not applicable.

3.1 (h) The Great Barrier Reef Marine Park

Description

Not applicable. The proposed survey will not be conducted in the Great Barrier Reef Marine Park.

Nature and extent of likely impact

Not applicable.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

Not applicable.

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

Not applicable.

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**		No
		X	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

Seismic acquisition activities are regularly conducted throughout the Commonwealth marine area. The impacts on the Commonwealth marine area associated with seismic surveying have been deemed to be not significant. Furthermore, the relevant area where the proposed seismic survey is to occur does not represent a significant portion of the Commonwealth marine area, and therefore potential impacts on the environment as a whole are likely to be low.

The proposed survey activities will be undertaken within the permit areas for EPP 37, EPP 38, EPP 39 and EPP 40 in water ranging between approximately 1000 m to 3000 m deep, approximately 200 km from the mainland. There are no shallow submergent lands, shoals or reefs in the proposed survey area.

Several volcanic features have been identified in the GAB region, including Anna's Pimple, located within the BPZ approximately 185 km offshore in waters 2000 m deep. Very little information is known about these features as they have not yet been surveyed, but they may potentially represent important habitats for deep water fauna, including stony corals, hydroids, gorgonians and glass sponges (SARDI 2010). At these depths, it is unlikely that the proposed seismic survey will have any direct or indirect impact on habitats and species associated with these volcanic features.

Sources of likely impact to Commonwealth marine areas are limited to the generation of underwater noise, the routine discharge of grey water and the exclusion of other users from the survey area, which are considered to have short term and localised effects on the environment as a whole.

The proposed survey area overlaps part of the BPZ which protects a transect representative of the seabed of the continental shelf and slope of the GAB. The survey is not anticipated to modify, destroy, fragment, isolate or disturb an important or substantial area of habitat. Vessels will not anchor whilst performing the survey unless in an emergency, and will not conduct routine discharges within 25 km of the GABMP. In addition, the waters and seabed of the GAB that lie in the 1000-3000 m depths range are relatively undisturbed throughout the GAB region due to relatively low human activity and use at these depths and the habitat type and benthic biota present in the proposed survey area is likely to be broadly homogenous and similar over extensive areas of the GAB where similar water depths occur.

Pest species have the potential to cause negative effects on native organisms from competition, predation or disease. The introduction of non-native (pest) species into the marine environment may occur through ballast water or biofouling. The survey vessel has recently undergone hull cleaning and inspection by the Australian Quarantine and Inspection Service (AQIS) in January 2011. In the event that the vessel will need to exchange ballast water prior to the survey commencing, it will occur at least 12 Nm from land (22 km), in accordance with AQIS requirements, the Australian Ballast Water Management Requirements, Version 4 March 2008 and the *Quarantine Act 1908* (Cth). Survey operations will also comply with the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (April 2009).

A suite of management measures has been developed for the proposed seismic survey to minimise its potential environmental impacts as discussed in Section 4. These measures will form part of the EP which will be subject to assessment and approval by PIRSA under the OPGGS (E) Regulations.

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

Not applicable

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

Not applicable

3.3 Other important features of the environment

3.3 (a) Flora and fauna

Marine species with broad distributions such as marine mammals, turtles, fish, sharks and seabirds may transit through the proposed survey area; however, the proposed survey area does not contain habitats likely to be critical to any of these species.

The EPBC Act Protected Matters Database (DEWHA, 2010a) lists threatened and migratory species that could occur in the proposed survey area (Tables 2 and 3). Description and likely impacts to these species are discussed in Sections 3.1 (d) and 3.1 (e).

The proposed survey area is located along the continental slope and covers depths ranging between 1000 to 3000 m. Seabed sediments have been described to comprise of sandy, gravelly substrate in the shallower regions and muddy substrate in deeper, offshore regions (McLeay et al 2003). The inner regions of the GAB support diverse range of seagrass and macroalgae habitats; however, these habitats are generally restricted due to light penetration and topography levels and therefore are generally within waters less than 100 m deep (McLeay et al 2003).

Over 6,640 benthic species are thought to occur in South Australian waters, with a high degree of endemism in the GAB (McLeay et al. 2003). Invertebrates in the region include non-reef building soft corals, hydroids, molluscs, sponges, polychaetes, crustaceans and echinoderms. There is a lack of information on the structure and species composition of the GAB's benthic communities. However, it is believed that habitat diversity decreases with depth and distance from shore, with the seabed becoming more uniform and therefore attracting less diverse communities (DEWHA 2008b) in deeper waters.

Generally, marine invertebrates are considered to have poorly developed mechano-sensory systems, due to the absence of ears with air-filled voids. Instead, marine invertebrates detect sound vibrations through other external and internal structures, such as hairs, statocysts and muscles. Because of this physiology, marine invertebrates are considered to be little affected by noise generated by seismic surveys, with some research postulating that they only "hear" seismic sounds at very close range, such as less than 15 m (McCauley, 1994). Over-stimulation and pathological damage may only occur when in close proximity to the source (less than a few metres) (Swan et al. 1994).

Although the proposed survey area overlaps with the BPZ, a representative north-south transect of the region, it is not considered to support critical benthic habitats. Therefore, the overall risk to benthic species as a result of seismic operations is considered to be low.

The open ocean environment generally supports highly mobile fish species, many of which are brought into the region by the warm tropical Leeuwin current, such as southern bluefin tuna and mackerel, salmon and herring (Edyvane 1998). As previously mentioned, the open ocean also supports larger fauna, including cetaceans and sea turtles. The effects of seismic pulses on marine mammals, sea turtles, fish and sharks are discussed in detail in Sections 3.1 (d) and 3.1 (e).

The proposed site survey operations may result in temporary displacement and / or behavioural changes (i.e. avoidance of area) of marine fauna in the area. There is only potential for injury to these species if individuals are within very close range of the seismic source. However, due to the mobile nature of these species and the management measures to be implemented, the overall impact resulting from the proposed survey to marine fauna is likely to be very low.

Phytoplankton and zooplankton communities directly or indirectly support larger marine fauna in both coastal and open ocean environments. Given the likely wide distribution of phytoplankton and zooplankton communities in the region, the overall impact to such populations as a result of the survey is considered to be low.

3.3 (b) Hydrology, including water flows

Four distinct currents occur within the GAB region, namely the Leeuwin, Central Bight, West Wind and Flinders currents. The Leeuwin current comprises waters of low salinity and high temperatures. The current originates from the tropical Indian Ocean and passes along the continental break during winter months. The Central Bight current is characterised by warm, high-saline waters derived from the south-west Indian Ocean and is present in the central and eastern portions of the GAB, particularly during winter. The West Wind current is present in the slope and shelf break regions throughout the year and comprises cold waters with low salinity. The Flinders current is a surface current characterised by cool, low-saline waters (Edyvane 1998).

Seasonal upwellings occur in the GAB region, such as the Kangaroo Island and Eyre Peninsula upwellings (DEWHA, 2007). These upwellings are thought to be linked to mesoscale eddies which form off the Eyre Peninsula. These eddies are believed to play a role in lifting cool, nutrient-rich deep water toward the surface, therefore enhancing production of plankton communities (DEWHA, 2007).

3.3 (c) Outstanding natural features

Kangaroo Island canyons are associated with enhanced productivity resulting from upwellings, which provide excellent food source for marine fauna, attracting aggregations of several species of marine mammals, sharks, bird and fish to the area. These upwellings are in turn thought to be linked to mesoscale eddies which form off the Eyre Peninsula.

The continental shelf in the GAB region is characterised by numerous submarine canyons. These include the Kangaroo Island canyons to the south-east of the proposed survey area, and one canyon which coincides with the southern edge of the proposed survey area. These canyons are associated with enhanced productivity resulting from upwellings, which provide excellent food source for marine fauna, attracting aggregations of several species of marine mammals, sharks, bird and fish to the area, including orange roughy, pygmy blue, fin and sperm whales. These upwellings are in turn thought to be linked to mesoscale eddies which form off the Eyre Peninsula, which are associated with enhanced productivity and aggregations of marine life (DEWHA 2008a).

Some volcanic features have been identified within the GAB. These are described in Section 3.2 (c).

The GABMP covers a total area of 19,700 km^2, which includes both Commonwealth waters and South Australian State waters. The GABMP is divided into four management zones: Sanctuary and Conservation Zones in State waters, and Marine Mammal Protection (MMPZ) and Benthic Protection Zones (BPZ) in Commonwealth waters (DEWHA, 2007).

The MMPZ extends from 3 Nm (5.5 km) out to approximately 12 Nm (22 km) from the shoreline and is designed to ensure the integrity of the calving grounds for the southern right whale and Australian sea lion colonies. The BPZ is a narrow 20 Nm strip (37 km) which extends from the MMPZ out the Australian Fishing Zone boundary, approximately 200 Nm offshore (370 km). The BPZ is a transect designed to represent the biodiversity of the region and is the only one of its kind in Australia (DEWHA, 2007).

The GABMP supports a higher level of biodiversity and endemism in southern Australian waters. The marine park also supports internationally significant habitats for the southern right whale and the Australia sea lion (DEWHA, 2007). The proposed survey area overlaps portions of the Benthic Protection Zone, but is not considered to support any critical habitats.

3.3 (d) Remnant native vegetation

Not applicable.

3.3 (e) Current state of the environment

Petroleum exploration activities in the Bight Basin commenced in the 1960s, with a number of wells drilled throughout the region. Four wells are either within the proposed survey area or within 100 km of the proposed survey area; namely Apollo 1, Gnarlyknots 1 and 1A and Potoroo 1 (DEWHA, 2010b).

3.3 (f) Commonwealth Heritage Places or other places recognised as having heritage values

The proposed survey area is not within any known Commonwealth Heritage Places or any other places of heritage value.

3.3 (g) Indigenous heritage values

Not applicable.

3.3 (h) Other important or unique values of the environment

Not applicable.

3.3 (i) Tenure of the action area (eg freehold, leasehold)

The proposed survey will be undertaken wholly in Commonwealth waters within the permit areas for EPP 37, EPP 38, EPP 39 and EPP 40.

3.3 (j) Existing land/marine uses of area

The survey area overlaps with fishing zones for the following Commonwealth managed fisheries:

- Western Skipjack Tuna Fishery
- Small Pelagic Fishery
- Southern and Eastern Scalefish and Shark Fishery (which includes the Great Australian Bight Trawl Fishery)
- Southern Bluefin Tuna Fishery
- Southern Squid Jig
- Western Tuna and Billfish Fishery.

In addition, the survey area overlaps with fishing zones for the following State managed fisheries:

- Giant Crab Fishery
- Marine Scalefish Fishery
- Sardine (Pilchard) Fishery
- Charter Boat Fishery

Although the proposed survey area overlaps with the above fishing zones, fishing effort is predominantly located in coastal waters. Ongoing consultation with State and Commonwealth fisheries organisations, including the fishers and their associations, are being conducted as part of the OPGGS (E) Regulations requirements. This consultation will provide the communications and agreed actions to ensure ongoing fisheries activities and seismic activities are coordinated to reduce risks to the environment.

Two stock assessment surveys are scheduled to be undertaken between January and April 2011 and will overlap with the proposed survey period. An aerial survey of southern bluefin tuna stocks will be conducted by CSIRO from January to March, and a vessel based survey of trawl fishery stocks will be conducted twice between January and April, to coincide with full moons. Both BP and the seismic

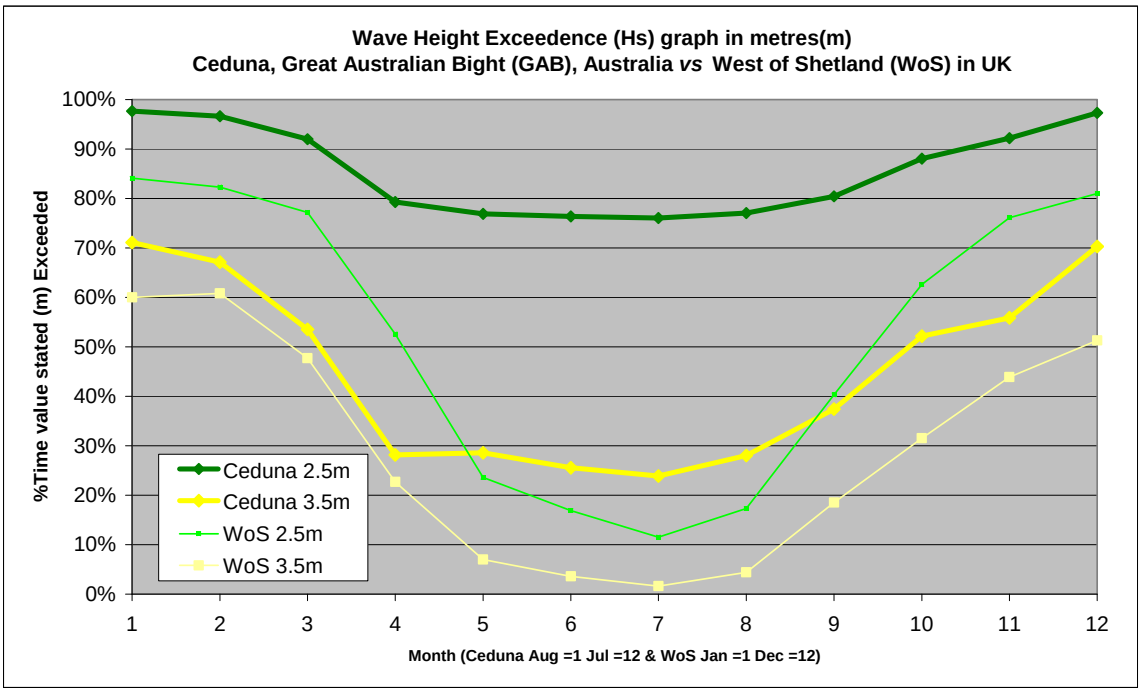
contractor have determined that November to April are the key months during which 3D seismic operations can be undertaken in the proposed survey area.

There has been one recent seismic survey undertaken in the GAB region which did not commence until April, that is the GXT BightSPAN 2D survey undertaken in 2009 (Table 4). As this survey was a 2D seismic operation, the vessel towed a single 10 km streamer which was easily and quickly recovered during poor weather conditions and then redeployed. Nevertheless, the seismic contractor that conducted this survey reported severe problems with weather conditions during the survey period (April to July 2009).

For the purposes of this survey, there will be a significant amount of equipment will be deployed on the 3D operation (approximately ten times that for the 2D seismic operations), specifically 12 x 8 km streamer, which is the most efficient way to acquire data over the survey area. However, this will result in slower recovery and deployment times. Workboats are also used to maintain the streamers on 3D operations. Given these two factors, little or no seismic acquisition would be possible during the winter months.

The wave height (Hs) exceedence graph shown in Figure 6 highlights why BP requires a survey commencement date of no earlier than the second week of October. This will ensure that the seismic survey is undertaken during the optimum weather window (from November to April, when wave height in the GAB would exceed 3.5 m less than 30 % of the time on average). Targeting this optimum 'weather window' in the region is not merely a strategy of BP but is industry best practice globally. Moreover, seismic surveys in the Otway and Bass Strait that are subject to Southern Ocean influences are planned in the same way.

Based on BP's experience in West of Shetland (WoS) UK, with quite similar long fetch Atlantic swell conditions, 2.5 m is the approximate wave height (Hs) limit for 3D seismic operations. Due to the long wavelength of the south-westerly swell experienced in the Southern Ocean, lighter winds and the planned orientation of seismic lines across the swell (NW-SE line direction) BP and the seismic contractor have determined that a higher working limit of around 3.5 m is possible for the proposed seismic survey in the GAB. A review of previous surveys has also suggested that this will be the case.



				Ceduna 3D seismic operational weather window									
	1	2	3	4	5	6	7	8	9	10	11	12
Ceduna Hs	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Ceduna 2.5m	97.66%	96.64%	91.99%	79.27%	76.89%	76.36%	76.05%	77.04%	80.44%	88.05%	92.21%	97.30%
Ceduna 3.5m	71.07%	67.14%	53.53%	28.13%	28.58%	25.53%	23.89%	28.02%	37.40%	52.14%	55.86%	70.29%

WoS Hs	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WoS 2.5m	84.10%	82.30%	77.20%	52.60%	23.60%	16.90%	11.50%	17.30%	40.30%	62.60%	76.10%	81.00%
WoS 3.5m	60.00%	60.80%	47.70%	22.70%	7.00%	3.60%	1.60%	4.40%	18.50%	31.50%	43.90%	51.30%

Summary of BP West Of Shetland (WoS) 3D operations highlighting use of 'weather defined' 3D seismic season

BP 1993 3D												
BP 1996 3D												
BP 1999 3D												
BP 2000 3D												
BP 2002 3D												
BP 2004 3D												Late start 49% Weather Stby.
BP 2006 3D												
BP 2008 3D												

Figure 6: Wave height exceedence graph highlighting optimum weather window for 3D seismic operations in the GAB.

Consultations with the relevant stakeholders (including CSIRO, ASBTIA and GABIA) have indicated that the stock assessment surveys do not overlap geographically with the proposed seismic survey area, except for one Southern Bluefin Tuna Stock Assessment Survey aerial transect overlapping the northern extremity of the proposed survey area (Figure 3).

However, stakeholders have raised concerns that seismic activity could alter the behaviour and/or the migration pathway of southern bluefin tuna such that the results of the Southern Bluefin Tuna Stock Assessment Survey could be biased. CMST's noise modelling results have confirmed that noise levels decay rapidly inshore of the proposed survey area and will not be at a level sufficiently above ambient noise levels to cause an impact on fish (Section 3.1 (d)).

Discussions on appropriate and practical steps to further reassure the relevant industry associations will continue, including the implementation of an offshore communications plan on the vessel so as to provide all relevant stakeholders with regular survey updates. In addition, noise loggers will be deployed to record noise levels before and during the survey period to confirm the ambient noise levels, including natural (physical and biological) and man-made noises, as well as to confirm the modelling results.

The proposed survey area is potentially used by recreational fishing vessels, targeting tunas, striped marlin, snapper, Australian salmon and trevally. However, due to the proposed survey area's distance

offshore, this activity appears unlikely. The closest charter fishing operators are based on Kangaroo Island, the Eyre Peninsula and at Streaky Bay (DEWHA, 2007).

Shipping also occurs in the region, and shipping traffic between Western Australia and Port Lincoln/Spencer Gulf/Adelaide is likely to traverse the southern extremity of the proposed survey area. The shipping route crossing the southern boundary of the proposed survey area is likely to be used by between one and five vessels a day (DEWHA, 2007). A Notice to Mariners will be issued to ensure that relevant stakeholders are notified of the presence of the survey and support vessels in the proposed survey area during the survey period.

3.3 (k) Any proposed land / marine uses of area

The proposed survey area may be targeted for offshore mineral exploration. Several licence applications have been lodged to mine for mainly cobalt and shell sands; however, to date, no licences are active.

A Commonwealth marine reserve network proposal for the South-west Marine Region has been released, which include a proposed extension to the east of the GABMP, which overlaps with the proposed survey area. This marine reserve is proposed as a multiple use zone which would allow petroleum exploration activities with approval from the Governor General under the EPBC Act.

4 Measures to avoid or reduce impacts

As described in Section 3, the potential impacts on matters protected under the EPBC Act associated with the proposed activities are likely to be very low. To further reduce the risk of any impact to Commonwealth marine areas, the potential environmental risks associated with the survey have been identified and assessed, and specific measures to avoid or reduce environmental effects have been initiated.

These measures will be detailed in the EP to be submitted for approval by PIRSA before commencing operations. The key management measures to avoid or reduce impacts are summarised in Table 9.

Table 9: Summary of Environmental Risk, Potential Effects and Management Approach

Environmental Aspect / Incident	Potential Environmental Effect	Management Approach
Acoustic impulse from seismic source	Potential physiological effects or disruption to behaviour patterns of marine fauna.	• Minimise duration of operation to the extent practicable. • Power down source during vessel turns. • Comply with EPBC Act Policy Statement 2.1 - 'Interaction between offshore seismic exploration and whales, September 2008 (DEWHA 2008b)', all requirement under sections A1 to A4 including: – 30 minute pre-shooting watch. – 3 km precautionary zone. – 30 minute soft start. – Continual marine fauna watch throughout the period when the seismic source is operating. – 2 km low-power zone. – 500 m shut down zone. Additional measure of two MMOs during cetacean migration periods, i.e. from October to January (southern right whales and blue whales) and April to May (southern right whales) (to the closest scheduled crew change). • Record ambient noise levels, including natural and other man-made noise occurring in the GAB region prior to the survey commencing and measure received noise levels at specific locations within the GAB region (to be confirmed in consultation with relevant stakeholders) to confirm the modelling results (Section 3.3 (j)).
Grey water/ sewage disposal	Potential localised reduction in water quality - nutrient enrichment	• Onboard sewage treatment plant approved by the International Maritime Organisation (IMO) to be compliant with Annex IV of the International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of the 1978 relating thereto (MARPOL 73/78) (as implemented in Commonwealth waters by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (Cth) (PSPPS Act)). • Offshore discharge only (>12 Nm from land (22 km)). • High dispersal/dilution factor. • Biodegradable detergents only. • Sewerage waste is localised and has low persistence in the environment. • Sewage macerated prior to disposal. • No disposal within 25 km of the GABMP

Environmental Aspect / Incident	Potential Environmental Effect	Management Approach
Discharge of oily water from bilges	Potential localised chronic/acute toxic effects	• Treat in accordance with MARPOL 73/78 (as implemented in Commonwealth waters by the PSPPS Act) prior to discharge. • All bilge water passes through an oil/water separator prior to discharge and meets International Maritime Organisation (IMO) requirements. • All bilge discharges treated to <15 ppm hydrocarbons. • Discharge quality automatically monitored with alarm. • Low volumes and rapid dilution/dispersal. • No discharge within 25 km of the GABMP. • Activities that would result in discharge via scuppers such as deck cleaning will be prohibited within 25km of the GABMP
Putrescible galley wastes disposal	Potential localised reduction in water quality - nutrient enrichment	• Discharge in accordance with MARPOL 73/78 (as implemented in Commonwealth waters by the PSPPS Act and OPGGS Act. • Low volumes and rapid dispersal/dilution. • Incineration or maceration to <25 mm prior to discharge. • Discharge only when >12 Nm from shore (22 km). • No disposal within 25 km of the GABMP.
Solid wastes disposal	Potential environmental degradation from incorrect disposal	• Collection and appropriate onshore disposal of solid wastes in accordance with MARPOL 73/78 (as implemented in Commonwealth waters by the PSPPS Act). • All solid, liquid and hazardous wastes collected and sent ashore for recycling, disposal or treatment at an appropriately licensed waste/recycling/treatment facility. • Details of wastes generated and disposal requirements to be provided in a Waste Management Plan and the EP.
Waste oil disposal	Potential localised chronic/acute toxic effects	• No waste oil disposed of at sea. • All waste oils collected and returned to shore for recycling/disposal in accordance with the EP and MARPOL 73/78 (as implemented in Commonwealth waters by the PSPPS Act).
Atmospheric emissions	Potential increase in greenhouse effect	• Compliance with Annex VI of MARPOL 73/78 (as implemented in Commonwealth waters by the PSPPS Act). • Use of low sulphur diesel if available. • Engines maintained to operate at optimum efficiency to minimise emissions.
Artificial lighting	Potential attractant / disturbance to marine life	• Lighting minimum required for navigation and safety requirements. Extent of light spill limited. • Survey in remote location and away from any light sensitive habitats (i.e. turtle nesting beaches).
Anchoring activity	Potential localised disturbance to benthos	• No anchoring on location except in emergency. • If anchoring is required in emergency, efforts should be made to anchor outside of the GABMP.

Environmental Aspect / Incident	Potential Environmental Effect	Management Approach
Vessel collision	Potential localised chronic/acute toxicity effects on marine organisms from hydrocarbon spill. Potential injury or death to cetacean and other marine fauna species.	• Vessel equipped with sophisticated navigation aids and competent crew maintaining 24 hour visual, radio and radar watch for other vessels. • Other vessels made aware of survey vessel's restricted ability to manoeuvre through adherence to maritime standards requiring notification of vessel presence. • Survey vessel carries navigation lighting and beacons. • Movements of vessel will comply with maritime standards and Australian Maritime Safety Authority (AMSA) standards i.e. Notice to Mariners. • Consultation with fishermen at sea (if required). • In event of collision and fuel loss, the Shipboard Oil Pollution Emergency Plan (SOPEP) would be implemented. • Survey audit inspections of the survey vessel and associated support vessels prior to mobilisation to the survey area. • Comply with EPBC Act Policy Statement 2.1 - 'Interaction between offshore seismic exploration and whales, September 2008 (DEWHA 2008b)', all requirement under sections A1 to A4 including: – 30 minute pre-shooting watch. – 3 km precautionary zone. – 30 minute soft start. – Continual marine fauna watch throughout the period when the seismic source is operating. – 2 km low-power zone. – 500 m shut down zone. Additional measure of two MMOs during cetacean migration periods, i.e. from October to January (southern right whales and blue whales) and April to May (southern right whales) (to the closest scheduled crew change).
Fuel / Oil spills during use, transfer and re-fuelling activities.	Potential acute toxic effect on marine organisms	• Survey vessel will maintain a Shipboard Oil Pollution Emergency Plan (SOPEP) in accordance with requirements of MARPOL 73/78, as implemented in Commonwealth waters by the PSPPS Act. This plan will bridge with the seismic contractor's Emergency Response Plan. • Hydrocarbons located above deck will be stored within bunded areas to contain any leaks or spills. • Fuel spill contingency procedures in place and operational. • Report environmental incidents as detailed in the EP. • No refuelling at sea is planned during the proposed survey. •
Displacement of other users of marine environment	Potential disruption to commercial fishing/vessel operations	• Liaise with relevant authorities (including AMSA, AFMA etc). • Fishermen, fishing organisations and other commercial mariners alerted of vessel presence on a regular basis including details of specific area of operations. • Notice to Mariners posted.

Environmental Aspect / Incident	Potential Environmental Effect	Management Approach
Introduction of exotic species into marine environment	Potential negative effects on native organisms from competition, predation or disease	• Compliance with AQIS requirements and the Australian Ballast Water Management Requirements, Version 4 – March 2008. • No exchange of ballast water <12 Nm (22 km) from land.

5 Conclusion on the likelihood of significant impacts

5.1 Do you THINK your proposed action is a controlled action?

X	No, complete section 5.2
	Yes, complete section 5.3

5.2 Proposed action IS NOT a controlled action.

The proposed seismic survey is not a controlled action as it is not likely to have a significant impact on any matter of national environmental significance. The impacts associated with the proposed survey will be limited to temporary noise disturbance, limited light spill and waste disposal, all of which can be managed in a manner that will reduce associated environmental effects.

While the EPBC Act Protected Matters Database identified 18 Threatened and 23 Migratory species that have the potential to occur in the proposed survey area, the impact on any of these species will be minimal as the proposed survey area does not contain any significant habitats that these species will specifically rely upon for feeding, breeding or calving. It is recognised that some of these listed species, as well as other marine fauna, including those identified through consultation and literature review undertaken by BP, may be present in the vicinity of the survey area. However, specific mitigation measures will be implemented throughout the survey and the overall risk to these species is considered low.

In addition, there are no World Heritage Areas, National Heritage Places, Wetlands of International Significance (Ramsar Sites) or threatened ecological communities within and surrounding the proposed survey area. Although the proposed survey area overlaps with the BPZ of the GABMP, no significant impacts on the benthic communities and other features for which the BPZ was designated are expected.

All survey operations will be conducted in accordance with relevant legislation and associated guidelines, specifically to meet the requirements of the OPGGS Act and EPBC Act as well as to implement comprehensive cetacean interaction management procedures (DEWHA, 2008b).

5.3 Proposed action IS a controlled action

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

6 Environmental record of the responsible party

		Yes	No
6.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** The BP Group is of one of the world's largest energy companies with well-established operations in the UK and the rest of Europe, North and South America, Asia, Australasia, Africa and Russia, with some 79,700 people working together in 85 countries and across six continents. Our main activities are the exploration and production of crude oil and natural gas; refining, marketing, supply and transportation; and manufacture and marketing of petrochemicals. Our exploration activities cover 29 countries; our 22,100 service stations serve around 13 million customers each day. Responsible environmental management is an essential component of conducting this business. BP's commitment to no accidents, no harm to people and no damage to the environment is the responsibility of everyone in BP and this is continuously reinforced by leaders. The BP Group's annual Sustainability Reports, freely available from the corporate website, www.bp.com, chart the company's progress on Environmental, Health, Safety and other measures. These reports incorporate feedback from our customers, shareholders, suppliers and others, and are independently verified by Ernst & Young. However we acknowledge that last year, the BP Group was involved in an accident in the Gulf of Mexico that triggered a major oil spill and cost the lives of 11 men. We are sorry for what happened. We are taking the lessons learned deep into the fabric of our company and are resetting BP to further strengthen the way we manage risk and safety. We are doing this chiefly by learning from the lessons of the Deepwater Horizon incident, centralising our drilling function, and creating a new Safety and Operational Risk organization that has the independence to set safety standards and intervene, where necessary, to stop operations. In Australia, BP operates a downstream refining and marketing business and also has interests (as a non-operator participant) in the North West Shelf Venture, the Browse LNG Project and the Greater Gorgon fields and thus supports the ongoing development of these projects in accordance with the requisite environmental management conditions and obligations.	**X**	
6.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		**X**
6.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?**	**X**	

If yes, provide details of environmental policy and planning framework

A summary of the BP Group Health, Safety, Security and Environmental (HSSE) policy is attached as Appendix 1.

The BP Group's environmental planning framework ensures minimum performance criteria are defined up-front and risks are identified and appropriately managed. Lifecycle environmental management is a fundamental component of the BP Group's Operating Management System (OMS) and is defined by the BP Environmental Group Defined Practice (E-GDP). This creates a consistent impact management process for identifying and managing environmental and social risks throughout the project lifecycle.

The practice is based on several fundamental principles:

- Implementation and maintenance of a programme for verifying compliance with environmental and social regulatory and legal requirements.
- Identification and understanding of risks and opportunities through early screening and assessment.
- Stakeholder consultation and community engagement.
- Avoidance of impacts through design.
- Mitigation of potential negative impacts through conformance with environmental and social performance requirements.
- Management of any significant residual impacts.
- Management of the socio-economic benefits of our presence.

The practice consists of two major components (as described in Appendix 2):

- A set of nine environmental impact management processes that are undertaken at different times in the life of a project. The Environmental Impact Management Process will identify, assess and reduce major environmental impacts based on a comprehensive Environmental Impact Assessment system for each stage of development.
- A series of twelve Environmental Performance Requirements that cover the different aspects of environmental performance ranging from energy efficiency to local community impacts. The Environmental Performance Requirements will establish a minimum performance level for Air Quality, Impact on Communities, Cultural Property, Drilling, Completions and Work-over Wastes and Discharges, Energy Efficiency, Environmental Liability Prevention, Flaring and Venting, Marine Mammals, Ozone depleting Substances, Physical and Ecological Impacts, and Waste and Water Management.

This practice applies to all exploration and development projects in sensitive areas, as well as all other major projects (a major project is defined as a project with a cost of greater than $250 million net to BP), non-major projects in sensitive areas and acquisition activities. The practice is applied from the earliest stages of appraisal. Early environmental and social evaluation influences development concepts and informs the potential exploration schedule and resource plan.

6.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)**		**X**

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7.2 Reliability and date of information

This referral has been compiled using information sourced from an extensive selection of scientific papers, published reports, specially commissioned unpublished reports and presentations, books and government websites. Where appropriate information used has been subjected to technical and scientific review resulting in a referral, which contains not only the most current information available, but information of a high quality nature.

7.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Figure 1 and Figure 2
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Figure 4
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.3)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.4)		
	copies of any flora and fauna investigations and surveys (section 3)		
	technical reports relevant to the assessment of impacts on protected matters and that support the arguments and conclusions in the referral (section 3 and 4)		
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

8 Contacts, signatures and declarations

Project title: Ceduna 3D Marine Seismic Survey, Great Australian Bight

8.1 Person proposing to take action

Name	Phil Home
Title	Director
Organisation	BP Exploration (Alpha) Limited
ACN / ABN (if applicable)	ARBN 089 229 649
Postal address	QV1 Building (Level 8), 250 St. Georges Terrace, Perth, 6000
Telephone	(08) 9420 1820
Email	phil.home@se1.bp.com
Declaration	I declare that the information contained in this form is, to my knowledge, true and not misleading. I agree to be the proponent for this action.
Signature	 Date 13 May 2011

8.2 Person preparing the referral information (if different from 8.1)

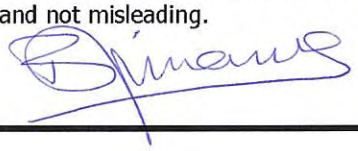
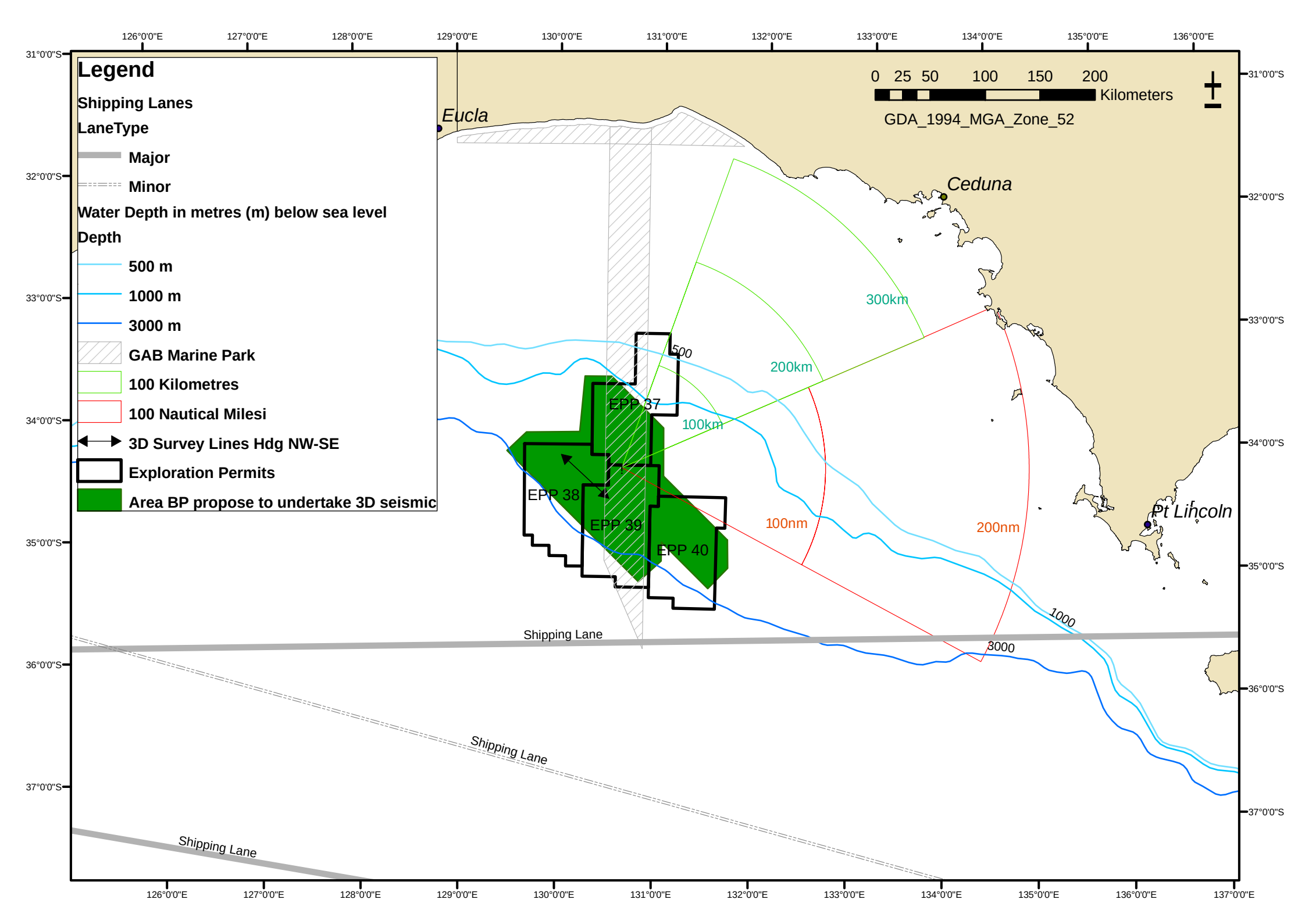
Name	Claire Espinasse
Title	Managing Scientist
Company	RPS Environmental and Planning Pty Ltd
ACN / ABN (if applicable)	ABN 45 108 680 977
Postal address	PO Box 465 Subiaco, WA 6904
Telephone	(08) 9211 1111
Email	claire.espinasse@rpsgroup.com.au
Declaration	I declare that the information contained in this form is, to my knowledge, true and not misleading.
Signature	 Date 16/05/11

Figure 1 – Location Map


Legend
Shipping Lanes
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Depth
500 m
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3000 m
GAB Marine Park
100 Kilometres
100 Nautical Milesi
3D Survey Lines Hdg NW-SE
Exploration Permits
Area BP propose to undertake 3D seismic
0 25 50 100 150 200
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Eucla
Ceduna
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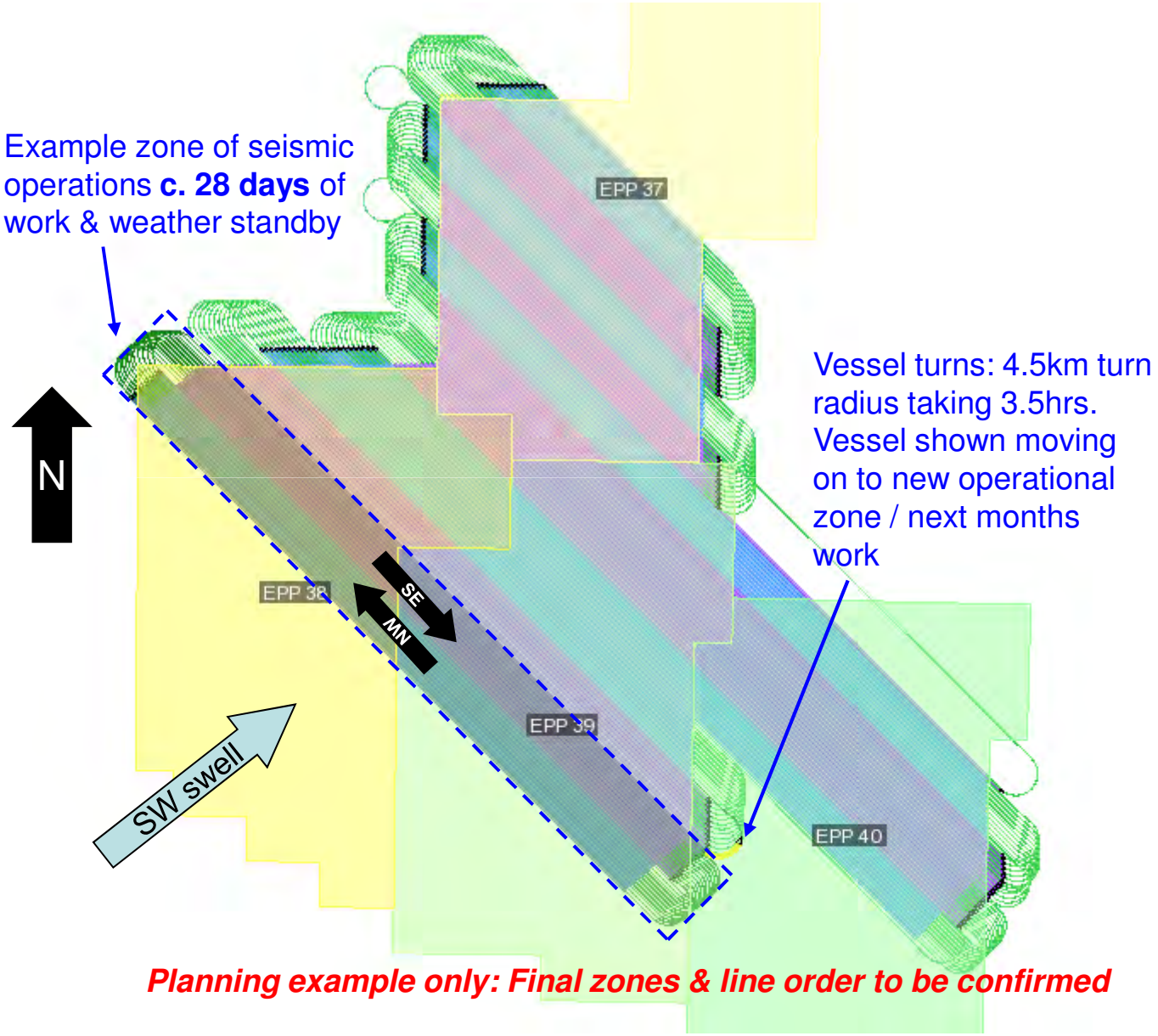
Figure 2 – Ceduna 3S Seismic Operations Planning Overview

Figure 2 - Ceduna 3D Seismic Operations Planning Overview



Planning example only: Final zones & line order to be confirmed

Figure 3 – Environmental & Socio-economic Sensitivities of the Surrounding Area

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

130°0'0"E 132°0'0"E 134°0'0"E 136°0'0"E

32°0'0"S 34°0'0"S 36°0'0"S

WESTERN AUSTRALIA

SOUTH AUSTRALIA

SOUTHERN OCEAN

Eyre Peninsula

Nullarbor
Head of Bight
Eucla
Penong
Fowlers Bay
Ceduna
Whale Bone Area & Point Fowler Structure, Fowlers Bay Conservation Reserve
St Peter Island Whaling Sites
Flinders Reef
Nuyts Archipelago (MP)
Nuyts Archipeago
Point Collinson Whaling Station Site
Streaky Bay
Kirkala Station Site
Port Labatt
Port Kenny
West Coast Bays (MP)
Colton
Elliston
Elliston Jetty
Flinders Island
Flinders Island Whaling & Sealing Site
Investigator (MP)
Dorothee Island
Pearson Islands
Investigator(MP)
Lake Hamilton Homestead
Homestead - 'Kiana'
Soliders' Memorial Hall
Eyre
Homestead - 'Poona'
Former Coffin Bay Whaling Site
Coffin Bay Main Jetty
Thorny Passage (MP)
Port Lincoln

EPP 37
EPP 38
EPP 39
EPP 40

-100 -200 -300 -400 -500 -600 -700 -800 -900 -1000 -1100 -1200 -1300 -1400 -1500 -1600 -1700 -1800 -1900 -2000 -2100 -2200 -2300 -2400 -2500 -2600 -2700 -2800 -2900 -3000 -3100 -3200 -3300 -3400 -3500 -3600 -3700 -3800 -3900 -4000 -4100 -4200 -4300 -4400 -4500 -4600 -4700 -4800 -4900 -5000 -5100 -5200 -5300 -5400 -5500

Potential 3D Seismic Survey Area
Cetacean Sightings (2009/2010)
Australian Permit Areas (GPinfo April 2011)
200m Isobath
Indicative Shipping Lanes (AUSREP 2010)
GAB SBT Fishery Aerial Survey Transects (January - March)
National Heritage Places (SPAR 2010)
Ramsar (WDPA)
Southern Right Whale Aggregation Area (ERIN 2005)
Indicative Blue Whale Feeding Area

Relative Fishing Intensity (hours trawled/km²/year) (AFMA 2008)
- Low (=1)
- Medium (1-2)
- High (2-3)

Fishery Management Areas (Geoscience 06)
- Commonwealth GAB Trawl Sector
- Southern & Eastern Scalefish & Shark, Southern Bluefin Tuna Fishery

Australian Sea Lion
- Known Breeding Sites (DEWHA 2010)
- Known Haul-Out Sites (DEWHA 2010)

South Australian Marine Parks (DENR 2009)
- South Australian Marine Parks (DENR 2009)

GAB Marine Park Zones (Commonwealth)
- Benthic Protection Zone
- Conservation Zone
- Marine Mammal Protection Zone
- Marine Mammal and Benthic Protection Zone
- Sanctuary Zone Whales and Sea Lions

Potential 3D Seismic Survey Area coordinates

Point	Easting	Northing
1	664782	6084296
2	685518	6103158
3	685865	6120220
4	728053	6077989
5	746106	6096536
6	745866	6122176
7	687823	6180220
8	687848	6224034
9	640701	6271181
10	616446	6271459
11	611525	6220935
12	563082	6220503
13	545316	6203763

RPS

Dwg Number: M10226-002
Date: 16.05.11
Revision: C - Potential Survey Area Updated
Scale: 1:2,200,000 @ A3
Projection: GDA 1994
Drafted by: MA
Source: GP Info 2011, Geoscience Australia, DEC, DENR 2009, WDPA, ERIN 2005, CAMRIS 2008, AFMA 2006

0 12.5 25 50 75 100 km

Figure 3

Environmental & Socio-economic Sensitivities of the Surrounding Area

Appendix 1 – BP Group HSE Policy

PO-PD-019 - Health & Safety Policy

BP Australia Group Pty Ltd ("BP") is committed to providing so far as is reasonably practicable a working environment that is safe and without risk to health to all its employees, contractors and others through the effective implementation of this Health & Safety Policy. Every person who works for BP is responsible for ensuring that health and safety is managed in all aspects of our business.

BP's aspirations are simply stated:

"No accidents, No harm to people, and No damage to the environment."

BP will

- Systematically manage its operating activities to continuously reduce risk and deliver performance improvement
- Consult, listen and respond openly to its employees, contractors, customers, neighbours, public interest groups and stakeholders, to ensure the input of all employees and contractors are included in the decision making processes impacting on workplace health and safety.
- Formally identify, assess and mitigate health and safety hazards and risks, appropriate to the nature and scale of BP's risks.
- Ensure that its Leadership takes responsibility for taking immediate action to remove safety hazards when they are identified and reported.
- Work with its partners, suppliers, competitors and regulators to aim to achieve best practice.
- Comply with all relevant health and safety legislation, Standards, Codes of Practice, BP Group requirements and all other health and safety requirements to which the organisation subscribes and ensure that all Leadership and Staff are provided with information, instruction and training to be able to comply with those requirements.
- Ensure all Leadership and Staff are provided with information, instruction and training on BP's Health & Safety policies and procedures and that all interested parties have access to the Health & Safety Policy.
- Develop and implement training programmes to improve health and safety skills and knowledge requirements of employees and disseminate health and safety information to all employees, contractors, and others to the workplace.
- Continually strive to improve health and safety performance by establishing clear and measurable objectives and targets, auditing, reviewing, monitoring and reporting performance (both good and bad) and recognizing those who contribute positively to improvement.
- Provide employees with the appropriate equipment and facilities to undertake their duties in a professional and safe manner.
- Ensure that the Health & Safety Policy remains relevant and appropriate to BP by requiring periodic review in line with Management review procedures

BP employees and contractors:

- Are required to adopt safe work practices and comply with all Health & Safety policies and procedures and to report safety hazards or unsafe work practices.
- Have responsibility and authority to stop work if there is any question related to safety or operational risk.

A critical part of the success of the business is the health and safety of everyone who works for and on behalf of BP.

The ANZ FVC HSSE Manager should be contacted for any questions relating to the interpretation of this policy.

Paul Waterman
Director
BP Australia Group Pty Ltd

BP's commitment to **health, safety, security** and **environmental** performance (HSSE)

Our goals are simply stated. No accidents, no harm to people, and no damage to the environment.

Our goals are simply stated – no accidents, no harm to people, and no damage to the environment.

We will operate our facilities safely and reliably and care for all those on our sites or impacted by our activities. Everybody who works for BP, anywhere, is responsible for getting HSSE right. The health, safety and security of everyone who works for us are critical to the success of our business.

We will continue to drive down the environmental and health impact of our operations by reducing waste, emissions and discharges, and using energy efficiently. We will produce quality products that can be used safely by our customers.

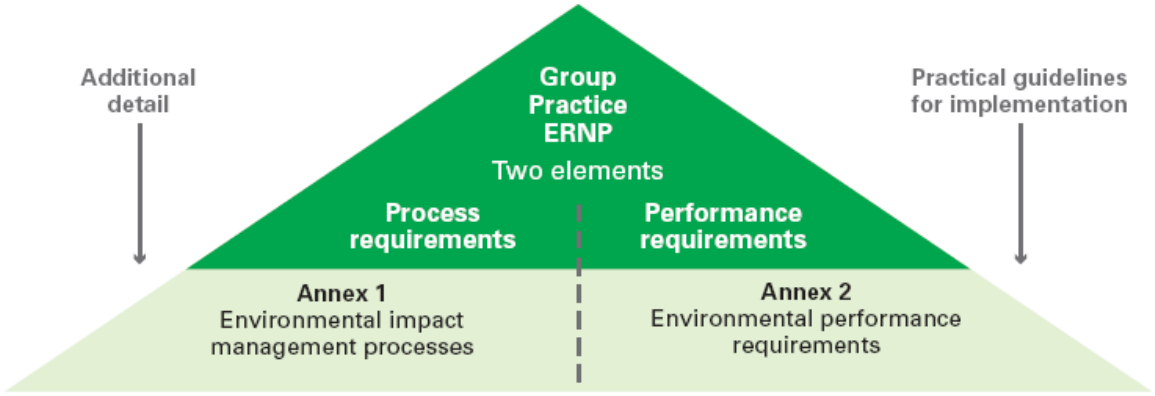
We will:

- **Systematically manage** our operating activities to continuously reduce risk and deliver performance improvement.
- **Comply** with all applicable local laws and company policies and procedures.
- **Consult,** listen and respond openly to our customers, employees, neighbours, public interest groups and those who work with us.
- **Work with others** – our partners, suppliers, competitors and regulators – to raise the standards of our industry.
- **Openly report** our performance, good and bad.
- **Recognize those who contribute** to improved HSSE performance.
- **Continuously improve** our performance by improving the leadership, capability and capacity of our organization.

Our business plans include measurable HSSE targets. We are all committed to meeting them.

Bob Dudley
Group Chief Executive
1 October 2010

Appendix 2 – BP Group Environmental Policy and Planning Framework



Annex 1 – Environmental impact management processes	Annex 2 – Environmental performance requirements (EPR)
1. Screening and categorisation	**EPR-1** Air quality
2. Environmental assessment	**EPR-2** Community disturbance
3. Consultation and disclosure	**EPR-3** Cultural property
4. Compliance	**EPR-4** Drilling, completions and workover wastes and discharges
5. Resourcing and contracting	**EPR-5** Energy efficiency
6. Residual impacts	**EPR-6** Environmental liability prevention
7. Environmental management system	**EPR-7** Flaring and venting
8. Assurance and lessons learned	**EPR-8** Marine mammals
9. Reporting	**EPR-9** Ozone-depleting substances
	EPR-10 Physical and ecological impacts
	EPR-11 Waste management
	EPR-12 Water management