STYBARROW 4D MARINE SEISMIC SURVEY 2011

1. SURVEY OPERATIONS

BHP Billiton Petroleum Ltd (BHP Billiton) proposes to conduct the Stybarrow 4D marine seismic survey (MSS) 2011 off the North West Cape in Western Australia. The survey is scheduled to commence in March 2011 and will be conducted over approximately two weeks.

A 4D seismic survey involves repeating the same 3D seismic survey over time, and analysing the differences between successive surveys in order to detect changes in seismic characteristics of the reservoir. The Stybarrow 4D MSS will be conducted as the first acquisition of reservoir data following the completion of the Stybarrow 4D Baseline MSS conducted in November 2008. The only planned change has been to the vessels.

Seismic data will be obtained by two purpose-built seismic survey vessels. Whilst subject to change, these vessels are likely to be the MV Aquila Explorer and the MV Western Spirit, and will be supported by the MV Allgo Sharapova. The vessels will traverse the survey area in a series of pre-determined lines within the survey area at a speed of approximately 8km/hour.

The MV Aquila Explorer will tow an acoustic source array using compressed air, with an operating pressure of approximately 2 000 psi and a volume of approximately 3150 cubic inches (cui). The receiver survey vessel will be the M/V Western Spirit, which will tow eight hydrophone cables, each with a maximum length of 3200 m. The marine acoustic source array will be towed behind the source survey vessel at ~5 m below sea level and receiver cables will be towed behind the receiver vessel at a depth of ~7 m beneath the sea surface. A tail buoy, that acts to identify the end point of the cable, will be towed behind each cable. The M/V Allgo Sharapova will act as a support vessel, providing logistical, safety, and gear management support to the survey vessels. The survey parameters are summarised within Table 1 below

Table 1: Survey parameters

Parameter	Stybarrow Baseline 4D MSS
Survey Acquisition Area	~60 km^2
Number of streamers	8
Streamer length	3200 m
Streamer separation	50 or 100 m
Compressed Air Source - total volume	Dual source (3 150 cui)
Operating pressure	13 800 kPa (2 000 psi)
Streamer depth	7 m
Compressed Air Source depth	5 m
Shot point interval	12.5 m
Peak source sound pulse	220 dB re 1µPa rms
Frequency range	1 to 110 Hz

2. LOCATION

The Stybarrow 4D MSS will be conducted within permit areas WA-32-L and WA-36-R, located with Commonwealth waters. Data will be acquired over an area of ~60 km^2. The coordinates of the survey area are provided in Table 2.

The closest point of the survey area is located ~35 km northwest of North West Cape and ~25km from the nearest boundary of the Ningaloo Marine Park (Figure 1). The water depth in the survey area is ~900 m.

In addition to the survey acquisition area, the vessel will require a larger area, nominally ~10 km, to conduct line turns and soft starts. This additional area will be to the NE and SW of the survey acquisition area, as the current survey design includes acquisition in a NE-SW direction.

The survey vessel will not enter the waters of the Ningaloo Marine Park or the Muiron Islands Marine Management Area under normal operations, including during turning manoeuvres. It is anticipated that the vessel may only enter the Commonwealth Waters of the Ningaloo Marine Park if required during an emergency situation (for example in cyclonic conditions).

Table 2 Survey coordinates

Location Point	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Sty 4D A	21 °	25'	33.08185"S	113°	50'	25.46013"E
Sty 4D B	21 °	29'	24.22765"S	113°	47'	25.51289"E
Sty 4D C	21 °	30'	32.45483"S	113°	47'	35.67979"E
Sty 4D D	21 °	31'	17.87248"S	113°	48'	39.95879"E
Sty 4D E	21 °	31'	8.34600"S	113°	49'	52.87332"E
Sty 4D F	21 °	27'	15.21738"S	113°	52'	53.53936"E
Sty 4D G	21 °	26'	0.49500"S	113°	52'	43.46897"E
Sty 4D H	21 °	25'	23.53637"S	113°	51'	38.32589"E

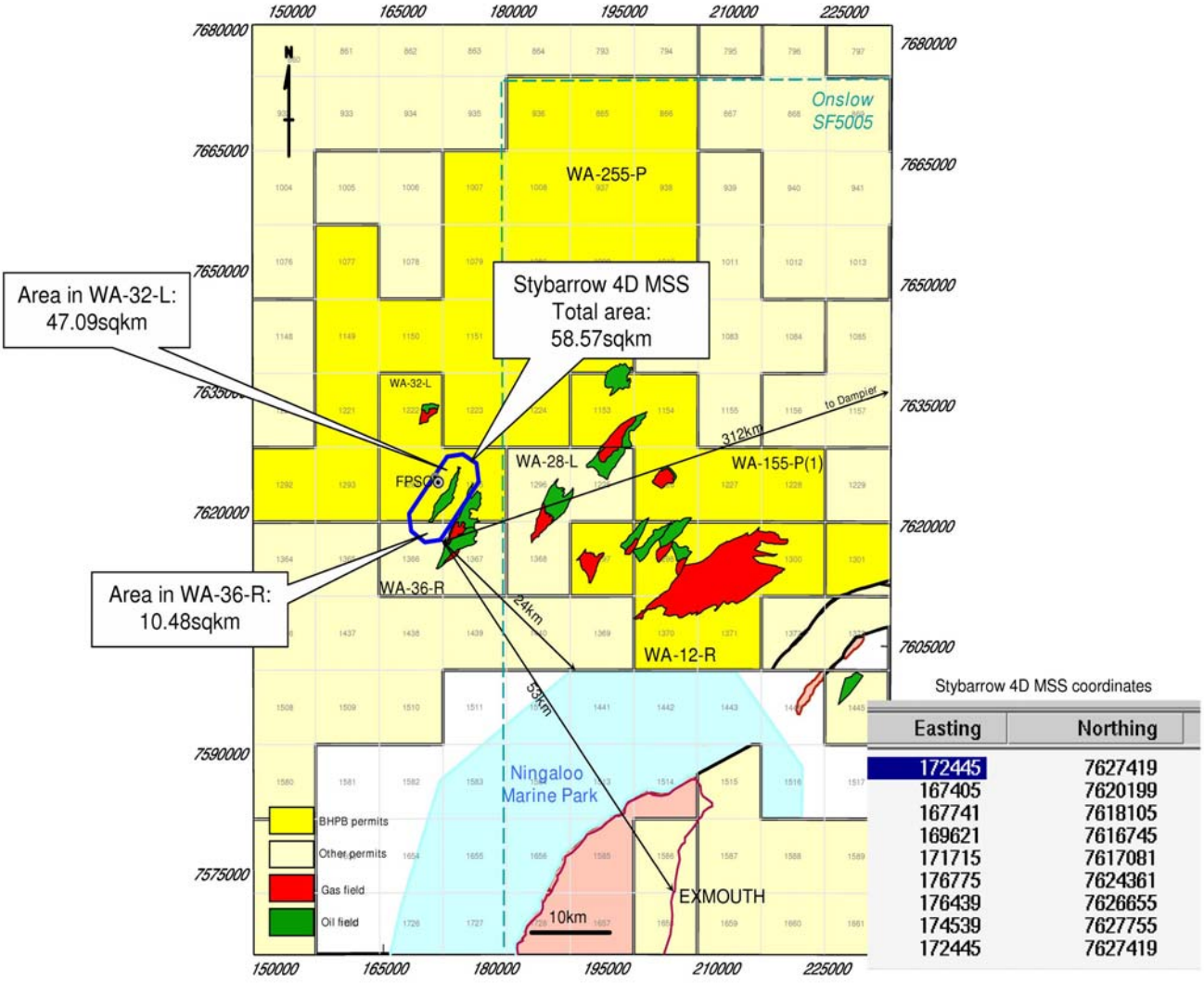

Figure 1: Location of Stybarrow 4D MSS

3. RECEIVING ENVIRONMENT

The Stybarrow Environmental Impact Statement included a full description of the physical, social and biological environment around the Stybarrow Development Area, which is summarised below.

The results of high-resolution geophysical surveys, video surveys and seabed sampling indicate that the seafloor in the area is predominantly featureless and consists of soft fine sediments (clay/silts). Seabed surveys have indicated a low abundance and patchy distribution of fauna dominated by echinoderms. While some unusual species were recorded, the same general collection of species is widespread and well represented along the continental shelf and upper slope in this region.

A variety of whale and dolphin species have been recorded during offshore surveys in the vicinity of the survey area. Some species have regular and predictable seasonal presence while others have less well known migratory patterns or are transient at all times of the year.

Humpbacks are the most abundant whale species and are present between June and November. Individuals were recorded up to 80km offshore. A peak in average numbers was recorded over a three-week transition period commencing in late August, when northern and southern migrations overlap. Overall, the highest concentrations of pods were observed south and east of the Stybarrow Development in water depths of around 200 m during the northern migration, 200 to 300 m during the transition period, and in waters shallower than 200 m during the southern migration.

Whale shark aggregations off Ningaloo Reef generally occur between April and June and encounters mainly take place within a few kilometres of the reef.

The closest population centre to the Stybarrow Development is the town of Exmouth. Exmouth is a popular tourist centre, based in large part on the natural resources contained in the Cape Range National Park and Ningaloo Marine Park. Other commercial activities in the Exmouth region include prawn fisheries and defence related activities.

An active community consultation programme was first initiated by BHP Billiton during the initial exploration activities in the permit area. This programme remains in operation and is continuously being updated to ensure that issues of concern are identified, discussed and where possible resolved.

Since the initial exploration activities, extensive consultation occurred for the Stybarrow, Pyrenees and Macedon Developments. The Exmouth Sub-basin Community Reference Group (CRG) was established in September 2003 and regular meetings continue to be held.

Ongoing consultation activities over the duration of the Stybarrow operations have included:

- Liaison by a BHP Billiton External Affairs Advisor and Environmental Specialist to manage the programme
- Face-to-face briefings and discussions with identified stakeholders;
- Continued use of CRG established in Exmouth;
- Periodic written newsletter updates posted to stakeholders;
- A 1800 toll-free telephone number for community enquiries

The Cape Conservation Group and the Shire of Exmouth have been advised of the proposed Stybarrow 4D MSS. Additional communications with local fishing groups will be conducted closer to survey commencement.

4. ENVIRONMENTAL RISK ASSESSMENT AND MANAGEMENT

The BHP Billiton HSE Management System is hierarchical, with the BHP Billiton Charter and Sustainable Development Policy providing key guidance regarding business practices.

Under the Charter and Sustainable Development Policy, BHP Billiton has a number of Group Level Documents that are a series of policies, standards and procedures which give effect to the intentions, directions and mandatory requirements arising from the BHP Billiton Operating Model. The BHP Billiton Petroleum HSE Management System has been established to assure compliance with the HSE Group Level Documents and other Petroleum specific requirements.

A systematic approach is taken to manage environmental aspects of the survey through the identification and assessment of hazards and risks, the establishment of mitigation measures, objectives, plans and performance standards, and the development of adequate documentation.

An environmental risk assessment was conducted for the Stybarrow Baseline 4D MSS using BHP Billiton's semi-quantitative risk rating method. The Residual Risk Rating and Risk Significance matrix is illustrated in Figure 2. There are no additional risks, or changes to the risk assessment, for the 2011 Stybarrow 4D MSS.

		Likelihood					
		0.03	0.1	0.3	1	3	10
Severity	300	9	30	90	300	900	3,000
	100	3	10	30	100	300	1,000
	30	0.9	3	9	30	90	300
	10	0.3	1	3	10	30	100
	3	0.09	0.3	0.9	3	9	30
	1	0.03	0.1	0.3	1	3	10
Low (≤ 1)			Moderate (3 – 10)		Significant (30)		High (Material)(≥ 90)

Figure 2 - Residual Risk Rating and Risk Significance

The Stybarrow 4D MSS risk assessment is summarised in Table 3 below. Mitigation and control practices to reduce environmental risk to As Low As Reasonably Practicable (ALARP) have been identified, and these are also summarised in Table 3. As can be seen from Table 3, the assessment indicates that the potential impacts arising from the proposed the survey can be categorised as having low to moderate risk levels. There are no impacts identified as having a high or severe risk level.

In addition to these mitigation and control practices, BHP Billiton's environmental performance objectives, relevant standards and criteria to measure its performance are outlined in the EP prepared for this survey. These are summarised in Table 4.

All staff and contractors taking part in the Stybarrow 4D MSS will be advised of their responsibilities prior to commencement of activities. This will occur through induction and awareness presentations that will be given to all crew.

Further information may be obtained from BHP Billiton's external affairs 1800 036 247 or by writing to:

External Affairs Advisor
BHP Billiton Petroleum Pty Ltd
Central Park 152-158 St Georges Terrace
PERTH WA, 6000.

Table 3 - Summary of Stybarrow Baseline 4D MSS risk register

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Stybarrow Baseline 4D Marine Seismic Survey (Nov-Dec 2008) Environmental Risk Register

RISK ID.ENTIFICATION			RISK ANALYSIS			RESIDUAL RISK RATING		
Ref No.	Risk Issue	Risk Events	Controls Mitigation and Control Practices	Control Owner	Impacts	Severity Factor	Likelihood Factor	RRR
Project Activity: Stybarrow Baseline 4D Marine Seismic Survey								
1	Acoustic disturbance to marine life	Marine fauna impacts	* Survey undertaken outside whale migration period * Standard and Additional Mitigation Measures described in detail in Section 7.1 & Appendices B&C. * Pre-survey planning and trained crew. * Presence of two Marine Fauna Observers (MFOs) on the source vessel assisted by bridge crew on the recording vessel.	* Party Chief * BHPBilliton Site Representative * Marine Fauna Observer	Potential interference with marine fauna	3	1	3
2	Physical disturbance to marine habitats and marine fauna	Marine fauna impacts Marine habitat impacts	* Standard and Additional Mitigation Measures described in detail in Section 7.1 & Appendices B&C. * Pre-survey planning and trained crew. * No anchoring except in emergency situations * All efforts made to retrieve any lost equipment	* Party Chief * BHPBilliton Site Representative * Marine Fauna Observer	* Impact on environmentally sensitive areas (conservation reserves, Ningaloo, Muiron Is) * Risk of collisions is minimal and volumes of fuel carried are relatively small	1	0.3	0.3
3	Impacts from Artificial lighting	Marine fauna impacts	* Minimum practicable lighting in place to meet navigation and safety requirements to reduce attraction of marine fauna. * Survey not visible from shore due to distance offshore	* Contractor * BHPBilliton	* Potential attraction and/or disorientation of seabirds and turtles * Possible impact to visual amenity	1	1	1
4	Occurrence and effects of hydrocarbon spills.	* Leaks from storage and equipment * Leaks during bunkering * Leaks from streamers	* Any hydrocarbons located above deck will be stored within bunded areas to contain any leaks or spills * All spills reported and cleaned up promptly and effectively. * Vessels carry adequate fuel prior to commencement of the survey to avoid refuelling at sea. * Vessels maintain SOPEP in accordance with the requirements of MARPOL. * Sufficient spill response equipment provided on board the vessels with additional stocks located onboard the Stybarrow FPSO and in Exmouth and Dampier. * Personnel responsibilities are clearly understood and followed.	*Contractor *BHPBilliton Site Representative	Hydrocarbon (diesel/isopar streamer fluid) spill resulting in pollution/ contamination of marine environment	3	1	3
5	Impact of chemical discharges on marine environment	* Leaks from storage and equipment * Transfer of chemicals between vessels (eg dropped loads) * Lifting of bulk containers containing chemicals from support vessel to Seismic vessels	* Few chemicals are used (cleaning agents, solvents). * Contractor procedures followed for handling all chemicals. * Design and operate equipment to prevent loss of containment. * Hazardous material register on board and materials stored/used in accordance with Material Safety Data Sheets (MSDS). * Ship Board Oil Pollution Emergency Plan (SOPEP) in accordance with the requirements of MARPOL 73/78.	*Contractor *BHPBilliton Site Representative	* Potential impact on water quality, affecting local marine fauna and flora	3	0.3	0.9
6	Impact of routine waste discharge on marine environment	* Deck drainage * Bilge water * Treated sewage and greywater * Macerated foodscraps	* Procedures for management and disposal of sewage in place. * Waste log maintained for sewage/ground food waste discharged overboard. * Briefing of all project personnel on environmental sensitivities, management procedures and commitments detailed in the EP. * Treat and discharge in accordance with MARPOL * Onboard sewage treatment plant approved by the International Maritime Organisation (IMO) to be compliant with Annex IV of MARPOL * The use of biodegradable detergents only. * Deck drainage and bilge water treated via an oil/water separator to <15 parts per million hydrocarbons prior to discharge.	* Contractor * BHPBilliton Site Representative	* Potential visible impact, ie visible sheen * Potential water quality impacts	1	0.3	0.3
7	General and Hazardous Waste Disposal	Incorrect storage & disposal of general & hazardous waste; loss over the side	* A Waste Management Plan will be in place detailing wastes generated and disposal requirements. * Vessel Waste Log will be maintained to record quantities of wastes transported ashore. * Waste will be contained on board prior to transfer * Solid, liquid and hazardous wastes collected will be sent ashore for recycling, disposal or treatment. * All efforts made to retrieve any lost equipment . Details of all items lost overboard will be recorded and reported to BHPBilliton	* Contractor * BHPBilliton	* Additional waste to onshore waste reception facilities * Potential decline in water quality if waste is lost overboard * Inappropriate disposal of hazardous wastes leading to localised pollution and/or community outcry	1	0.3	0.3

RISK ID.ENTIFICATION			RISK ANALYSIS			RESIDUAL RISK RATING		
Ref No.	Risk Issue	Risk Events	Controls Mitigation and Control Practices	Control Owner	Impacts	Severity Factor	Likelihood Factor	RRR
8	Atmospheric Emissions	Power generator, vessel propulsion	* Engines maintained to operate at optimum efficiency to minimise emissions. * Compliance with MARPOL 73/78 Annex VI	* Contractor * BHPBilliton	Increase in GHG Emissions	1	3	3
9	Potential for introducing non-indigenous marine species	Release and settlement of non indigenous marine species in Australian waters	* All vessels contractually obliged to comply with AQIS requirements. * Ballast water exchange procedures for ships entering Australian waters in accordance with AQIS, MARPOL & IMO Guidelines (Australian Ballast Water Management Requirements require at least a 95% dilution). * Vessels arriving in Australia from international waters will submit a Quarantine Pre-Arrival Report (QPAR) to AQIS and complete the AQIS Ballast Water Log. Submission to the Ballast Water Decision Support System (BWDSS) as required. * AQIS / DAFF / DOF draft Biofouling Management Requirements will be followed, including Biofouling risk assessment for vessels entering Australian waters.	* BHPBilliton * Contractor	Introduction of exotic species	30	0.3	9
10	Interference with commercial and recreational fishing, shipping, recreational vessels and oil and gas facilities	Reduced access to fishing grounds, nuisance and interference, increased collision risk	* Functional navigational lighting in place and in use for all vessels. * Radio warnings provided to shipping * All vessels involved in the survey activities will be equipped with sophisticated navigation aids and competent crew maintaining 24 hour visual, radio and radar watch for other vessels. * Adherence to maritime standards requiring notification of vessel presence via notice to mariners. * Liaison with commercial and recreational fisheries in the area. * Stybarrow FPSO shall be consulted prior to and during MSS activities * A schedule of the survey vessel's operation and location will be made available when the exact dates of the survey are known. * Compliance with Australian Maritime Safety Authority (AMSA) administered marine safety regulations and marine notification requirements. *Commercial fisheries and shipping activities will be restricted from entering a cautionary and safety zone around the seismic vessels	* Contractor * BHPBilliton Site Representative * Marine Fauna Observer	Commercial fisheries and shipping activities will be restricted from entering a cautionary and safety zone around the seismic vessels	1	0.3	0.3

Table 4: Performance Objectives, Standards, Commitments and Criteria

Risk Ref	Objective	Standards	Commitments/Criteria
1.	Minimise acoustic disturbance to marine life	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (September 2008)	• Survey undertaken outside whale migration period • Pre-survey planning and trained crew. • Presence of two Marine Fauna Observers (MFOs) on the source vessel assisted by bridge crew on the recording vessel. • Adherence to the mitigation measures descried in the EPBC Act Policy Statement 2.1
2.	Minimise physical disturbance to marine habitats and marine fauna	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (September 2008)	• Pre-survey planning and trained crew. • Adherence to the mitigation measures descried in the EPBC Act Policy Statement 2.1 • No anchoring except in emergency situations • All efforts made to retrieve any lost equipment
3.	Minimise impacts from Artificial lighting	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton's HSE Management System	• Minimum practicable lighting in place to meet navigation and safety requirements to reduce attraction of marine fauna. • Survey not visible from shore due to distance offshore
4.	Minimise occurrence and effects of hydrocarbon spills.	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales (September 2008 • Vessel Oil Pollution Emergency Plan • Stybarrow Operations OSCP • Vessel bunkering procedures	• Any hydrocarbons located above deck will be stored within bunded areas to contain any leaks or spills • All spills reported and cleaned up promptly and effectively. • Vessels carry adequate fuel prior to commencement of the survey to avoid refuelling at sea. • Vessels maintain SOPEP in accordance with the requirements of MARPOL. • Sufficient spill response equipment provided on board the vessels with additional stocks located onboard the Stybarrow FPSO and in Exmouth and Dampier. • Personnel responsibilities are clearly understood and followed.
5.	Minimise impact of chemical discharges on marine environment.	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • Vessel Oil Pollution Emergency Plan • Stybarrow Operations OSCP	• Contractor procedures followed for handling all chemicals. • Design and operate equipment to prevent loss of containment. • Hazardous material register on board and materials stored/used in accordance with Material Safety Data Sheets (MSDS). • Ship Board Oil Pollution Emergency Plan (SOPEP) in accordance with the requirements of MARPOL 73/78.
6.	Minimise impact of routine waste discharge on marine environment.	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • MARPOL 73/78 Annex V: Prevention of Pollution by Garbage from Ships • MARPOL 73/78 Annex IV: Prevention of Pollution by Sewage from Ships	• Procedures for management and disposal of sewage in place. • Waste log maintained for sewage/ground food waste discharged overboard. • Briefing of all project personnel on environmental sensitivities, management procedures and commitments detailed in the EP. • Treat and discharge in accordance with MARPOL • Onboard sewage treatment plant approved by the IMO to be compliant with Annex IV of MARPOL • Deck drainage and bilge water treated via an oil/water separator to <15 parts per million hydrocarbons prior to discharge.

Risk Ref	Objective	Standards	Commitments/Criteria
7.	Minimise impact of general and hazardous waste disposal	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • MARPOL 73/78 Annex IV: Prevention of Pollution by Sewage from Ships • MARPOL 73/78 Annex V: Prevention of Pollution by Garbage from Ships • Vessel Waste Management Procedure	• A Waste Management Plan will be in place detailing wastes generated and disposal requirements. • Vessel Waste Log will be maintained to record quantities of wastes transported ashore. • Waste will be contained on board prior to transfer • Solid, liquid and hazardous wastes collected will be sent ashore for recycling, disposal or treatment. • All efforts made to retrieve any lost equipment. Details of all items lost overboard will be recorded and reported to BHP Billiton
8.	Minimise Atmospheric Emissions	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System	• Engines maintained to operate at optimum efficiency to minimise emissions.
9.	Minimise potential for introducing non-indigenous marine species	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • AQIS/DAFF draft Biofouling Management Requirements	• All vessels contractually obliged to comply with AQIS requirements. • Ballast water exchange procedures for ships entering Australian waters in accordance with AQIS, MARPOL & IMO Guidelines • Vessels arriving in Australia from international waters will submit a Quarantine Pre-Arrival Report (QPAR) to AQIS and complete the AQIS Ballast Water Log. Submission to the Ballast Water Decision Support System (BWDSS) as required. • The seismic contractor will comply with oil and gas industry standard biofouling practices, including biofouling risk assessment for vessels entering Australian waters.
10.	Minimise interference with commercial and recreational fishing, shipping, recreational vessels and oil and gas facilities.	• BHP Billiton Charter and Sustainable Development Policy • BHP Billiton Petroleum HSE Management System • MARPOL 73/78 Annex I: Prevention of Pollution by Oil	• Functional navigational lighting in place and in use for all vessels. • Radio warnings provided to shipping • All vessels involved in the survey activities will be equipped with sophisticated navigation aids and competent crew maintaining 24 hour visual, radio and radar watch for other vessels. • Adherence to maritime standards requiring notification of vessel presence via notice to mariners. • Liaison with commercial and recreational fisheries in the area. • Stybarrow FPSO shall be consulted prior to and during MSS activities • A schedule of the survey vessel's operation and location will be made available when the exact dates of the survey are known. • Compliance with Australian Maritime Safety Authority administered marine safety regulations and marine notification requirements. • Commercial fisheries and shipping activities will be restricted from entering a cautionary and safety zone around the seismic vessels