

## BHPBILLITON PETROLEUM: HEX07B 3D MARINE SEISMIC SURVEY

### LOCATION

BHP Billiton Petroleum Ltd (BHPB) proposes to conduct the HEX07B 3D Marine Seismic Survey (MSS) over September - October 2007. Seismic acquisition will be conducted over approximately 50 days using the WesternGeco 'MV Geco Diamond' seismic vessel.

The HEX07B 3D MSS involves 3D seismic acquisition over a maximum area of ~1200 km<sup>2</sup>. The survey is predominantly located in the WA-346-P permit area, which is located on the North West Shelf, offshore northwest WA.

The survey area is in deep water (~1000 m) away from areas of environmental sensitivity. The survey area is ~265 km from the Northwest Cape and Barrow Island. The following coordinates (Datum GDA 94) outline the general boundaries of the survey area:

Point	UTM 49 Co-Ordinates		Geographic Co-ordinates	
	X	Y	Latitude	Longitude
<b>A</b>	713,531	7,840,360	19° 31' 12.22"S	113° 02' 05.54"E
<b>B</b>	716,630	7,856,576	19° 22' 23.78"S	113° 03' 45.14"E
<b>C</b>	712,789	7,858,920	19° 21' 09.05"S	113° 01' 32.60"E
<b>D</b>	715,945	7,864,093	19° 18' 16.65"S	113° 03' 18.61"E
<b>E</b>	714,500	7,878,860	19° 10' 20.07"S	113° 02' 23.19"E
<b>F</b>	716,193	7,881,634	19° 08' 49.23"S	113° 03' 20.00"E
<b>G</b>	732,385	7,881,438	19° 08' 49.17"S	113° 12' 34.02"E
<b>H</b>	751,166	7,869,980	19° 14' 53.59"S	113° 23' 21.83"E
<b>I</b>	727,787	7,831,662	19° 35' 49.31"S	113° 10' 18.15"E

The Geco Diamond will traverse a series of pre-determined survey lines within the survey area. The vessel will tow dual 3147 cui air guns at a depth of 5-6 m and eight hydrophone cables, each of which will be 3.6 km in length. These cables will be towed at a depth of approximately 6-7 m beneath the sea surface, and will include a tail buoy, which acts to identify the end point of the cable.

### RECEIVING ENVIRONMENT

The survey area is in deep water (~1000 m) away from areas of environmental sensitivity. The survey area is ~265 km from the Northwest Cape and Barrow Island. The seabed in the area is expected to generally be featureless, and predominantly covered with a soft sediment layer. Seabed communities at this depth are likely to be relatively sparse, dominated by echinoderms, crustaceans and molluscs.

A number of notable fauna species are likely to be found within the survey area, including: Blue, Humpback, Minke, Bryde's, Killer and Sperm whales; Green, Leatherback and Flatback turtles; and the Southern Giant Petrel. A number of species of seasnake, fish and smaller marine mammals are also likely to occur in the area. However, it should be noted that the survey area is outside migration routes, and is unlikely to provide important habitat for any of these species. Rather, individuals are likely to be transient through the survey area.

The closest population centre to the drilling sites is the town of Exmouth, located over 270 km away. BHPBilliton conducts ongoing consultation with the Exmouth community regarding their oil and gas activities in the region. However, given the remote location of the current survey, it is considered unlikely to affect the Exmouth community, and specific consultation has not been conducted.

There is limited commercial fishing in the vicinity of the survey area, however BHPBilliton has notified relevant fishing bodies regarding this survey.

## **ENVIRONMENTAL RISK ASSESSMENT AND MANAGEMENT**

The seismic survey will be conducted as per BHPB's Global Geophysical Group's Management System and BHPB's Health, Safety, Environment and Community Management Standards. 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.

A number of actual and potential environmental impacts have been identified for the HEX07B 3D MSS. The risk of these potential impacts has been assessed, and this risk assessment is summarised in Table 1 below. Management measures to minimise these impacts and risks have been identified, and these are also summarised below (Table 2).

Objectives, standards and performance criteria for environmental management have been established based on consideration of:

- Sustainable Development Policy requirements;
- BHPB HSEC management Standards;
- Legal requirements; and
- Technology options and feasibility.

Table 3 provides a summary of these for each identified activity/event.

All staff and contractors taking part in the HEX07B 3D MSS will be advised of the potential environmental impacts associated with this survey, and their responsibilities relating to environmental management. This will occur through an induction that will be given to all crew prior to survey commencement.

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

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

**Table 1 - Summary of Environmental Risk Assessment – HEX07B 3D Marine Seismic Survey**

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophe
	CDEU 1.0 - 1.5	CDEU 1.5 - 2.5	CDEU 2.5 - 3.5	CDEU 3.5 - 4.5	CDEU 4.5 - 5.0
(Likelihood of the realisation of the potential consequences)	<ul style="list-style-type: none"> <li>No measurable damage</li> <li>Damage area not detectable</li> <li>Damage to ecosystem not detectable</li> <li>Potential impact on substrate with sparse biotic cover</li> </ul>	<ul style="list-style-type: none"> <li>Minor Damage</li> <li>Damage area &lt;200 000m<sup>2</sup></li> <li>0-25% of ecosystem damaged</li> <li>Natural recovery &lt;1yrs acute, &lt;5yrs planned</li> <li>Artificial recovery possible</li> <li>Impact on substrate with sparse halimeda (less than 30%) / low biotic cover</li> </ul>	<ul style="list-style-type: none"> <li>Localised Damage, sustainability unaffected</li> <li>Damage area &lt;785 000m<sup>2</sup></li> <li>25-50% of ecosystem damaged</li> <li>Natural recovery &lt;5yrs acute, &lt;10yrs planned</li> <li>Artificial recovery difficult</li> <li>Impact on substrate with variable cover of gorgonians and sponges, sparse coral coverage</li> </ul>	<ul style="list-style-type: none"> <li>Major Damage sustainability affected</li> <li>Damage area &lt;3 140 000m<sup>2</sup></li> <li>50-75% of ecosystem damaged</li> <li>Potential transmission to other ecosystem components or new generations</li> <li>Natural recovery &lt;10yrs acute, &lt;20yrs planned</li> <li>Artificial recovery very difficult</li> <li>Impact on habitat with up to 30% live coral coverage</li> <li>Impact on migration routes for marine mammals</li> </ul>	<ul style="list-style-type: none"> <li>Massive Damage, sustainability affected</li> <li>Damage area &gt;3 140 000m<sup>2</sup></li> <li>75-100% of ecosystem damaged</li> <li>Transmission to other ecosystem components or new generations</li> <li>Natural recovery &gt;10yrs acute, &gt;20yrs planned</li> <li>Artificial recovery not yet possible</li> <li>Impact on habitat with up to 30% live coral coverage</li> <li>Impact on breeding calving of marine mammals</li> </ul>
Almost certain					
Likely					
Moderate					
Unlikely	6.2 Physical presence 6.3 Seismic acquisition 6.6 Waste disposal 6.7 Diesel spill 2 500L 6.9 Streamer fluid release				
Rare	6.4 Deck drainage 6.5 Sewage/food scraps disposal	6.8 Diesel spill 109 000L			

Risk Level	ALARP Region	Action required	Risk Level	ALARP Region	Action required
High	Unacceptable Risk	Risks cannot be justified under any circumstances	Moderate	Lower Marginal Risk	Cost effective measures for risk reduction should be implemented and hazard analysis considered/
Significant	Upper Marginal Risk	Risk reduction measures are strongly recommended or where effective hazard control and emergency preparedness measures are necessary	Low	Negligible Risk	Further risk reduction measures are not generally required in favour of long term risk reduction programs

**Table 2 - Summary of Mitigation and Control Practices**

<b>Mitigation and Control Practices</b>		<b>Vessel Master</b>	<b>Seismic Contractor Party Manager</b>	<b>Other BHPB</b>	<b>BHPB Rep Onboard</b>
<b>General</b>					
6.0.1	Comply with all relevant legislation	R	R	HSE C	R
6.0.2	Liaise with Fisheries WA and local fisheries			HSE/PM R	C
6.0.3	Ensure Notice to Mariners is issued	R			M
<b>Seismic activities</b>					
6.0.4	Manage seismic activities in accordance with DEWR Cetacean Guidelines	R	C		M
6.0.5	Record sightings of whales	R		HSE C	R
6.0.6	Maintain and review towing equipment to prevent loss of streamers due to failure of towing equipment	C	R		
6.0.7	Monitor streamers for loss of buoyancy. Repair or replace damaged sections.		R		
<b>Waste and hazardous substances</b>					
6.0.8	Ensure that all food scraps and sewage wastes disposed of overboard are comminuted/ground so that it can be passed thru a screen with openings no greater than 25mm	R			M
6.0.9	Oil and chemicals to be stored in contained areas	R			M
6.0.10	All wastes to be stored in suitable containers for return to shore in accordance with vessel waste management practices	R	R		C
6.0.11	Ensure that no waste (other than macerated food scraps/sewage) is released into the marine environment	R			M
6.0.12	MSDS are to accompany hazardous waste consignments	R			M
6.0.13	Ensure adherence to vessel waste management plan	R	R		M
6.0.14	Ensure waste management is included in vessel induction	R		HSE/PM R	C
<b>Fuel and Chemical Spill Prevention</b>					
6.0.15	Should refuelling at sea be required, transfer operations to take place under close supervision and within safe operational limits	R			C
6.0.16	Scupper plugs/bunds on deck drains	R			M
6.0.17	Ensure save-alls are located around cable reels on deck	R	R		M
<b>Spill response</b>					
6.0.18	Spill kits available and maintained on vessel for clean up of minor spills	R			M
6.0.19	Any oil or chemical spills on board cleaned up as soon as possible to minimise contamination potential	R			C
6.0.20	Spills reported via BHPB IHR system. Spills >80L reported to DoIR	C			R
6.0.21	Ensure a Shipboard Oil Pollution Response Plan is available on board	R	C	HSE C	C
6.0.22	Ensure that no chemical dispersants are used on spills without approval from DoIR	R	C	HSE C	R
6.0.23	Ensure personnel are aware of emergency response and reporting requirements	R	C	HSE C	C

**Table 3: Summary of Environmental Objectives, Standards and Performance Criteria**

Activity / Event	Objectives	Standards	Performance Criteria
Physical Presence	<ul style="list-style-type: none"> <li>Minimise impact upon the marine environment</li> <li>Minimise impact on fisheries, tourism and other users of the region</li> </ul>	<ul style="list-style-type: none"> <li>Section 124, P(SL)A</li> <li>Regulations 13 &amp; 14 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> <li>International Convention for the Safety of Life at Sea (SOLAS), 1974</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>No breaches in applicable Laws, Regulations or conditions of approval</li> </ul>
Seismic Acquisition	<ul style="list-style-type: none"> <li>Minimise impact upon marine fauna</li> </ul>	<ul style="list-style-type: none"> <li>Regulations 13 &amp; 14 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> <li>Clause 401 issued as a schedule to the Petroleum (Submerged Lands) Act, 2005 consolidation</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>Record sightings of whales</li> </ul>
Deck Drainage	<ul style="list-style-type: none"> <li>Prevent contaminated deck drainage from entering the marine environment</li> </ul>	<ul style="list-style-type: none"> <li>Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)</li> <li>Regulations 13 &amp; 14 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>Records show personnel are trained in emergency response and reporting requirements</li> </ul>
Sewage and Food Scrap Disposal	<ul style="list-style-type: none"> <li>Prevent releases of un-commuted sewage and food scraps to the marine environment</li> </ul>	<ul style="list-style-type: none"> <li>Protection of the Sea (Prevention of Pollution From Ships) Act 1993</li> <li>MARPOL 73/78 Annexe IV</li> <li>Regulations 13 &amp; 14 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>No breaches of applicable legislation, regulations or approval conditions</li> <li>Records show personnel trained in waste management</li> </ul>
Waste Disposal	<ul style="list-style-type: none"> <li>Prevent release of waste products to the marine environment</li> <li>Prevent incorrect onshore disposal of wastes</li> </ul>	<ul style="list-style-type: none"> <li>Regulations 13 &amp; 14 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> <li>Protection of the Sea (Prevention of Pollution From Ships) Act 1993</li> <li>MARPOL 73/78 Annexe IV</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>No breaches of applicable legislation, regulations or approval conditions</li> <li>Records show personnel trained in waste management</li> </ul>
Spills of Diesel (2 500L)	<ul style="list-style-type: none"> <li>Prevent hydrocarbon loss to sea</li> <li>Ensure appropriate preparedness in case of oil spill</li> </ul>	<ul style="list-style-type: none"> <li>Regulations 13, 14 &amp; 26 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> <li>Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>No breaches of applicable legislation, regulations or approval conditions</li> <li>Any spills reported as per BHPB incident reporting system</li> <li>Records show personnel are trained in emergency response and reporting requirements</li> </ul>
Spills of Diesel (109 000L)	<ul style="list-style-type: none"> <li>Prevent hydrocarbon loss to sea</li> <li>Ensure appropriate preparedness in case of oil spill</li> </ul>	<ul style="list-style-type: none"> <li>Regulations 13, 14 &amp; 26 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> <li>Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>No breaches of applicable legislation, regulations or approval conditions</li> <li>Any spills reported as per BHPB incident reporting system</li> <li>Records show personnel are trained in emergency response and reporting requirements</li> </ul>
Streamer Fluid Release	<ul style="list-style-type: none"> <li>Prevent loss of chemicals to sea</li> </ul>	<ul style="list-style-type: none"> <li>Regulations 13, 14 &amp; 26 of the Petroleum (Submerged Lands)(Management of Environment) Regulations 1999</li> <li>Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)</li> </ul>	<ul style="list-style-type: none"> <li>EP accepted by DoIR</li> <li>Conduct HSE audit of vessel to verify compliance with management measures</li> <li>No breaches of applicable legislation, regulations or approval conditions</li> <li>Any spills or incidents reported as per BHPB incident reporting system</li> <li>Records show personnel are trained in emergency response and reporting requirements</li> </ul>