3. PROJECT DESCRIPTION

3.1 GENERAL INFORMATION

3.1.1 EXPLORATION RIGHT

TOTAL Exploration & Production South Africa B.V. (hereafter referred to as “TEPSA”) is the operator and holder of an existing Exploration Right for undertaking seismic surveys and exploration well drilling in Block 11B/12B. Following a farm-in to the Exploration Right TEPSA has assumed the operatorship of Block 11B/12B from CNR International (South Africa) Limited (hereafter referred to as “CNRI”), who has retained a 50% working interest in the block.

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3.1.2 EXPLORATION BLOCK DETAILS

Location and Surface area

Block 11B/12B is located offshore of the south coast of South Africa, roughly between Mossel Bay and Cape St Francis between 90 km and 60 km from the coastline of each town, respectively (see Figure 1.1 and Figure 1.2). Adjacent Petroleum Licence Blocks include Block 9 to the west, Pletmos Inshore Blockand Algoa and Gamtoos Block to the north, and east and the Outeniqua South Area located to the south.

Block 11B/12B has a total surface area of 18 734 km^2.

Nearest Infrastructure

The nearest coastal settlements to Blocks 11B/12B include Mossel Bay, George, Knysna, Plettenberg Bay and Cape St Francis.

Location of Other Projects

Oil and gas production projects are currently in operation in Block 9, to the west of Block 11B/12B. These include the F-A Platform with its satellite gas fields and the Oribi/Oryx oil production facility.

Well drilling is being undertaken on an ongoing basis in Block 9 by PetroSA as part of the exploration work for the FO field and the refurbishment of various production facilities.

No other offshore mining, such as for agricultural or heavy minerals, is expected to take place in Block 11B/12B in the near to middle future.

3.1.3 FINANCIAL PROVISION

In terms of Section 41 of the MPRDA and Sections 52 and 53 of the MPRDA Regulations, TEPSA would provide for rehabilitation, management and remediation of negative environmental impacts associated with the additional exploration work programme that is being proposed. This would be provided for by means of an insurance policy. The determination of the quantum of the financial provision is set out in Appendix 4, which is expected to be in the order of USD 1 000 000.

Proof of Financial Provision would be provided to PASA in the following manner:

- Copies of the insurance cover carried by the Contractors and TEPSA would be provided together with the environmental notification submitted to PASA at least 30 days prior to the commencement of any exploration activity;
- A copy of the insurance certificate for the year would be provided on the renewal date of each year; and
- The annual revision of the closure provision would be submitted together with the annual Performance Assessment reports.

3.1.4 ENVIRONMENTAL POLICY

A copy of TEPSA Health, Safety and Environmental Policy is presented in Appendix 5. This policy sets out their commitment to ensure successful implementation of the proposed project and EMP.

3.1.5 MONITORING AND EMP PERFORMANCE ASSESSMENT

TEPSA would undertake appropriate monitoring during the proposed sonar surveys and seabed sediment sampling as presented in Chapter 7. TEPSA would track performance against objectives and targets specified in this EMPr.

TEPSA would appoint an Environmental Officer to undertake monitoring on an ongoing basis to ensure the protection of the environment and the safety of personnel and contractors. The audit would generate a list of recommended corrective actions, which would be used as a tool to document all corrective actions taken and how they were performed. In addition, TEPSA would conduct a performance assessment as determined by PASA.

At the conclusion of each exploration activity a “close-out” report would be prepared, which would include monitoring and performance assessments. This report would outline the implementation of the EMPr and highlight any problems and issues that arose during the proposed activities.

3.1.6 PLANS AND PROCEDURES FOR ENVIRONMENTAL RELATED EMERGENCIES AND REMEDIATION

An Emergency Response Plan would be prepared for the proposed survey and sediment sampling. TEPSA would use as a basis its generic Emergency Response Plan (see extract in Appendix 6). This plan would be updated and modified for the proposed activities in Block 11B/12B. The project specific Emergency Response Plan would be submitted to PASA (see Section 3.2.5).

All offshore emergencies (would be managed in terms of a bridging document between the Emergency Response Plan prepared for Block 11B/12B by TEPSA and the emergency response procedures and plans of the selected Contractor.

3.1.7 UNDERTAKING BY THE APPLICANT

TEPSA undertakes to comply with the specifications of the EMPr and provisions of the MPRDA and Regulations thereto (see Appendix 7).

3.2 PROJECT OVERVIEW

The proposed exploration activities would include various sonar surveys and seabed sediment sampling. These activities provide for the rapid collection of data and provide critical information regarding the exploration potential of the licence area and would guide future exploration efforts. These exploration activities are described in more detail below.

3.2.1 SONAR SURVEYS

In order to further investigate the structure of the ocean bed sediment layers, TEPSA is proposing to undertake surveys of the seabed. In this regard, the following sonar surveying tools are currently considered for use:

- Depth sounders;
- Side scan sonar;
- Bottom profilers; and
- Multi-beam bathymetry.

A description of each of the above techniques is provided below. However, it is noted that at this stage, multi-beam bathymetry surveying is the most likely technique that would be used.

Depth Sounders

The majority of hydrographic depth/echo sounders are dual frequency, transmitting a low frequency pulse (typically around 24 kHz) at the same time as a high frequency pulse (typically around 200 kHz). Dual frequency depth/echo sounding has the ability to identify a vegetation layer or a layer of soft mud on top of a layer of rock. The pulse emitted would be for a duration of more than 0.025 seconds and typically produces sound levels in the order of approximately 180 dB re 1 µPa at 1m.

Side Scan Sonar

Side scan sonar systems produce acoustic intensity images of the seafloor and are used to map the different sediment textures of the seafloor. Side-scan uses a sonar device, towed from a surface vessel or mounted on the ship’s hull, that emits conical or fan-shaped pulses down toward the seafloor across a wide angle perpendicular to the path of the sensor through the water (see Figure 3-1). The intensity of the acoustic reflections from the seafloor of this fan-shaped beam is recorded in a series of cross-track slices. When stitched together along the direction of motion, these slices form an image of the sea bottom within the swath (coverage width) of the beam. A typical side scan sonar emits a pulse at frequencies ranging from 50 to 500 kHz and typically produces sound levels in the order of 220-230 db re 1µPa at 1m.

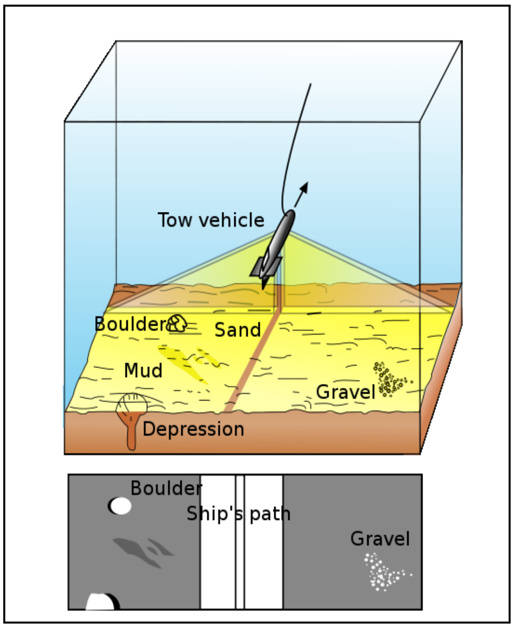

Figure 3-1: Schematic of a typical side scan sonar device and resulting information.

Bottom Profilers

Bottom profilers are powerful low frequency echo-sounders that provide profiles of the upper layers of the ocean floor. A typical bottom profiler emits an acoustic pulse at frequencies ranging from 0.4 to 30 kHz and typically produces sound levels in the order of 200-230 db re 1µPa at 1m.

Multi-Beam Bathymetry

The use of multi-beam bathymetry survey allows the operator to produce a digital terrain model of the seafloor (see Figure 3-2).

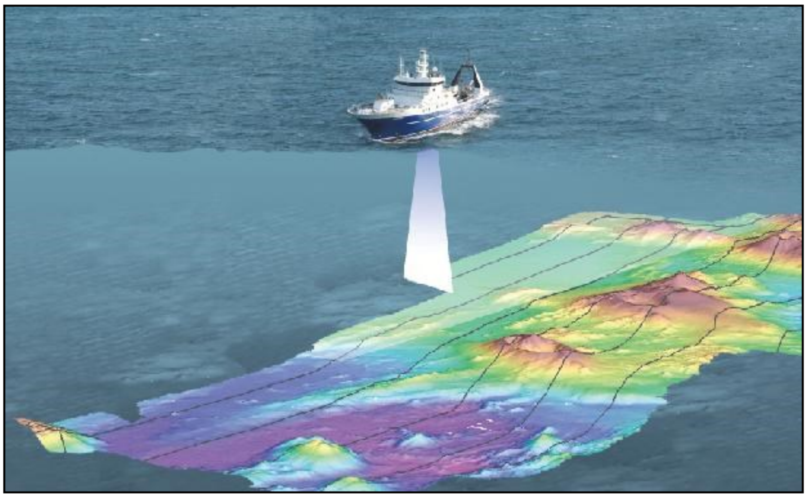

Figure 3-2: Illustration of a vessel using multi-beam depth/echo sounders (http://www.gns.cri.nz/).

The survey vessel would be equipped with a multi-beam echo sounder to obtain swath bathymetry and a sub-bottom profiler to image the seabed and the near surface geology. The multi-beam system provides depth sounding information on either side of the vessel's track across a swath width of approximately two times the water depth. Although this type of survey typically does not require the vessel to tow any cables, it is “restricted in its ability to manoeuvre” due to the operational nature of this work.

Typical multi-beam echo sounder emits a fan of acoustic beams from a transducer at frequencies ranging from 10 kHz to 200 kHz and typically produces sound levels in the order of 207 db re 1µPa at 1m. A typical sub-bottom profiler emits an acoustic pulse from a transducer at frequencies ranging from 3 kHz to 40 kHz and typically produces sound levels in the order of 206 db re 1µPa at 1m.

The multi-beam bathymetry survey would be undertaken in small specific areas across the block. It is anticipated that each data acquisition operation would take in the order of three to four weeks to complete.

In general terms, sound sources that have high sound pressure and low frequency will travel the greatest distances in the marine environment. Conversely, sources that have high frequency will tend to have greater attenuation over distance due to interference and scattering effects (Anon, 2007). It is for this reason that the acoustic footprint of the above-mentioned sonar survey tools is considered to be much lower than that of seismic surveys and in addition have lower sound pressure levels. It should be noted that a decibel is a logarithmic scale of pressure where each unit of increase represents a tenfold increase in the quantity being measured.

The low frequency sound source of the airgun arrays associated with seismic surveys tends to produce a larger acoustic footprint in the marine environment due to the high intensity and low frequency of the source. Due to the higher frequency emissions utilised in normal multi-beam and sub-bottom profiling operations, the associated sound pressure tends to be dissipated to safe levels over a relatively short distance. The anticipated radius of influence of multi-beam sonar would thus be significantly less than that for a seismic airgun array (Anon, 2007).

3.3 SEABED SEDIMENT SAMPLING

3.3.1 INTRODUCTION

The seabed sediment sampling programme would involve the collection of sediment samples in order to characterise the seafloor and for laboratory geochemical analyses in order to determine if there is any naturally occurring hydrocarbon seepage at the seabed. Piston and box coring (or grab samples) techniques would be used to collect seabed sediment samples. These are described below.

Piston Coring

Piston core (or drop core) is one of the more common seafloor sampling methods. A piston coring device with ultra-short baseline (USBL) navigation would be used to accurately target and collect the seafloor samples (see Figure 3-3). The programme would likely utilise a piston corer (approximately 1 000 kg) capable of retrieving sediment samples that are up to a maximum of 6 m in length and 0.08 m in radius.

The piston corer is lowered over the side of the survey vessel on a line and allowed to free fall from about 3 m above the seafloor to allow better penetration (see Figure 3-3-A). As the trigger weight hits the bottom (Figure 3-3-B), it releases the weight on the trigger arm and the corer is released to "free-fall" the 3 m distance to the bottom (Figure 3-3-B & C), forcing the core barrel to travel down over the piston into the sediment (Figure 3-3-D). The movement of the core barrel over the piston creates suction below the piston and expels the water out the top of the corer. When forward momentum of the core has stopped, a slow pull-out of the winch commences. This suction triggers the separation of the top and bottom sections of the piston (Figure 3-3-E). The corer and sample are then slowly pulled from the seafloor and retrieved.

The recovered cores are visually examined at the surface for indications of hydrocarbons (gas hydrate, gas parting or oil staining) and sub-samples retained for further geochemical analysis in an onshore laboratory.

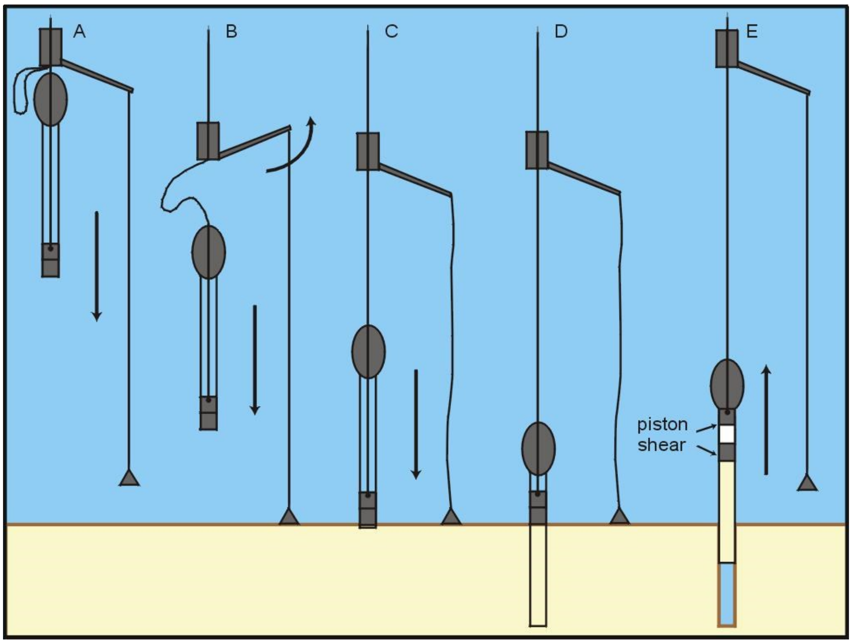

Figure 3-3: Schematic of a drop piston core operation at the seabed (from TDI Brooks).

Box Coring / Grab Samples

The box corer (see Figure 3-4) is deployed from a survey vessel by lowering it vertically to the seabed. At the seabed the instrument is triggered by a trip as the main coring stem passes through its frame. The stem has a weight of up to 800 kg to aid penetration. While pulling the corer out of the sediment a spade swings underneath the sample to prevent loss. When hauled back on board, the spade is under the box. The recovered sample is completely enclosed after sampling, reducing the loss of finer materials during recovery. Stainless steel doors, kept open during the deployment to reduce any "bow-wave effect" during sampling, are triggered on sampling and remain tightly closed, sealing the sampled water from that of the water column. On recovery, the sample can be processed directly through the large access doors or via the removal of the box completely, together with its cutting blade. A spare box and spade can then be added, ready for an immediate redeployment.

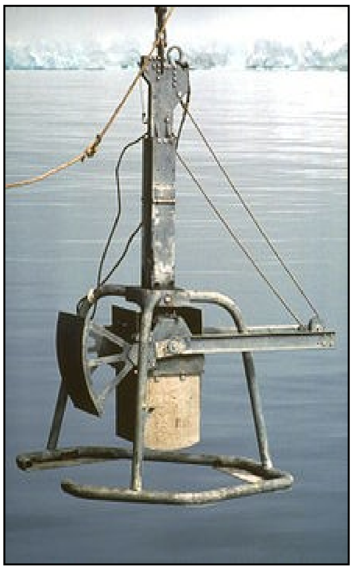

Figure 3-4: Box corer (http://en. wikipedia.org/ wiki/Box corer).

Grab sampling (see Figure 3-5) is the simple process of bringing up surface sediments from the seafloor. This method, however, cannot be used to characterise different sedimentary layers since it is unable to penetrate the ground to depth and a mixture of sediments is produced. Once the grab sampler is launched, the jaws open and it descends to the seafloor. A spring closes the jaws and they trap sediments or loose substrate. The grab sampler is then brought up to the surface where its contents are studied in detail.

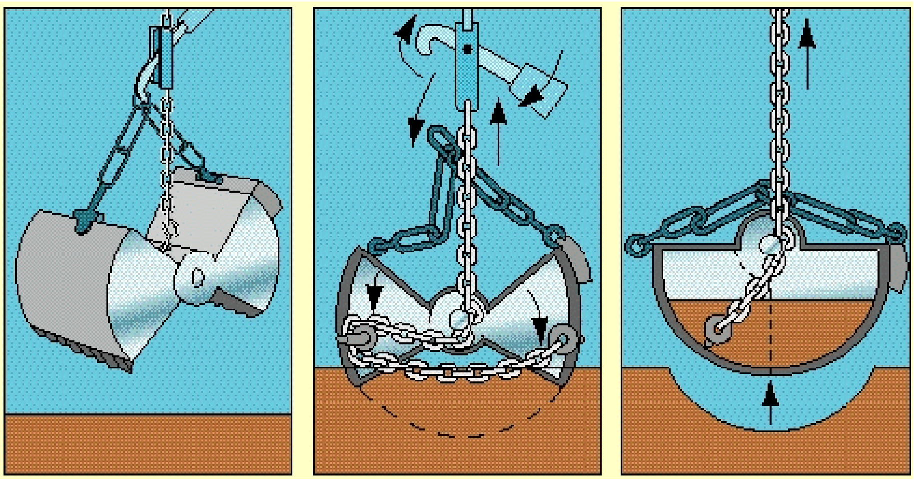

Figure 3-5: Grab sampler (Source: http://www.jochemnet.de/fiu/OCB3043_35.html).

Location, extent and duration

The seabed sediment sampling would be undertaken in small specific areas across the block. Each individual piston and box core would have a maximum volume of 0.02 m^3 and 0.03 m^3, respectively.

It should be noted that the total cumulative volume of material that would be removed from the seabed would be less than 5 m^3.

It is anticipated that the seafloor sampling would take in the order of three to five weeks to complete per sampling campaign.

3.3.2 EXCLUSION ZONES

Under the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS, 1972, Part B, Rule 18), survey vessels engaged in surveying or towing operations are defined as "vessel restricted in its ability to manoeuvre[1]" which requires that power-driven and sailing vessels give way to a vessel restricted in its ability to manoeuvre. Vessels engaged in fishing shall, so far as possible, keep out of the way of the survey operations. Furthermore, under the Marine Traffic Act, 1981 (No. 2 of 1981), a vessel (including array of airguns and hydrophones) used for the purpose of exploiting the seabed falls under the definition of an "offshore installation" and as such it is protected by a 500 m safety zone. It is an offence for an unauthorised vessel to enter the safety zone.

The 500 m safety zone and proposed safe operational limits would be communicated to key stakeholders well in advance of the proposed exploration programme. Notices to Mariners will also be communicated through the proper channels.

[1] Definition: The term "vessel restricted in her ability to manoeuvre" means a vessel which from the nature of her work is restricted in her ability to manoeuvre as required by these Rules and is therefore unable to keep out of the way of another vessel. The term "vessels restricted in their ability to manoeuvre" shall include but not be limited to:

- (i) a vessel engaged in laying, servicing, or picking up a navigation mark, submarine cable or pipeline;
- (ii) a vessel engaged in dredging, surveying or underwater operations;
- (iii) a vessel engaged in replenishment or transferring persons, provisions or cargo while underway;
- (iv) a vessel engaged in the launching or recovery of aircraft;
- (v) a vessel engaged in mine clearance operations; and
- (vi) a vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course.