APPLICATION FOR AN EXPLORATION RIGHT: NORTHERN CAPE ULTRA-DEEP LICENCE AREA IN THE ORANGE BASIN, WEST COAST OF SOUTH AFRICA

BACKGROUND INFORMATION DOCUMENT JANUARY 2014

1. INTRODUCTION

OK Energy Limited (hereafter referred to as OK Energy) has applied to the Petroleum Agency SA (PASA) for an Exploration Right in the Northern Cape Ultra-deep licence area in the Orange Basin off the West Coast of South Africa (see Figure 1). OK Energy is proposing to explore for oil and gas using various methodologies, which may include 2D/3D seismic surveys, boat-acquired gravity and magnetics, multi-beam bathymetry and seafloor sampling for geochemical analysis. The purpose of this exploration programme is to investigate the subsea geology for the presence of oil and gas prospects.

The Northern Cape Ultra-deep licence area has a size of approximately 6 930 km^2 and is located beyond the continental shelf in depths from roughly the 2 500 m depth contour to beyond 3 000 m.

OK Energy has appointed CCA Environmental (Pty) Ltd (CCA) to ensure compliance with the necessary Environmental Management Programme (EMP) requirements in order to undertake the proposed exploration programme.

2. PURPOSE OF THIS DOCUMENT

This Background Information Document (BID) serves to:

- Inform interested and affected parties (I&APs) about the authorisation process that OK Energy is required to comply with;
- Provide background information about the proposed exploration activities and study process;
- Highlight some key issues regarding the potential environmental impacts of the proposed activities; and
- Provide I&APs with an opportunity to comment and/or raise any concerns they may have regarding the planned activities. This document has been released for 21-day comment / review period from **17 January 2014 to 10 February 2014**.

3. WHAT AUTHORISATION IS REQUIRED?

In terms of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA) an Exploration Right must be approved prior to the commencement of exploration activities. A requirement for obtaining an Exploration Right is that an EMP has to be compiled in terms of Section 39 of the MPRDA and submitted to PASA for consideration and Minister of Mineral Resources (or the delegated authority) for approval.

4. PROJECT OVERVIEW

OK Energy's proposed work programme would include an initial 2D seismic survey and boat-acquired full tensor gravity and magnetics, with a contingent work programme including a possible further 3D seismic survey, multibeam bathymetry and seafloor sampling for geochemical analysis. The different project components are discussed in this section.

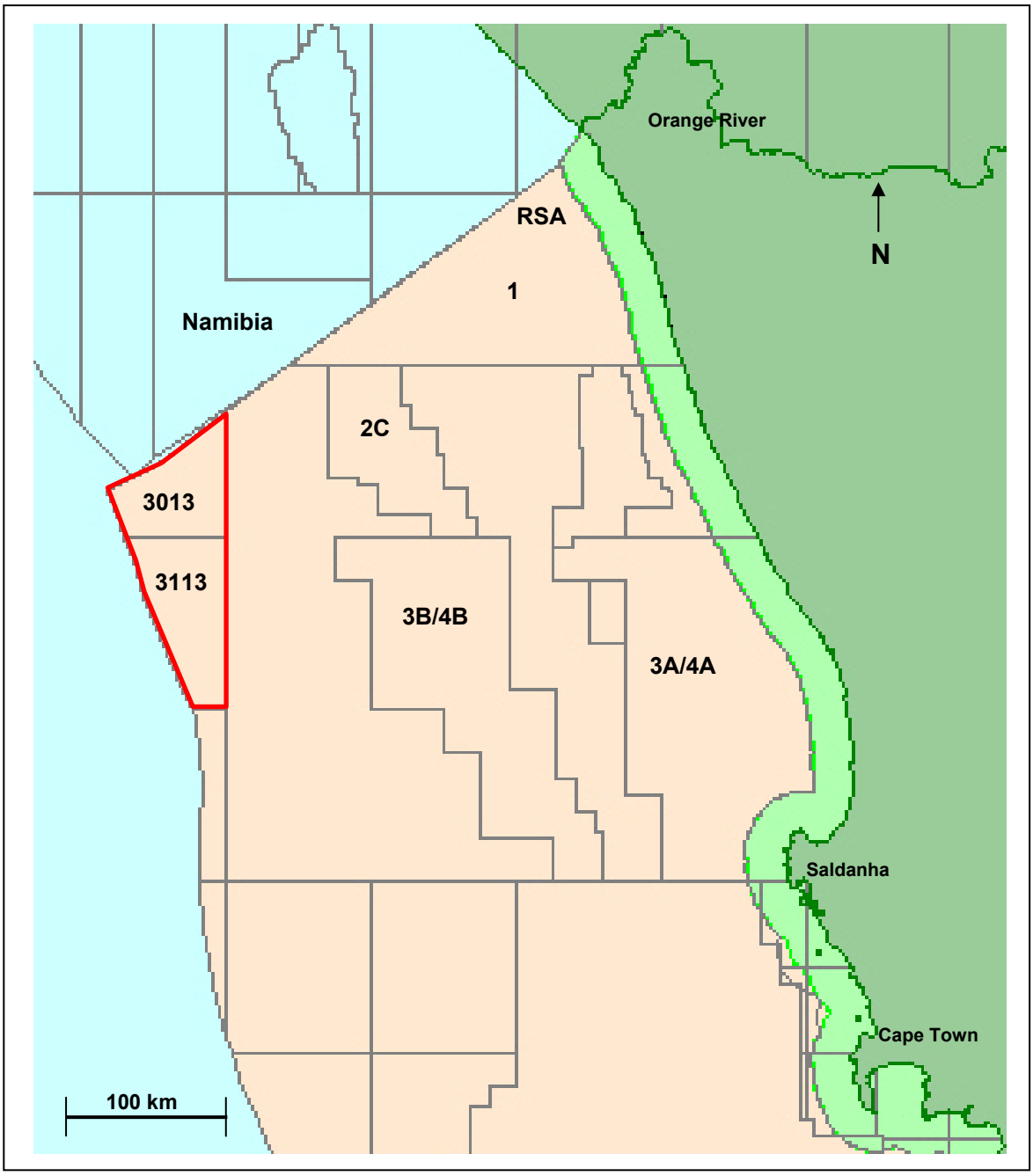

Figure 1: Location of the proposed Exploration Right area in the Orange Basin off the West Coast of South Africa (red outline).

4.1 Seismic surveys

Offshore seismic surveys are carried out during oil and gas exploration in order to investigate subsea geological formations. During seismic surveys high-level, low frequency sounds are directed towards the seabed from near-surface sound sources towed by a seismic vessel. Signals reflected from geological interfaces below the seafloor are recorded by multiple receivers (or hydrophones) towed in a single or multiple streamers (see Figure 2). Analyses of the returned signals allow for interpretation of subsea geological formations.

Seismic surveys are undertaken to collect either 2D or 3D data. For this investigation OK Energy is proposing to undertake both a 2D and 3D seismic survey. A 2D survey typically involves a towed airgun array and a single streamer, whereas 3D surveys use multiple streamers.

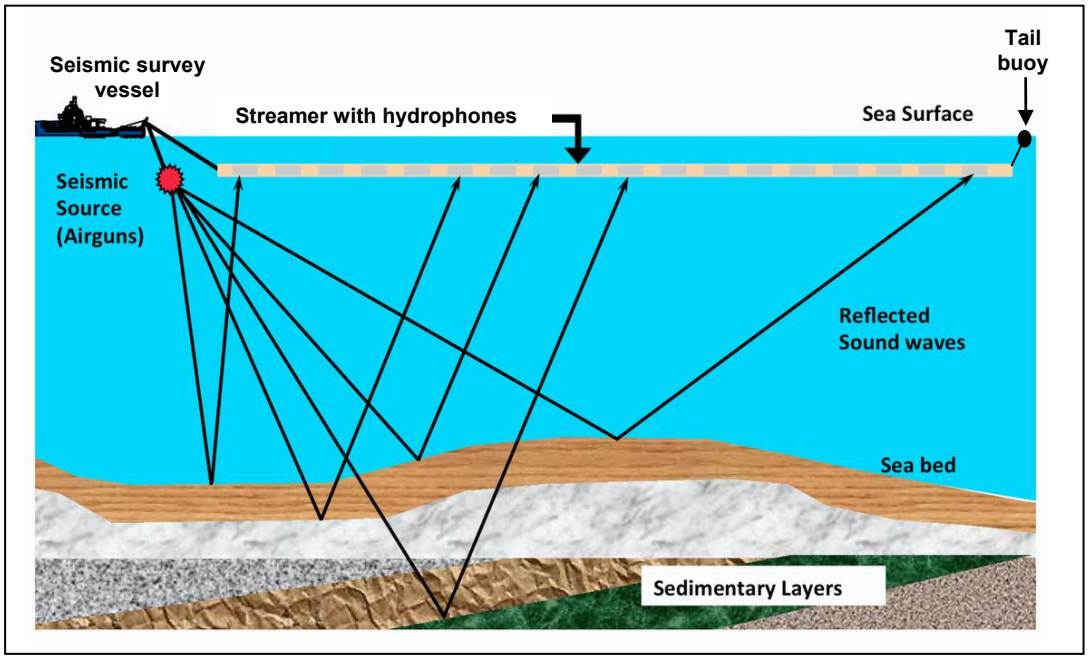

Figure 2: Principles of offshore seismic acquisition surveys (adapted from www.api.org).

Extent, duration and timing

The proposed 2D seismic survey would be approximately 500 km in length comprising a number of low density spaced survey lines covering the entire licence area (6 903 km^2). It is anticipated that the proposed seismic survey would either commence late in the 2013/2014 survey window period or early in the 2014/2015 survey window period and would take approximately two weeks to complete.

As part of the contingent work programme the acquisition of 1 000 km2 3D data within the licence area is also proposed. The 3D survey would take approximately four weeks to complete. The planned survey period has not as yet been determined.

Survey methodology and airgun array

The seismic vessel would travel along transects of a prescribed grid within the survey area that have been carefully chosen to cross any known or suspected geological structure in the area. During surveying the seismic vessel would travel at a speed of between four and six knots (i.e. 2 to 3 metres per second).

The seismic survey would involve a towed airgun array, which provides the seismic source energy for the profiling process, and a seismic wave detector system, usually known as a hydrophone streamer. The sound source or airgun would be situated some 100 m behind the vessel at a depth of approximately 7 m below the surface, and would be fired at approximately 10 to 20 second intervals. A 2D survey typically involves a towed airgun array and a single streamer, whereas 3D surveys use multiple streamers. A single array can be up to 10 000 m long. Streamers are generally towed at a depth of 9 m to 10 m and are not visible, except for tail-buoys at the far end of the streamers. A typical 3D seismic survey configuration and safe operational limits for both 2D and 3D surveys are illustrated in Figure 3.

The sound waves are reflected by boundaries between sediments of different densities and returned signals are recorded by hydrophones mounted inside streamer cables and transmitted to the seismic vessel for electronic processing. A surface tail-buoy with radar reflectors would be connected to the end of each streamer to provide a visible location point for reference.

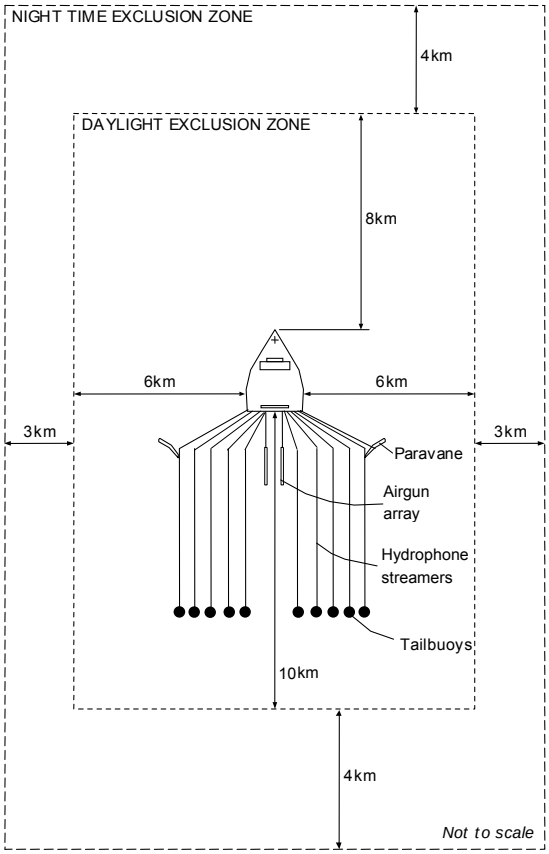

Figure 3: Typical safe operational limits for 2D and 3D seismic survey operations.

Sound pressure emission levels

Airguns are used on an individual basis or in arrays. Arrays of airguns are made up of towed parallel strings of airguns (usually comprised of between 12 and 70 airguns in total). The proposed sound source would consist of four airgun arrays each containing 10 active guns with operating pressures of 2 000 pound-force per square inch (psi) and volumes of 5 000 cubic inches.

The airgun array would produce sound levels of the order of 220-230 dB re 1 µPa @ 1m. The majority of energy produced would be in the 0 to 120 Hz bandwidth, although energy at much higher frequencies is also recorded.

One of the required characteristics of a seismic shot is that it is of short duration (the main pulse is usually between 5 and 30 milliseconds). The main pulse is followed by a negative pressure reflection from the sea surface of several lower magnitude bubble pulses. Although the peak levels during the shot may be high, the overall energy is limited by the duration of the shot.

Exclusion zone

Under the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS, 1972, Part B, Rule 18), survey vessels that are engaged in surveying or towing operations are defined as a “vessel restricted in its ability to manoeuvre” which requires that power-driven and sailing vessels give way to a restricted vessel. Vessels engaged in fishing shall, so far as possible, keep out of the way of survey operations.

Furthermore, under the Marine Traffic Act, 1981 (No. 2 of 1981), a seismic vessel is considered to be 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. In addition to a statutory 500 m safety zone, the seismic contractor would request a safe operational limit (that is greater than the 500 m safety zone) that it would like other vessels to stay beyond. Typical safe operational limits for 2D surveys are illustrated in Figure 3.

At least a 500 m safety zone would need to be enforced around the survey vessel (including its array of airguns and hydrophones) at all times. A support vessel with appropriate radar and communications would be used during the seismic survey to warn vessels that are in danger of breaching the exclusion zone. The 500 m safety zone and proposed safe operational limits would be communicated to key stakeholders well in advance of the proposed seismic survey. Notices to Mariners would also be communicated through the proper channels.

4.2 Boat acquired full tensor gravity and magnetics

During the seismic survey operations, full tensor gravity and magnetic data would also be acquired. The gravimeter would be located within the hull of the seismic vessel and measures small fractional changes within the earth's gravity caused by nearby geologic structures or the shape of the seafloor. Magnetic field strength would be measured using a magnetometer which would be towed off the back of the vessel alongside the airgun array. The magnetometer is used to detect variations in the total magnetic field of the underlying seafloor. Increased magnetisation can indicate the presence of certain geological features on the seafloor. Magnetic data can be used to estimate the age and thickness of rock layers.

4.3 Multibeam Bathymetry Survey

A multi-beam bathymetry survey may also be conducted as part of the contingent work programme. This survey produces a digital terrain model of the seafloor. A survey vessel is equipped with a deep water multi-beam echo sounder and a sub-bottom profiler to obtain a digital terrain model of the structure and geology of the seafloor (see Figure 4).

Note that this type of survey typically does not require the vessel to tow any cables. However, due to the operational nature of this work would be “restricted in her ability to manoeuvre”.

The 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 (approximately 1 000 time less than the seismic survey). The 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.

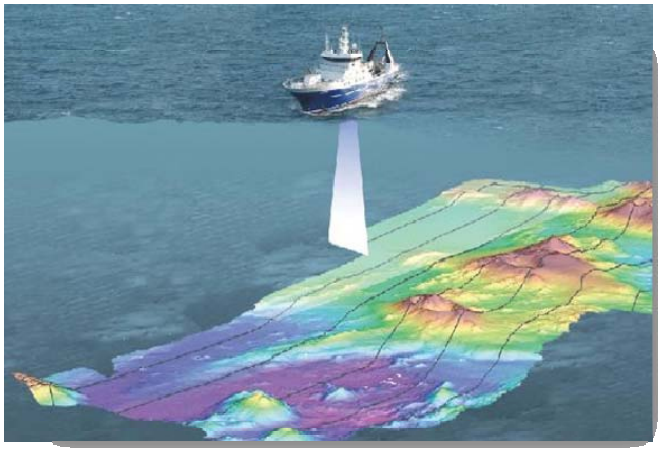

Figure 4: Illustration of a vessel using multi-beam depth/echo sounders (http://www.gns.cri.nz/).

4.4 Seafloor Sampling Programme

The seafloor sampling program would consist of collecting seafloor sediment samples for laboratory geochemical analyses in order to determine if there are any naturally occurring hydrocarbons are present.

Today, piston coring is one of the more common seafloor sampling methods. A piston coring device with ultra-short baseline (USBL) navigation would be used to collect the seafloor samples (see Figure 5). The

piston corer is lowered over the side of the survey vessel and allowed to free fall from about 3 m above the seafloor to allow good penetration. The USBL navigation system is used to accurately track the position of the core through the water column and position the core over the desired target for sampling.

The program would likely utilise a core barrel capable of retrieving sediment samples that are up to 6 m in length and 6.7 cm in diameter. Recovered sediment samples would be visually described and sampled for geochemical analysis.

It is anticipated that up to 5 core samples would be collected across the licence area. Each individual core would have a disturbance volume of 0.02 m³, respectively, resulting in a total disturbance volume of approximately 0.1 m³. The final number of cores samples and the exact location would be identified following the analysis of the multi-beam bathymetric survey results.

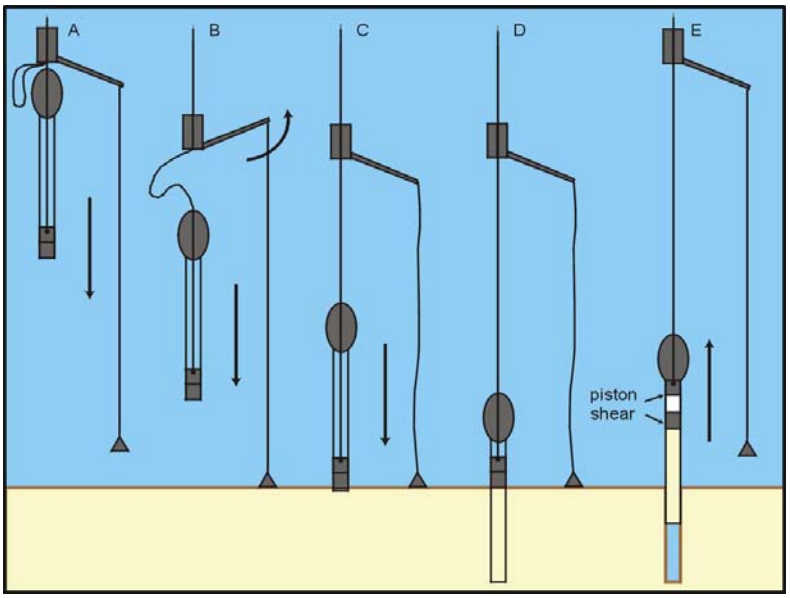

Figure 5: Schematic of a piston core operation at the seabed.

5. KEY ISSUES TO BE INVESTIGATED

The following key issues and potential impacts have been identified in relation to the proposed exploration activities and will be addressed in the EMP:

- Noise effects on marine fauna from seismic and multi-beam bathymetry surveys, and seafloor sampling;
- Potential impact on the fishing industry, including effects on fish behaviour, fish catches and cessation or displacement of fishing activities, as a result of noise effects and presence of survey and sampling vessels;
- Potential interference with marine recreational facilities and transport routes; and
- Waste discharge to sea and atmosphere.

6. STUDY PROCESS

The following steps have been / will be undertaken to ensure compliance with necessary legislative requirements in South Africa:

1. This BID has been distributed for a 21-day registration and comment period from 17 January 2014 to 10 February 2014;
2. Advertisements announcing the proposed project and the availability of the BID have been placed in the Cape Times and Die Burger on 17 January 2014;

3. Specialist studies will be commissioned and undertaken to address those issues requiring investigation;
4. An EMP will be compiled integrating all specialist studies and other relevant information. This report will aim to present all information in a clear and understandable format that is suitable for easy interpretation by I&APs and authorities; and
5. The EMP will be released for a 30-day review and comment period at the same time as it is submitted to PASA. All comments received will be forwarded directly to PASA for consideration.

7. YOUR INVITATION TO REGISTER AND COMMENT

If you or your organisation wish to register as an I&AP and/or wish to raise any issues or concerns regarding the proposed project, please make use of the attached Registration and Comment Form and forward it to Eloise Costandius of CCA at the contact details below by **no later than 10 February 2014.**

It should be noted that all registered I&APs will be notified when the EMP is available for review and comment.

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