

Kiffa 3D Marine Seismic Survey

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Woodside Mauritania Pty. Ltd. (Woodside) proposes to carry out a 3D marine seismic survey offshore from the Islamic Republic of Mauritania, in north-west Africa. The objective of the survey, labeled as the Kiffa 3D Marine Seismic Survey (MSS), is to acquire 3D seismic data within the PSC (Production Sharing Contract) Area A to assess further the hydrocarbon potential of the area. Previous 3D seismic has identified a number of potential hydrocarbon-bearing structures (or "leads"). Data from the Kiffa 3D MSS will provide further information necessary to determine if some of these leads are worth drilling.

The Kiffa 3D MSS is planned to commence in August 2004, with an expected duration of approximately 4 months. The survey will cover a maximum area of approximately 2,926km².

Survey	PSC Area	Area (km ²)
Kiffa 3D	A (Block 3)	2,926

The relative location of the survey area, which is located between 16 and 90 km from the coast and in water depths ranging from 50 to 1,600 m, is shown in the attached map.

The Kiffa 3D MSS will be conducted using the PGS seismic survey vessel M/V *Ramform Explorer*, towing two compressed air sound sources and eight streamer (hydrophone) cables. The survey vessel will be refueled at sea, at an expected frequency of approximately every six weeks during the survey, using a support vessel. Crew changes will be conducted using a support vessel, or by helicopter.



Seismic survey vessel M/V *Ramform Explorer*

Details of the seismic array for the Kiffa 3D MSS are shown below:

Parameter	Data
Total 3D Survey Area	2,926 km ²
No of streamers	8
Streamer length	4,500 m
Source capacity	3,090 cui
Operating pressure	2,000 psi
Streamer depth	8 m
Source depth	6 m
Shotpoint interval	18.75 m
Peak source sound pulse	220 dB re 1µPa rms
Frequency range	7–110 Hz

The survey will also involve the use of a support vessel (*M/V Sanco Sea*), and a chase vessel, both of which will accompany the *Ramform Explorer* to warn fishing vessels of the navigational hazard presented by the survey vessel and towed array, and to remove fishing equipment from the path of the *Ramform Explorer*.

The most northerly part of the survey area is located approximately 215 km south from the southern boundary of the Banc d'Arguin National Park. It is therefore extremely unlikely that there will be any impacts from the proposed Kiffa 3D MSS on the Banc d'Arguin area.



Support survey vessel M/V *Sanco Sea*

For more information please contact:

WOODSIDE MAURITANIA PTY. LTD.

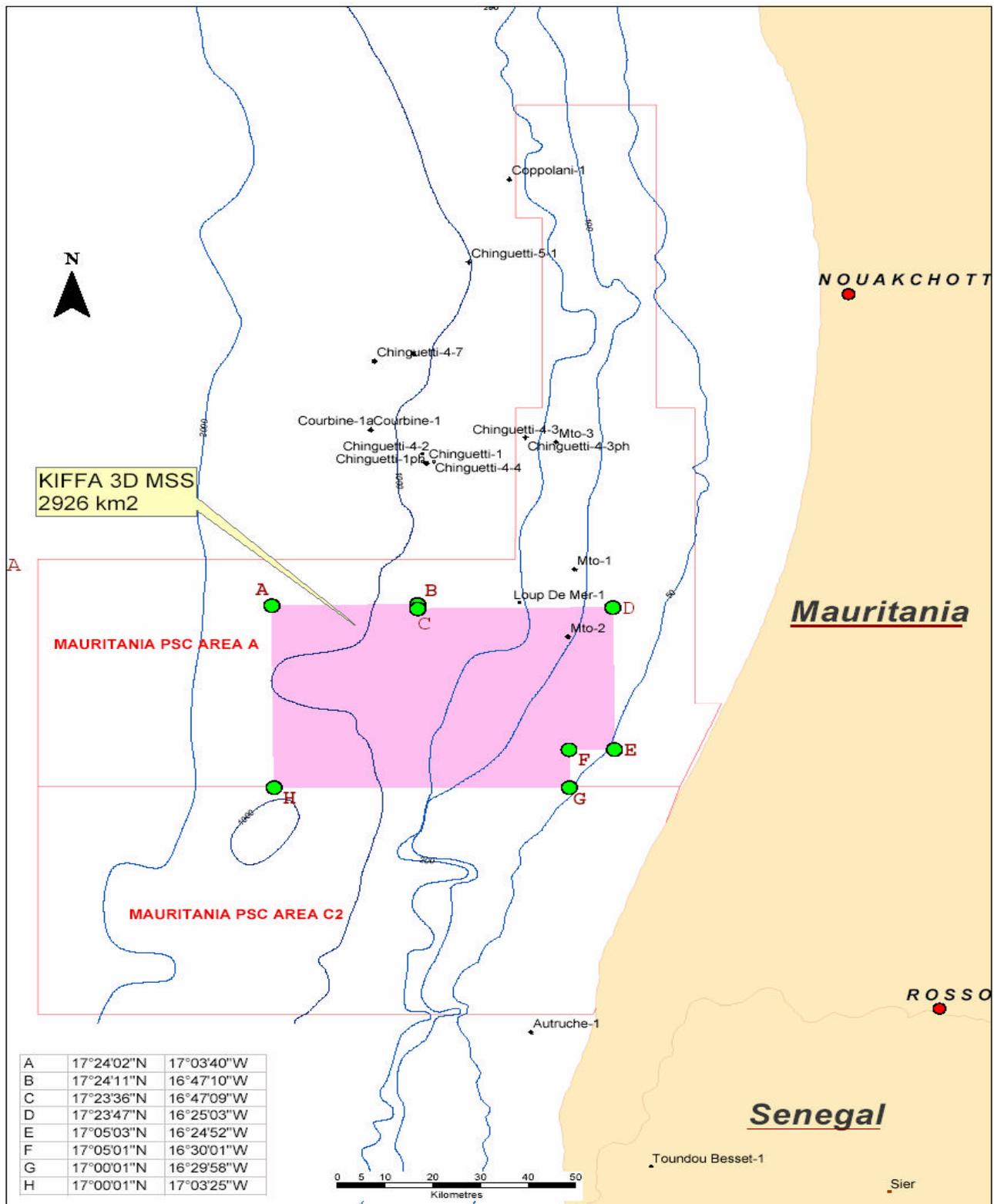
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Location map for the Kiffa 3D Marine Seismic Survey

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Woodside Mauritania Pty. Ltd. Environmental Commitment and Policy

Woodside is committed to protecting and preserving the natural environment by ensuring that adverse effects on the environment are either avoided or kept to an acceptable level while meeting all statutory requirements.

All of our company exploration and development activities are guided by an environmental management policy that has been integrated into business planning at all levels.

Before new projects can commence, the environmental assessment and planning process must be completed. For marine seismic survey activities this usually starts with an assessment of the environmental, social and cultural values and sensitivities of the proposed survey areas and surrounding waters. The next phase of environmental management consists of a risk assessment process that examines the potential impacts from seismic survey acquisition on the identified values and sensitivities.

In this phase potential impacts to marine life, water quality, commercial and artisanal fishing activities, and shipping are studied and evaluated. Where necessary appropriate control and mitigation measures are developed and implemented to either eliminate the potential risks and effects of the proposed activities, or to reduce them to levels as low as reasonably practicable.

Woodside is committed to pro-active and ongoing stakeholder involvement, with the objective of ensuring that all stakeholders are kept fully informed about proposed activities. This process focuses on informing relevant organisations, individuals and stakeholder groups of the potential impacts of seismic survey activities, and how Woodside intends to manage those impacts. Stakeholder involvement is an integral part of the planning and preparation work for seismic surveys.

Environment Plan

Under the draft Mauritanian *Marine Pollution Code*, companies will be required to submit safety and environment plans to the Mauritanian Government prior to commencement of an activity offshore. In the current absence of decrees detailing the content, approval process and implementation of environment plans produced under the draft *Marine Pollution Code*, Woodside prepares Environment Plans (EP) for its Mauritanian operations in accordance with Australian Commonwealth Government regulatory requirements and guidelines.

The overall purpose of an Environment Plan is not only to comply with statutory requirements but also to ensure that seismic acquisition is planned and conducted in line with Woodside corporate environmental policies and Health, Safety and Environment (HSE) Management System.

An environment plan must:

- describe the proposed activity;
- describe the existing environment;
- identify and assess all environmental risks; and
- develop control and mitigation measures to avoid risks and effects or to reduce them to as low as reasonable practicable.



Long-finned pilot whales

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Environmental Management Measures

Woodside’s environmental management of seismic survey operations is aimed at the protection of the marine and coastal environment potentially affected by the operation, and the minimisation of conflicts with other users of the marine environment.

The components of a seismic survey that have the potential to result in significant environmental effects are assessed as being:

- operation of the seismic vessel and towing of the airgun and streamer (hydrophone) array through the survey areas;
- discharge or ‘firing’ of the air-gun arrays;
- routine waste discharges from the survey and supply vessels;
- accidental fuel and oil spills from the survey and support vessels; and
- accidental loss of streamers and associated equipment.

To either eliminate the potential environmental risks and effects of seismic surveys, or to reduce them to as low as reasonably practicable, we have developed several key control and mitigation measures that are implemented during seismic survey programmes.

Marine Fauna

In seismic exploration, low frequency sound pulses generated by high pressure air-guns may affect marine life, particularly marine mammals, which employ extremely acute acoustic sensory systems to monitor their environment, and for underwater communication.

Marine seismic surveys produce intense, short, sharp and regular impulsive signals over periods of weeks to months, that have the potential to cause behavioural changes in some species of whales.



Breaching humpback whale, © Great Barrier Reef Marine Park Authority

Whale Interaction Procedures

Control and mitigation measures have been developed specifically to minimise potential impacts of seismic surveys on migrating whales, other cetaceans and marine fauna.

For the Kiffa 3D MSS the whale interaction procedures will include:

- **pre start-up visual observations**—to check for the presence of whales within 2 km of the survey vessel;
- **start-up delay**—air-gun discharge will not begin unless whales are outside the 2 km zone;
- **‘soft start’ procedures**—a sequential build-up of warning pulses (over a period of 10-20 minutes) will be made at the start of each acquisition line to warn and deter whales from approaching the survey vessel;
- **stop work procedures**—air-gun discharge will cease if whales are seen to approach within 2 km of the survey vessel; and
- **visual observations** (10 minutes per hour) will be carried out during seismic operations (during daylight hours)—see details on the whale sighting programme overleaf.

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Whale Sighting Programme

A specific whale sighting programme will be implemented during the Kiffa 3D MSS, the primary objective of which will be the detection of whales and other cetaceans that are within 2 km of the *Ramform Explorer*. If whales are observed, the whale interaction procedures detailed above will be implemented to remove or minimise any potential impacts from the acoustic source.

A secondary objective of the whale sighting programme is to collect information on the diversity, distribution and behaviour of whales and other cetaceans in Mauritania's offshore waters. Visual observations, for a minimum of 10 minutes per hour, will be conducted during daylight hours. Any sightings of whales and other cetaceans during the surveys will be recorded on the UK JNCC (Joint Nature Conservation Committee) *Marine Mammal Recording Form* sheets.

Seabed (Benthic) Environment

The surveys are unlikely to have any significant effects on benthic communities due to the water depth (50-1,600 m). The *Ramform Explorer* will not be anchoring during the surveys, except in an emergency situation. There is the potential for some limited disturbance of benthic habitats resulting from accidental loss of equipment that could sink to the seabed as debris. Wherever possible, streamers and associated equipment are recovered when lost during survey activities.



Deepwater coral community

Fisheries

The control and mitigation measures to eliminate or minimise potential impacts from the proposed surveys on commercial and artisanal fisheries in the survey areas are:

- use of a support vessel and a chase vessel to warn fishing vessels of approach of the survey vessel, and to remove fishing equipment from acquisition lines;
- increased monitoring for presence of fishing vessels, particularly during night-time;
- presence of a Mauritanian fisheries representative aboard support vessel;
- direct consultation with fishermen at sea;
- consultation with Ministry of Fisheries and Maritime Economy;
- standard maritime safety procedures (radio contact, display of appropriate navigational beacons and lights); and
- recording of all sightings of fishing vessels.



Pirogues launching off a beach in Mauritania

Shipping

The control and mitigation measures to minimise adverse impacts on shipping transiting the Kiffa 3D MSS survey area are:

- Use of a support vessel to warn merchant vessels of navigational hazard presented by survey vessel and towed array; and

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- Standard maritime safety procedures (radio contact with approaching vessels, display of appropriate navigational beacons and lights).

Waste Disposal

Risks to marine environmental resources in the Kiffa 3D MSS survey area and adjacent waters from disposal of wastes are considered to be negligible given that wastes other than routine sewage and foodscrap material will be disposed of onshore.

Sewage and foodscraps disposal will conform to the requirements of the *International Convention for the Prevention of Pollution from Ships 1973*. Foodscraps are to be macerated to a diameter of less than 25 mm prior to discharge into the sea.

All other wastes are stored aboard the survey vessel and returned to shore for appropriate treatment and disposal.

Refueling

Specific control and mitigation measures must be implemented to eliminate or minimise the risk of spills and potential environmental impacts from at sea refuelling. These include:

- refuelling will only take place in locations that minimise risks to sensitive environmental resources (e.g. away from the coastline);
- dry-break couplings for the flexible transfer hoses;
- threshold sea-state and wind conditions above which the operation will not be conducted;
- refuelling will only take place during daylight hours; and
- the exclusion of concurrent refuelling and streamer maintenance operations.

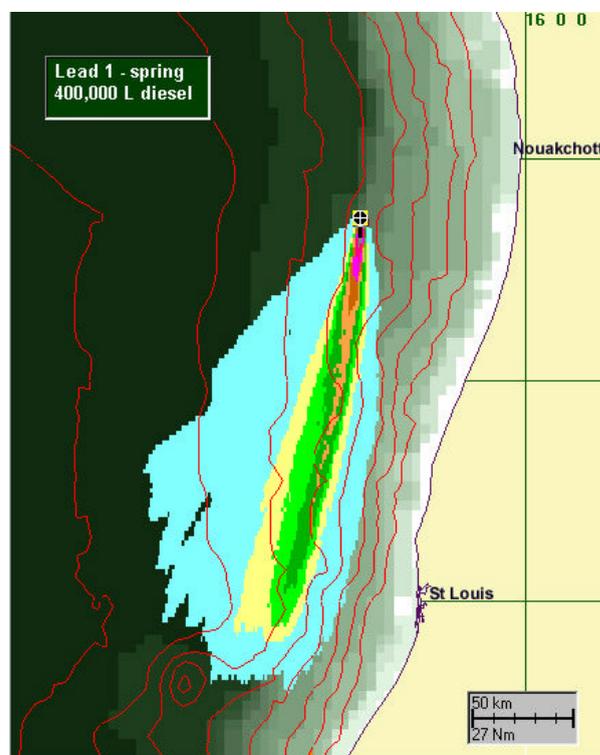
Fuel and Oil Spills

The *Ramform Explorer* has specific fuel spill contingency procedures in the unlikely event of a fuel spill. For any major diesel spills during at sea refuelling operations, Woodside has the capability

to initiate real-time fuel spill fate and trajectory modelling using the OILTRAK and OILMAP computer models.

Any fuel or oil spills will be reported internally and any incidents involving the loss of fuel or oil of greater than 80L will be reported to the Mauritanian Ministry of Mines and Ministry of Fisheries and Maritime Economy by Woodside as soon as possible after the event.

Stocks of absorbent materials aboard the *Ramform Explorer* will be checked for their adequacy and replenished as necessary prior to the commencement of activities within the survey areas.



Fuel spill trajectory modelling for Mauritanian waters

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