



# Drillsearch Energy Limited



## Marina-1 Drilling Summary Environment Plan

AGR Asia Pacific Controlled Document

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# 1 Project Description

Drillsearch Energy is the title holder of permit area WA-318-P which contains the Marina prospect, located on Commonwealth Waters of the Joseph Bonaparte Gulf. Geotechnical evaluation has shown that the Marina prospect contains contingent resources of 235MMbbls, making it a very attractive exploration target. Drillsearch is, therefore, proposing to drill the Marina-1 well to fully appraise the Marina prospect.

The proposed Marina-1 well site is located at latitude 13° 47' 48.46" S and longitude 127° 58' 18.23" E in 65m of water, approximately 190km north of Wyndham and 340km southwest of Darwin (see Figure 1). The well is planned to be drilled using the Premium Drilling operated "Wilcraft" jack-up rig in September 2007. The well is expected to take between 18 – 20 days to drill with a total depth of 2350m.

The Marina-1 well will be drilled by the following methodology:

- Upper Well Sections: Riserless drilling using seawater and prehydrated bentonite sweeps to clean the hole of cuttings; and
- Lower Well Sections: Water Based Mud (WBM) [KCl/PHPA]. The adopted standard industry practices for WBM treatment and management will minimize the amount of WBM discharged to the marine environment.

A check-shot survey will take place once the drilling has finished. No well testing, and hence no flaring, is planned for the Marina-1 well. Regardless of the success of the well, it will be plugged and abandoned (P&A) at the end of the drilling program. In accordance to the requirements detailed in the *Petroleum (Submerged Lands) Act 1967* (as amended) & associated legislation, the P&A program will involve cutting the casing at 5m below the seabed and removal of all infrastructure above this level. No subsea development is planned at the Marina-1 location.

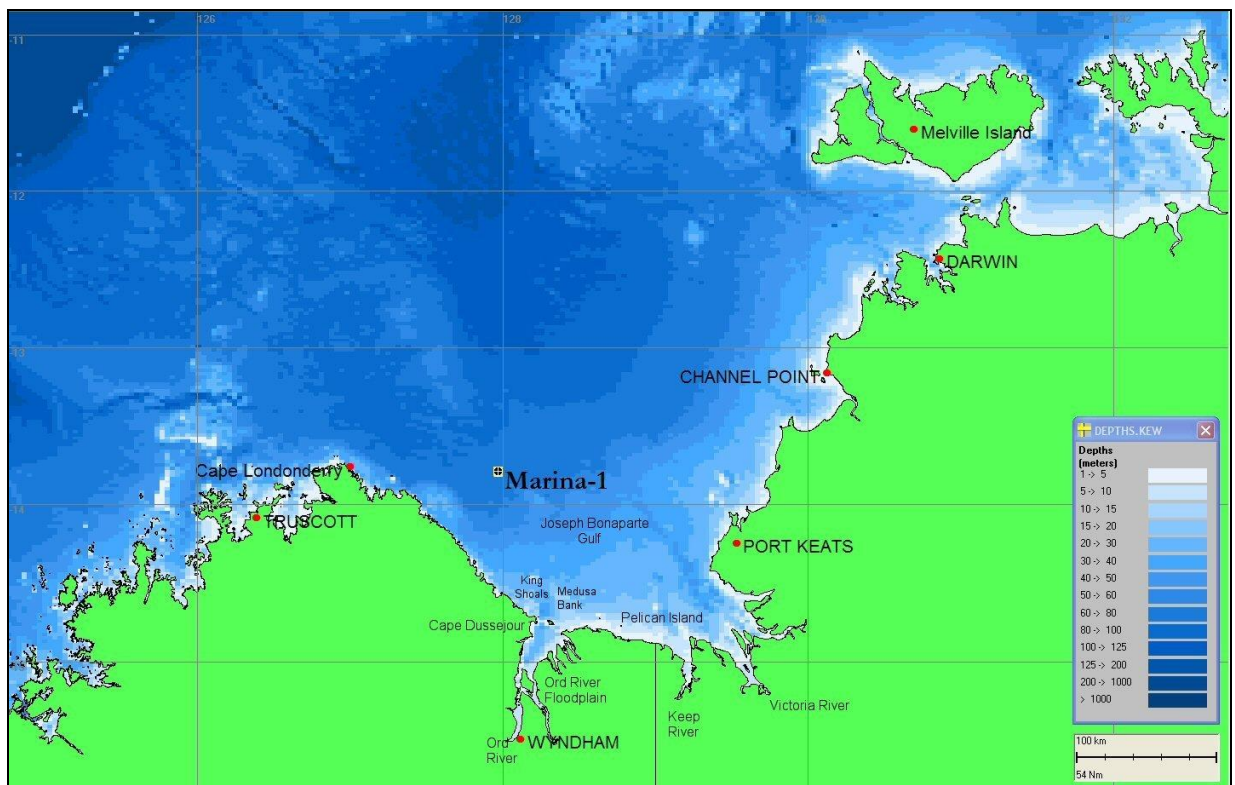


Figure 1 Marina-1 location



## 2 Receiving Environment

The Marina-1 well is located WA-318-P permit area within the shallow water of the Joseph Bonaparte Gulf. There are no areas of natural significance with Conservation Status present in the WA-318-P permit area. The closest sensitive areas located near the Marina-1 well are the Ord River Plain, a RAMSAR wetland approximately 100km south and Pelican Islet, A National Heritage Place approximately 150km southeast.

The climate of the region is tropical with two distinct seasons: the northwest Monsoon, occurring from November to March (southern summer); and the southeast Monsoon, occurring from April to September (southern winter). Winds on the Joseph Bonaparte Gulf are relatively strong (mean 9.6 knots; maximum 35 knots) and vary seasonally. For the Spring/Storm season (September through to November), the winds are weaker but typically from the Northwest direction. Tropical cyclones occur in the area with an average of 2.6 cyclones per year, most commonly between December and April. The gulf is protected from swell generated in the Indian Ocean, therefore swells in the area are limited to those generated by cyclone or prolonged strong winds. Tides in the Joseph Bonaparte Basin are semi-diurnal with two high and low tides per day, propagating in from the Timor Sea, flooding into Gulf toward the coast in a southeast direction and ebbing out of the Gulf towards the northwest.

The WA-318-P permit area covers approximately 3,300km<sup>2</sup> with water depth varying from 40 – 80m. The proposed Marina-1 exploration well is located in 65m of water. Features along the shoreline of Joseph Bonaparte Gulf include extensive mudflats and mangrove systems east of Cape Dommett and rocky sandstone cliffs with small sand/mud embayment west of Cambridge Gulf. The seabed is generally characterised by very soft, grey green, gravely sand clay with no other significant features.

Both resident and migratory fauna, including fish, sharks, seahorses, sea snakes, turtles, and cetaceans may occur in the vicinity of the proposed Marina-1 area. Up to 15 migratory species, including 3 endangered species (Blue Whale, Olive Ridley turtle and Loggerhead turtle) and 6 vulnerable species (Whale Shark, Humpback Whale, Green turtle, Leatherback turtle, Hawksbill turtle and Flatback turtle) may potentially migrate or temporarily forage in the Joseph Bonaparte Gulf waters during certain periods. However, the WA-318-P permit area is not recognized as an aggregation area for the species and there are no threatened ecological communities listed under the EPBC Act in the vicinity of the site.

Migratory bird species such as the Streaked Shearwater (*Calonectris leucomelas* and *Puffinus leucomelas*) may pass through the proposed drilling area to undertake foraging activities. However due to the lack of suitable roosting and breeding habitats or important habitats for these species in WA-318-P permit area, they are not expected to be present for extended periods of time.

A wide range of human activities occurs in Joseph Bonaparte Gulf including fishing, commercial oil and gas fields, shipping as well as recreational pursuits, heritage, research and tourism. However, the proposed Marina-1 exploration well is located well inshore of Timor Sea Shipping routes, approximately 350km east of the main shipping routes between Darwin port and Southeast Asia. Fishing effort in the area is limited, except for the Commonwealth managed Northern Prawn Fishery (NPF) which encompasses an area of 771,000km<sup>2</sup>, extending from the low water mark to the outer edge of the Australian fishing zone (AFZ) in the area between Cape York in Queensland and Cape Londonderry in Western Australia.



### 3 Major Environmental Hazards and Controls

A risk analysis has been undertaken for all aspects of the proposed Marina-1 drilling operations in accordance with the requirements of AS/NZ4360:2004 (Risk Management) and AS14001. The analysis indicates that, with the proposed management/mitigation measures implemented, no significant environmental impacts are expected and the activities carry a low residual environmental risk. Further details of key environmental aspects of the drilling activities are provided in Table 1.

### 4 Summary of Management Approach

Drillsearch Energy, as the operator of the permit area WA-318-P, has engaged AGR Asia Pacific (AGR-AP) as the overall responsible party for the management of Marina-1 drilling operations. AGR-AP has taken a systematic approach in identifying and assessing operational activities (aspects) and their associated environmental risk and establishing objectives, performance standards and criteria to manage and measure environmental performance. AGR-AP has activated its Integrated Management System (IMS) to fulfil the company's environmental policy and objectives and act in an environmentally responsible manner. AGR-AP's IMS is certified to ISO 14001 and provides a framework for the management of environment during both operational and maintenance activities. The IMS applies to all employees, contractors and other third parties.

Table 1 also summarizes the management/mitigation measures for each aspect of the drilling operation.

### 5 Consultation Process

Drillsearch has consulted with regulatory agencies, fishery groups and fishing industry groups in preparation for the Marina-1 drilling operations. Regulatory agencies consulted include the Department of Environment and Water Resources (DEW), Department of Industry and Resources (DoIR) and the Australian Maritime Safety Authority (AMSA).

Over a two month period (May to June 2007), a series of consultations have been held with parties having an interest in the commercial fisheries within the area of proposed Marina-1 location, including Australian Fishery Management Authority (AFMA), Northern Prawn Fishing Industry Organisation, Northern Fishing Companies Association, Western Australian Northern Trawl Owners Association, Commonwealth Fisheries Association, A Raptis and Sons and the Northern Fishing Companies Association. Drillsearch is also committed to continued and regular communications to relevant parties to minimise fishing impacts where possible and ensure the group is informed of any changes to the development strategy which may affect commercial fishing operations.

### 6 Contact Details

Further information associated with the environmental aspects of the Marina-1 Drilling operations may be obtained from Drillsearch Energy by writing to:

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Managing Director  
Level 8, 16 Spring Street  
Sydney NSW 2000



Table 1 Summary of Potential Environmental Impacts from Marina-1 Drilling

Environmental Aspects / Potential Impacts	Environmental Objectives	Mitigation Measures	Risk
Physical Presence of Drilling Infrastructure <ul style="list-style-type: none"> <li>• Possible collision with marine mammals causing injury or death;</li> <li>• Disturbance of marine mammals/fauna (altered behaviour);</li> <li>• Potential changes in fauna cause by lights emitted from the Wilcraft.</li> </ul>	Minimise disruption to marine life	<ul style="list-style-type: none"> <li>• Drilling activities is short duration (18 – 20 days) only;</li> <li>• No nesting or breeding area in the permit location</li> <li>• Environmental induction for crews;</li> <li>• Whale &amp; dolphin sighting reports to be completed and submitted to Department of Environment and Water Resources (DEW);</li> <li>• All mobile vessels will adhere to the 2005 Australian National Guidelines for Whale &amp; Dolphin Watching (DEW, 2005).</li> </ul>	Low
Physical Presence of Drilling Infrastructure <ul style="list-style-type: none"> <li>• Interference with shipping and fishing vessels increasing the risk of collisions;</li> <li>• Restricted access to drilling area, causing disruption to fishing activities.</li> </ul>	Minimise interference with commercial fishing and shipping vessels	<ul style="list-style-type: none"> <li>• A 500m Safety zone around the Wilcraft will be gazetted and will be published on Australia Navigational Charts;</li> <li>• Lighting and continuous radar/radio monitoring while the Wilcraft is on location;</li> <li>• Consultation with fishing industry group undertaken and continuing.</li> <li>• An emergency response/oil spill contingency plan will be specifically established, implemented and tested for the drilling of Marina-1 well.</li> </ul>	Low
Seabed disturbance <ul style="list-style-type: none"> <li>• Disturbance to seafloor resulting in loss of seabed fauna.</li> </ul>	Minimise seabed disturbance	<ul style="list-style-type: none"> <li>• Seabed survey of the area prior to Wilcraft mobilisation to find a location where seabed disturbance can be minimised.</li> </ul>	Low
Discharges of Ballast Water <ul style="list-style-type: none"> <li>• Potential to discharge exotic organisms which may cause ecological disruption;</li> <li>• Potential contamination of ballast tanks with oil.</li> </ul>	Avoid invasion by non-endemic species.	<ul style="list-style-type: none"> <li>• Local ballasting only for the Wilcraft, which will be towed from North West Shelf location;</li> <li>• Documentation of all ballast exchange activities; and</li> <li>• Segregated ballast tanks.</li> </ul>	Low
Discharge of Drilling Fluids/Cuttings <ul style="list-style-type: none"> <li>• Fluid may contain chemicals that are harmful for the environment;</li> <li>• Water turbidity affecting sunlight to phytoplankton;</li> <li>• Smothering of benthic communities on seabed;</li> </ul>	Minimise impact of drilling fluids and cuttings on marine environment.	<ul style="list-style-type: none"> <li>• Marina-1 well will be drilled with Water Based Mud (WBM). No Synthetic Based Mud or Oil Based Mud will be used;</li> <li>• Drilling mud discharges to be minimised through closed drilling system (lower well section);</li> <li>• During the drilling of the lower section, drill cutting will be discharged overboard at sea-level, allowing for cuttings and mud dispersion over a wide area; and</li> <li>• Drilling fluid and additives used are monitored and recorded.</li> </ul>	Low



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Discharge of Food-scraps & Sewage <ul style="list-style-type: none"> <li>• <i>Nutrient enrichment of surrounding water;</i></li> <li>• <i>Chemical impacts.</i></li> </ul>	Avoid negative affects to surrounding water quality.	<ul style="list-style-type: none"> <li>• All foodscraps macerated to less than 25mm;</li> <li>• All sewage treated to reduce BOD loading;</li> <li>• Treatment units inspected on regular basis;</li> <li>• Grey-water directly discharged overboard;</li> <li>• Cleaning agents (detergents) selected are biodegradable.</li> </ul>	Low
Cooling Water <ul style="list-style-type: none"> <li>• <i>Thermal impacts to marine flora/fauna near the discharge point.</i></li> </ul>	Avoid negative affects to surrounding water quality.	<ul style="list-style-type: none"> <li>• Warm cooling water is expected to disperse near the sea surface very rapidly within a few tens of metres from the discharge point.</li> </ul>	Low
Deck Drainage <ul style="list-style-type: none"> <li>• <i>Toxicity impacts to marine flora &amp; fauna;</i></li> <li>• <i>Reduction of water quality.</i></li> </ul>	Avoid negative affects to surrounding water quality.	<ul style="list-style-type: none"> <li>• Chemicals, oils and wastes shall be stored in the designated storage areas where appropriate spill cleanup materials (e.g. absorbents, containers) are maintained in accessible locations;</li> <li>• In the event of a chemical or oil spill, absorbents are used to remove spill material prior to any washing activities;</li> <li>• Absorbent material, used for cleanup, is containerised and sent to shore as hazardous waste;</li> <li>• Bunding (temporary or permanent) is provided for those areas/activities where there is an increased risk of oil/chemical spill (e.g. fuel transfer);</li> <li>• Material Safety Data Sheets are available for all chemicals used on the <i>Wilcraft</i> (which includes spill response requirements);</li> <li>• Chemicals used are assessed for environmental impact prior to purchase (e.g. fully biodegradable detergent); and</li> <li>• Slops water will be discharged via an IMO approved Oil-in-water (OIW) meter as per MARPOL Annex 1.</li> </ul>	Low
Equipment/Machine Space Drainage <ul style="list-style-type: none"> <li>• <i>Toxicity impacts to marine flora &amp; fauna;</i></li> <li>• <i>Reduction of water quality.</i></li> </ul>	Avoid negative affects to surrounding water quality.	<ul style="list-style-type: none"> <li>• Equipment and machine spaces on the <i>Wilcraft</i> are fully contained and have dedicated drains leading to the bilge water system for oily waste products;</li> <li>• Oily residues collected in this system are containerised in transit tanks and returned to shore for disposal.</li> </ul>	Low





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Sewage, greywater and foodscraps <ul style="list-style-type: none"> <li>• <i>Nutrient enrichment of surrounding water;</i></li> <li>• <i>Visual amenity impacts.</i></li> </ul>	Avoid negative affects to surrounding water quality.	<ul style="list-style-type: none"> <li>• Sewage and greywater will be treated in a sewage treatment unit prior to discharge to the marine environment;</li> <li>• Foodscraps are collected and macerated to a particulate size of less than 25mm before being discharged to the marine environment below the water line;</li> <li>• Cleaning agents used in the accommodation block are fully biodegradable;</li> <li>• Inspection of treatment system on regular basis to confirm operability and performance.</li> </ul>	Low
Emissions from Combustion Sources (Includes: Generators, Drill Equipment) <ul style="list-style-type: none"> <li>• <i>Release of Greenhouse Gas Emissions;</i></li> <li>• <i>Aesthetics of smoke &amp; particulates.</i></li> </ul>	Minimise emissions, use energy efficiently and avoid aesthetic impacts of incomplete combustion	<ul style="list-style-type: none"> <li>• Combustion equipment maintained to maximise combustion efficiencies;</li> <li>• Fuel usage rigorously monitored;</li> <li>• All emissions from marine utilities are in accordance with the guidelines in MARPOL Annex 6 Prevention of Air Pollution from Ships.</li> </ul>	Low
Ozone depleting substances <ul style="list-style-type: none"> <li>• <i>Reduces ozone layer increasing humans to UV exposure;</i></li> <li>• <i>Contributes to global warming.</i></li> </ul>	Minimise impacts of emissions of ozone depleting substances	<ul style="list-style-type: none"> <li>• Use of fully trained personnel to maintain and test systems;</li> <li>• ODS Inventory is maintained; and</li> <li>• Routine inspection on these systems for integrity issues and records of ODS replacement are kept in accordance with MARPOL Annex VI requirements.</li> </ul>	Low
Generation of Noise <ul style="list-style-type: none"> <li>• <i>Potential impacts to marine mammals.</i></li> </ul>	Avoid or minimise negative effects of noise on sensitive species	<ul style="list-style-type: none"> <li>• All mobile vessels will adhere to the 2005 Australian National Guidelines for Whale &amp; Dolphin Watching;</li> <li>• Cetacean sighting data will be collected during Marina-1 drilling campaign and will be forwarded to DEW.</li> <li>• Soft start procedure will be used for check-shot survey;</li> <li>• Cessation of check-shot survey if marine mammals and turtles are sighted.</li> </ul>	Low
Storage & Disposal of Environmentally Hazardous and General Wastes <ul style="list-style-type: none"> <li>• <i>Potentially harmful/toxic discharges to marine environment;</i></li> <li>• <i>Potential turbidity and BOD reduction if discharged.</i></li> </ul>	Avoid negative effects of marine water quality.  Minimise wastes	<ul style="list-style-type: none"> <li>• Clear waste identification, segregation, containment (in skips or sealed drums) and labelling;</li> <li>• Storage of waste in dedicated 'contained' (&amp; covered) areas which are routinely inspected;</li> <li>• Training and reinforcement to all drilling <i>Wilcraft</i> (&amp; other) personnel of waste management requirements; and</li> <li>• Documented Disposal Records.</li> </ul>	Low



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Environmental Aspects / Potential Impacts	Environmental Objectives	Mitigation Measures	Risk
<p>Loss of Well Fluids (Blowout)</p> <ul style="list-style-type: none"> <li>• <i>Impacts to surrounding water quality and marine flora/fauna;</i></li> <li>• <i>Disruption to fishing activities.</i></li> </ul>	<p>Avoid negative effect on surrounding water quality</p>	<ul style="list-style-type: none"> <li>• Well locations are surveyed and assessed for potential shallow occurrences of hydrocarbon prior to drilling;</li> <li>• The composition of the drilling fluids is constantly monitored to ensure sufficient density to control subsurface pressures;</li> <li>• Blow-out Preventers (BOP) and related well control equipment are installed, operated, maintained and tested in accordance with manufacturer's recommendations as per P(SL)A Directions 505 &amp; 506;</li> <li>• The well is designed and constructed in accordance with regulated international standard.</li> </ul>	<p>Low</p>
<p>Diesel spillage - Rupture of fuel tank</p> <ul style="list-style-type: none"> <li>• <i>Impacts on water quality and marine lives;</i></li> <li>• <i>Shoreline Pollution (very low probability);</i></li> <li>• <i>Disruption to fishing activities.</i></li> </ul>	<p>Avoid negative effect on surrounding water quality</p>	<ul style="list-style-type: none"> <li>• A 500 m safety exclusion zone around the <i>Wilcraft</i> drilling rig will be declared;</li> <li>• Navigational aids on the <i>Wilcraft</i> and supply vessels including lighting and radars to avoid collisions.</li> </ul>	<p>Low</p>
<p>Oil Spill during Fuel Transfer</p> <ul style="list-style-type: none"> <li>• <i>Oiling of Seabirds;</i></li> <li>• <i>Disruption to fishing activities.</i></li> </ul>	<p>Avoid negative impacts on surrounding water quality</p>	<ul style="list-style-type: none"> <li>• Fuel transfers in accordance with Bunkering Procedures with equipment routinely maintained and inspected;</li> <li>• Monitoring fuel level in tank and flow rates;</li> <li>• Hose couplings used are dry-break;</li> <li>• Suitable absorbent material is held on the attendant vessels and MODU to cleanup small diesel spills;</li> <li>• Good communication established between bunkering vessel and <i>Wilcraft</i>.</li> </ul>	<p>Low</p>
<p>Chemicals spills</p> <ul style="list-style-type: none"> <li>• <i>Impact on water quality and marine lives.</i></li> </ul>	<p>Avoid negative impacts on surrounding water quality</p>	<ul style="list-style-type: none"> <li>• Handling of Hazardous Substances Procedure;</li> <li>• Chemical storage and handling area is bunded;</li> <li>• Competent personnel and training provided for those handling chemicals;</li> <li>• MSDSs to be made available for all chemicals; and</li> <li>• Spill kits to be provided in appropriate locations.</li> </ul>	<p>Low</p>