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1 EXECUTIVE SUMMARY

1.1 The Proponent

Hawkestone Oil Pty Ltd (Hawkestone) is the main proponent for the Songa Venus Hawkestone Oil Drilling Operations in WA-333-P and WA-342-P on behalf of the Braveheart Joint Venture and Cornea-3 Joint Venture. ADA is a well engineering and project management company, conducting the drilling operations on behalf of Hawkestone.

1.2 The Proposal

Hawkestone Oil Pty Ltd (Hawkestone Oil) proposes to undertake exploration and appraisal drilling of two wells; Braveheart-1 and Cornea-3, in Commonwealth waters of the Browse Basin, off the northwest coast of Western Australia. Braveheart-1 is located in petroleum Permit WA-333-P and Cornea-3 is located in petroleum Permit WA-342-P of which Hawkestone Oil is the appointed operator on behalf of the Braveheart Joint Venture and Cornea-3 Joint Venture for each well respectively.

The operations will utilise the Songa Venus semi-submersible MODU, which has a NOPSA approved Vessel Safety Case (VSC) dated 10th July 2005, to drill two wells; Braveheart-1 and Cornea-3, in the Permit areas WA-333-P and WA-342-P respectively (Figure 1). Hawkestone Oil's operations are expected to begin in December 2009 when the Songa Venus will be towed from its current location in the Bonaparte Basin to Hawkestone Oil's first well location, Cornea-3, in WA-342-P by two anchor handling supply vessels (AHSV). The drilling operations are expected to last for a total of approximately 30 days. Coordinates of the well location and permit area are listed in Table 1 below. Drilling will occur 24 hours per day.

Two Anchor Handling Supply Vessels (AHSV) will service the rig with approximately 30 support vessel trips per month during the drilling program. Both vessels will return to port (Port of Darwin) for refuelling. There will be helicopter support to the drill rig from Broome with alternate helicopter base in Truscott and Lombadina.

At the Cornea-3 location, a vertical well will be drilled to an approximate depth of 877 metres. The prime objective of this well is to determine if any hydrocarbons are present in the mapped structure and to obtain information that will provide the basis for further evaluation and exploration. The well will be drilled primarily using a combination of water based mud and seawater. Overall, approximately 115 m³ of drill cuttings will be discharged overboard. No production testing will be undertaken at Cornea-3. The well will be permanently plugged and abandoned when all data gathering is complete.

At the Braveheart-1 location, the well will be drilled vertically to an approximate depth of 1940 metres. The prime objective of the well is to confirm the presence of hydrocarbon in the target formations and to gather data to enable the volume of any oil and gas present to be calculated. The well will be drilled primarily using a combination of water based mud and seawater. Overall, approximately 131 m³ of drill cuttings will be discharged overboard. Production testing of Braveheart-1 will not be undertaken. On completion of data gathering from the well, it is expected that the well will be permanently plugged and abandoned and the wellhead will be removed so that no part of the well is left protruding above the seabed.

The Environment Plan and the supporting Oil Spill Contingency Plan were approved by the Western Australia Department of Mines and Petroleum (DMP) on 27 November 2009. The Commonwealth

1.3 Description of the Environment

Physical Environment

The climate within the vicinity of the proposed well locations is characterised as arid sub-tropical. There are two distinct seasons in the area, summer (September to March) and winter (May to July). Summers are hot and humid, with winds mainly from the south west, and occasional heavy rainfall events associated with tropical cyclones – which occur on average twice a year between January and March.

Cyclone season in the project area occurs between the months of November through to May, however, most frequent between January and March. Tropical cyclones form in the area generally south of the equator in the eastern Indian Ocean area, and in the Timor and Arafura Seas. Permit area WA-333-P is frequented by cyclones. On average, 2.3 storms per year pass within 300 nm radius of the permit area.

The Braveheart-1 and Cornea-3 well site locations are characterised by a relatively featureless slightly sandy clay seabed with water depths of approximately 114 m and 81 m respectively at each site.

Biological Environment

The Browse Basin resides entirely offshore north of Broome and covers approximately 140,000 km². The basin contains up to 15 kilometres of Phanerozoic, marine and fluvial, siliciclastic and carbonate sediments (GA, 2009).

Benthic infauna is likely to be present in the project area. It is likely that sea stars, worms and crustaceans will also be present. Substrate composition, water depth, temperature and season all effect the spatial distribution of these species.

Five species of marine turtle may occur within the project region. These are the green turtle (*Chelonia mydas*), flatback turtle (*Natator depressus*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*) and the leatherback turtle (*Dermochelys coriacia*). All species, but the leatherback turtle, are on the National List of Threatened Species. The green, flatback and hawksbill turtles exhibit a summer nesting period on deep sandy beaches (Pendoley, 2005). The operation locations do not contain any emergent land or shallow reef in which the turtles usually breed and reside in. The nearest habitat would be the Browse Island where turtle nesting is common. The likelihood of encountering significant numbers of turtles at the project location is significantly low.

Whales and dolphins are common to the Western Australian coast. However, the project area resides in offshore waters where there is low potential for interaction between the proposed operations and whales. Particularly due to the short period required for the operations; 18 days at the Braveheart-1 location and 15 days at the Cornea-3 location, and the stationary nature of the activity. The operations are planned to be undertaken in November 2009, which is entering the migratory periods for the blue whale and humpback whale, where the whales will be heading south or sighted in southern Australian waters.

There are no World Heritage locations within the project area based on a search using the Department of Environment, Water, Heritage and the Arts EPC Act Protected Matters Search Tool (DEWHA 2009).

There are no National Heritage locations within the project area based on a search using the Department of Environment, Water, Heritage and the Arts EPC Act Protected Matters Search Tool (DEWHA 2009).

Socio-economic Environment

The Browse Basin is a proven petroleum province. The main activities in the project area include:

- Recreational fishing and tourism;
- Petroleum exploration and production;
- Commercial shipping; and
- Commercial fishing.

1.4 Stakeholder Consultation

In the course of planning the proposed drilling program, Hawkstone and ADA has to date, undertaken consultation with relevant stakeholders in the region to identify regulatory processes, potential environmental issues and management requirements. Ongoing consultation with these groups will continue up to and during the drilling program.

Stakeholders associated with the program that have been consulted are listed in **Table 2**.

Table 2 Stakeholder consultation

Stakeholder	Contact	Date	Matters Discussed
DMP	Chris Zadow Chris.zadow@DMP.wa.gov.au Ph: (08) 9222 3658	Ongoing	EP requirements.
	Zoe Jones Zoe.jones@DMP.wa.gov.au Ph: (08) 9222 3658	Ongoing	EP requirements.
WA Department of Fisheries	Rob Tregonning Rob.tregonning@fish.wa.gov.au (08) 9482 7375	07/10/09	Advice on locations and fisher groups. Advised to contact: Western Skipjack Tuna Fishery, Western Tuna & Bilfish Fishery & North West Slope Trawl Fishery.
WAFIC – Western Australia Fishing Council	wafic@wafic.org.au (08) 9492 8888	07/10/09	Advice on locations and fisher groups. No further action required.
AFMA	Daniel Quinn (02) 6225 5555 Daniel.quinn@afma.gov.au	07/10/09	Advice on locations and fisher groups contact. Historical AFMA logbook data for 2007 and 2008 indicate that no vessels reported operating in the proposed area of the wells. No further action required.
AMSA	Mark Roberts cme@amsa.gov.au (02) 6279 5000.	07/10/09	Shipping routes. No further action required.

Western Skipjack Tuna Fishery	Yvonne Zunic yvonne.zunic@afma.gov.au	13/10/09	Operations information. No further action required.
Western Tuna & Bilfish Fishery	Yvonne Zunic yvonne.zunic@afma.gov.au	13/10/09	Operations information. No further action required.
West Slope Trawl Fishery	Melissa Brown melissa.brown@afma.gov.au	13/10/09	Operations information. No further action required.

1.5 Environmental Impact Assessment, Management and Mitigation

The main environmental hazards associated with the drilling program include:

- Presence of drill rig and support vessels;
- Well equipment remaining on seabed after drilling (rig to be removed from location at end of drilling);
- Drilling operations (i.e., lost equipment);
- Discharge of sewerage and putrescible wastes, deck drainage oily wastes;
- Management of solid and hazardous materials and waste;
- Ballast water discharge and hull cleaning (if required);
- Deck drainage discharge from drill rig and vessels; and
- Accidental spills.

The Environment Plan provides a detailed assessment of potential impacts. The key points of the assessment, and management and mitigation measures are summarised in **Table 3** below. The summary risk ranking is also shown in **Table 3**; there are a total of 18 potential environmental risks, all of which have been assessed as having low risk.

Table 3 Summary of environmental impact assessment results

Impact Assessment	Management and Mitigation	Risk Ranking
<p>Presence of drilling rig and support vessels: rig positioning and anchoring. Disturbance to seabed habitat</p>	<ul style="list-style-type: none"> • Pre-mobilisation survey of drill locations • Adherence to anchoring procedures to minimise chain and anchor drag. 	<p>Low</p>
<p>Presence of drilling rig and support vessels: interference with other activities. Interference with commercial fishing and shipping, cumulative affects of offshore oil and gas activities and risk of collision with other vessels leading to oil spills.</p>	<ul style="list-style-type: none"> • Implementation of measures discussed in consultation with commercial fisheries. • Liaison and communication with commercial fishing operators regarding schedules and work plans during the drilling program. • Offshore distance will reduce the extent of inconvenience. • All support vessel operations will be conducted in compliance with the AMSA OSV Code (e.g., radar monitoring, vessel communications). • 500m safety zone to protect rig infrastructure. • Navigation light present on Songa Venus. • Continuous support vessel surveillance. • Commercial shipping lanes through the WA-406-P permit area managed by liaison with AMSA. 	<p>Low</p>
<p>Presence of drilling rig and support vessels: artificial lighting. Attraction of seabirds and other marine life and the safety need to other vessels visibility at night.</p>	<ul style="list-style-type: none"> • Standard maritime safety procedures will be adopted (AMSA). Lighting selected to meet safety requirements. • Minimise unnecessary lights directed downwards toward water. • Crew to record observations of whales and other megafauna. These will be provided to DEWHA. 	<p>Low</p>
<p>Presence of drilling infrastructure and support vessels: impact to visual amenity. Visual impact in nearshore areas</p>	<ul style="list-style-type: none"> • Proposed operation is of short duration. • Distance from shoreline is 100 km away. 	<p>Low</p>
<p>Presence of drilling rig and support vessels: Noise from VSP survey. Behavioural changes to marine mammals.</p>	<ul style="list-style-type: none"> • Application of DEWHA VSP guidelines: <ul style="list-style-type: none"> – Pre-start up visual observations. – Soft-start up procedures. – Operating procedures including: <ol style="list-style-type: none"> i. Visual observations of the <i>observation zone</i> must be maintained continuously to identify if there are any whales present. ii. If a whale is sighted within the <i>observation zone</i> the operator of the acoustic source must be placed on stand-by to power down the acoustic source. iii. If a whale is sighted within the <i>shut down zone</i> the acoustic source must be shut down completely. 	<p>Low</p>

	<ul style="list-style-type: none"> - Low visibility operating procedures. - Observation zone: A 3 kilometre horizontal radius from the VSP acoustic source <p>Shut down zone: A 500 metre horizontal radius from the VSP acoustic source</p>	
<p>Presence of drilling rig and support vessels: noise from drill rig, drilling vessels and support vessels, helicopters. Behavioural changes to marine mammals.</p>	<ul style="list-style-type: none"> • Application of DEWHA guidelines for cetacean observation and recording on rig and support vessels. • Program will be undertaken on the outskirts of the calving period and at the beginning of the migratory, periods for whale species that are likely to occur in the region. • Program of short duration (approximately 30 days). • Noise produced from the drilling rig (low-level, low-frequency tones), and accompanying support vessels in the order of magnitude of noise produced by commercial shipping. • Adoption of encroachment distances from whales by service vessels (300 m) and helicopters (500 m) (Australian National Guidelines for Whale and Dolphin Watching 2005). 	<p>Low</p>
<p>Drilling discharges: discharge of water based drilling cuttings and muds to sea. Disturbance to water column and benthic communities in immediate area of discharge.</p>	<ul style="list-style-type: none"> • Drill cuttings are treated on the shale shaker and by centrifuges prior to disposal to maximise recovery and reuse of drill muds. • WBM is low toxicity and rapidly disperses • Drilling mud spills will be prevented by containment on the main deck and mud handling area. 	<p>Low</p>
<p>Drilling operations: lost equipment and well completion Disruption to commercial fishing operations.</p>	<ul style="list-style-type: none"> • Equipment retrieval at end of drilling campaign. • ROV recovery where required and if feasible. 	<p>Low</p>
<p>Discharge of sewerage and putrescible wastes, deck drainage, oily wastes: Waste discharge to sea. Disturbance to marine environment.</p>	<ul style="list-style-type: none"> • Solid waste discharges to sea will be limited to food scraps and sewage. • Sewage will be treated through an on-board effluent treatment plant prior to being discharged to sea in accordance with MARPOL regulations (Annex IV). • Macerated to less than 25 mm diameter prior to disposal 	<p>Low</p>
<p>Discharge of solid and hazardous materials and waste: Waste discharge to sea. Disturbance to marine environment.</p>	<ul style="list-style-type: none"> • All vessels will comply with State and Commonwealth legislation for the control of pollution and dumping at sea. • Solids will be returned to shore for disposal. • All hazardous materials will be stored in appropriately banded areas. • Wastes will be segregated as required and stored in storage areas and transferred to onshore licensed materials handlers for disposal to a licensed depot. • Waste register will be maintained to record waste management practices and audited to verify compliance. • Records kept of unplanned emissions and discharges. • Induction training will be provided for waste management. • A maintenance program shall be in place for waste management equipment. 	<p>Low</p>

<p>Freight transfer: Introduction of pests such as vermin.</p>	<ul style="list-style-type: none"> Freight transfers from the shore to the rig will be managed by inspection at the shore base. Equipment arriving packaged to the shore base will be unpacked and loaded onto the supply vessel prior to loading onto the rig. 	<p>Low</p>
<p>Ballast water discharge and hull cleaning: Introduction of marine pests. Introduction of marine species.</p>	<ul style="list-style-type: none"> Ballast water will be exchanged as per vessel procedures, if required. Rig to comply with Australian Ballast Water Management Requirements by AQIS and the Commonwealth National Biofouling Management Guidance for the Petroleum Production and Exploration Industry. Vessel to comply with the Australian Ballast Water Management Requirements (AQIS). Vessel masters will be made aware of the AQIS Maritime Awareness Kit. 	<p>Low</p>
<p>Deck drainage discharge from drill rig and vessels: waste discharge to sea. Disturbance to marine environment.</p>	<ul style="list-style-type: none"> In the event of a chemical or oil spill, absorbent materials will be used to remove spill material prior to any washing activities. The absorbent material will be containerised and sent to shore as hazardous waste to ensure that no contaminated waste streams are routinely discharged from the deck drainage system. MSDS forms available for all hazardous chemicals Use of oil detection monitoring equipment (OMD-2005 scattered light sensor) for treated oily water, which is maintained under the routine maintenance system in place. Deck treatment systems (separators) for oily wastes and discharge of separated water. 	<p>Low</p>
<p>Accidental spill: fuel spill, condensate spill. Disturbance to marine environment.</p>	<ul style="list-style-type: none"> Ensure that the vessel has an Oil Spill Contingency Plan (OSCP) in place and staff appropriately trained in its execution. Ensure that all necessary fuel spill equipment is functional and accessible on the vessel. Ensure that fuel will not be transferred during inappropriate weather conditions. Ensure that equipment and procedures used for transferring fuel from vessel to rig (e.g., 'Dry-Break' hose couplings), conform to the AMSA Code for the safe working of support vessels. Supply vessels will cease operating and seek safe harbour (or deep water) where conditions make it unsafe, in the view of the Vessel Master. Ensure that all vessel operations are conducted in compliance with the AMSA OSV Code (e.g., radar monitoring, vessel communications). Spill modelling undertaken to enable oil spill contingency planning. Ensure that all personnel are aware of the existence and location of the above-listed documents. 	<p>Low</p>
<p>Accidental spill: Chemical spill. Impacts to water quality and marine life. Impacts to water quality and marine life.</p>	<ul style="list-style-type: none"> Minimisation of chemical usage and generation of waste. Education in waste handling procedures during transfer and operational usage for relevant personnel. 	<p>Low</p>
<p>Accidental spills: Blow out, uncontrolled release of reservoir fluids. Impacts to marine fauna.</p>	<ul style="list-style-type: none"> Shallow gas study to understand risk of intersecting hydrocarbon bearing zone while drilling before BOPs are installed. Offset well review to understand likelihood of intersecting over-pressured strata. 	<p>Low</p>

	<ul style="list-style-type: none"> • Maintenance of all well control equipment including routine maintenance of choke and kill line hoses and other fittings to the BOP, and other well control equipment. • Installation of blowout preventers. • Routine monitoring of pressure within the drilling fluid system. • Oils spill and emergency response plan. 	
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Management and mitigation measures to manage the drilling operations which will be monitored during the project are provided in the Environment Plan. In line with the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999, the implementation strategy for the Environment Plan specifically details the measures needed to ensure that the environmental performance objectives and standards are met, and identifies:

- Systems, practices and procedures;
- Specific roles and responsibilities;
- Employee training
- Monitoring, auditing and recording requirements;
- Emergency response planning; and;
- Consultation with government and stakeholders;

1.6 Contact Details

Please direct all queries, comments or request for a copy of the approved ADA Songa Venus Hawkestone Drilling Operations Environment Plan to:

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