

Santos

Burnside-1 ENVIRONMENT PLAN - SUMMARY

WA-281-P

OA-5000-A02- F028

DATE	REV	REASON FOR ISSUE	AUTHOR	CHECKED	APPROVED
21/05/09	A	Summary of Approved Environment Plan	J. Cordeiro	P. Jernakoff	



INTRODUCTION

This summary of the Burnside-1 Environment Plan (Document Reference OA 5000-A02-F028) has been prepared by Santos Ltd (Santos). It presents a summary of the aforementioned plan in accordance with requirements of the Commonwealth Petroleum (Submerged Lands) (Management of Environment) Regulations 1999.

Santos proposed to drill one exploration well, Burnside-1 (B1), in Petroleum Exploration Permit WA-287-P. WA-281-P is located in Commonwealth waters in the Greater Ichthys Field, Browse Basin, off the northern coast of Western Australia. It is approximately 45 km north west of Browse Island, 58 km north east of North Scott Reef and 420 km north of Broome (see attached map).

The well drilling is scheduled to commence in June 2009 and be completed during August 2009. Further information, including the well schematics, will be submitted to the Western Australian (WA) Department Mines and Petroleum (DMP) in the Drilling Program.

BACKGROUND

The drilling activities are typical, in terms of technical methods and procedures, of standard exploration and development campaigns conducted in Australian marine waters. No unique or unusual equipment or operations are proposed.

The wells will be drilled by the MODU *Songa Mercur*, an anchored semi-submersible floating rig operated by Songa Offshore ASA (Songa Offshore). The wells will be drilled in a water depth of approximately 200 m. Total depths of approximately 4,775 m below Rotary Table (mRT) (details provided in Table 1). The top section of the well will be drilled using seawater with prehydrated gel (PHG) 'sweeps' to flush cuttings from the hole. The cuttings and drilling fluids will be discharged at seabed level in an open system. After drilling the upper sections, steel casings will be cemented into place within the hole. After the casing has been set in place, a blowout preventer and marine riser will be installed over the well. The installation of the riser, connected to the drilling rig via a flexible joint, allows for the capture and recirculation of drilling fluids from the well bore back to the rig (closed system), during the subsequent drilling of lower hole sections. The lower sections will be drilled using synthetic based muds (SBMs). The SBMs will be separated and recovered from the cuttings using industry standard separation technology, to minimise the amount of any SBM entering the environment during disposal of the cuttings. *Songa Mercur* uses a combination of shale shakers and other screening and centrifuge gear to recover the SBM and dry the drill cuttings. The dried drill cuttings and the WBM will be discharged to the sea after use. The used SBM will be disposed of onshore in an appropriate manner.

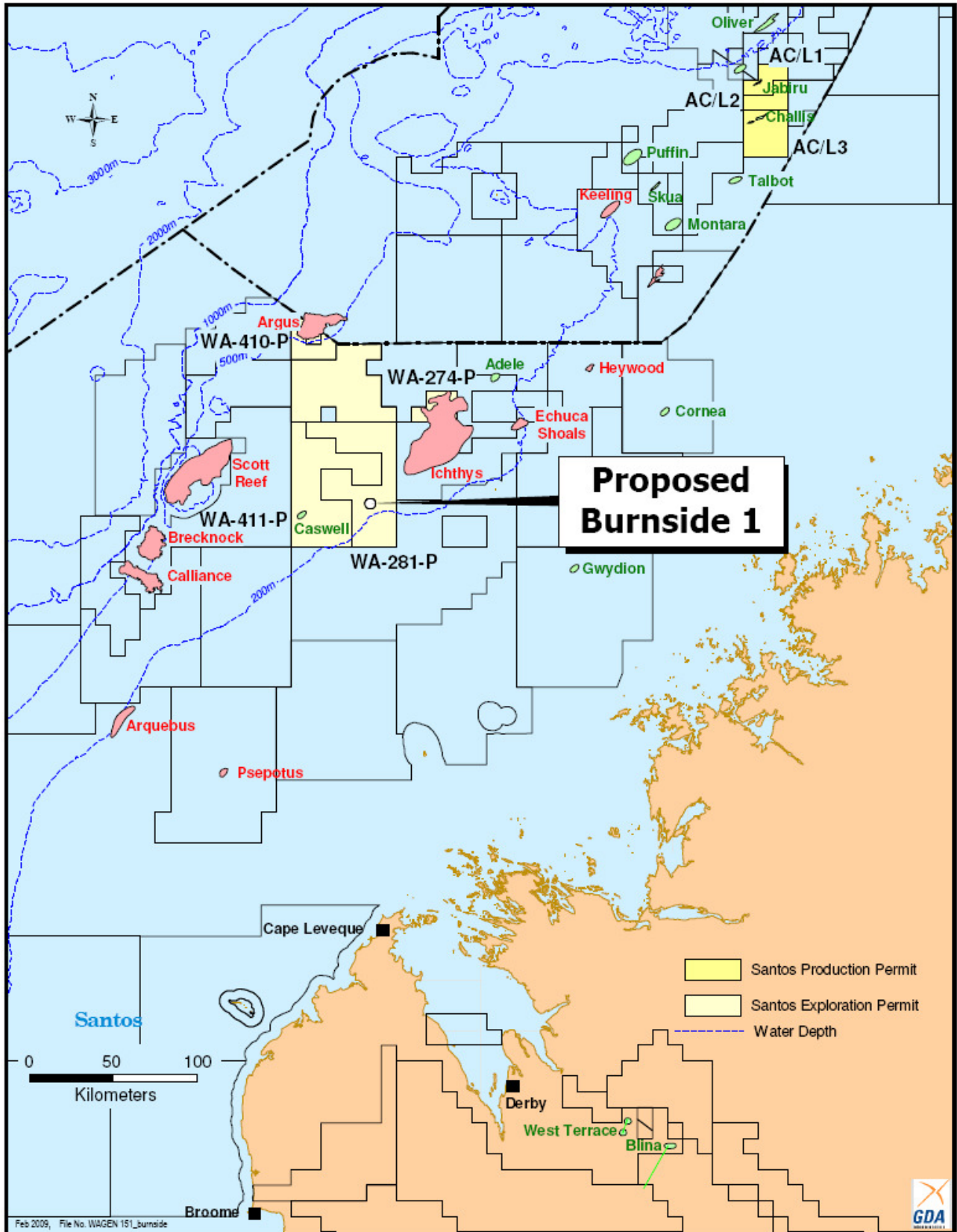
At the completion of drilling Burnside-1, the well will be decommissioned (plugged and abandoned as per *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGSA) requirements). This includes cementing the well bore and well casing removal to a depth of five metres below the seabed. Subsea equipment installed during the drilling operation will be removed.

Table 1: Key Details for Burnside-1

Aspect		Burnside-1
Well Location (Lat / Long)		14° 12' 47.36" S 122° 53' 38.38" E
Permit Area		WA-281-P
Well Type		Exploration
Rig Type		Semi-submersible
Rig Name		<i>Songa Mercur</i>
Contractor Name		Songa Offshore
Anticipated commencement date		June 2009
Well Duration		60
Well testing		No
Total depth of drill*		4,775 mRT MD
Drilling Fluids	36" & 26" holes	Sea water / pre-hydrated gel sweeps
	17.5" hole	Sea water / gel polymer
	12.25" & 8.5" holes	Rheosyn LAO base SBM (Syn-drill)
Drill Fluid Volumes Total		10,000 bbls Total Volume of Water Base Mud 5,500 bbls Total Volume of SBM 1,500 Total Volume of KCl Brine
Drill Fluid Disposal Method		WBM discharged from rig, SBM disposed of in appropriate manner
Drilling Cutting Volume	Total	723 m ³
Drilling Cutting Disposal Method	36", 26", 17.5" & 14.75" holes	Directly to sea floor
	12.25", 8.5" hole	Discharged from rig
Fuel Volumes	Total Fuel	Approx. 2,000 m ³ + 250m ³
	Tanks	Capacity 950 m ³
Other likely chemicals associated with drilling		Bentonite, barite, corrosion inhibitors, viscosity and weighting chemicals, pipe dope, lubricating oils, cleaning and cooling chemicals
Personnel on board		120 persons max
Method of crew change		Helicopter
Port used for refueling (if required)		Broome

* mRT - metres below rotary table.

Burnside-1 Well Location Map



BIOLOGICAL ENVIRONMENT

A desktop assessment of the environmental characteristics and sensitivities has been completed for this drilling programme. The key attributes are summarised below.

Ecological Environment

Given the depth of water (200 m) and sedimentary seabed, few significant benthic resources are expected to be located across the permit area. The depth of water limits the occurrence of algae, seagrasses, corals and some fish and reptile species.

Marine Fauna

Fauna of national significance that may be encountered within the Ichthys Campaign project are have been identified based on a search of the DEWHA EPBC Online Database (DEWHA, 2009). Complete details of the search results are contained in the Burnside-1 Environment Plan, copies of which can be obtained from Santos.

Locations of Ecological Significance

There are no marine parks, reserves, reef structures or landfalls (typically associated with high marine productivity), bird or turtle nesting sites, or other known areas of biological significance in the vicinity of WA-281-P.

Scott Reef (North Reef), located approximately 110km to the west of the B1 well is a Class 'C' Nature Reserve for the protection of major nesting sites of the Green Turtle. Browse Island, located approximately 70km to the east of B1 is also a Class 'C' Nature Reserve and is a major nesting site of the Green Turtle. Adele Island, currently freehold Commonwealth land, is recognised as a major seabird rookery.

In relation to the permit area, all recognised conservation areas are considered to be sufficiently distant from the proposed activities, such that they will not be impacted by the drilling activities.

Commercial Fisheries

The region supports a valuable and diverse fishing industry, with the marine and coastal habitats being significant at all life stages for commercial species in the North West Kimberley. Significant commercial fisheries are currently operating in the offshore waters of the Browse Basin, however, fishing effort is low and operators tend to concentrate their efforts in inshore areas. The fisheries of the area include the Northern Demersal Scalefish Managed Fishery, the Northern Shark Fisheries, the Wetline Fishing and, the Western Tuna and Billfish Fishery.

Traditional Fishing

Limited Indonesian fishing activities using traditional methods and sail-powered vessels are permitted in areas authorised under a Memorandum of Understanding between the Australian and Indonesian Governments.

Petroleum Development

More than 15 permits for petroleum exploration are currently held in the Basin. Currently the Basin contains no producing fields, but the area is considered prospective and is subject to regular drilling programs by a number of operators. Extensive exploration activities are planned for the region, with some seismic and drilling activities already in place.

ENVIRONMENTAL HAZARDS, CONTROL AND MANAGEMENT APPROACH

The proposed drilling activities will be conducted in accordance with the Santos Environmental Policy and the Santos Environment, Health and Safety Management System; the latter being based on international standards and industry best practice.

Potential Environmental Hazards

The key environmental hazards and consequences associated with B1 are summarised in the table below.

Potential Consequences (Effects)		Management Measures
Noise Emission	1a Disturbance to cetaceans	<ul style="list-style-type: none"> Ensuring the MODU has adequate whale identification material and holds a pre-start up cetacean awareness meeting for all of its crew.
	1b Disturbance to turtles	<ul style="list-style-type: none"> The rig start-up procedures and crew awareness for cetaceans will help minimise disturbance to turtles.
	1c Disturbance to fish	<ul style="list-style-type: none"> Follow normal start-up procedures for the drilling of B1.
Physical presence of rig	2a Localised disturbance to seabed from rig anchoring	<ul style="list-style-type: none"> The use of a semi-submersible rig reduces seafloor impact. Adherence to anchoring procedures to minimise anchor and chain drag.
	2b Interference with fishing, shipping and recreational operators	<ul style="list-style-type: none"> Commercial fishing groups shall be advised of the location and schedule of B1. Contractors shall remain vigilant for commercial fishing vessels during the operation and establish communications to avoid conflict. A record of consultation with commercial fisheries groups shall be kept and made available to regulatory authorities upon request. AMSA will be formally contacted prior to rig mobilisation. Standard maritime safety procedures shall be adopted.
	2c Light emissions during operations	<ul style="list-style-type: none"> Standard maritime safety procedures shall be adopted (eg AMSA). Lighting selected to meet safety requirements.
Drilling cutting and fluid discharges	3a Increased turbidity	<ul style="list-style-type: none"> SBMs will be recycled and retained for disposal on shore. Drill fluids to be recycled within the drill system as practicable. Cuttings and associated drill fluids (muds) shall be treated to achieve solids separation and meet statutory requirement for discharge (SBM).
	3b Burial/smothering of benthic communities	<ul style="list-style-type: none"> SBMs will be recycled and retained for disposal on shore. Low toxicity WBMs will be used for drilling. Drill fluids to be recycled within the drill system as practicable. Cuttings and associated drill fluids (muds) shall be treated to achieve solids separation and meet statutory requirement for discharge (SBM).

Potential Consequences (Effects)		Management Measures
	3c Toxicity and bioaccumulation to marine organisms	<ul style="list-style-type: none"> ▪ SBMs will be recycled and retained for disposal on shore. ▪ Low toxicity WBMs will be used for drilling the upper sections of the well. ▪ Drill fluids to be recycled within the drill system as practicable. ▪ Cuttings and associated drill fluids (muds) shall be treated to achieve solids separation and meet statutory requirement for discharge (SBM).
Other waste discharges	4a Changes to water quality	<ul style="list-style-type: none"> ▪ All waste management shall comply with the <i>OPGGSA</i>, appropriate hazardous waste legislation and local government disposal guidelines. <p><i>Putrescible Wastes</i></p> <ul style="list-style-type: none"> ▪ Waste discharges shall be limited to food scraps and sewage. ▪ Sewage and food scrap disposal will conform to the requirement of MARPOL 73/78 Annex IV (ie macerated to less than 25 mm diameter prior to disposal). ▪ No sewage or putrescible waste will be discharged within 12 nm of any land. ▪ Sewage shall be macerated to a small particle size and is treated to neutralise bacteria. <p><i>Solid Wastes</i></p> <ul style="list-style-type: none"> ▪ All other waste shall be retained onboard for appropriate disposal on shore (ie all domestic, solid, plastics and maintenance wastes). ▪ All waste containers will be closed (ie with lid or netting) to prevent loss overboard. ▪ Spent oils and lubricants shall be securely containerised and returned to shore upon campaign completion. <p><i>Hazardous Wastes</i></p> <ul style="list-style-type: none"> ▪ All hazardous wastes shall be documented, tracked and segregated from other streams of operational wastes. ▪ A complete inventory will be kept of all chemicals to allow sufficient and appropriate recovery materials to be on hand in the event of a spill (ie Material Safety Data Sheet (MSDS)s, labelling and handling procedures). <p><i>Other</i></p> <ul style="list-style-type: none"> ▪ All drainage from decks and work areas shall be collected through a closed drain system and processed through an oil water separation system. ▪ No sewage or putrescible waste will be discharged within 12 nm of any land. ▪ All other waste shall be retained onboard for appropriate disposal on shore (ie all domestic, solid, plastics and maintenance wastes). ▪ The rig will be remote from any sensitive receptors such as population centres and any emissions are therefore considered insignificant.
	4b Modification of feeding habits	See Assessment 4a.
	4c Atmospheric emissions	Minimise emissions by reducing fuel usage where possible.

Potential Consequences (Effects)		Management Measures
Hydrocarbon and/or chemical spills	5a Contamination and/or toxicity to marine species and ecology and other sensitive environments from a well blowout (crude)	<p><i>Blowout Prevention</i></p> <p>Facilities and procedures to prevent spills must be in place during drilling operations including:</p> <ul style="list-style-type: none"> ▪ Burnside-1 OSCP (OA-5000-A02-F029); ▪ Oil spill response procedures specific to the <i>Songa Mercur</i>; ▪ Safety systems such as blowout preventers; ▪ Australian Marine Oil Spill Centre (AMOSC) has confirmed the availability of oil spill recovery and clean up materials and equipment within the region. <p><i>Blowout Response</i></p> <ul style="list-style-type: none"> ▪ Ensure rig equipment and personnel preparedness. ▪ Preparation of project specific (or appropriate bridging documents) Emergency Response Plan (ERP) and OSCP documents. ▪ ERPs which address oil spill incidents must be prepared in the planning phase for specific drilling locations. Plans must include: <ul style="list-style-type: none"> ▪ Oil spill trajectory modelling capability based on site specific metocean conditions and knowledge of oil weathering rates. ▪ Identification of oil-sensitive marine and coastal resources and priority protection areas. ▪ Identification of internal and external emergency organisations, responsibilities and resources (human and equipment and materials) for oil spill response, and callout details. ▪ Spill response and cleanup strategies (offshore and shoreline). ▪ Include OSCP and Emergency Response Plan (ERP) requirements, roles, responsibilities, procedures and objectives in induction sessions.

Potential Consequences (Effects)	Management Measures
<p>5b Contamination and/or toxicity to marine species and ecology and other sensitive environments from a vessel collision or coupling failure (diesel)</p>	<p><i>Refuelling</i></p> <ul style="list-style-type: none"> ▪ Transfer of diesel from support vessels will be undertaken in accordance with normal operating procedures. ▪ Transfer hoses will be fitted with dry break couplings, will be fit for purpose, not outside design life limits and regularly checked for leaks. ▪ A crane will be used to lift the refuelling hose up to gravity drain fuel left in hose after completing transfer. ▪ Drip trays will be provided under all refuelling hose connections. ▪ Refuelling will occur during daylight hours, depending on sea conditions. ▪ Spills on the rig will be contained by the sealed decking. <p><i>Housekeeping</i></p> <ul style="list-style-type: none"> ▪ Spills will be cleaned up immediately using absorbent pads. The absorbent material will be properly disposed of onshore. ▪ Oil and chemical spill containment and cleanup material (eg absorbent) will be available where spills are possible, including on small boats. ▪ Fuel and diesel will be stored in large, internal tanks/bunkers onboard. <p><i>Spill Prevention</i></p> <p>Facilities and procedures to prevent spills must be in place during drilling operations including:</p> <ul style="list-style-type: none"> ▪ Burnside-1 OSCP (OA-5000-A02-F029); ▪ Oil spill response procedures specific to the <i>Songa Mercur</i>; ▪ Drill floor is sealed preventing escape of deck liquids to marine environment; ▪ Safe fuel transfer procedures from supply vessel to drilling rig (eg checking product transfer hoses for leaks, monitoring tank levels, etc); and ▪ Australian Marine Oil Spill Centre (AMOSOC) has confirmed the availability of oil spill recovery and clean up materials and equipment within the region. <p><i>Spill Response</i></p> <ul style="list-style-type: none"> ▪ Ensure rig equipment and personnel preparedness. ▪ Preparation of project specific (or appropriate bridging documents) Emergency Response Plan (ERP) and OSCP documents. ▪ ERPs which address oil spill incidents must be prepared in the planning phase for specific drilling locations. Plans must include: <ul style="list-style-type: none"> ▪ Oil spill trajectory modelling capability based on site specific metocean conditions and knowledge of oil weathering rates. ▪ Identification of oil-sensitive marine and coastal resources and priority protection areas. ▪ Identification of internal and external emergency organisations, responsibilities and resources (human and equipment and materials) for oil spill response, and callout details. ▪ Spill response and cleanup strategies (offshore and shoreline). ▪ Include OSCP and Emergency Response Plan (ERP) requirements, roles, responsibilities, procedures and objectives in induction sessions.

Potential Consequences (Effects)	Management Measures
<p>5c Contamination and/or toxicity to marine species and ecology and other sensitive environments from other spills. These could include chemicals or lube oils.</p>	<p><i>Refuelling</i></p> <ul style="list-style-type: none"> ▪ Transfer of diesel and other fluids (eg chemicals and WBMs) from support vessels will be undertaken in accordance with normal operating procedures. ▪ Supplies will be transferred during daylight hours, depending on sea conditions. <p><i>Housekeeping</i></p> <ul style="list-style-type: none"> ▪ Any conduit being drained, filled or flushed with cable fluid must be contained within a drip tray area. ▪ Spills will be cleaned up immediately using absorbent pads. The absorbent material will be properly disposed of onshore. ▪ Oil and chemical spill containment and cleanup material (eg absorbent) will be available where spills are possible, including on small boats. ▪ Scuppers will be closed in the event of spills to ensure pollution from the deck is not discharged into the ocean. ▪ Bilge water and washdown will be processed through an oily water separator (to MARPOL 73/78 and OPGGSA standards) prior to discharge overboard. ▪ SBMs will be stored in bunded tanks with the master valve tagged under the Permit to Work System at all times. ▪ Lube oil will not be changed during the B1 program and new lube oil will be stored onboard in large tanks. Spent oils and lubricants shall be containerised and returned to appropriately licensed facilities onshore. ▪ All waste containers will be closed to prevent loss overboard. <p><i>Chemical and Hazardous Materials Management</i></p> <p>Facilities and procedures for chemicals and hazardous materials management should be adopted taking into account relevant regulatory requirements and environmental considerations including:</p> <ul style="list-style-type: none"> ▪ Provision of MSDSs and handling procedures for hazardous chemicals and materials; ▪ Provision of appropriate absorbent material and spill cleanup equipment; ▪ Provision of segregated and contained storage areas; and ▪ Use of low impact chemicals and materials as far as practicable. <p><i>Spill Prevention</i></p> <p>Facilities and procedures to prevent spills must be in place during drilling operations including:</p> <ul style="list-style-type: none"> ▪ Burnside-1 OSCP (OA-5000-A02-F029); ▪ Oil spill response procedures specific to the <i>Songa Mercur</i>; ▪ Safety systems such as drip trays; ▪ Contained oil and chemical packaging and storage areas; ▪ Containment around oil- and chemical-use areas and equipment such as the pipe deck, mud tanks, pumps, etc; ▪ Drill floor is sealed preventing escape of deck liquids to marine environment; and ▪ Australian Marine Oil Spill Centre (AMOSC) has confirmed the availability of oil spill recovery and clean up materials and equipment within the region.

Potential Consequences (Effects)		Management Measures
		<p><i>Spill Response</i></p> <ul style="list-style-type: none"> ▪ Ensure rig equipment and personnel preparedness. ▪ Preparation of project specific (or appropriate bridging documents) Emergency Response Plan (ERP) and OSCP documents. ▪ ERPs which address oil spill incidents must be prepared in the planning phase for specific drilling locations.
Well clean ups	6a Changes to water quality and temperature	<ul style="list-style-type: none"> ▪ Oil in water averages less than 30 mg/L during each period of 24 hours. ▪ Effluent streams should be monitored prior to discharge.
	6b Flaring of gas (light, hydrocarbon source, CO2)	<ul style="list-style-type: none"> ▪ Minimise flaring activities to shortest period practical. ▪ Compliance with regulatory requirements. ▪ Optimise flare burner characteristics to ensure maximum burning of all hydrocarbons produced during tests.

CONSULTATION

Various consultations have been held in the course of planning the Burnside-1 Drilling Campaign. Santos has undertaken consultation with relevant stakeholders to identify potential environmental issues and management requirements. Relevant stakeholders include:

- DMP;
- WA Department of Fisheries;
- WAFIC;
- AFMA
- CFA;
- AMOSC; and
- AMSA.

Consultation with relevant fisheries groups will continue in the lead up to the program to ensure possible impacts to fishers and the drilling program are avoided or otherwise minimised. All stakeholders have been provided with details of the program and Santos will respond to any queries expediently. Should the campaign program change in any way that can impact on stakeholders, further consultation will be undertaken.

Songa Offshore will also contact the AMSA regarding shipping movements and to report its position every 24 hours.

CONTACT DETAILS:

All queries, comments or requests for a copy of the approved Ichthys North-1 Drilling Campaign Environment Plan should be directed to:

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