Santos

MUTINEER-EXETER PHASE 4A

ENVIRONMENT PLAN - SUMMARY

ME-5700-A02-F003

Date	Rev	Reason for Issue	Author	Checked	Approved
19/11/07	O	Summary of approved Environment Plan	R Batterham		P King

INTRODUCTION

This summary of the *Mutineer-Exeter Phase 4A Environment Plan 2007* (document reference ME-5700-A02-F003) 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.

Under the proposed campaign Santos aims to drill one exploration well (Fletcher-1) and one appraisal well (Exeter-9), and undertake completion of one development well (Mutineer-13) and the workover of one production well (Exeter 4AH). All wells are located in Commonwealth waters (permit area WA-191-P containing production licences WA-26-L and WA-27-L) off the North West Shelf (NWS), approximately 160 km north of Dampier (refer attached figure).

The campaign is scheduled to commence mid June and be finished in October 2007.

BACKGROUND

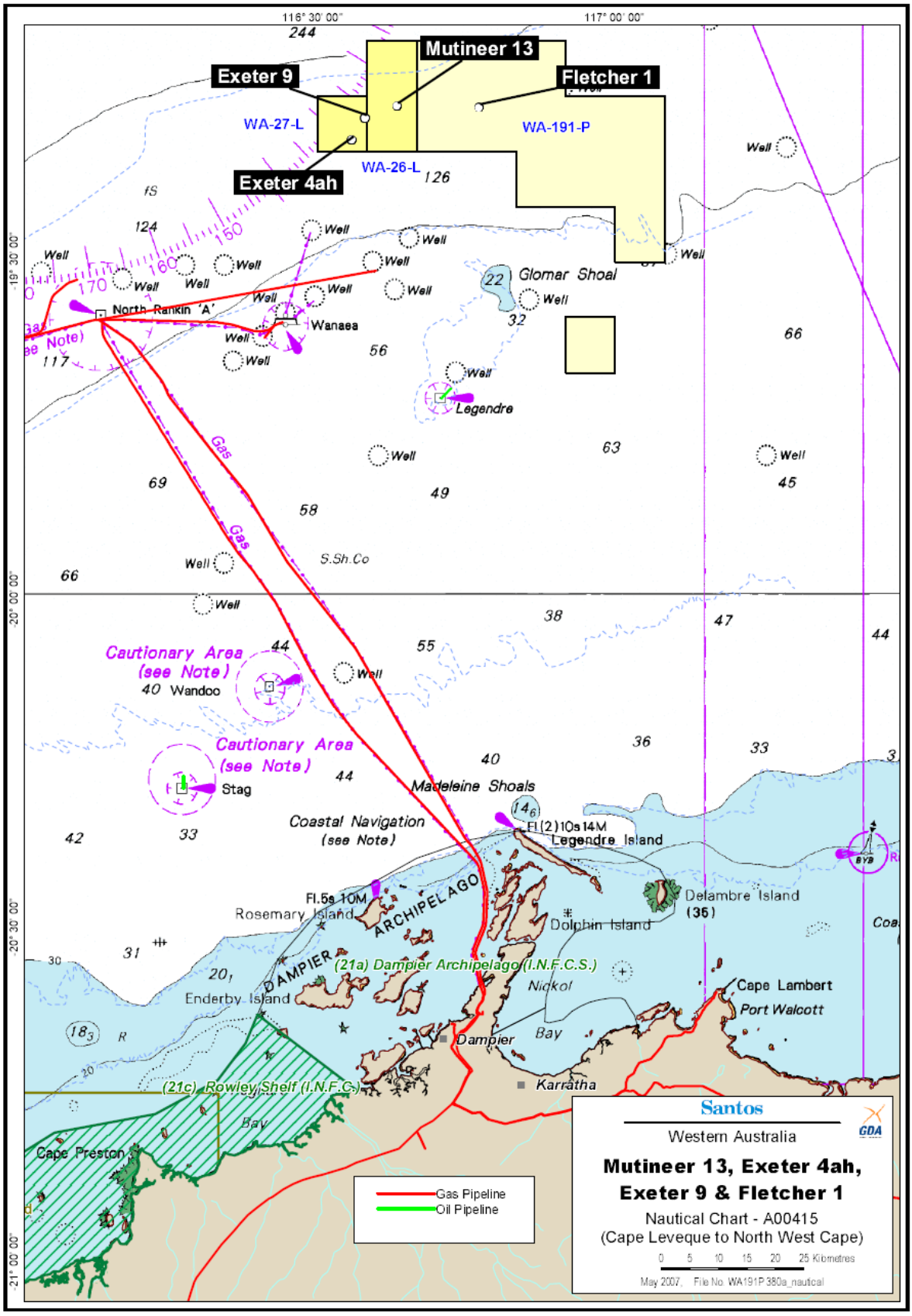
In terms of technical methods and procedures, the planned exploration and development activities are considered typical of standard campaigns conducted in Australian marine waters. No unique or unusual equipment or operations are proposed. No production testing will be conducted during the campaign, however some flaring is envisaged (up to 10,000 bbl/day) during the well clean-up of Mutineer-13.

The wells will be drilled by the MODU *Songa Mercur* operated by Songa Offshore ASA. The wells will be drilled in a water depth of approximately 155 to 160 m. The top sections of the wells 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 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. Drill cuttings and the water based muds (WBMs) will be discharged to the sea after use.

For the Fletcher-1 and Exeter-9 wells it is proposed to use seawater and PHG sweeps for the top section holes and a partially hydrolysed polyacrylamide (PHPA) water based gel with Potassium Chloride (KCl) and Glycol for the bottom sections. Mutineer-13 will utilise WBMs for the top two sections (26" and 17.5" diameter) and Synthetic Based Muds) SBMs for the lower pilot and development holes. The SBM is of a Rheosyn LAO base and will be kept aboard the rig and disposed of onshore. The MODU will employ industry standard separation technology to minimise the amount of any SBM entering the environment during disposal of cuttings.

The workover of the existing production well Exeter-4AH will follow routine technical methods and procedures.

Location Map: Exeter-9, Mutineer-13, Exeter-4AH and Fletcher-1



Key Design Details: Mutineer-Exeter Phase 4A

Aspect		Fletcher 1	Mutineer 13	Exeter 9	Exeter 4AH Workover
Well Location (Lat / Long)		19˚ 15' 39.46" S 116˚ 46' 29.87" E	19˚ 15' 33.283" S 116˚ 38' 15.292" E	19˚ 16' 38.373" S 116˚ 34' 59.324" E	19°18'36.190"S 116°33'40.664"E
Permit Area		WA-191-P	WA-26-L	WA-27-L	WA-27-L
Well Type		Exploration, no test	Pilot, development and completion.	Appraisal, no test	Workover
Rig Type		Semi-submersible			
Rig Name		Songa Mercur			
Contractor Name		Songa Offshore			
Anticipated commencement date		June 2007	July 2007	October 2007	August 2007
Well Duration		21	67	25	20
Well testing		NA	NA	NA	N/A
Total depth of drill*		3,070 mRT MD	5,109 mRT MD	3,670 mRT MD	N/A
Drilling Fluids	36", 26" & 14 ¾" holes	Sea water / gel sweeps	Sea water / gel sweeps	Sea water / gel sweeps	N/A
	17 ½", 12 ¼" & 8 ½" holes	KCl Glycol (PHPA) polymer	17 ½" Hole Section KCl Glycol (PHPA) polymer 12 1/4" and 8 ½" Syn-drill SBM (Rheosyn LAO base)	KCl Glycol (PHPA) polymer	Completion (KCl) Brine
Drill Fluid Volumes Total		10,500 bbls Total Volume of Water Base Mud	14,500 bbls Total Volume of Water Base 4,000 bbls Total Volume of SBM	12,000 bbls Total Volume of Water Base Mud	1,500 Total Volume of KCl Brine
Drill Fluid Disposal Method		WBM discharged from rig, SBM returned to base			Discharged from rig
Drilling Cutting Volume	Total	315 m3	775 m3	350 m3	N/A
Drilling Cutting Disposal Method	36", 14¾" hole	Sea bed	Sea bed	Sea bed	N/A
	17 ½", 12 ¼", 8 ½ " hole	Overboard	Overboard	Overboard	N/A
Fuel Volumes	Total Fuel	Average approx. 500 m3 per well			
	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)		Dampier			

* mRT metres below rotary table.

BIOLOGICAL ENVIRONMENT

A review of available information identifying existing environmental characteristics and sensitivities within and surrounding the permit areas has been undertaken. Key attributes are summarised below.

Ecological Environment

Given the depth of water (~150 – 160 m) and sedimentary seabed, few significant benthic resources are expected to be located across the activity 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 WA-191-P permit area have been identified based on a search of the EPBC Online Database (DEW, 2007). This includes a number of fishes, turtles and sea snakes listed under the Act and considered to occur/potentially occur in the WA-191-P permit area.

A number of whale and dolphin species are also identified as occurring in the waters of the NWS, and may occur in the WA-191-P permit area. The most common whale species in the NWS region is the humpback whale (*Megaptera novaeangliae*). Although the campaign activities overlap the peak migration period for the humpback whale, since the permit area occurs on the outer edge of the whales' migration route, the numbers of humpbacks passing through the area of activity is expected to be low.

Locations of Ecological Significance

At present there are no marine reserves or other protected natural or historic features within 50 km of the WA-191-P permit. There are no 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 the permit. The nearest Sensitive Marine Environment is an area of coastline extending from Dampier Archipelago to North West Cape and associated coast and islands, over 100 km away.

SOCIO-ECONOMIC ENVIRONMENT

Petroleum Development

Petroleum exploration began in the region in 1953 and became commercial (Barrow Island oilfield) in 1964. Since then extensive exploration activities have been undertaken in offshore areas with numerous oil and gas wells and production facilities now operating close to the WA-191-P permit area.

Shipping and Navigation

The NWS area contains a number of shipping routes for national and international shipping utilising WA ports. WA-191-P is located within a major shipping route servicing mostly bulk carriers, tankers and supply vessels into and from the Port of Dampier. Owing to the existence of drilling and production activities in the permit area since January 2004, and the short time this campaign will take to complete, impacts of the proposed campaign on shipping are anticipated to be minor.

Commercial Fisheries

The region supports a small but diverse fishing industry. Several commercial fisheries are active off the Pilbara coast, however, fishing effort is low and operators tend to concentrate their efforts in inshore areas. The fisheries of the area include the Pilbara Trap Fishery, the North Coast Shark Fishery, the Open Access Fishery, the Pilbara Trawl Fishery, the Western Tuna and Billfish Fishery and aquaculture. Santos has undertaken consultation with key fishing industry bodies/representatives to outline the project activities to be undertaken within the WA-191-P permit area.

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.

ENVIRONMENTAL HAZARDS, CONTROLS AND MANAGEMENT APPROACH

Santos is committed to conducting its operations in a manner compatible with the environmental and economic needs of all communities in which it operates. 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 based on international standards and industry best practice.

Potential Environmental Hazards

The main potential environmental hazards (and main associated consequences) of the proposed Phase 4A campaign are:

Potential Consequences (Effects)		Management Measures
Noise Emission	Disturbance to marine fauna	• Ensuring the MODU has adequate whale identification material and holds a pre-start up cetacean awareness meeting for all of its crew. • The rig start-up procedures and crew awareness for cetaceans will help minimise disturbance to turtles. • Follow normal start-up procedures for the drilling of Phase 4A. • The timing and location of the proposed drilling operation will avoid the southern migration of humpback whales.
Physical presence of rig	Localised disturbance to seabed from rig anchoring	• The use of a semi-submersible rig reduces seafloor impact. • Adherence to anchoring procedures to minimise anchor and chain drag.
	Interference with fishing, shipping and recreational operators	• Commercial fishing groups shall be advised of the location and schedule of Phase 4A. • 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.
	Light emissions during operations	• Standard maritime safety procedures shall be adopted (eg AMSA). • Lighting selected to meet safety requirements.
Drilling cutting and fluid discharges	Increased turbidity Burial/smothering of benthic communities Toxicity and bioaccumulation to marine organisms	• SBMs will be recycled and retained for disposal on shore. • Low toxicity WBMs will be used for drilling where possible. • 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
Other waste discharges	Changes to water quality	• All waste management shall comply with the *P(SL)A*, appropriate hazardous waste legislation and local government disposal guidelines. ***Putrescible Wastes*** • 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 12nm of any land. • Sewage shall be macerated to a small particle size and treated to neutralise bacteria. ***Solid Wastes*** • 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. ***Hazardous Wastes*** • 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). ***Other*** • All drainage from decks and work areas shall be collected through a closed drain system and processed through an oil water separation system. • Domestic waste such as cans, glass, plastic and paper will not be discharged to the sea. • No sewage or putrescible waste will be discharged within 12 nm of any land. • The rig will be remote from any sensitive receptors such as population centres and any emissions are therefore considered insignificant.
	Modification of feeding habits	• Refer *changes to water quality* above.
	Atmospheric emissions	• Minimise emissions by reducing fuel usage where possible.

Potential Consequences (Effects)		Management Measures
Hydrocarbon and/or chemical spills	Contamination and/or toxicity to marine species and/or ecologically sensitive environments from a well blowout (crude)	***Blowout Prevention*** Facilities and procedures to prevent spills must be in place during drilling operations including: • Mutineer Exeter Development Field Operations OSCP (ME-7000-A02-F004); • Oil spill response procedures specific to the *Songa Mercur*; • 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. ***Blowout Response*** • 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: o Oil spill trajectory modelling capability based on site specific metocean conditions and knowledge of oil weathering rates. o Identification of oil-sensitive marine and coastal resources and priority protection areas. o Identification of internal and external emergency organisations, responsibilities and resources (human and equipment and materials) for oil spill response, and callout details. o Spill response and cleanup strategies (offshore and shoreline). o Include OSCP and Emergency Response Plan (ERP) requirements, roles, responsibilities, procedures and objectives in induction sessions.

Potential Consequences (Effects)		Management Measures
	Contamination and/or toxicity to marine species and/or ecologically sensitive environments from a vessel collision or coupling failure (diesel)	***Refuelling*** • Transfer of diesel from support vessels will be undertaken in accordance with normal operating procedures. • Specific procedures for transfer loss will be prepared by Contractor. • 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. ***Housekeeping*** • 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. ***Spill Prevention*** Facilities and procedures to prevent spills must be in place during drilling operations including: • Mutineer Exeter Development Field Operations OSCP (ME-7000-A02-F004); • oil spill response procedures specific to the *Songa Mercur*; • 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 (AMOSC) has confirmed the availability of oil spill recovery and clean up materials and equipment within the region. ***Spill Response*** • 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: o Oil spill trajectory modelling capability based on site specific metocean conditions and knowledge of oil weathering rates. o Identification of oil-sensitive marine and coastal resources and priority protection areas. o Identification of internal and external emergency organisations, responsibilities and resources (human and equipment and materials) for oil spill response, and callout details. o Spill response and cleanup strategies (offshore and shoreline). o Include OSCP and Emergency Response Plan (ERP) requirements, roles, responsibilities, procedures and objectives in induction sessions.

Potential Consequences (Effects)		Management Measures
	Contamination and/or toxicity to marine species and/or ecologically sensitive environment from other spills. These could include chemicals or lube oils.	***Refuelling*** • Transfer of diesel and other fluids (eg chemicals and WBMs) from support vessels will be undertaken in accordance with normal operating procedures. • Specific procedures for transfer loss will be prepared by Contractor. • Supplies will be transferred during daylight hours, depending on sea conditions. ***Housekeeping*** • 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 *P(SL)A* 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 be changed during Phase 4A program in accordance with the vessel maintenance program. • 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. ***Chemical and Hazardous Materials Management*** Facilities and procedures for chemicals and hazardous materials management should be adopted taking into account relevant regulatory requirements and environmental considerations including: • 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. ***Spill Prevention*** Facilities and procedures to prevent spills must be in place during drilling operations including: • Mutineer Exeter Development Field Operations OSCP (ME-7000-A02-F004); • oil spill response procedures specific to the *Songa Mercur*; • 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
		Spill Response • 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.

CONSULTATION

Extensive consultation with various stakeholders has been undertaken during the course of planning the Mutineer-Exeter campaign in order to identify potential environmental issues and management requirements. Santos has consulted with the following organisations:

Organisation	Details of Consultation
WA Department of Industry and Resources	Submission of Environment Plan and Oil Spill Contingency Plan.
WA Department of Fisheries	Phone consultation followed by email provision of program summary under cover letter. Summary of program submitted. Permit areas occur within Pilbara Fishing Zones 1 and 2. No major issues as fishing effort in area is minimal, however will review program and advise of any issues. Recommended inform local fishers of program. Satisfied that notification process stewarded by WAFIC will be sufficient.
WA Fishing Industry Council (WAFIC)	Phone consultation followed by email provision of program summary under cover letter. As per previous programs WAFIC will forward details of program to potentially affected members.
Australian Fisheries Management Authority (AFMA)	Phone consultation followed by email provision of program summary under cover letter. Informed of consultation with WAFIC and WA Fisheries. AFMA advised there may be other fishing bodies that could require notification. AFMA would review and where relevant to project, provide contact details to Santos.

In addition to the above:

- The Australian Marine Oil Spill Response Centre (AMOSC) will be notified prior to the commencement of drilling; and
- Songa Offshore will contact AMSA regarding shipping movements and to report its position every 24 hours.

Consultation and information dissemination will continue prior to campaign commencement and continue throughout, via a range of media including:

- Meetings with regulators; and
- Meetings and correspondence with key stakeholders.

Contact Details:

All queries, comments or requests for a copy of the approved *Mutineer-Exeter Phase 4A Environment Plan 2007* should be directed to:

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