

Santos

MUTINEER-EXETER DEVELOPMENT




MUTINEER-EXETER WELL WORKOVER AND ADAMS-1

ENVIRONMENT PLAN - SUMMARY

MUTINEER-EXETER PHASE 4A ENVIRONMENT PLAN
(ME-5700-A02-F003)

MUTINEER-EXETER WELL WORKOVER AND ADAMS-1
ENVIRONMENT PLAN BRIDGING DOCUMENT
(ME-5800-A02-F002)

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INTRODUCTION

This summary of the Mutineer-Exeter Phase 4a Environment Plan (Document Reference ME-5700-A02-F003) and the Mutineer-Exeter Well Workover and Adams-1 Environment Plan Bridgning Document (Document Reference ME-5800-A02-F002) has been prepared by Santos Ltd (Santos). It presents a summary of the aforementioned plans in accordance with requirements of the Commonwealth Petroleum (Submerged Lands) (Management of Environment) Regulations 1999.

Santos proposes to drill one exploration well (Adams-1) and perform workover activities at Exeter 4 and 8 and Mutineer 12 well locations. The work is scheduled to commence in April 2008 and be finished in August 2008. The well locations are in production licenses WA-26-L and WA-27-L, which are located in Commonwealth waters on the North West Shelf (NWS), approximately 160 km north of Dampier (see attached map). Further information, including the well schematics, will be submitted to the Western Australian (WA) Department of Industry and Resources (DoIR) in the Drilling Program.

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BACKGROUND

The drilling of the Adams-1 will be a standard exploration well, in terms of technical methods and procedures, of standard exploration campaigns conducted in Australian marine waters. No unique or unusual equipment or operations are proposed. No production testing will be conducted during Adams-1. The drilling programme for Adams-1 is based on that of Fletcher-1.

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 are located in a water depth of approximately 155 to 160 m, with total depths of between 3,272 m and 5,109 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 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 WBMs will be discharged to the sea after use. *Songa Mercur* uses a combination of shale shakers and other screening and centrifuge gear to dry the drill cuttings. The dried drill cuttings and the WBMs will be discharged to the sea after use.

At the completion of drilling Adams-1, the well will be decommissioned (plugged and abandoned as per *P(SL)A* requirements), which 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.

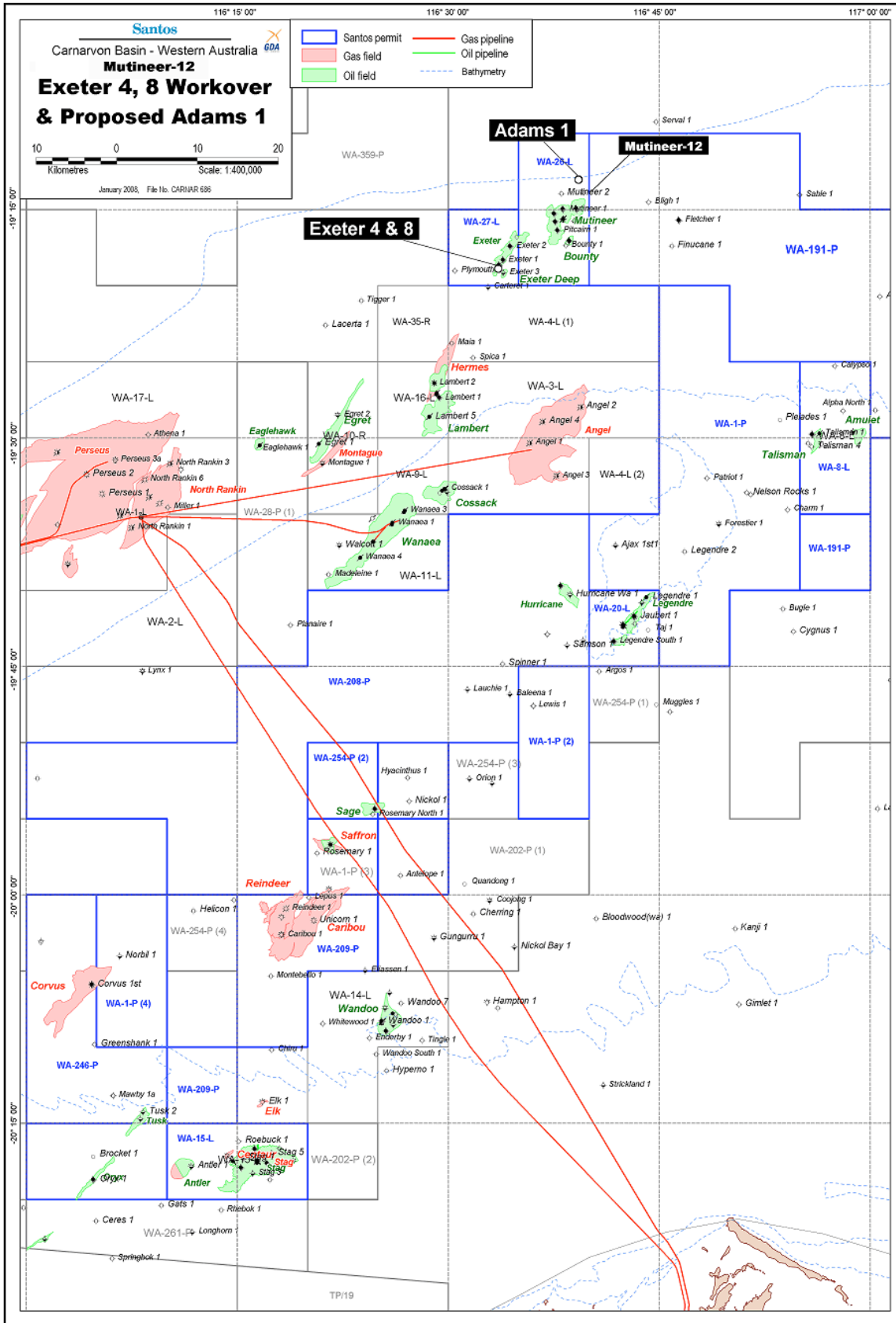
The workover of the existing production well Exeter 4 and 8 and Mutineer 12 will follow routine technical methods and procedures. No unique or unusual equipment or operations are proposed. The workover scope includes routine retrieval of the upper completion, and then a re-running of the upper completion, as per activities conducted on Mutineer-4 Workover.

Table 1: Key Details for Mutineer-Exeter Workover and Adams-1

Aspect		Adams-1	Exeter-4 Workover	Exeter-8 Workover	Mutineer-12 Workover (TBC)
Well Location (Lat / Long)		19° 12' 50.62" S 116° 39' 17.16" E	19° 18' 36.190" S 116° 33' 40.664" E	19° 18' 35.505" S 116° 33' 40.486" E	19° 15' 33.7" S 116° 38' 16.435" E
Permit Area		WA-26-L	WA-27-L	WA-26-L	WA-27-L
Well Type		Exploration, no test	Workover	Workover	Workover
Rig Type		Semi-submersible			
Rig Name		Songa Mercur			
Contractor Name		Songa Offshore			
Anticipated commencement date		April 2008	May 2008	July 2008	August 2008
Well Duration		23 days	20 days	25 days	20 days
Well testing		NA	NA	NA	N/A
Total depth of drill*		3,272 mRT MD	N/A	N/A	N/A
Drilling Fluids	36", 26" & 14 3/4" holes	Sea water / gel sweeps	N/A	N/A	N/A
	17 1/2", 12 1/4" & 8 1/2" holes	KCl Glycol (PHPA) polymer	Completion (KCl) Brine	Completion (KCl) Brine	Completion (KCl) Brine
Drill Fluid Volumes Total		10,500 bbls Total Volume of Water Base Mud	1,500 bbls Total Volume of KCl Brine	1,500 bbls Total Volume of KCl Brine	1,500 bbls Total Volume of KCl Brine
Drill Fluid Disposal Method		Discharged from rig			
Drilling Cutting Volume	Total	285 m3	N/A	N/A	N/A
Drilling Cutting Disposal Method	36", 14 3/4" hole	Sea bed	N/A	N/A	N/A
	12 1/4", 8 1/2" hole	Overboard	N/A	N/A	N/A
Fuel Volumes	Total Fuel	Average approx. 1000 m3 per well			
	Tanks	Capacity 950 m ³			
Other likely chemicals associated with drilling		Bentonite, barite, corrosion inhibitors, viscosity and weighting chemicals, pipe dope, Cement lubricating oils, cleaning and cooling chemicals & Nitrogen			
Personnel on board		120 persons max			
Method of crew change		Helicopter			
Port used for refuelling (if required)		Dampier			

* mRT metres below rotary table.

Location of Mutineer 12, Exeter-4, Exeter-8, Adams-1 and Mutineer-12 Location Map



BIOLOGICAL ENVIRONMENT

An assessment of the environmental characteristics and sensitivities is provided in Section 3 of the Mutineer-Exeter Phase 4a Environment Plan (ME-5700-A02-F003). The 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 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 Mutineer-Exeter Field and Adams-1 well location have been identified based on a search of the DEC EPBC Online Database (DEC, 2008). Complete details of the search results are contained in Section 3 of the Mutineer-Exeter Phase 4a Environment Plan (ME-5700-A02-F003), 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-26-L and WA-27-L.

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 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.

Petroleum Development

The region is very prospective for oil and gas, with previous and ongoing exploration drilling for petroleum, oil and natural gas in the vicinity of WA-26-L and WA-27-L. The Mutineer-Exeter production facilities are already located in the region.

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 Mutineer-Exeter workover and Adams-1 well activities are summarised in the table below.

Potential Consequences (Effects)		Management Measures
Noise Emission	1a Disturbance to cetaceans	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	The rig start-up procedures and crew awareness for cetaceans will help minimise disturbance to turtles.
	1c Disturbance to fish	Follow normal start-up procedures for the drilling of Mutineer-Exeter workover and Adams-1 activities.
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 the Mutineer-Exeter workover and Adams-1 activities. ▪ 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"> ▪ WBMs remaining as tank bottoms will be minimised as far as reasonably practicable. ▪ 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 (WBM).
	3b Burial/smothering of benthic communities	<ul style="list-style-type: none"> ▪ 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 (WBM).
	3c Toxicity and bioaccumulation to marine organisms	<ul style="list-style-type: none"> ▪ 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 (WBM).

Potential Consequences (Effects)		Management Measures
Other waste discharges	4a Changes to water quality	<ul style="list-style-type: none"> ▪ All waste management shall comply with the <i>P(LS)A</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. ▪ The vessel's sewage treatment system ensures that sewage is macerated to a small particle size and is treated to neutralise bacteria. ▪ Domestic waste such as cans, glass, plastic and paper will not be discharged to the sea. ▪ 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"> ▪ Mutineer-Exeter Field Operations Oil Spill Contingency Plan (ME-7000-A02-F004); ▪ oil spill response procedures specific to the <i>Songa Mercur</i>; ▪ safety systems such as blowout preventers; ▪ 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>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. ▪ 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. <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"> ▪ Mutineer-Exeter Field Operations Oil Spill Contingency Plan (ME-7000-A02-F004); ▪ 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. ▪ Specific procedures for transfer loss will be prepared by Contractor. ▪ 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 P(SL)A standards) prior to discharge overboard. ▪ Lube oil will not be changed during the Mutineer Exeter well workover and Adams-1 well. ▪ 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"> ▪ Mutineer-Exeter Field Operations Oil Spill Contingency Plan (ME-7000-A02-F004); ▪ 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. 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.

CONSULTATION

Various consultations have been held in the course of planning the Mutineer Exeter well workover and Adams-1 well campaign. Santos has undertaken consultation with relevant stakeholders to identify potential environmental issues and management requirements. Relevant stakeholders include:

- DoIR;
- Australian Fisheries Management Authority
- Commonwealth Fisheries Association
- Western Australia Fishing Industry Council
- Western Australian Northern Trawl Owners Association
- Northern Fishing Companies Association
- 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 the Mutineer-Exeter Phase 4a Environment Plan and the Mutineer-Exeter Well Workover and Adams-1 Environment Plan Bridgning Document should be directed to:

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