

## MUTINEER-EXETER DEVELOPMENT



## MUTINEER EXETER DEVELOPMENT ENVIRONMENTAL PLAN: PUBLIC SUMMARY

ME-7000-A02-F011

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## 1. INTRODUCTION

This summary of the Mutineer-Exeter Development Field Operations Environment Plan (Document Reference ME-7000-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.

## 2. DESCRIPTION OF ACTIVITY

Santos on behalf of the Joint Venture Partners is the designated Operator of the Mutineer-Exeter field in Western Australia. Mutineer-Exeter field operations began on 29 March 2005. At the start of field operations the MODEC Venture 11 FPSO arrived in the field and hooked-up to the subsea infrastructure already in place.

Operations initially involved weekly offloads to offtake tankers with the offloading frequency decreasing in later field life. The current Mutineer-Exeter Development consists of two wells at Exeter and five wells at Mutineer. Future development may include: additional wells around the existing production centres; up to a total of four wells at Exeter and seven at Mutineer, or; other fields tied into the existing production centres. The design life of all the facilities in the field is 15 years.

Mutineer-Exeter is covered by two adjacent production licences as shown in Figure 2.1 (WA-26-L for the Mutineer field and WA-27-L for the Exeter field). The development comprises the following principal infrastructure:

- Subsea production system with production centres in each of the Mutineer and Exeter fields.
- FPSO with a Disconnectable Turret Mooring (DTM) moored between the two fields.

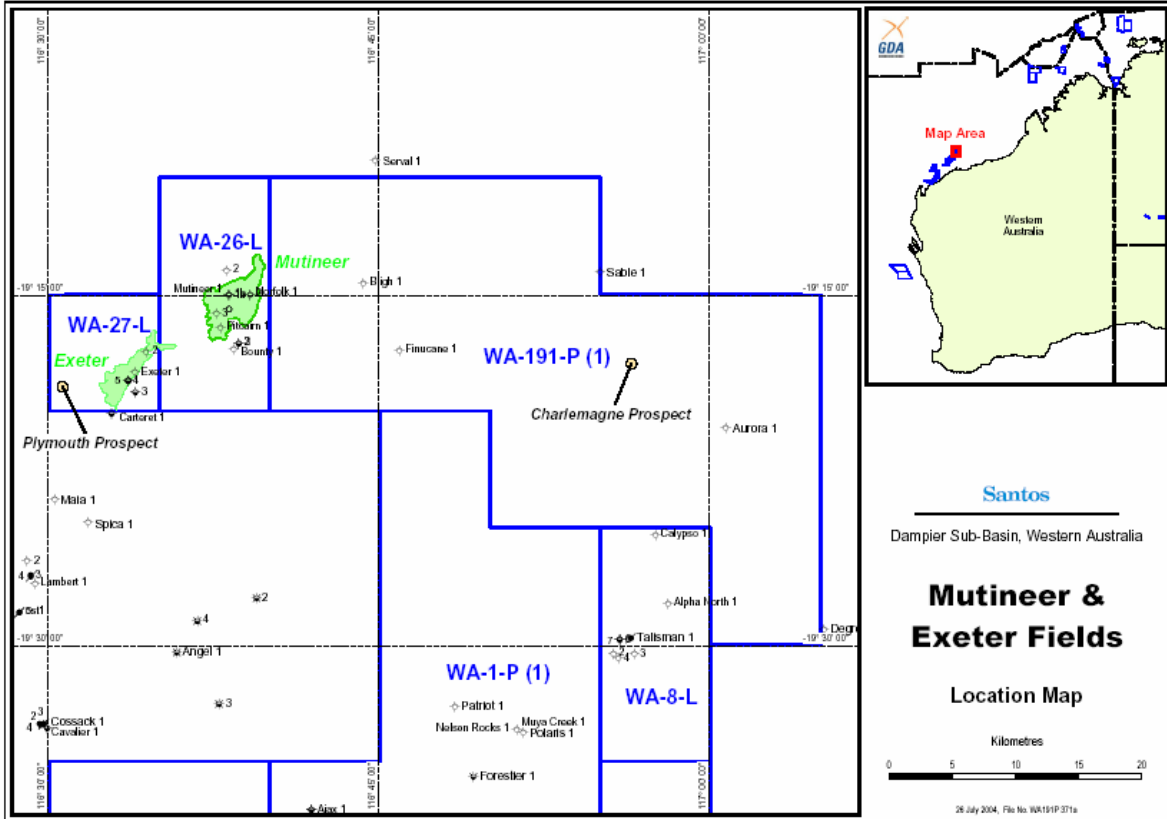
## 3. COORDINATES OF ACTIVITY

Table 2 presents the surface coordinates of and water depth at, the FPSO DTM and at the Mutineer and Exeter production centres. Water depth in both WA-26-L and WA-27-L ranges between 140 and 160 m.

**Table 2 FPSO and Production Centre Surface Coordinates**

FPSO DTM	Mutineer Production Centre	Exeter Production Centre
Geographic Surface Coordinates – Latitude and Longitude		
19° 16' 33.45" S 116° 36' 45.62" E	19° 15' 32.6764" S 116° 38' 16.375" E	19° 18' 35.447" S 116° 33' 41.146" E
Geographic Surface Coordinates – Northings and Eastings (Geodetic Datum of Australia 1994, Map Grid of Australia Zone 50)		
7,868,591.7 m N 458,946.0 m E	7,870,465.61 m N 461,654.38 m E	7,864,829.89 m N 453,926.25 m E
Water Depth		
155.5 m below Lowest Astronomical Tide (LAT) 157.9 m below Mean Sea Level (MSL)	160.8 m below LAT 162.7 m below MSL	145.5m below LAT 147.4m below MSL

Figure 2.1 Mutineer-Exeter Field Development Map



#### 4. RECEIVING ENVIRONMENT

An assessment of the environmental characteristics and sensitivities is provided in Section 4 of the Mutineer-Exeter Development Field Operations Environment Plan (ME-7000-A02-F003). The key attributes are summarised below.

##### Ecological Environment

The seabed across production licences shoals evenly and very gently (seabed gradient much less than 1°) to the south to southeast. The depth contours are parallel, evenly spaced and trending east to northeast. The sediments are siliceous carbonate medium sands to silt/clays, greenish grey in colour with some shells and shell fragments. Given the depth of water and sedimentary seabed, few significant benthic resources are expected to be located across the survey area.

##### Fish

The area supports a diverse assemblage of fish, most fish have tropical distributions and are well distributed throughout the Indo-West Pacific region. The region also supports large populations of cartilaginous fishes such as sharks and rays. The most prolific of the sharks are the whalers, represented by at least twelve species in the region, whale sharks are not known to aggregate in or near production licences.

## Whales and Dolphins

A number of whale and dolphin species occur in the waters some being seasonal visitors while others occur at low densities all year round. The most common whale species is the Humpback Whale.

## Seabirds

Sixteen species of seabirds have been recorded in the area these included birds that occur year round or as seasonal visitors, such as Petrels and Shearwaters. Most birds encountered offshore were foraging in flocks of 20 to more than 200 individuals, often of different species, and commonly associated with schools of pelagic fish, such as tuna. Foraging groups typically comprise Sooty Terns, Wedge-tailed Shearwaters and the occasional Frigate bird. Many migratory birds that occur in the area are trans-equatorial some of these are protected with agreements between Australia and other countries.

## Locations of 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 the production licences.

There are no shipwrecks or heritage sites in the vicinity of production licences. There are no known Aboriginal or European heritage or archaeological sites of significance associated with the production licences.

## Fisheries

The region supports a small but valuable and 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.

## 5. ENVIRONMENTAL HAZARDS, CONTROLS AND MANAGEMENT APPROACH

The Mutineer-Exeter Development 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.

The Mutineer-Exeter Field EHSMS continually identifies hazards, systematically assesses the risks and eliminates or manages the hazards. This can be demonstrated by the following:

- The Field EHSMS covers all activities in the Mutineer and Exeter fields; and
- It has the appropriate structure and processes to foster continual improvement in health, safety and environmental performance.

The key environmental hazards and potential environmental impact associated with Mutineer-Exeter Development activities are summarised in the table below.

Environmental Hazard	Potential Environmental Impact	Key Hazard Control and Management Measures
<b>Waste Materials</b>		
<i>Routine Activities</i>		
Produced Formation Water (PFW)	Potential mortality of marine organisms, adverse effects on water quality in immediate surround of the PFW outlet	<p><b>Monitoring;</b> quarterly samples sent to onshore laboratory</p> <p><b>Procedural;</b> regular calibration and testing of equipment for monitoring of OIW</p> <p><b>Design;</b> concentrations &gt;30 mg/l diverted inboard and re processed</p>
Grey water, sewage and putrescible waste	Contamination of marine organisms. Nutrient enrichment and bio stimulation of the water column surrounding FPSO.	<p><b>Procedural;</b> routine maintenance of treatment system</p> <p><b>Design;</b> sewage effluent treated in extended aeration system with a screen size less than 25mm</p>
Production Chemicals	Mortality of marine organisms, adverse effects on water quality.	<p><b>Monitoring;</b> chemicals transport, handling, storage, usage and disposal to comply with MSDS</p> <p><b>Procedural;</b> reviewed and selected based on minimum effect and minimum quantities</p> <p><b>Design;</b> chemical injection package banded and drained to slops tanks</p>
Power generation exhaust emissions	Localised effect on air quality and global contribution to greenhouse gas emissions.	<p><b>Monitoring;</b> treated crude fuel consumption recorded and reported daily</p> <p><b>Procedural;</b> regular maintenance of engines to ensure maximum efficiency all boilers inspected in accordance with manufacturers recommendations</p> <p><b>Design;</b> low sulphur fuel used, high thermal efficiency reciprocating engines used.</p>
Venting gas and fugitive emissions	Localised effect on air quality and global contribution to greenhouse gas emissions.	<p><b>Procedural;</b> regular maintenance of all process equipment</p> <p><b>Design;</b> Use boiler flue gas, shutdown valves fitted with limit switches &amp; isolation valves locked in position</p>
Flaring	Localised effect on air quality and global contribution to greenhouse gas emissions.	<p><b>Monitoring;</b> monitoring of flaring process on a continuous basis</p> <p><b>Procedural;</b> routine maintenance of flaring equipment</p> <p><b>Design;</b> flare tip is low radiation smokeless type assisted by air blower for flare stability</p>

Environmental Hazard	Potential Environmental Impact	Key Hazard Control and Management Measures
<b>Hydrocarbon Releases</b>		
<b>Non-Routine Activities</b>		
Crude oil spill from well blow-out	Oil spill resulting in reduced water quality and mortality of marine organisms	<p><b>Monitoring;</b> all well and process under continuous monitoring.</p> <p><b>Procedural;</b> ESD and SSSV's tested periodically, exclusion zone around subsea structures controlled, Oil Spill Contingency plan approved and tested</p> <p><b>Design;</b> well planning and design integrity, well valves controlled on the FPSO and Shutdown valves tested periodically.</p>
Crude oil spill from FPSO / offtake tanker cargo tanks	Oil spill resulting in reduced water quality and mortality of marine organisms	<p><b>Monitoring;</b> early warning system for errant vessels,</p> <p><b>Procedural;</b> Cautionary and safety zones gazetted. Oil Spill Contingency plan approved and tested</p> <p><b>Design;</b> FPSO of double hull design</p>
Release of crude oil from subsea flowline/infrastructure/riser	Oil spill resulting in reduced water quality and mortality of marine organisms	<p><b>Procedural;</b> flow, pressure and temperature recorded on the FPSO, routine maintenance Asset Integrity Management System</p> <p><b>Design;</b> All subsea equipment API rated, production system designed to maximum shut-in pressure and designed to 100 year cyclone conditions.</p>
Leak of crude oil from FPSO offloading line and associated pipework.	Oil spill resulting in reduced water quality and mortality of marine organisms	<p><b>Monitoring;</b> all off loadings monitored on a 24 hour basis.</p> <p><b>Procedural;</b> Off loading hose pressure tested periodically.</p> <p><b>Design;</b> break away coupling installed and a SDV fitted to discharge outlet of the FPSO</p>
Spillage or inadvertent release of diesel fuel	Diesel spill resulting in reduced water quality and mortality of marine organisms	<p><b>Procedural:</b> diesel handling, loading and offtake procedures in place.</p> <p><b>Design;</b> treated crude fuel is produced on board the FPSO limiting the need to transfer diesel and is stored in tanks onboard.</p>
<b>Chemical Releases</b>		
<b>Non-Routine Activities</b>		
Planned chemical releases, e.g. hydrotest discharge, hydraulic fluids	Potential acute toxic or chronic effect on marine organisms	<p><b>Monitoring;</b> PFW discharge monitoring equipment ensure levels are kept below regulatory limits</p> <p><b>Procedural;</b> release of hydrotest fluid after testing will occur in a controlled manner, Operating and maintenance of SSSVs is conducted to minimise losses of hydraulic fluid.</p> <p><b>Design;</b> segregated and contained storage areas.</p>



## 6. CONSULTATION

In developing the Mutineer Exeter Development Santos consulted with numerous stakeholders and representatives including;

- Australian Maritime Safety Authority (AMSA)
- Australian Maritime Oil Spill Centre (AMOSC)
- Department of Environment and Conservation (Formally CALM and Department of Environment)
- Department of Industry & Resources (DoIR)
- Environmental Protection Agency
- Fisheries WA
- WA Fishing Industry Council (WAFIC)
- Western Tuna and Billfish fisheries

## 7. CONTACT DETAILS

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