Santos

Mutineer Exeter Decommissioning Environment Plan

Information for Relevant Persons

Activity Overview

Santos Ltd (Santos) is preparing for the final phase of decommissioning of the Mutineer, Exeter, Fletcher and Finucane (MEFF) field and is planning for the removal of most of the seabed infrastructure within production licences WA-26-L, WA-27-L & WA-54-L, with some select infrastructure proposed to be left in situ.

The Operational Area for MEFF decommissioning activities is in Commonwealth waters approximately 147 km north of Dampier, Western Australia (see **Figure 1**).

Proposed activities are expected to commence in Q4 2024, taking approximately 170 days but could take up to 12 months cumulative duration with potentially multiple campaigns, subject to activity schedule requirements, vessel availability and weather.

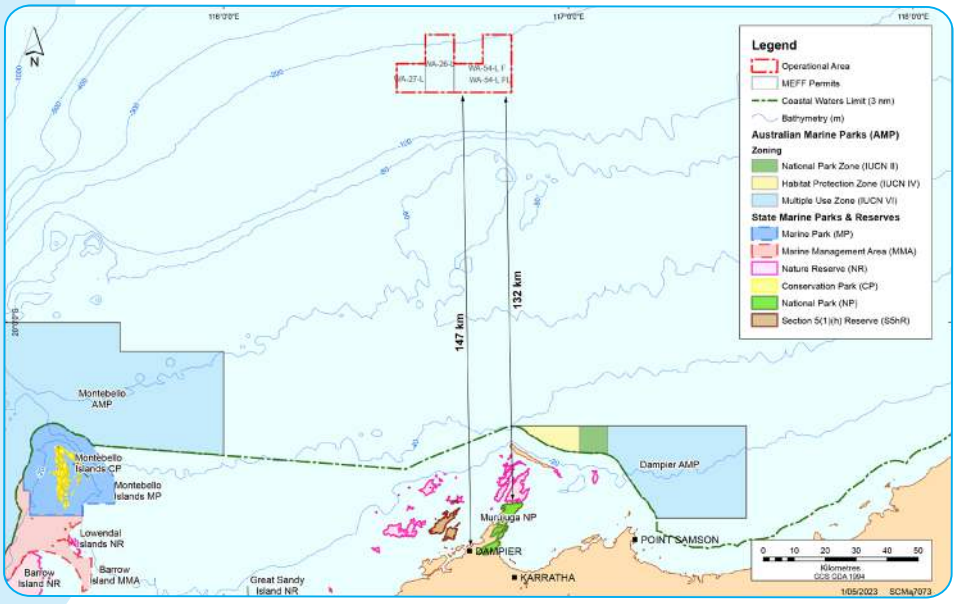

Figure 1. MEFF decommissioning activity location.

Consultation & Feedback

All petroleum activities in Commonwealth waters must have an Environment Plan (EP) accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) before any activities can take place.

Under Commonwealth Environmental Regulations, Santos is required to consult with relevant persons about proposed activities when preparing an EP. A relevant person includes authorities, persons or organisations whose functions, interests or activities may be affected by the proposed activity.

You might be a relevant person if, for example, you have spiritual or cultural connections to land and sea country in accordance with Indigenous tradition that might be affected by our activity, if you otherwise carry out recreational or commercial fishing, tourism or other activities that might be affected by our proposed activity, or if you are part of a local community that might be affected by our proposed activity.

Santos is now consulting with relevant persons for activities proposed to be managed under the Mutineer Exeter Decommissioning Environment Plan. If you consider you may be a relevant person, please contact us as soon as possible if you require any further information or if you think you are not on our consultation list.

We are asking for relevant persons to provide feedback by **26 July 2023**.

Details on how to contact us are included in the **Providing Feedback** section of this information sheet.

Activity Description

ACTIVITY DETAILS	
Location	Approximately 147 km north of Dampier.
Timing	Activities are planned to commence in Q4 2024.
Duration	Expected total duration of approximately 170 days but could take up to 12 months (multiple campaigns may occur).
Water depth	Approximately 130 m to 160 m.

Planned activities	+ The removal of the majority of seabed infrastructure from the operational area, including plastics from the ocean through the removal of the 12" Rigid Flowline, 2" coiled tubing, all (four) production manifolds and their mudmats/bases.
	+ Preparation for, and abandonment of, select seabed infrastructure to remain in situ on title, comprising:
	  + Two steel, epoxy coated gravity bases (approximately 19 m x 6 m x 3.1 m high) complete with concrete ballast (approximately 6 m x 1.4 m x 2.35 m high) weighing about 330 t each set.
	  + Six deeply buried steel anchors and the six corresponding steel mooring chains of approximately 710 m / ~190 t per mooring leg (each chain is partially buried) and the expectation is that the buried length will increase overtime.

Vessels	A multipurpose support vessel (MPSV) will be the primary vessel undertaking removal activities. However, up to four vessels may be present in the operational area at any one time.
Aircraft	Helicopters may be used for crew changes, critical equipment supply and emergency response uses.
Description of the natural environment	The seabed in permit areas is generally flat and featureless. There are no protected marine parks over the operational are area, but the Ancient Coastline Key Ecological Feature at 125 m depth contour intersects the south eastern portion of the Operational area.
Operational Area	WA-26-L, WA 27-L and WA-54-L
Petroleum production licence	WA-26-L, WA 27-L and WA-54-L

ACTIVITY COORDINATES

LOCATION	Latitude	Longitude	Water depth
Operational Area	19° 9' 55.21" S	116° 35' 4.72" E	Approximately 130 – 160 m
	19° 9' 55.21" S	116° 40' 4.72" E	
	19° 14' 55.21" S	116° 40' 4.72" E	
	19° 14' 55.21" S	116° 45' 4.72" E	
	19° 9' 55.21" S	116° 45' 4.72" E	
	19° 9' 55.20" S	116° 50' 4.72" E	
	19° 19' 55.21" S	116° 50' 4.72" E	
	19° 19' 55.22" S	116° 35' 4.72" E	
	19° 19' 55.22" S	116° 30' 4.72" E	
	19° 14' 55.22" S	116° 30' 4.72" E	
	19° 14' 55.21" S	116° 35' 4.72" E	

About decommissioning activities (source NOPSEMA)

Decommissioning is a normal and inevitable stage in the lifetime of an offshore petroleum project that is planned and matured throughout the life of operations.

Decommissioning involves the timely, safe and environmentally responsible removal of, or otherwise satisfactorily dealing with, infrastructure from the offshore area that was previously used to support oil and gas operations.

Key aspects for consideration in planning decommission activities are:

+ **Navigation** – ensuring that property does not cause an unacceptable impact and risk to other marine users.
+ **Contamination** – consideration of any pollution or contamination resulting from the deterioration of property.
+ **Impact on marine environment** – consideration of impacts and risks from the activity to the marine environment.
+ **Stability** – consideration of movement of infrastructure.
+ **Technical Feasibility** – review of the technical feasibility of implementing the decommissioning activity.

The Australian Government base case for decommissioning is the complete removal of all infrastructure.

Options other than complete removal may be considered, however the titleholder must demonstrate that the alternative decommissioning approach delivers equal or better environmental outcomes compared to complete removal and meets all applicable requirements under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and regulations, including well integrity and safety related matters, and other applicable laws.

More information about decommissioning can be found **here**.

Figure 2. *Gravity base/ballast module and a steel anchor being installed*

Activity Purpose and Approvals

Santos produced hydrocarbons from the Mutineer, Exeter, Fletcher and Finucane light crude oil fields between 2005 and 2018.

The MEFF production system comprised a series of subsea wells linked by subsea pipelines via mid-water arches (MWAs) and a disconnectable turret mooring (DTM) to a Floating Production Storage and Offloading unit (FPSO).

The MEFF Development ceased production in 2018, following which the FPSO departed the field. The subsea production system has been flushed of hydrocarbons with treated seawater and is in a preservation state.

The MWAs and DTM were removed in 2023, under the MEFF Cessation of Production EP, which was accepted by NOPSEMA in March 2022.

Santos will, subject to acceptance of a separate EP, permanently plug and abandon 12 wells, with an estimated campaign duration of 230 days but which could take up to 12 months.

The final phase of decommissioning will be the removal of most of the seabed infrastructure, including plastics, with some select infrastructure proposed to be left in situ.

Santos also is proposing to leave in situ two gravity bases, complete with concrete ballast, each weighing about 330 t, as well as six deeply buried steel anchors and steel mooring chains.

Apart from the P&A activity, all other activities are proposed to be managed under the revised **Mutineer Exeter Cessation of Production and Decommissioning Environment Plan**, which is currently under assessment by NOPSEMA.

Feedback provided by relevant persons will be considered in an update to the EP.

Defining the Environment Area for Proposed Activities

Santos has undertaken an initial assessment to identify the environmental, social, economic and cultural values and sensitivities that may be affected by impacts and risks of proposed activities.

To do this we have considered the totality of the areas where activity impacts and risks may occur. These areas are summarised in **Table 1**. The widest extent of these areas is called the Environment that May Be Affected (EMBA), which for this activity is the outer boundary of a worst-case marine diesel spill resulting from a vessel collision during decommissioning activities. The EMBA the activities illustrated in **Figure 3**.

Oil spill EMBAs are defined by overlaying a great number (usually hundreds) of individual, computer simulated, hypothetical oil spill events into a single map. Each simulation run starts from the same location (release point) but each run will be subject to a different set of wind and weather conditions derived from historical data. The use of advanced and sophisticated models enables us to present all the areas that could be affected.

While the EMBA represents the largest possible spatial extent that could be contacted by the worst-case spill events modelled, an actual spill event is more accurately represented by a single simulation run, resulting in a smaller spatial extent in the event of an actual spill. Often one or more simulation runs are selected to be representative of the 'worst-case' based on the nature and scale of the activity and the local environment.

Both the EMBA and the single representative worst-case oil spill are used for the environmental risk assessment and oil spill preparedness and response planning.

Please see the NOPSEMA Spill Modelling Video for more information on oil spill modelling and why it is required for the preparation of Environment Plans.

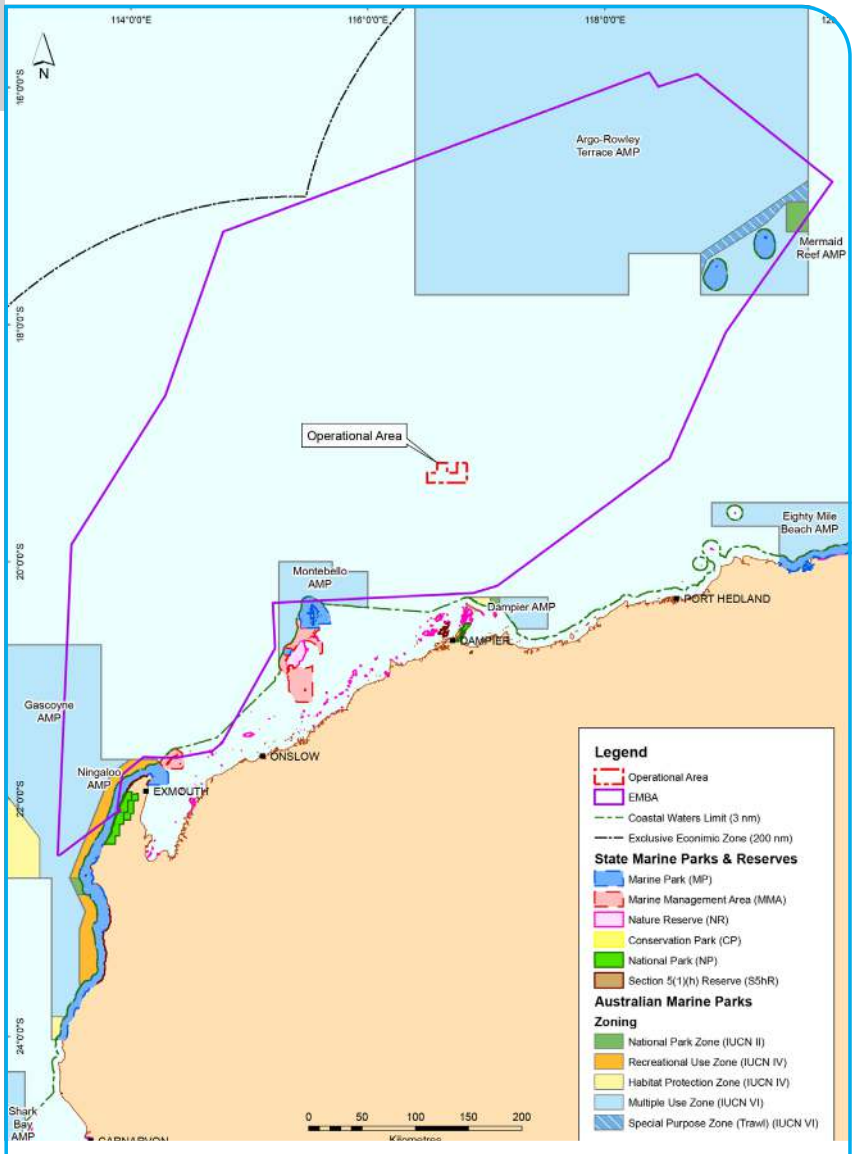

Figure 3. Activity location map with EMBA

TABLE 1 ENVIRONMENT AREA FOR PROPOSED ACTIVITIES

ENVIRONMENT AREA	
Operational Area	The area in which the multipurpose support vessel and support vessels will operate.
Environment that May Be Affected (EMBA)	The spatial extent of activity impacts (e.g., facility presence, light, noise) and risk (e.g., hydrocarbon spill).

Environmental, Social, Economic and Cultural Features

We have undertaken a review of publicly available information to identify environmental, social, economic and cultural features that may be affected by activity impacts and risks, which are summarised in **Table 2**.

TABLE 2
ENVIRONMENTAL, SOCIAL, ECONOMIC AND CULTURAL FEATURES

FEATURES	DESCRIPTION	OPERATIONAL AREA	EMBA	PUBLIC INFORMATION REVIEW
Aboriginal Heritage	Registered Aboriginal heritage sites protected under the: + *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* + *WA Aboriginal Heritage Act 2021*	No	Yes	No known sites of Aboriginal Heritage significance occur within the Operational Area. Two registered Aboriginal Heritage sites occur within the EMBA.
Cultural Heritage	Registered cultural sites under the: + *Underwater Cultural Heritage Act 2018*	No	Yes	No known sites of shipwrecks, sunken aircraft or Aboriginal and Torres Strait Islander Underwater Cultural Heritage have been identified within the Operational Area. The nearest shipwreck, the McCormack dredging barge is approximately 106 km south west of the Operational Area.
Defence	Designated defence activity areas	No	Yes	Defence activities may take place within the EMBA.
Fishing	Commercial fishing (Cwth and State)	Yes	Yes	A number of Commonwealth and State fisheries overlap the EMBA, of which some are active in the Operational Area.
	Indigenous, subsistence or customary fishing	No	No	Traditional Australian Indigenous fishing activities are generally concentrated within 3 NM of the Northern Territory / Western Australian coastline.
	Recreational and charter boat fishing	No	Yes	Given the water depths and distance from the nearest mainland, it is unlikely recreational fishing would occur in the OA. Recreational fishing does occur within the EMBA and therefore could be impacted by unplanned events.
Oil and Gas Operations	Petroleum operations	No	Yes	Oil and gas facilities occur within the EMBA as do permits operated by other titleholders. Thus, oil and gas activities could be impacted by unplanned events.

Protected Areas (nearest Commonwealth and State marine parks)	Montebello Marine Park Cwth	No	Yes	The Montebello Marine Park is approximately 98km southwest from the operational area.
	Montebello Islands Marine Park (State)	No	Yes	The Montebello Islands Marine Park is approximately 98 km southwest from the operational area.
Shipping	Shipping fairway	Yes	Yes	The eastern boundary of the operational area abuts the Dampier shipping fairway. The shipping fairways of the region service Dampier and Karratha. Therefore, vessel traffic is expected in the vicinity of the operational area.
Telecommunications	Subsea telecommunications cables	No	Yes	The JASURAUS cable system and the North West Cable System and are located approximately 181 km and 185 km east of the operational area.
Tourism	Tourism operations	No	Yes	The EMBA encompasses a number of marine parks and reserves. Thus, ecotourism based on specific local values (game fish, nearshore reef snorkelling and diving) could be impacted by unplanned events.
	Shipwrecks	No	Yes	Multiple shipwrecks are listed to occur within the EMBA.
Towns / communities	Dampier	No	No	Dampier is approximately 147 km south of the Operational Area.

Activity Impacts and Risk Management

We have summarised in **Table 3** potential environmental risks and impacts and associated management measures for the proposed activity. These aspects will be risk-assessed with the Environment Plan on a case-by-case basis.

TABLE 3
ACTIVITY IMPACT AND RISK MANAGEMENT

POTENTIAL ACTIVITY IMPACTS	
Acoustic disturbance to fauna	
Description of potential impacts Potential impacts from noise emissions may occur in the operational area from the following sources: + Vessel, helicopter and RoV activities. + Equipment positioning, cutting / deburial activities. + Removal of infrastructure and marine growth.	**Compliance with the following key management measures** + Santos procedures for interacting with marine fauna. + Santos Marine Assurance Procedure. + Vessel Planned Maintenance System (PMS) to maintain vessel dynamic positioning, engines and machinery.
Atmospheric emissions	
Description of potential impacts + Potential impacts from atmospheric emissions may occur in the operational area from the following sources: + Combustion through the engines and incinerators on project vessels. + Operation of vessel engines, helicopters, and equipment.	**Compliance with the following key management measures** + Vessel fuel oil sulphur content is compliant with the International Convention for the Prevention of Pollution from Ships (MARPOL). + Pursuant to MARPOL Annex VI, vessels will maintain a current International Air Pollution Prevention (IAPP) Certificate as relevant to vessel class. + Waste (garbage) management procedure. + Santos marine assurance standard. + Vessel Planned Maintenance System (PMS) to maintain vessel dynamic positioning, engines and machinery.
Chemical and hydrocarbon discharges	
Description of potential impacts Planned operational discharges include: + Minor discharge from ROV or tooling hydraulics (typically mineral oil) during subsea operations. + The discharge of up to approximately 2250 m3 of treated seawater with <40 ppm oil in water content, along with residual hydrocarbons from the rough-bore carcass of flexible flowlines during disconnection and removal of seabed infrastructure or discharge overtime from infrastructure left in situ (e.g. rigid flowlines). + Scale inhibitor, hydraulic control fluid and glycol discharges during disconnection and removal of EFLs and HFLs. Santos does not anticipate any other contaminants (e.g. mercury).	**Compliance with the following key management measures** + Santos Chemical Selection Procedure during operations phase using environmentally acceptable products. + Previous flushing of the subsea system to as low as reasonably practicable (ALARP).

Degradation of abandoned seabed equipment

Description of potential impacts

Potential impacts from the degradation and corrosion of abandoned seabed equipment may occur in the marine environment from:

+ Degradation of the steel mooring chains and anchors, gravity bases and concrete ballast, and the two steel base/mudmats (from the manifolds which are being removed).
+ Release of treated seawater and residual hydrocarbons from degradation of abandoned seabed infrastructure.

Compliance with the following key management measures

+ Consultation with persons relevant to end state during Santos' decision making to inform proposed end states that are the subject of the EP.
+ Detailed Environment Impact Assessment using a multi criteria analysis to help inform end state risk and impact assessment.
+ Infrastructure left in situ marked on nautical charts.
+ Application is made to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) for a sea dumping permit for infrastructure left on title (legal requirement).

Light emissions

Description of potential impacts

+ Light emissions in the marine environment will occur as a result of:
+ Vessel operations; and
+ ROV / Diver Operations and activities.

Compliance with the following key management measures

+ Vessel navigation lighting and equipment is compliant with the Convention on the International Regulations for Preventing Collisions at Sea, 1972 / Marine Orders 30: Prevention of Collisions, and with Marine Orders 21: Safety of Navigation and Emergency Procedures.

Operational discharges

Description of potential impacts

Planned operational discharges include all discharges that are not chemical/hydrocarbon related e.g chemicals that are used in desal/cooling water/deck drainage /sewage treatment. Planned operational discharges will occur as a result of:

+ Cleaning and preparation activities.
+ Removals of topside and substructure.
+ Vessel operations.
+ Indirect discharge associated with transport and towing assets to port and onshore disposal.

Compliance with the following key management measures

+ Waste (garbage) Management Plan..
+ Routine vessel discharge (sewage, bilge water, food waste) will meet MARPOL requirements.
+ Deck cleaning products that may be discharged to the ocean will meet MARPOL requirements.
+ General chemical management procedures.

Physical presence and interaction with other marine users

Description of potential impacts

Interaction with other marine users may occur as a result of:

+ Vessel and ROV Operations.
+ Helicopter activities.
+ wet stored equipment; and
+ continued presence of abandoned in situ seabed equipment (e.g., 2 x gravity bases and concrete ballast and 6 x deeply buried mooring anchors.

Compliance with the following key management measures

+ Existing (gazetted) PSZs established around the MEFF DTM and manifold locations.
+ Maritime notices.
+ If requested, stakeholders will be notified prior to the commencement of, and on cessation of each activity.
+ A visual and radar watch will be maintained on the support vessel bridge.
+ Lighting compliance with National Standard for Commercial Vessels or Marine Orders requirements.

Seabed and benthic habitat disturbance

Description of potential impacts

Activities may disturb seabed and benthic habitat through:

+ Temporary wet storage of equipment.
+ sand and / or grout bags to provide stabilisation to end of disconnected risers, flowlines and umbilicals at the seabed.
+ IMMR activities during the cessation phase.
+ environmental sediment sampling.
+ localised seabed disturbance if required, to provide for activities such as installing plugs / caps /deburial and removal activities.
+ continued presence of abandoned seabed equipment.

Compliance with the following key management measures

+ Objects dropped overboard are recovered (where possible) to mitigate the environmental consequences from objects remaining in the marine environment.

ACTIVITY RISKS

Accidental introduction of invasive marine species (IMS)

Description of risks

Introduction of invasive marine species (IMS) may occur due to:

+ Biofouling on support vessels and external/ internal (e.g., sea chests, seawater systems) niches.
+ Biofouling on equipment that is routinely submerged in water (e.g., ROVs).
+ Discharge of high-risk ballast water.
+ Cross contamination between vessels.

Compliance with the following key management measures

+ The activity will comply with relevant regulations and guidelines.
+ Ballast water exchange will be managed through a Ballast Water Management Plan, and a vessel biosecurity risk assessment in accordance with the Invasive Marine Species Management Plan (EA-00-RI-10172) will be undertaken.
+ Compliance with the *Biosecurity Act 2015*.
+ International Convention on the Control of Harmful Anti-fouling Systems on Ships.
+ Quarantine management.

Unplanned oil spill resulting from a vessel collision

Description of risks

+ A worst-case credible scenario for the proposed activity is a marine diesel oil (MDO) / marine gas oil (MGO) spill resulting from a vessel collision.
+ This worst-case estimated volume would be typical for similar vessel-based or maintenance activities and significantly less than for commercial shipping activities in the region.

Compliance with the following key management measures

+ In the event of a hydrocarbon spill, an activity-specific Oil Pollution Emergency Plan (OPEP) will be implemented to mitigate environmental impacts.
+ The OPEP sets out environmental protection priorities and appropriate response measures for a range of spill scenarios.
+ The OPEP is developed in conjunction with the Regulator assessing the plan and in accordance with National, State and Territory marine pollution plans.

Interaction with other marine users (equipment left in situ)

Description of risks

+ Interaction with other marine users may occur as a result of:
+ the continued presence of seabed assets (gravity bases up to 3.1 m).

The physical presence of the seabed equipment abandoned in situ on or above the seabed may interfere with third party activities including:

+ current and future commercial fishing activities (accidental damage to fishing equipment such as trawl fishing gear).
+ future petroleum activities.
+ future commercial shipping activities.

Compliance with the following key management measures

+ Notify the Australian Hydrographic Office (AHO) of locations for equipment abandoned in situ for marking on navigational charts.

Unplanned hazardous and non-hazardous discharges

Description of risks

Sources of risk from a minor hydrocarbon release may occur as a result of:

+ Vessel and equipment Operations.
+ ROV/Diver Operations.
+ Refuelling of equipment / machinery (on deck).

Compliance with the following key management measures

+ Dropped object prevention procedures.
+ Hazardous and General chemical management procedures.
+ International Maritime Dangerous Goods Code.
+ Vessel spill response plans (SOPEP/SMPEP).
+ Santos marine assurance standard.
+ Vessel Planned Maintenance System (PMS) to maintain vessel dynamic positioning, engines and machinery.

Unplanned interaction with marine fauna

Description of risks

Marine fauna interactions may occur as a result of:

+ Vessel / ROV / helicopter and diver operations.

Compliance with the following key management measures

+ Santos procedures for interacting with marine fauna.
+ Vessel navigation procedures, including constant bridge watch.

Unplanned release of solid objects

Description of risks

Release of these objects may occur as a result of overfull and/or uncovered bins, incorrectly disposed items or spills during transfers of waste, or dropped objects/lost equipment.

Key management measures

+ Dropped object prevention procedure.
+ Santos Vessel Assurance Procedure.
+ Waste Management Plan.
+ Objects dropped overboard are recovered (where possible and safe to do so) to mitigate the environmental consequences from objects remaining in the marine environment.

Consultation

Consultation provides Santos with an opportunity to receive feedback from authorities, persons and organisations whose functions, interests or activities may be affected by proposed petroleum activities.

This feedback helps us to refine or change the management measures we are planning to address potential activity impacts and risks. Santos' objective for proposed activities is to reduce environmental impacts and risks to a level that is As Low As Reasonably Practicable (ALARP) and acceptable over the life of the activity.

Consultation also helps us to identify values and sensitivities where information is not publicly available, such as spiritual and cultural connection to land and sea country, as well as first-hand feedback on commercial and recreational fishing, tourism and local community activities and interests.

Providing feedback

If you consider you may be a relevant person, please contact us as soon as possible if you require any further information or if you think you are not on our consultation list.

We are asking for relevant persons to provide feedback by **26 July 2023**.

Feedback provided by relevant persons will be considered in an update to the Mutineer Exeter Cessation of Production and Decommissioning Environment Plan currently under assessment by NOPSEMA and through the life of the activity. Feedback from relevant persons will be included in the updated EP that is submitted to NOPSEMA for assessment.

Please let us know if you would like your personal/organisational details or any part of your feedback to remain private and we will ensure this remains confidential to NOPSEMA.

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