Santos

Eos 3D Marine Seismic Survey

Oil Pollution Emergency Plan

November 2025

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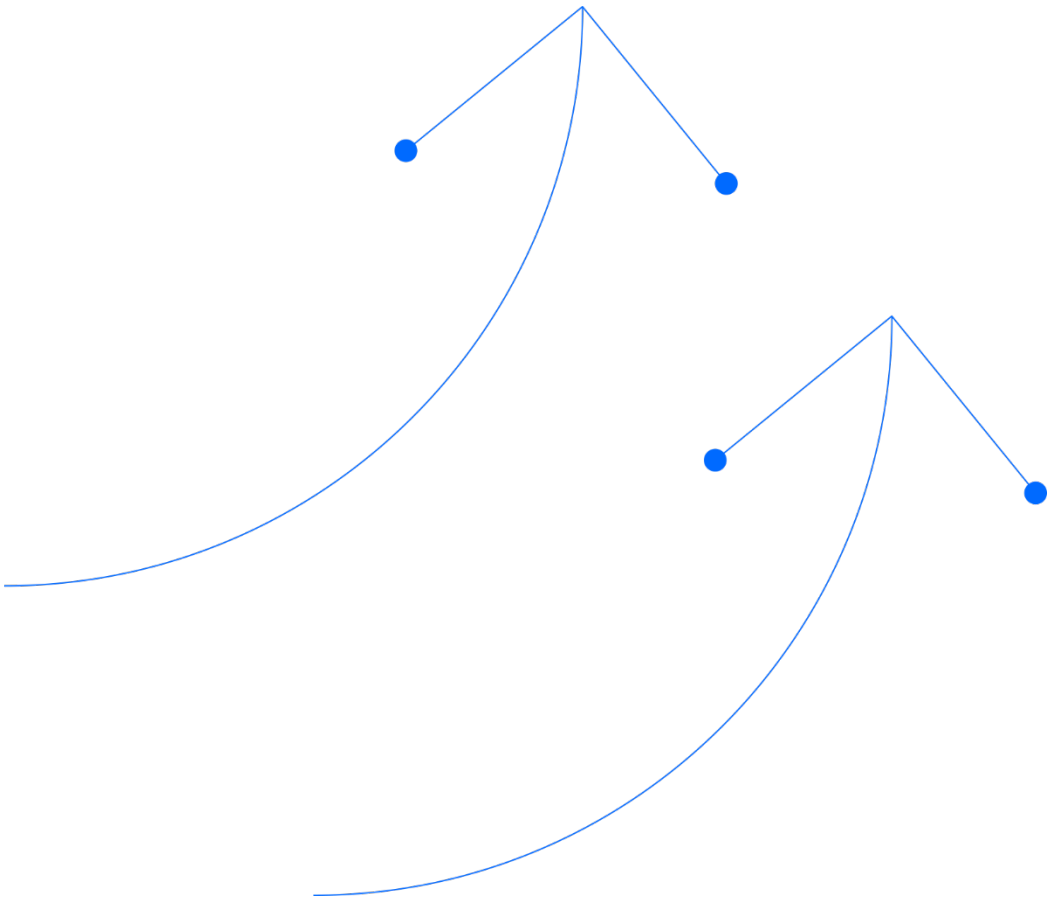

Santos

Eos 3D Marine Seismic Survey

Oil Pollution Emergency Plan

Document No.: 7710-650-EMP-0011-1

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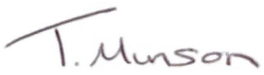
1		 p.p. 	p.p. 

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Senior Oil Spill Response Coordinator	link only
Santos Company Site Representative (CSR)	link only
AMOSC	●
DTMI	●
AMSA	●
OSRL	●

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Terms

Term	Definition
AEP	Australian Energy Producers (formerly Australian Petroleum Production and Exploration Association [APPEA]; from 13 September 2023)
AIS	automatic identification system
ALARP	as low as reasonably practicable
AMOSC	Australian Marine Oil Spill Centre Pty Ltd
AMSA	Australian Marine Safety Authority
API	American Petroleum Institute
AEP	Former Australian Petroleum Production & Exploration Association (APPEA) (to 12 September 2023), now Australian Energy Producers (AEP)
BAOAC	Bonn Agreement Oil Appearance Codes
BIP	Bridging Implementation Plan
CMT	Crisis Management Team
CSR	company site representative
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DISR	Department of Industry, Science and Resources
DLPE	Department of Lands, Planning and Environment
DMPE	Department of Mines, Petroleum and Exploration
DPIRD	Department of Primary Industries and Regional Development
DTMI	Department of Transport and Major Infrastructure
EMBA	environment that may be affected
EP	Environment Plan
EPA	Environment Protection Authority (NT)
ER	emergency response
ERT	Emergency Response Team
FOB	forward operating base
GIS	geographic information system
GPS	global positioning system
HMA	Hazard Management Agency
HR	human resources
IAP	Incident Action Plan
ICC	incident command centre
IMT	Incident Management Team
MARPOL	International Convention for the Prevention of Pollution from Ships
MEECC	Maritime Environmental Emergency Coordination Centre
MEER	Maritime Environmental Emergency Response
MNES	matters of national environmental significance
MoU	Memorandum of Understanding
MSA	Master Services Agreement
NEBA	net environmental benefit analysis
NOPSEMA	National Offshore Petroleum Safety and Environment Management Authority

Term	Definition
OMP	Operational Monitoring Plan
NT	Northern Territory
OPEP	Oil Pollution Emergency Plan
OPGGS(E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023
OSC	On-Scene Commander
OSM	Operational and Scientific Monitoring
OSM-BIP	Operational and Scientific Monitoring- Bridging Implementation Plan
OSRL	Oil Spill Response Limited
OSTM	oil spill trajectory modelling
OWR	oiled wildlife response
SHP-MEE	State Hazard Plan for Maritime Environmental Emergencies
SIMA	spill impact mitigation assessment
SMP	Scientific Monitoring Plan
SMPC	State Marine Pollution Coordinator
SMPEP	Shipboard Marine Pollution Emergency Plan
SOPEP	Shipboard Oil Pollution Emergency Plans
TEMC	Territory Emergency Management Council
TRP	Tactical Response Plan
UAV	Unmanned Aerial Vehicle
VOC	volatile organic compound
VOO	vessels of opportunity
VPO	Vice President Offshore Upstream WA
WA	Western Australia
WAOWRP	Western Australian Oiled Wildlife Response Plan
WSP	waste service provider

1. Quick reference information

<table>
<tr><th>Parameter</th><th colspan="3">Description</th><th>Further information</th></tr>
<tr><td>Petroleum Activity</td><td colspan="3">Vessel-based three dimensional (3D) marine seismic survey (MSS) in Commonwealth waters</td><td>Section 2 - Environment Plan (EP)</td></tr>
<tr><td rowspan="6">Location</td><td colspan="3">Operational Area Coordinates:</td><td rowspan="6">Section 2 EP</td></tr>
<tr><td>Latitude</td><td colspan="2">Longitude</td></tr>
<tr><td>12° 47' 45.870" S</td><td colspan="2">127° 35' 9.014" E</td></tr>
<tr><td>12° 38' 5.216" S</td><td colspan="2">127° 44' 2.253" E</td></tr>
<tr><td>12° 38' 16.443" S</td><td colspan="2">128° 6' 3.199" E</td></tr>
<tr><td>13° 18' 22.214" S</td><td colspan="2">128° 53' 45.423" E</td></tr>
<tr><td></td><td>13° 38' 52.656" S</td><td colspan="2">128° 35' 23.154" E</td></tr>
<tr><td>GHG Assessment Permit</td><td colspan="3">G-11-AP (Commonwealth waters)</td><td>N/A</td></tr>
<tr><td>Facilities/vessels</td><td colspan="4">One primary vessel and at least one support vessel (maximum of three vessels in Operational Area at any one time)</td></tr>
<tr><td rowspan="2">Worst-case spill scenarios</td><td>Scenario</td><td>Hydrocarbon</td><td>Worst-case volume</td><td rowspan="2">Section 6.1</td></tr>
<tr><td>Vessel collision resulting in a surface Marine Diesel Oil (MDO) release</td><td>MDO</td><td>1,065 m^3</td></tr>
<tr><td>Hydrocarbon properties</td><td colspan="3">MDO:
Density at 25 °C = 829.1 kg/m^3
Dynamic viscosity = 4 cP @ 25 °C
API Gravity = 37.6°
Wax content = 1%
Pour point = −14 °C
Oil property classification = Persistent (medium)</td><td>Appendix A</td></tr>
<tr><td>Weathering potential</td><td colspan="3">MDO is a mixture of volatile and persistent hydrocarbons with low viscosity. It will spread quickly and thin out to low thickness levels, thereby increasing the rate of evaporation. Up to 60% will generally evaporate over the first two days. Approximately 5% is considered ‘persistent’, which are unlikely to evaporate and will decay over time.</td><td>Appendix A</td></tr>
<tr><td>Protection priorities</td><td colspan="4">Jon Bonaparte Gulf (JBG) East Coast
Tiwi Islands</td></tr>
</table>

2. First-strike response actions

The initial response actions to major oil spill incidents will be undertaken by the relevant Vessel Master or the Santos Company Site Representative. The Emergency Commander is either the Santos Company Site Representative (if present) or the Vessel Master. This will be determined during the planning stages of the activity.

Following those initial actions undertaken by the Emergency Commander to ensure the safety of personnel on the vessel and to control the source of the spill, the Emergency Commander will assess the situation based on:

- What has caused the spill?
- Is the source under control?
- What type of hydrocarbon has been spilled?
- How much has been spilled?

For spills from vessels, initial response actions to major incidents are under the direction of the Vessel Master and in accordance with vessel-specific procedures (e.g. Shipboard Oil Pollution Emergency Plans [SOPEPs]).

Response information contained within this OPEP is concerned primarily with a large scale (Level 2/3) hydrocarbon spill where the Perth-based Incident Management Team (IMT) is engaged for support.

Level 1 spills are managed through on-site response and do not typically require the stand-up of the IMT for support, however, on-site response actions to monitor the spill and regulatory requirements for reporting still apply. Therefore, the immediate response actions listed in Table 2-1 are relevant for any spill. Once sufficient information is known about the spill, the Incident Commander at the Santos IMT in Perth will classify the level of the spill. If the spill is classified as a Level 1 spill, then the actions related to Level 2/3 spills do not apply, unless specified by the IMT Incident Commander.

Table 2-1: First-strike activations

When (indicative)	Activations		Who
	Objective	Action	
All spills			
Immediate	Manage the safety of personnel	Implement site incident response procedures or vessel-specific procedures, as applicable	Emergency Commander
Immediate	Control the source using site resources, where possible	Implement site source control procedures (Vessel SOPEP) Refer to source control plan – Section 9	Emergency Commander
30 minutes of incident being identified	Notify Santos Offshore Duty Manager/Incident Commander	Verbal communication to Offshore Duty Manager/Incident Commander's duty phone	Emergency Commander
As soon as practicable	Obtain as much information about the spill as possible	Provide as much information to the IMT (Incident Commander or delegate) as soon as possible	Emergency Commander
60 minutes of incident being reported	Gain situational awareness and begin on-site spill surveillance	Level 1 spills may only require the use of onsite resources to conduct monitor and evaluate activities (e.g. vessel surveillance). Activate the Monitor and Evaluate Plan – Section 10	Emergency Commander Incident Commander
Refer timeframes Go to Section 7	Make regulatory notifications within regulatory timeframes	Activate the External Notifications and Reporting Procedures – Section 7	Initial notifications by Planning Section Chief – Section 7
Level 2/3 spills (in addition to actions above)			
Immediately once notified of spill (to Incident Commander)	Activate IMT, if required	Notify IMT	Offshore Duty Manager/ Incident Commander
IMT actions (0 to 48 hours)			
Within 90 minutes from IMT call-out	Set up IMT room	Refer to IMT tools and checklists for room and incident log set-up	Incident Commander IMT Data Manager
	Gain situational awareness and set incident objectives, strategies and tasks	Begin reactive Incident Action Planning process Go to Section 8 Review First-strike Activations (this table)	Incident Commander Planning Section Chief
Refer timeframes Section 7	Make regulatory notifications as required Notify and mobilise/put on standby external oil spill response organisations and support organisations, as required	Go to Section 7	Initial notifications by Planning Section Chief Oil Spill Response Organisations (Australian Marine Oil Spill Centre [AMOSC] and Oil Spill Response Ltd [OSRL])

When (indicative)	Activations		Who
	Objective	Action	
			activation by designated call-out authorities (Incident Commanders/Duty Managers)
Refer timeframes Section 10	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT decision making	Vessel Surveillance (Section 10.1) Aerial Surveillance (Section 10.2) Tracking Buoys (Section 10.3) Oil Spill Trajectory Modelling (Section 10.4) Satellite Imagery (Section 10.5)	Operations Section Chief Logistics Section Chief/ Supply Unit Leader Environment Unit Leader
Activate on Day 1 as applicable to the incident	Source control support to stop the release of hydrocarbons into the marine environment. **Degree of IMT support will be scenario-dependent**	Activate the source control plan. Go to Section 9	Operations Section Chief Logistics Section Chief/ Supply Unit Leader
Activate on Day 1 as applicable to the incident Refer Section 11	Reduce exposure of shorelines and wildlife to floating oil through mechanical dispersion	Activate the Mechanical Dispersion Plan Go to Section 11	Operations Section Chief Logistics Section Chief/ Supply Unit Leader
Activate on day 1 as applicable to the incident Refer Section 16	Assess and monitor effectiveness of response strategies and potential impacts from spill and response	Activate the Santos Northern Australia Operational and Scientific Monitoring Bridging Implementation Plan (OSM-BIP) (7715-650-ERP-0003) Go to Section 16	Environment Unit Leader Logistics Section Chief/ Supply Unit Leader Operations Section Chief
Day 1	Identify environmental sensitivities at risk and conduct operational Net Environmental Benefit Analysis (NEBA)	Review situational awareness and spill trajectory modelling Review strategic NEBA and begin operational NEBA (Section 6.7)	Environment Unit Leader
Day 1	Develop forward operational base/s to support forward operations	Begin planning for forward operations base as per Forward Operations Plan (Appendix Q)	Operations Section Chief Logistics Section Chief/ Supply Unit Leader
Day 1	Ensure the health and safety of spill responders	Identify relevant hazards controls and develop hazard register Begin preparation Site Health and Safety Management requirements Refer Oil Spill Response Health and Safety Management Manual (SO-91-RF-10016)	Safety Officer
If/when initiated Refer Section 14	Prevent or reduce impacts to wildlife	Activate the Oiled Wildlife Response Plan Go to Section 14	Environment Unit Leader Operations Section Chief Logistics Section Chief / Supply Unit Leader

When (indicative)	Activations		Who
	Objective	Action	
If/when initiated Refer Section 12	Protect identified shoreline protection priorities	Activate the Shoreline Protection and Deflection Plan Go to Section 12	Operations Section Chief Logistics Section Chief / Supply Unit Leader Environment Unit Leader
If/when initiated Refer Section 13	Clean-up oiled shorelines	Activate the Shoreline Clean-up Plan Go to Section 13	Operations Section Chief Logistics Section Chief Supply Unit Leader Environment Unit Leader
If/when initiated Refer Section 15	Safely transfer, transport and dispose of waste collected from response activities.	Activate the Waste Management Plan. Go to Section 15	Operations Section Chief Logistics Section Chief/ Supply Unit Leader
IMT Actions (48+ hours)			
Ongoing	• For ongoing incident management – indicatively 48 + hours – a formal incident action planning process is to be adopted to continue with spill response strategies identified above. An Incident Action Plan (IAP) is to be developed for each successive operational period. • Santos will maintain control for those activities for which it is the designated Control Agency/Lead IMT. • Depending on the specifics of the spill, the Australian Maritime Safety Authority (AMSA), the Western Australia (WA) Department of Transport and Major Infrastructure (DTMI) and/or the Northern Territory (NT) Government may be relevant Control Agencies (see Section 4.2). • Where another Control Agency has taken control of aspects of the response, Santos will provide support to that Control Agency. Santos' support to WA DTMI (for a WA State waters response) is detailed in Section 4.5 and to NT Government (for a NT State waters response) is detailed in Section 4.6.		Control agency IMT Santos to provide the following roles to DTMI Maritime Environmental Emergency Coordination Centre (MEECC) / IMT for WA State waters response or the equivalent to the NT Control Agency for NT State waters response (refer to Table 5-5): • CMT Liaison Officer • Deputy Incident Controller • Deputy Intelligence Officer • Deputy Planning Officer • Environment Support Officer • Deputy Public Information Officer • Deputy Logistics Officer • Deputy Waste Management Coordinator • Deputy Finance Officer • Deputy Operations Officer • Deputy Division Commander (FOB)

3. Introduction

This document is the accompanying Oil Pollution Emergency Plan (OPEP) to the *Eos 3D MSS Environment Plan* (7710-650-EMP-0011) required by Regulation 22(8) of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2023* (OPGGS (E) Regulations).

3.1 Description of activity

Santos Energy Ltd. (Santos) proposes to conduct a three-dimensional (3D) marine seismic survey (MSS) in the Bonaparte Basin, located in Commonwealth waters off the northern coast of Australia (Figure 3-1). The timing of the survey is described in Section 2.4 of the *Eos 3D MSS Environment Plan* (7710-650-EMP-0011).

During the survey, a seismic survey vessel will tow a seismic source array and a series of streamers within the Operational Area. The seismic source will emit pulses of low-frequency sound which will reflect from the underlying rock layers beneath the seabed, and the reflected sound (seismic data) will be recorded by the towed streamers. The seismic survey vessel will be supported by up to two dedicated support marine vessels (one being a chase vessel) which will provide logistical, safety, equipment, and assist with re-supply and refuelling support operations. Aircraft, such as helicopters and drones, will also support operations.

Refer to Section 2 of the Eos 3D MSS EP for further details on the activity.

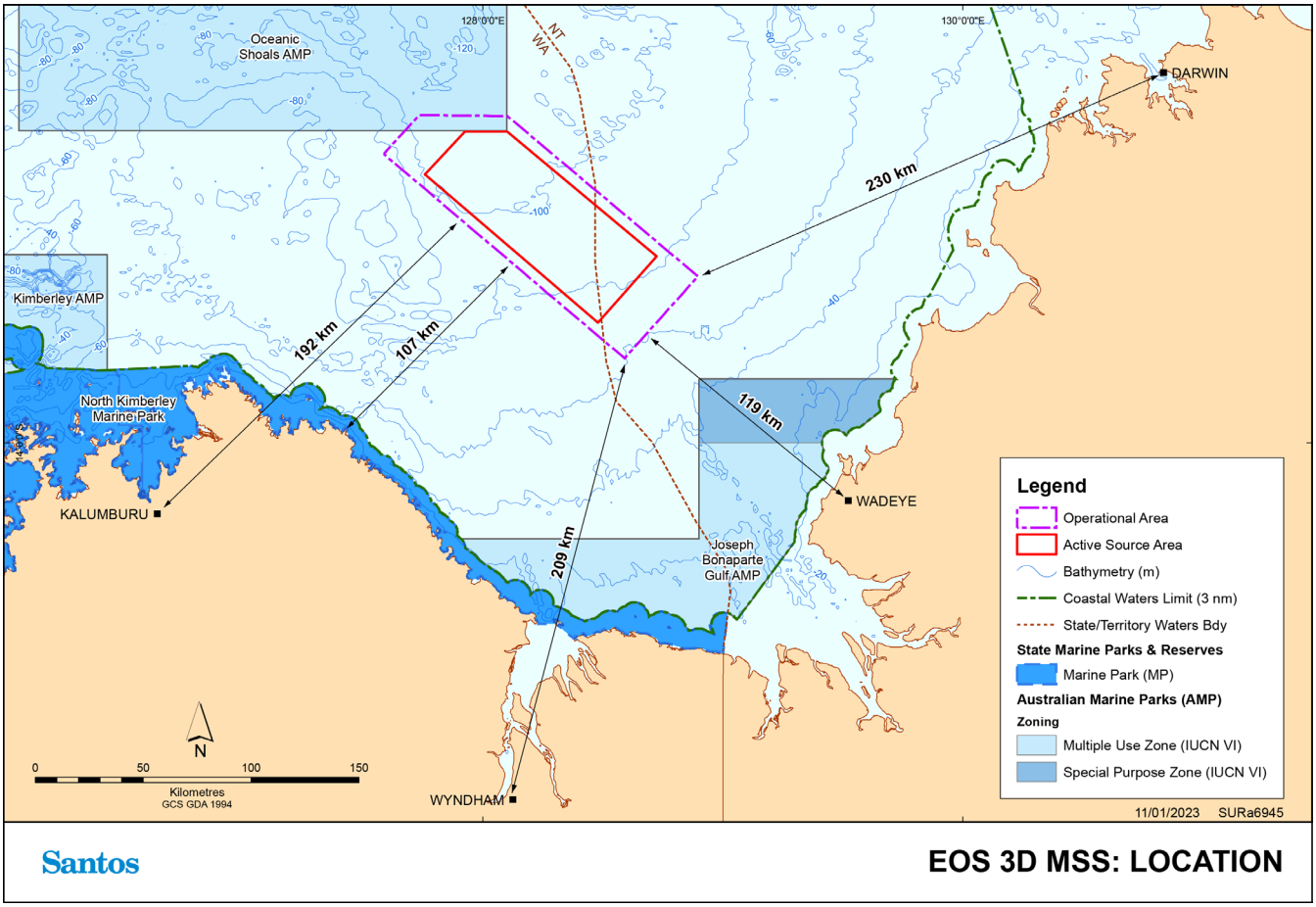

Figure 3-1: Eos 3D MSS EP Operational Area and Active Source Area

3.2 Purpose

The purpose of this OPEP is to describe Santos' response to a hydrocarbon spill during marine seismic surveys within the Operational Area covered in the Eos 3D MSS EP (7710-650-EMP-0011).

This OPEP has been developed to meet all relevant requirements of the Commonwealth OPGGS (E) Regulations. It is consistent with the national and State (WA)/ Territory (NT) systems for oil pollution preparedness and response, being the National Plan for Maritime Environmental Emergencies (AMSA 2020) managed by AMSA; the

WA State Hazard Plan for Maritime Environmental Emergencies (SHP-MEE) (WA DoT 2024), and the Territory Emergency Plan (Northern Territory Government, 2021).

This OPEP is to be read in conjunction with the Eos 3D MSS EP (7710-650-EMP-0011) when considering the existing environment, environmental impacts, risk management, performance standards and the reporting compliance requirements.

This OPEP will apply from acceptance of the Eos 3D MSS EP (7710-650-EMP-0011) and will remain valid for the duration of life of the EP.

The response strategies outlined in this OPEP have been developed by Santos using risk assessments to identify credible worst-case hydrocarbon spill scenarios, expected/calculated release rates, known information of hydrocarbon types and behaviour, and expected partitioning of the hydrocarbon within the marine environment with an estimate of the volume of persistent oil. This information has been modelled to give a theoretical zone of dispersion that is used to identify potential sensitive receptors and response strategies required to reduce the consequences of a spill to 'as low as reasonably practicable' (ALARP). The response strategies are identified under a NEBA process so the most effective response strategies with the lowest environmental consequences can be identified, documented and prepared for.

3.3 Objectives

The aim of this OPEP is to provide detailed guidance to Santos' IMT, so that it will direct its response effort with the aim of preventing long-term significant environmental impacts by safely limiting the adverse environmental effects from an unplanned release of hydrocarbons to the marine environment to a level that is ALARP. This will be achieved through the implementation of the various strategies and spill response mechanisms presented throughout this OPEP. Through their implementation, Santos will:

- initiate spill response immediately following a spill
- establish source control as soon as reasonably practicable to minimise the amount of oil being spilt into the environment
- assess the spill characteristics and understand its fate in order to be able to make informed and clear response decisions
- monitor the spill to identify the primary marine and coastal resources requiring protection
- remove as much oil as possible from the marine environment while keeping environmental impacts from the removal methods to ALARP
- reduce the impacts of the remaining floating and stranded oil to ALARP
- respond to the spill using efficient response strategies that do not damage the environment themselves
- comply with all relevant environmental legislation when implementing this OPEP
- conduct all responses safely without causing harm to participants
- monitor the impacts from a spill until impacted habitats have returned to baseline conditions
- remain in a state of 'Readiness' at all times for implementation of this OPEP by keeping resources ready for deployment, staff fully trained and completing response exercises as scheduled
- keep stakeholders informed of the status of the hydrocarbon spill response to aid in the reduction of social and economic impacts.

3.4 Area of operation

The Eos 3D MSS EP (7710-650-EMP-0011) Operational Area is located in Commonwealth waters approximately 107 km north-east of the Kimberly coastline and 102 km west of the Northern Territory (NT) coastline.

The Operational Area lies within the Greenhouse Gas Assessment Permit G-11-AP within Commonwealth waters in water depths ranging from approximately 56 m to 112 m. Section 3 of the Eos 3D MSS EP (7710-650-EMP-0011) includes a comprehensive description of the existing environment.

3.5 Interface with internal documents

In addition to this OPEP, a number of other Santos documents provide guidance and instruction relevant to spill response, including:

- Incident Management Plan – WANATL (7700-670-PLA-0016)
- Santos Incident Management Handbook
- Santos Crisis Management Plan (SMS-HSS-OS05-PD03)
- Eos 3D MSS EP (7710-650-EMP-0011)
- Incident Response Telephone Directory (7700-670-PLA-0016. 20)
- Refuelling and Chemical Management Standard (SO-91-IQ-00098)
- Waste Management Plan (WA) (7715-650-ERP-0001)
- Waste Management Plan (NT) (BAA-201_0027)
- Oil Spill Response Health and Safety Management Manual (SO-91-RF-10016)
- Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017)
- Santos Oiled Wildlife Sample Collection Protocol
- Santos Northern Australia Operational and Scientific Monitoring – Bridging Implementation Plan (OSM-BIP) (7715-650-ERP-0003)
- Oil Spill Scientific Monitoring Baseline Data Review (SO-91-RF-20022)
- Santos Offshore Division Incident and Crisis Management Training and Exercise Plan (SO-92-HG-10001)
- Santos Offshore Division Oil Spill Response Readiness Guideline (7710-650-GDE-0001)
- Santos Oil and Water Sampling Procedures (7710-650-PRO-0008)
- Santos Marine Vessel Requirements for Oil Spill Response (7710-650-ERP-0001)
- Santos Oil Spill Response – Forward Operating Base Guideline (SO-91-IF-20017).

Relevant Tactical Response Plans are made available within the ‘First Strike Resources’ folder within the Offshore Emergency Response on Santos intranet site.

3.6 Interface with external documents

Information from the following external documents have been used or referred to within this OPEP:

- AMOSPlan – Australian Industry Cooperative Spill Response Arrangements
  - details the cooperative arrangements for response to oil spills by Australian oil and associated industries.
- Offshore Petroleum Incident Coordination Framework
  - provides overarching guidance on the Commonwealth Government’s role and responsibilities in the event of an offshore petroleum incident in Commonwealth waters.
- National Plan for Maritime Environmental Emergencies and National Marine Oil Spill Contingency Plan
  - sets out national arrangements, policies and principles for the management of maritime environmental emergencies. The plan provides for a comprehensive response to maritime environmental emergencies regardless of how costs might be attributed or ultimately recovered.
- Western Australia State Hazard Plan for Maritime Environmental Emergencies (SHP-MEE)
  - details the management arrangements for preparation and response to a marine pollution incident occurring in State waters.
- WA DTMI Incident Management Plan – Marine Oil Pollution
  - provides the WA DTMI, as the HMA for marine oil pollution, with an IMP that outlines the procedures and arrangements for responding to MOP incidents occurring within or impacting WA State Waters

- DTMI's Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (go to: Offshore Petroleum Industry Guidance Note – Marine Oil pollution: Response and Consultation Arrangements).
- Western Australia Oiled Wildlife Response Plan
  - establishes the framework for responding to potential or actual wildlife impacts in WA waters, within the framework of an overall maritime environmental emergency
  - outlines risk reduction strategies, preparedness for, response to and initiation of recovery arrangements for wildlife impacts during a marine oil pollution incident.
- Western Australia Oiled Wildlife Response Manual
  - a companion document to the Western Australia Oiled Wildlife Response Plan for Maritime Environmental Emergencies, designed to standardise operating procedures, protocols and processes for wildlife response.
- Northern Territory Emergency Plan
  - defines the NT's approach to emergency and recovery operations, the governance and coordination arrangements, and roles and responsibilities of agencies.
- Northern Territory Oiled Wildlife Response Plan
  - Defines strategies and nominates indicative personnel numbers and role requirements for OWR.
- Joint Industry Operational and Scientific Monitoring Framework
  - provides a standardised approach to oil pollution monitoring, including industry guidance, templates, worked examples and standardised Operational and Scientific Monitoring Plans which titleholders can apply to identify and detail monitoring arrangements and capabilities in their EP and OPEP submissions.
- Shipboard Oil Pollution Emergency Plans
  - under International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I requirements, all vessels of over 400 gross tonnage are required to have a current SOPEP. The SOPEP includes actions to be taken by the crew in the event of an oil spill including steps taken to contain the source with equipment available onboard the vessel.
- OSRL Associate Member Agreement
  - defines the activation and mobilisation methods of OSRL spill response personnel and equipment allocated under contract.
- Australian Government Coordination Arrangements for Maritime Environmental Emergencies
  - provides a framework for the coordination of Australian Government departments and agencies in response to maritime environmental emergencies.

3.7 Document review

In line with regulatory requirements, this document shall be reviewed, updated and submitted to NOPSEMA every five years from date of acceptance.

The document may be reviewed and revised more frequently, if required, in accordance with the Santos Management of Change Procedure (EA-91-IQ-10001). This could include changes required in response to one or more of:

- when major changes have occurred that affect oil spill response coordination or capabilities
- changes to the Environment Plan that affect oil spill response coordination or capabilities (e.g. a significant increase in spill risk)
- following routine testing of the OPEP if improvements or corrections are identified
- after a Level 2/3 spill incident.

The extent of changes made to the OPEP and resultant requirements for regulatory resubmission will be informed by the relevant Commonwealth regulations; i.e. the OPGGS (E) Regulations.

The custodian of the OPEP is Santos Senior Oil Spill Response Coordinator.

4. Spill management arrangements

4.1 Response levels and escalation criteria

Santos uses a tiered system of three incident response levels consistent with the National Plan for Maritime Environmental Emergencies (National Plan) (AMSA 2020) and the WA State Hazard Plan for Maritime Environmental Emergencies (SHP- MEE) (WA DoT 2024). Spill Response Levels help to identify the severity of an oil spill incident and the level of response required to manage the incident and mitigate environmental impacts. Incident response levels are outlined within the Santos Incident Management Plan – WANATL (7700-670-PLA-0016) and further detailed in Table 4-1 for hydrocarbon spills. The spill scenarios for this activity are described in Section 6.1.

Table 4-1: Santos oil spill response levels

Level 1	
An incident which will not have an adverse effect on the public or the environment which can be controlled by the use of resources normally available on site.	
• Oil is contained within the incident site. • Spill occurs within immediate site proximity. • Incident can be managed by the On-site Emergency Response Team (ERT) and its resources.	• Source of spill has been contained. • Oil is evaporating quickly and no danger of explosive vapours. • Spill likely to naturally dissipate. • No media interest/not have an adverse effect on the public.
Level 2	
An incident that cannot be controlled by the use of on-site resources alone and requires external support and resources to combat the situation; or An incident that can be controlled on site, but which may have an adverse effect on the public or the environment.	
• Danger of fire or explosion. • Possible continuous release. • Concentrated oil accumulating in close proximity to the site or vessel. • Potential to impact other installations.	• Level 1 resources overwhelmed, requiring additional regional resources. • Potential impact to sensitive areas and/or local communities. • Local/national media attention/may adversely affect the public or the environment.
Level 3	
An incident which has a wide-ranging impact on Santos and may require the mobilisation of external state, national or international resources to bring the situation under control.	
• Loss of well integrity. • Actual or potentially serious threat to life, property, industry. • Major spill beyond site vicinity. • Significant shoreline environmental impact.	• Level 2 resources overwhelmed, requiring international assistance. • Level 3 resources to be mobilised. • Significant impact on local communities. • International media attention.

4.2 Jurisdictional authorities and control agencies

The responsibility for an oil spill is dependent on location and spill origin. The National Plan (AMSA 2020) sets out the divisions of responsibility for an oil spill response. Definitions of Control Agency and Jurisdictional Authority are as follows:

- **Control agency:** the organisation assigned by legislation, administrative arrangements or within the relevant contingency plan, to control response activities to a maritime environmental emergency. Control agencies have the operational responsibility of response activities but may have arrangements in place with other parties to provide response assistance under their direction.
- **Jurisdictional authority:** the agency which has responsibility to verify that an adequate spill response plan is prepared and, in the event of an incident, that a satisfactory response is implemented. The Jurisdictional Authority is also responsible for initiating prosecutions and the recovery of clean-up costs on behalf of all participating agencies.

Table 4-2 provides guidance on the designated Control Agency and Jurisdictional Authority for Commonwealth and State waters for vessel spills.

To aid in the determination of whether a spill is classed as a vessel spill, the following guidance is adopted:

- A vessel is a ship at sea to which to which the *Navigation Act 2012* applies. Defined by Australian Government Coordination Arrangements for Maritime Environmental Emergencies (AMSA, 2017a) as a seismic vessel, supply or support vessel, or offtake tanker.
- A petroleum activity includes a fixed platform, FPSO/FSO, MODU, subsea infrastructure, or a construction, decommissioning and pipelaying vessel. As defined by Schedule 3, Part 1, Clause 4 and Volume 2, Part 6.8, Section 640 of the *OPGGS Act 2006*.

Table 4-2: Jurisdictional and control agencies for hydrocarbon spills

Jurisdictional boundary	Spill source	Jurisdictional authority	Control agency		Relevant documentation
			Level 1	Level 2/3	
Commonwealth waters (three to 200 nautical miles from territorial/state sea baseline)	Vessel[1]	AMSA	AMSA		Vessel SOPEP National Plan Eos 3D MSS OPEP (this document)
	Petroleum activities[2]	NOPSEMA	Titleholder		Eos 3D MSS OPEP (this document)
Western Australian (WA) state waters (State waters to three nautical miles and some areas around offshore atolls and islands)	Vessel	WA DTMI	WA DTMI		Vessel SOPEP State Hazard Plan: Maritime Environmental Emergencies (WA DoT 2024) WA Incident Management Plan – Marine Oil Pollution (WA DoT 2023) Eos 3D MSS OPEP (this document)
	Petroleum activities	WA DTMI	Titleholder	WA DTMI	Eos 3D MSS OPEP (this document) State Hazard Plan: Maritime Environmental Emergencies (WA DoT 2024)
Northern Territory (NT) Waters to three nautical miles and some areas around offshore atolls and islands)	Vessel	NT Department of Lands, Planning and Environment (DLPE)	Vessel owner	DLPE / NT Incident Controller (IC) / Territory Emergency Management Council (TEMC)[3]	Vessel SOPEP Relevant NT Oil Spill contingency Plan Eos 3D MSS OPEP (this document)
	Petroleum activities	NT DLPE	Titleholder		Relevant NT Oil Spill contingency Plan Eos 3D MSS OPEP (this document)
International waters[4]	Vessel	Relevant foreign authority	Santos will liaise with the Australian Government Department of Foreign Affairs and Trade (DFAT) in the event that an oil spill may enter international waters. Santos will work with DFAT and the respective governments to support response operations.		
	Petroleum activities				

[1] *In Commonwealth waters, vessels are defined by Australian Government Coordination Arrangements for Maritime Environmental Emergencies (AMSA, 2017a) as a seismic vessel, supply or support vessel. Note: this definition does not apply to WA State waters.*

[2] *Includes a 'facility', such as a fixed platform, FPSO/FSO, MODU, subsea infrastructure, or a construction, decommissioning and pipelaying vessel. As defined by Schedule 3, Part 1, Clause 4 of the OPGGSA 2006.*

[3] *Combination of DLPE / TEMC / NT Police may assume the 'Control Agency / Controlling Authority' (CA) role if DLPE is unable to manage as the CA.*

[4] *As per AMSA (2017b), Coordination of International Incidents: Notification Arrangements Guidance NP-GUI-007.*

4.3 Petroleum activity spill in Commonwealth waters

For an offshore petroleum activity spill in Commonwealth waters, the Jurisdictional Authority is National Offshore Petroleum Safety and Environment Management Authority (NOPSEMA). NOPSEMA is responsible for the oversight of response actions to pollution events from offshore Petroleum Activities, in areas of Commonwealth jurisdiction. During a spill incident, NOPSEMA's role will be to implement regulatory processes to monitor and secure compliance with the *OPGGS Act 2006* and OPGGS (E) Regulations, including the issuing of directions as required, and investigate accidents, occurrences and circumstances involving deficiencies in environment management.

Under the OPGGS (E) Regulations and the *OPGGS Act 2006*, the petroleum titleholder (i.e. Santos) is responsible for responding to an oil spill incident as the Control Agency in Commonwealth waters, in accordance with its OPEP.

4.4 Seismic survey spills in Commonwealth waters

AMSA manages the National Plan for Maritime Environmental Emergencies (AMSA 2020) and is the Control Agency for all vessel-based spills in the Commonwealth jurisdiction. AMSA works with State governments, emergency services and private industry to maximise Australia's marine pollution response capability. For all level 2/3 vessel-based spills in NT waters the DLPE would assume the Control Agency role. This includes vessels undertaking seismic surveys and associated supply or support vessels.

The Vessel Master is responsible for implementing source control arrangements detailed in the vessel specific SOPEP.

Once initial notifications to the Control Agency are made, Santos shall maintain direct contact with the Control Agency and act as a Supporting Agency throughout the response. This includes providing essential services, personnel, materials or advice in support of the Control Agency. In addition, Santos will be required to implement monitoring activities, as outlined in the Monitor and Evaluate Plan (Section 10) and Operational and Scientific Monitoring (Section 16).

4.5 Seismic survey spills in WA waters

Although the National Plan defines seismic survey spills to be 'vessel-based' spills, this definition does not apply to WA waters, or to cross jurisdictional arrangements involving WA. The WA DTMI manages the SHP-MEE (WA DoT 2024) and is the Control Agency for both Level 2/3 petroleum activity and vessel-based spills in WA waters outside of a port proclaimed pursuant to the *Port Authorities Act 1999* (WA). For vessel-based spills within a port proclaimed pursuant to the *Port Authorities Act 1999* (WA), the relevant Port Authority or DTMI may be the Control Agency.

As a potential seismic survey spill would be defined as a petroleum activity spill in WA waters, the DTMI's Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (WA DoT 2020) shall apply.

4.6 Seismic survey spills in NT waters

The Northern Territory Oil Spill Contingency Plan (2014) is currently being updated but does not provide a definition for seismic survey spills. NT Control Agency will assume the Control Agency role for all level 2/3 vessel-based spills which occur in or enter NT waters.

4.7 Cross-jurisdictional spills

4.7.1 Cross-jurisdictional petroleum activity spills

If a Level 2/3 petroleum activity spill crosses jurisdictions between Commonwealth and WA State/Territory waters, the Jurisdictional Authority remains true to the source of the spill (i.e. NOPSEMA for Commonwealth waters; and DTMI/NT Control Agency for State/Territory waters).

Where a Level 2/3 spill originating in Commonwealth waters moves into State/Territory waters two Control Agencies will exist: DTMI/NT Control Agency and the petroleum titleholder (Santos), each with its own IMT and Lead IMT responsibilities. The arrangements between NT Control Agency / WA DTMI and Santos for sharing resources and coordinating a response across both Commonwealth and State waters are further detailed in Section 4.8.

4.7.2 Cross-jurisdictional vessel spills

If a Level 2/3 vessel spill crosses jurisdictions between Commonwealth and WA State and/or NT waters, up to three Jurisdictional Authorities will exist: AMSA for Commonwealth waters; WA DTMI for WA State waters and NT Control Agency for NT waters. The Control Agency will remain with the original nominated agency or organisation unless otherwise appointed through agreement between the HMA/ Jurisdictional Authority of both waters. Santos will continue to provide all necessary resources (including personnel and equipment) as a supporting agency, as detailed in Section 4.2.

AMSA may request that DTMI manage a vessel incident in Australian Commonwealth waters (WA DoT 2024).

4.8 Integration with government organisations

4.8.1 Australian Maritime Safety Authority

AMSA is the designated Control Agency for oil spills from vessels within Commonwealth jurisdiction.

Upon notification of an incident involving a ship, AMSA will assume control of the incident and respond in accordance with the National Plan (AMSA 2020). AMSA is to be notified immediately of all ship-source incidents through the AMSA Rescue Coordination Centre (RCC) Australia (Santos Incident Response Telephone Directory [7700-670-PLA-0016. 20]).

AMSA manages the National Plan, Australia's key maritime emergency contingency and response plan (AMSA 2020). AMSA fulfils its obligations under the National Plan for non-ship source pollution incidents on the formal request from the respective Offshore Petroleum Incident Controller/s (AMSA 2021a). AMSA also has a range of National Plan supporting documents containing related policies, guidance and advisory information.

For any oil pollution event, Santos agrees to notify AMSA immediately in the interests of facilitating the most efficient and effective response to the incident.

4.8.2 Western Australia – Department of Transport & Major Infrastructure

If a Marine Oil Pollution incident occurs within WA State waters, the DTMI is the Hazard Management Agency (HMA) (DTMI Chief Executive Officer or proxy). The Director Maritime Environmental Emergency Response (MEER) & Ports has been nominated by the HMA to perform the role of State Marine Pollution Coordinator (SMPC) (as prescribed in Section 1.3 of the SHP – MEE [WA DoT 2024]). Under the SHP-MEE, the Control Agency for Level 1 Petroleum Activity spills in State waters is the Petroleum Titleholder (Santos) with the Control Agency for Level 2/3 spills nominated as DTMI. During a MEE incident within State and Port waters, the role of the SMPC provides strategic management of the incident response on behalf of the HMA.

For Level 2/3 spills within WA State waters/shorelines, DTMI as the Control Agency is the ultimate decision maker regarding identification and selection of protection priorities. DTMI will utilise their internal processes which typically includes the following:

- Evaluation of situational awareness information, including all surveillance, monitoring and visualisation data provided by the Titleholder
- Evaluation of resources at risk including use of the WA Oil Spill Response Atlas and any other relevant WA/Commonwealth government databases or other information sources
- Evaluate shoreline types, habitat types and seasonality of environmental, socio-economic and cultural values and sensitivities
- Consultation with the State Environmental Scientific Coordinator and other relevant State and Federal government departments with environmental responsibilities
- Consultation with other relevant oil spill agencies, including the AMSA Environment, Science and Technology network or any other experts as necessary
- Activation of State resources to support culture and heritage management (via request to the SMPC) sourced through State arrangements pertaining to Local Emergency Management Committees, Native Title Management, Heritage Management, and incorporation of local knowledge (WA DoT, 2024)
- All information is utilised in a NEBA/SIMA type process, to determine protection priorities and response strategies.

DTMI will adjust/amend their internal processes to suit the spill situation at the time.

Santos will notify the DTMI Maritime Environmental Emergency Response (MEER) unit as soon as reasonably practicable (within 2 hours of spill occurring) if an actual or impending spill occurs within or may impact WA State waters. On notification, the SMPC will activate their MEECC and the DTMI IMT.

For petroleum activity oil spills entering State waters (i.e. across jurisdictions) DTMI will only assume the role of Control Agency for that portion of the response activity that occurs within State waters, and therefore both Santos and DTMI will be Control Agencies. Titleholders will work in partnership with DTMI during such instances, as outlined within the DTMI's Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (WA DoT 2020), available online: Offshore Petroleum Industry Guidance Note – Marine Oil pollution: Response and Consultation Arrangements.

Santos will conduct initial response actions in State waters as necessary in accordance with its OPEP and continue to manage those operations until formal handover of incident control in State waters is completed. Appendix 1 in DTMI's Offshore Petroleum Industry Guidance Note (WA DoT 2020) provides a checklist for formal handover. Beyond formal handover, Santos will continue to provide all necessary resources, including personnel and equipment, to assist the DTMI in performing duties as the Control Agency for State waters.

For a cross-jurisdictional response, there will be a Lead IMT (DTMI or Santos) for each spill response activity, noting that DTMI only has jurisdictional/Control Agency authority within State waters.

Appendix 2 in DTMI's Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (WA DoT 2020) provides guidance on the allocation of a Lead IMT to response activities for a cross-jurisdictional spill.

To facilitate coordination between DTMI and Santos during a cross-jurisdictional response, a Joint Strategic Coordination Committee will be established. The Joint Strategic Coordination Committee will be jointly chaired between the SMPC and a nominated senior representative of Santos and will ensure alignment of objectives and provide a mechanism for de-conflicting priorities and resourcing requests.

For a cross-jurisdictional response Santos will be responsible for ensuring adequate resources are provided to DTMI as Control Agency, initially 11 personnel to fill roles in the DTMI IMT or FOB (refer to Section 5.2) and operational personnel to assist with those response strategies where DTMI is the Lead IMT. Concurrently DTMI will also provide two of their personnel to the Santos IMT as described in Table 5-4. Santos' CMT Liaison Officer and the Deputy Incident Controller are to attend the DTMI Fremantle Incident Control Centre (ICC) as soon as possible after the formal request has been made by the SMPC. It is an expectation that the remaining initial cohort will attend the DTMI Fremantle ICC no later than 8am on the day following the request being formally made to Santos by the SMPC. Santos personnel designated to serve in DTMI's FOB will arrive no later than 24 hours after receipt of formal request from the SMPC.

Figure 4-1 shows the organisational structure of Santos incident management personnel within Santos IMT and embedded within DTMI's MEECC/IMT.

Figure 4-2 shows the overall cross-jurisdictional organisational structure referenced from the SHP-MEE.

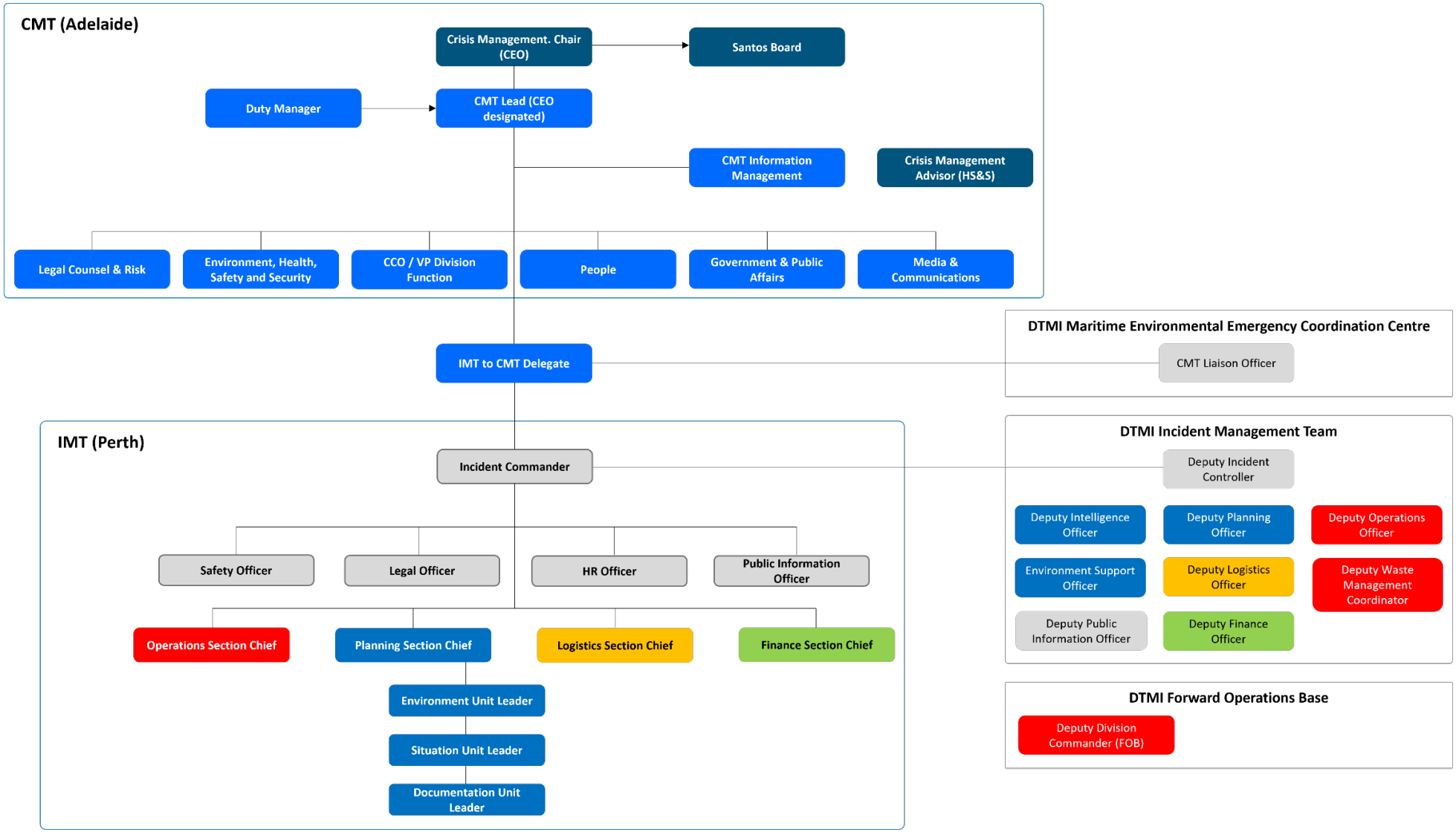

Figure 4-1: Santos cross-jurisdictional incident management structure for Commonwealth waters Level 2/3 facility oil pollution incident originating within or entering WA State waters

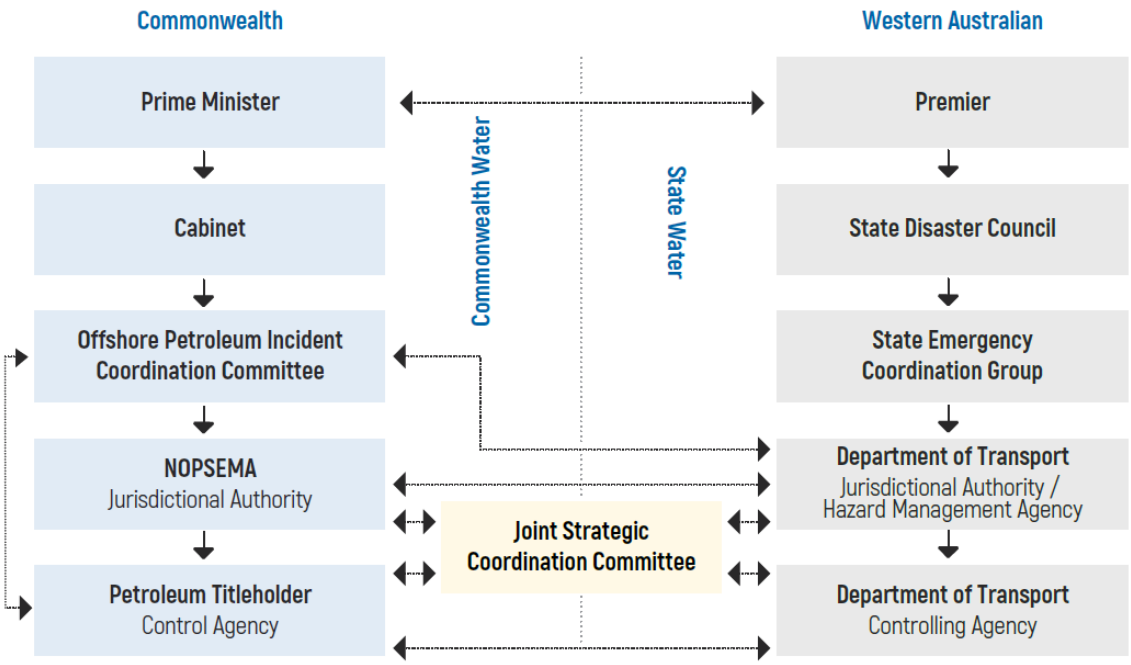

Figure 4-2: Overall control and coordination structure for offshore petroleum cross-jurisdiction incident

4.8.3 Western Australian Department of Biodiversity, Conservation and Attractions

The Western Australian Department of Biodiversity, Conservation and Attractions (DBCA) has responsibilities associated with wildlife and activities in national parks, reserves and State marine parks. The *Biodiversity Conservation Act 2016* (WA) is the legislation that provides DBCA with the responsibility and Statutory Authority to treat, protect, and destroy wildlife. In State waters, DBCA is the Jurisdictional Authority for Oiled Wildlife Response (OWR), providing advice to the Control Agency (DTMI). The role of DBCA in an OWR is outlined in the WA Oiled Wildlife Response Plan (DBCA 2022a).

For a Level 2/3 petroleum spill that originates within or moves into State waters, DTMI will be the Control Agency responsible for overall command of an oiled wildlife response. Santos will provide all necessary resources (equipment and personnel primarily through AMOSC membership) to DTMI to facilitate this response.

Any deterrence, displacement or rescue activity involving wildlife in WA (living or dead) constitutes “disturbance” or “taking” of wildlife under the *Biodiversity Conservation Act 2016* and will require authorisation through DBCA unless undertaken by licensed personnel. The DBCA OWA will expedite the process of granting interim licences or other authorities to undertake approved activities. No action specifically targeted at wildlife should occur without this authority. Deceased animals disposal will be managed in accordance with the DBCA’s WAOWRP which describes the process for disposal of dead animals/carcasses. Initially, the granting of authority to take deceased wildlife is likely to be via a direction from a DBCA wildlife officer while the appropriate licences or licence holder/s that the animals can be held by are identified and organised.

For matters relating to environmental sensitivities and scientific advice in State waters DBCA may provide an Environmental Scientific Coordinator (ESC) to support the SMPC and/or DTMI Incident Controller.

This may include advice on priorities for environmental protection, appropriateness of proposed response strategies and the planning and coordination of operational monitoring for response effectiveness evaluation, and planning scientific monitoring for impact and recovery assessment.

4.8.4 Northern Territory – NT Government

For a spill originating from a Santos activity, as soon as possible and within 24 hours of Santos becoming aware of an incident/spill that could reach NT coastal waters or shorelines, Santos will notify the NT Pollution Response Hotline and the DLPE, in their role as Hazard Management Authority for oil spills in NT waters (excluding spill

originating within Darwin harbour[5]) under the 'all-hazards' Territory Emergency Plan (TEP) (NT Emergency Service, 2024)[6].

Upon notification of a spill entering NT waters, or with the potential to enter NT waters, the DLPE, as the Control Agency , specifically, the DLPE Chief Executive Officer (CEO) in their role as the Territory Marine Pollution Coordinator (TMPC), will notify the Territory Emergency Controller (NT Commissioner of Police or delegate) who will appoint an NT Incident Controller (NT IC). The NT IC will form a NT Incident Management Team (IMT) appropriate to the scale of the incident with representatives from relevant emergency "Functional Groups" as identified under the TEP. If required an IMT will be established, comprising staff from across NT Government. If requested by the NT IC, members from the National Response Team may also be present. The NT IMT will be supported by existing NT emergency response arrangements, as defined in the NT *Emergency Management Act 2013*, through the Territory Emergency Management Council (TEMC) and the TEP.

The Northern Territory Oil Spill Contingency Plan (NTOSCP; Northern Territory Government, 2021) is a sub-plan under the TEP. DLPE has agreed, through consultation with the NT Government and the APPEA Oil Spill Preparedness and Response Working Group (20 June 2023), in principle, to use the WA DTMI Marine Oil Pollution: Response and Consultation Arrangements (WA DoT, 2020), as the basis for developing NT cross-jurisdictional arrangements. A working group was established (August 2023) to develop the NT cross-jurisdictional arrangements, which once agreed, will be updated into the NT OSCP. In the interim, the WA DTMI (WA DoT 2020) cross jurisdictional guidance can be broadly used by titleholders, as reference for how to support the NT IMT. Figure 4-3 shows the coordination structure between Santos and the NT Government for offshore petroleum incidents.

For all Level 2/3 spills from petroleum activities that enter NT waters, the NT IC will assume the role of Control Agency.

The NT IC, with advice from NT Environment, Scientific and Technical advisors, will work with the Santos IMT to agree protection priorities and determine the most appropriate response in NT waters. Santos will provide support to the NT IMT from the Santos IMT at the Incident Coordination Centre (ICC) in Perth. The Santos IMT will provide support, including drafting of operational taskings or Incident Action Plans (IAPs), to the NT IC for approval prior to their release/implementation.

At the request of the NT IC, Santos will be required to provide all necessary resources, including personnel and equipment, to assist the NT IMT in performing its duties as the Control Agency for NT waters and shorelines. This may include the provision of personnel to:

- work within the NT IMT; and
- assist response activities such as shoreline protection, clean-up and oiled wildlife response.

To facilitate coordination between the NT IMT and Santos IMT during a response, the NT IMT and Santos Forward Operating Base (FOB) will be established to ensure alignment of objectives and provide a mechanism for de-conflicting priorities and resourcing requests directly between the Santos IMT in Perth and NT IMT in Darwin.

The NT Government and relevant Control Agency plans to use the *Northern Territory Oiled Wildlife Response Plan* (AMOSC 2019) as the basis for the determination of protection priorities and shoreline response planning.

[5] *Darwin Port is the Control Agency for oil spills within Darwin Harbour, including all shipping spills, and Level 2 and above facility spills.*

[6] *At the time of writing this document (July 2025), the NT Department of Lands, Planning and Environment (DLPE) is the 'Controlling Authority' and Hazard Management Authority for oil spills in NT waters (excluding Darwin Harbour) under the 'all-hazards' Territory Emergency Plan (TEP) (NT Emergency Service, 2024).*

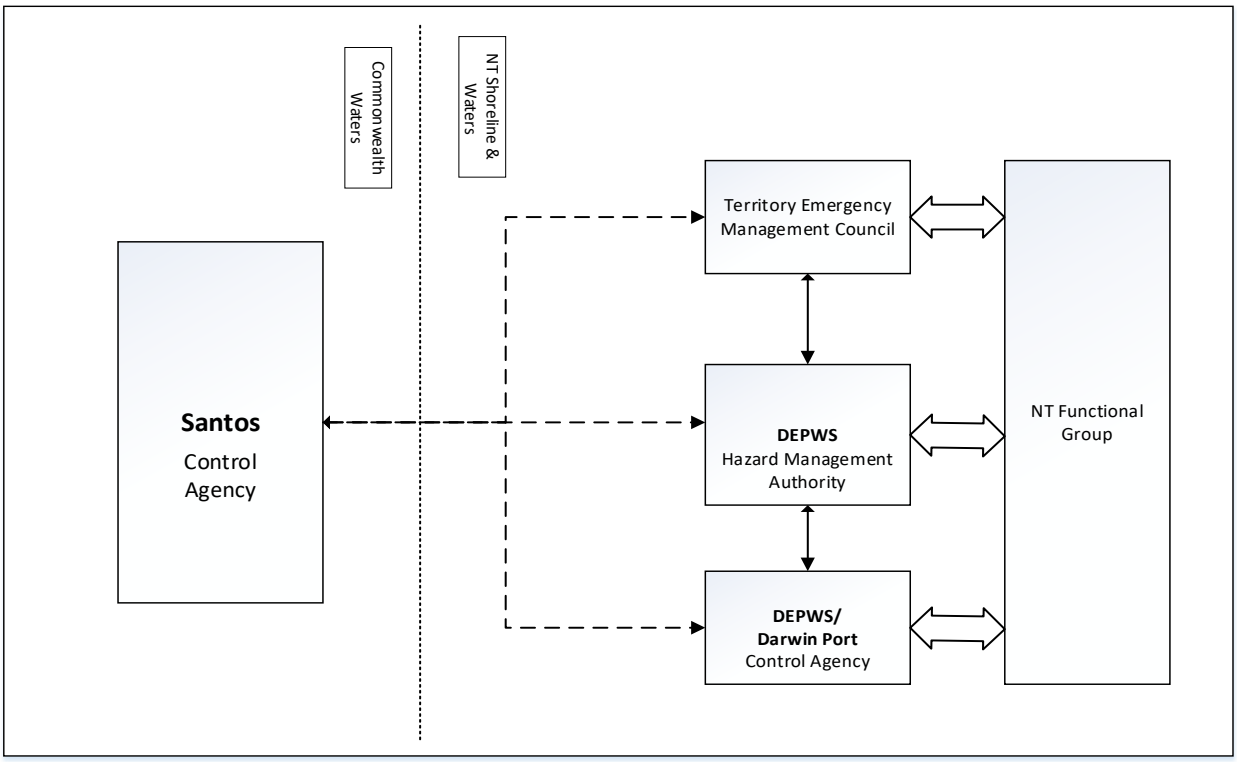

Figure 4-3: Coordination structure between Santos and NT Government for offshore petroleum incidents

4.8.5 Department of Industry, Science and Resources

DISR will be the lead Commonwealth Agency for providing strategic oversight and Commonwealth government support to a significant offshore petroleum incident (including oil spill incidents). NOPSEMA will notify DISR of a significant oil pollution incident and under the Offshore Petroleum Incident Coordination Framework will stand up the Offshore Petroleum Coordination Committee as the mechanism to provide Commonwealth strategic advice and support to the incident. To facilitate information between the petroleum titleholder IMT and Offshore Petroleum Incident Coordination Committee, Liaison Officer/s will be deployed from DISR to the petroleum titleholder IMT.

For incidents classified at a greater level than Significant (i.e. crisis level), a whole of government crisis committee will be formed under the Australian Government Crisis Management Framework to provide strategic advice and support and the Offshore Petroleum Incident Coordination Committee will not be convened, although DISR will remain as the lead agency.

4.8.6 Department of Foreign Affairs and Trade

The Department of Foreign Affairs and Trade (DFAT) is required to be notified if a spill is heading towards international waters, or if modelling predicts movement of hydrocarbon into international waters. DFAT will in turn notify the affected government(s) and engage the preferred methods for Santos to respond in order to minimise the impacts to ALARP. Following notification, DFAT, along with NOPSEMA and DISR, will form an inter-agency panel - the Australian Government Control Crisis Centre, who may request AMSA to coordinate the response operations across the trans-national boundary. This Control Crisis Centre will remain responsible for the Australian Government's approach to preparing for, responding to and recovering from a crisis, such as a hydrocarbon spill incident. Santos remains willing to respond as per the direction of the affected government(s) and designated Control Agency, following approvals established between DFAT and the affected countries country's government.

4.9 Interface with external organisations

Santos has contracts in place enabling access to Oil Spill Response Organisations (OSROs). OSROs have put specific measures in place to ensure that they are able to continue to meet their commitments to members. This support can be provided directly or remotely to aid the IMT and/or ERT.

4.9.1 Australian Marine Oil Spill Centre

Santos is a Participating Member of AMOSC and as such has access to AMOSC equipment and personnel as outlined in the AMOSPlan.

AMOSC has contracts with all its member companies to enable the immediate release of Core Group personnel to be made available for any Santos requirements, as outlined in Santos' *Master Service Contract* and *Principle and Agency Agreement* with AMOSC.

The mutual aid arrangements that AMOSC operates under are collaborated under the AMOSPlan, and are activated via the AMOSC Duty Officer. This provides the mechanism for members of AMOSC to access oil spill response capability of other members. To further enhance the mutual aid arrangements, Santos, Chevron, Woodside and Jadestone have signed a memorandum of understanding (MoU) that defines the group's mutual aid arrangements. Under this MoU, Santos, Chevron, Woodside and Jadestone have agreed to use their reasonable endeavours to assist in the provision of emergency response services, personnel, consumables and equipment.

4.9.2 Oil Spill Response Limited

Through an associate membership, Santos has access to spill response services from OSRL with offices in Perth, Singapore, UK and at other various locations around the globe. In the event of a Level 2/3 response, Santos could access OSRL's international personnel, equipment and dispersants to supplement resources available within Australia. Santos may also call on OSRL for technical services to support its IMT.

Under the OSRL Associate membership Service Level Agreement (SLA), Santos has access to response personnel (18 personnel per incident) and 50% of the global response equipment stockpile.

The OSM Services Supplementary Agreement provides Santos with access to Operational and Scientific monitoring services. Additional information on OSM services and capability is provided in the Santos Northern Australia OSM-BIP (7715-650-ERP-0003).

4.9.3 The Response Group

The Response Group (TRG) is an international provider of crisis management and emergency response services including oil spill response. TRG are available to Santos 24/7 and can provide personnel for emergency response support.

5. Santos incident management arrangements

5.1 Incident management structure

The Santos IMT (Perth) and Crisis Management Team (CMT) will be activated in the event of a Level 2/3 hydrocarbon spill[7] regardless of the type of spill or jurisdiction. Santos maintains internal resources (trained personnel and equipment) across its activities that provide first strike response capability and to also support an ongoing response. Should an incident occur, the IMT Duty Manager would be notified immediately. This rostered role is on-call, filled by trained Incident Commanders and available 24 hours/day and 7 days/week. The IMT Duty Manager would then activate the IMT via an automated call-out system. Documentation required in a response is accessed via the Santos Emergency Response (ER) intranet site.

As outlined in Section 4, control of the response may be taken over by the relevant Control Agency as the incident progresses. The Santos response structure to a major emergency incident is detailed in the Santos Incident Management Plan – WANATL (7700-670-PLA-0016) and the Santos Incident Management Handbook. The Incident Management Plan – Upstream Offshore and Santos Incident Management Handbook describe response planning and incident management that would operate under emergency conditions – describing how the Santos IMT operates and interfaces with the CMT and external parties.

The first priority of an escalating oil spill response to a Level 2/3 spill is the formation of an IMT and establishment of an incident coordination centre (ICC)[8] . The ongoing involvement of the IMT and CMT will be dependent on the severity and type of spill and the obligations of Santos and other agencies/authorities in the coordinated spill response.

Santos' incident response structure relevant to an Eos 3D MSS oil spill incident includes:

- Facility-based ERT
- Santos IMT – Perth-based ICC to coordinate and execute responses to an oil spill incident
- Santos CMT – Adelaide based to coordinate and manage threats to the company's reputation and to handle Santos' corporate requirements in conjunction with the Perth-based Santos IMT to CMT Delegate
- Other field-based command, response and monitoring teams for implementing strategies outlined within the OPEP.

The Santos incident response organisational structure is defined in the Incident Management Plan – WANATL (7700-670-PLA-0016) and Santos Incident Management Handbook, and in Figure 5-1 for reference. The Santos IMT roles and field-based teams are scalable; roles can be activated and mobilised according to the nature and scale of the incident response.

[7] *Note that Santos may also choose to activate the IMT regardless of the spill response Levels.*

[8] *The Santos ICC is located in the Santos WA Perth office.*

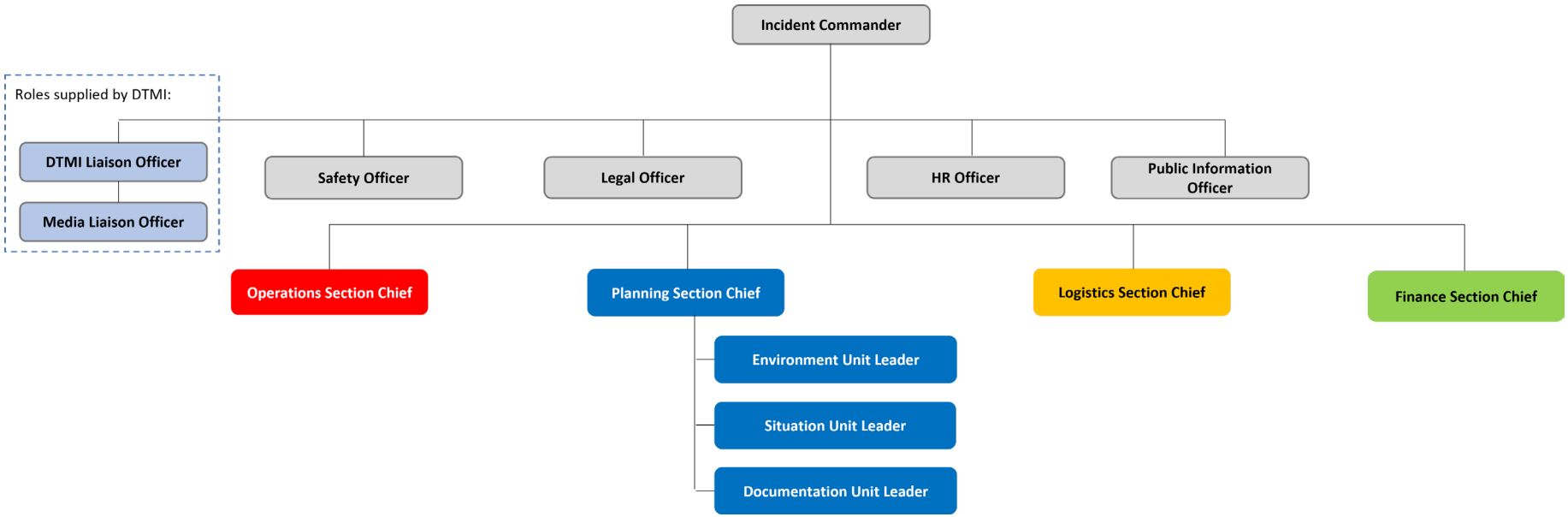

Figure 5-1: Santos incident management team organisational structure

Note: For a Level 2/3 facility spill whereby DTMI and/or NT Government is involved as a Control Agency, either within a single jurisdiction (WA State/Territory water only spills) or cross-jurisdictional (spills from Commonwealth to State/Territory waters), Santos will work in coordination with DTMI and/or NT government in providing spill response capability. In these cases, Santos may be required to supply the DTMI IMT Support roles to the DTMI MEECC / DTMI IMT. This is detailed further in Section 4.8.2. and Figure 4-1.

5.2 Roles and responsibilities

The following tables provide an overview of the responsibilities of the CMT and IMT:

- Santos CMT (Table 5-1);
- Santos IMT (Table 5-2);
- Filed-based response team members (ERT) (Table 5-3);
- DTMI roles embedded within the Santos CMT / IMT (Table 5-4);
- Santos roles embedded within the WA State MEECC / DTMI IMT and FOBs (Table 5-5).

The OPEP only provides a brief description of the roles. Full responsibilities checklists/job cards of each role are described in the Incident Management Plan – WANATL (7700-670-PLA-0016), Santos Incident Management Handbook and Santos Crisis Management Plan (SMS-HSS-OS05-PD03) to support the incident action planning process. The IMT and ERT are scalable to the nature and scale of the response.

As per Offshore Petroleum Industry Guidance Note – Marine Oil pollution: Response and Consultation Arrangements, where DTMI is the Control Agency for spill response Santos will provide personnel to work within DTMI's organisational structure. DTMI will also provide a Liaison Officer / Duty Incident Commander to the Santos IMT in a coordinated response.

DLPE has agreed, through consultation with the NT Government and the APPEA Oil Spill Preparedness and Response Working Group (20 June 2023), in principle, to utilise the WA DTMI Offshore Petroleum Industry Guidance Note – Marine Oil pollution: Response and Consultation Arrangements (WA DoT, 2020) as the basis for development of NT cross jurisdictional arrangements[9]. Therefore, Table 5-4 also provides indicative roles and responsibilities of Santos personnel that may be required to work within the NT IMT, based on WA DTMI (2020) cross jurisdictional guidance.

Table 5-1: Roles and responsibilities in the Santos Crisis Management Team

Santos CMT Role	Main Responsibilities
Crisis Management Chair (CEO)	The Crisis Management (CM) Chair (Santos CEO) is responsible for the following: • Leading crisis management direction • Providing governance and oversight of CMT operations. • Providing enterprise and strategic direction to the CMT for the resolution of the crisis event. • Delegating the CM Lead role and accountability to the appropriate ExCom designee. • Engaging with the CM Lead to endorse the crisis resolution plan. • Liaising with the Santos Board and strategic stakeholders. • Providing the full extent of the company's resources to bring about a resolution and recovery from the crisis impact.
CMT Lead/ Duty Manager	The CMT Lead is responsible for: • Determining the need for establishing a Level 3 response and for activating the CMT. • Determining which / if any Crisis Management Support Teams (CMST) are mobilised. • Leading the crisis resolution process. • Ensuring internal and external notifications to key stakeholders. • Using the crisis resolution process to determine enterprise level impacts (potential or actual) and strategic objectives. • Ensuring a crisis resolution plan is developed and direct the CMT functions to implement strategies, action plans and tasks. • Determining when it is appropriate to conclude the crisis response and stand down all or a portion of the CMT.
CMT Information Management	The CMT Information Managers directly support the CMT by: • Supporting the CMT during crisis management operations. • Setting up the crisis management room, assisting with set-up of communications, video conferences and information transfer within the CMT.

[9] *A working group is being established (August 2023) to develop the NT cross-jurisdictional arrangements, which once agreed, will be updated into the NT OSCP. In the interim, the WA DoT (2020) cross jurisdictional guidance can be broadly utilised by titleholders, as reference for how to support the NT IMT.*

Santos CMT Role	Main Responsibilities
	• Advising on CMT operating processes and available resources. • Assisting with reserving break out rooms for the CMT functions and CMSTs. • Ensuring CMT crisis resolution forms are used and displayed on the monitors. • Providing incident action plan information when an IMT is established. • Monitoring and managing the welfare needs of the CMT.
Crisis Management Advisor	The Crisis Management Advisor is responsible for the following: • Providing CMT process guidance and advice to CMT Lead, Function Leads, and CMST. • Supporting and facilitating the crisis resolution planning process. • Acting as the liaison between the CMT and IMT. • Working with CMT Information Managers to manage roster and handovers for extended CMT operations. • Scheduling and facilitating post crisis debriefs and after-action reviews.: The Crisis Management Advisor will support the CMT Lead by: • Facilitating CMT activation requirements with the CMT Lead. • Assisting the CMT Lead in maintaining an ongoing assessment of incident potential and analysis of stakeholder impacts. • Advising the CMT Lead on CMT structure and requirements for CMST engagement. • Coordinating tasks delegated by CMT Lead. • Providing tools to the CMT Lead for review and crisis assessment meetings.
CMT Function Leads	CMT Function Leads include Leaders for the following areas: • Legal Counsel and Risk • Environment Health Safety and Security • Operating Unit VP • People • Government and Public Affairs (GAPA) • Media and Communications The CMT Function Leads are responsible for: • Participating and contributing to the crisis resolution planning process. • Mobilising and coordinating activities of the function CMST. • Advising the CMT Lead on strategic impacts, threats and mitigation created by the crisis event. • Developing and executing strategies to meet objectives endorsed by the CM Chair. • Providing support and resources via the CMST to divisional IMTs. • Ensuring critical actions, decisions or points of strategic criticality are included in the CMT log. • Participating in the crisis management debrief and after-action reviews.

Table 5-2: Roles and responsibilities in the Santos Incident Management Team

Santos Management/ IMT Role	Main Responsibilities
IMT to CMT Delegate	• Depending on the Level of the incident, the IMT to CMT Delegate (and/or their delegate) will act as the primary liaison to the CMT Duty Manager. • On the activation of the IMT, the IMT to CMT Delegate is advised by the IMT Duty Manager.
Incident Commander (and **Deputy Incident Commander**)	• Overall management of the incident. • Set response objectives and strategic directions • Oversee the development and implementation of Incident Action Plans (IAPs)
Safety Officer	• Develops and recommends measures for assuring personnel safety • Assesses and/or anticipates hazardous and unsafe situations. • May have specialists as necessary.
Legal Officer	• Responsible for identifying potential legal issues stemming from the incident and providing advice and direction on all matters of a legal nature.

Santos Management/ IMT Role	Main Responsibilities
Human Resources (HR) Officer	• Advises and assists the Incident Commander, Command Staff and Section Chiefs on any HR related aspects of an incident.
Public Information Officer	• Public Information Officer is responsible for developing and releasing information about the incident to media, incident personnel and to appropriate agencies and organisations
Liaison Officer	• Acts as the conduit for assisting and cooperating with agency or organization representatives, particularly for incidents that are multi-jurisdictional or have several agencies involved.
Operations Section Chief*	• Leads the Operations Section within the IMT. • Manages all tactical operations directly applicable to the primary assignments. • Activates and supervises operational elements in accordance with the IAP and directs its execution.
Deputy Operations Section Chief	• Flexible role. May support the Operations Section Chief in a relief capacity, or by supervising field operations in lieu of an On-Scene Commander.
Planning Section Chief* (and **Deputy Planning Section Chief**)	• Leads the Planning Section within the IMT. • Collects, evaluates, disseminates and uses incident information. • Maintains status of assigned resources.
Environment Unit Leader	• Responsible for environmental matters associated with the response, including strategic assessment, modelling, surveillance and environmental monitoring and permitting.
Situation Unit Leader	• Responsible for collecting, processing, and organizing incident information relating to escalation, mitigation or intelligence activities taking place in an incident. • Responsible for preparing future projections of incident growth, maps, and intelligence information.
Documentation Unit Leader	• Responsible for maintenance of accurate, up-to-date incident files including Incident Action Plans, incident reports, communication logs, situation status reports etc.
Logistics Section Chief* (and **Deputy Logistics Section Chief**)	• Responsible for providing facilities, services and materials in support of the incident. • Participates in the development and implementation of the Logistics Section of the IAP.
Finance Section Chief* (and **Deputy Finance Section Chief**)	• Responsible for all the financial, administrative and cost analysis aspects of the incident and for supervising members of the Finance Section

** Note: The Section Chiefs may be supported by various other roles that will be mobilised as part of Support Team and Scale-up of IMT resources depending on the severity of the incident.*

Table 5-3: Roles and responsibilities in the field-based response team (ERT)

Field-based position	Main responsibilities
Emergency Commander[10]	• Assesses facility-based situations/ incident and responds accordingly. • Single point of communications between the ERT and IMT. • Directs emergency response activities in accordance with the Santos ER principles and philosophy. • Develops and emergency response strategy. • Communicates the incident response actions and delegates actions to the Incident Commander. • Manages the spill incident in accordance with Facility Emergency Response Plan, Third Party Incident Response Plan, and/or activity specific Oil Spill Contingency Plan or Oil Pollution Emergency Plan (this document). • Coordinates medical evacuations as required. • Liaises with the Perth IMT Operations Section Chief if/when the IMT is established
Emergency Coordinator	• Establishes and maintains contact with the incident scene.

[10] *For EOS activities, this is either the Santos Company Site Representative or the Vessel Master*

Field-based position	Main responsibilities
	• Ensures information is passed to and from the On-Scene Commander, including relevant emergency information from the Command Team time-outs (e.g. source of the spill, if the spill is ongoing or contained, number of personnel responding); also advises On-Scene Commander when the next Command Team time-out will be. • Ensures accurate transfer of information from On-Scene Commander to Status Board log person. • Communicates with outside assistance (e.g. vessels, aircraft). • If instructed, coordinates activities such as spill control/response strategies. • If instructed, liaises with onshore technical authorities and onshore IMT. • Informs Emergency Commander of incident and vessel status.
On-Scene Commander (OSC) (ERT Field Team Leader)	• Undertakes command and leads field response as directed by the Emergency Coordinator, where safe to do so. • Establishes, when appropriate, a Forward Control Point. • Maintains spill responder safety in accordance with the Santos response philosophy. • Assures all field and affected area personnel are accounted for. • Considers tactical response in accordance with incident management guides. • Deploys and implements spill control/response strategy resources to contain and control the spill incident, as per advice from the Emergency Coordinator / Incident Commander / Staging Area Manager / Deputy Division Commander (DTMI FOB).
Medical Evacuation Team	• Manages all medical and transportation requirements related to injured personnel to an appropriate medical facility *Refer to the Medical Evacuation Procedure (SO-91-IF-00020) for detailed descriptions of roles and responsibilities within the Medical Evacuation Team*
Wildlife Response Branch	• Responds to oiled wildlife incidents to minimise the impacts to wildlife. *Refer to the Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) for a description of the wildlife response branch, and the Santos Incident Management Handbook for detailed descriptions of roles and responsibilities within the Wildlife Response Branch.*
Monitoring Branch	• Monitors the effectiveness of response strategies, and impacts and recovery to sensitive receptors from an oil spill and associated response actions. *Refer to the Northern Australia OSM-BIP (7715-650-ERP-0002) for detail on Operational and Scientific Monitoring Team roles and responsibilities.*

Table 5-4: WA DTMI roles embedded within Santos' CMT/IMT

DTMI roles embedded within Santos' CMT/IMT	Main responsibilities
DTMI Liaison Officer (before DTMI assumes role of Control Agency) **Deputy Incident Controller – State Waters** (after DTMI assumes role of Control Agency)	• Facilitate effective communications between DTMI's SMPC/ State Maritime Environmental Emergency Coordinator (SMEEC) / the Incident Controller and Santos' appointed CMT Lead/ Incident Commander. • Provide enhanced situational awareness to DTMI of the incident and the potential impact on State waters. • Assist in the provision of support from DTMI to Santos. • Facilitate the provision of technical advice from DTMI to Santos' Incident Commander as required.
Media Liaison Officer	• Provide a direct liaison between the Santos Media team and DTMI IMT Media team. • Facilitate effective communications and coordination between the Santos and DTMI media teams. • Assist in the release of joint media statements and conduct of joint media briefings. • Assist in the release of joint information and warnings through the DTMI Information and Warnings team. • Offer advice to the Santos Media Coordinator on matters pertaining to DTMI and wider Government media policies and procedures.

Note: Similar roles may also be provided by the NT IMT in the event of a response in NT waters

Table 5-5: Santos personnel roles embedded within the WA State MEECC/ DTMI IMT/ FOB or NT IMT

Santos roles embedded within the State MEECC/ WA DTMI IMT / FOB or NT IMT	Main responsibilities
CMT Liaison Officer	• Provide a direct liaison between the Santos CMT and the State MEECC / NT IMT. • Facilitate effective communications and coordination between the Santos CMT Lead and the SMEEC. • Offer advice to SMEEC on matters pertaining to Santos crisis management policies and procedures
Deputy Incident Controller	• Provide a direct liaison between the Santos IMT and the WA DTMI IMT / NT IMT. • Facilitate effective communications and coordination between the Santos Incident Commander and the WA DTMI / NT Incident Controller. • Offer advice to the WA DTMI / NT Incident Controller on matters pertaining to the Santos incident response policies and procedures. • Offer advice to the Safety Coordinator on matters pertaining to Santos safety policies and procedures, particularly as they relate to Santos employees or contractors operating under the control of the WA DTMI IMT / NT IMT.
Deputy Intelligence Officer	• As part of the WA DTMI / NT IMT Intelligence Team, assist the Intelligence Officer in the performance of their duties in relation to situational awareness. • Facilitate the provision of relevant modelling and predications from the Santos IMT. • Assist in the interpretation of modelling and predictions originating from the Santos IMT. • Facilitate the provision of relevant situational awareness information originating from the WA DTMI IMT / NT IMT to the Santos IMT. • Facilitate the provision of relevant mapping from the Santos IMT. • Assist in the interpretation of mapping originating from the Santos IMT. • Facilitate the provision of relevant mapping originating from the Santos IMT.
Deputy Planning Officer	• As part of the WA DTMI / NT IMT Planning Team, assist the Planning Officer in the performance of their duties in relation to the interpretation of existing response plans and the development of incident action plans and related sub-plans • Facilitate the provision of relevant IAP and sub-plans from the Santos IMT. • Assist in the interpretation of the Santos OPEP from Santos. • Assist in the interpretation of the Santos IAP and sub-plans from the Santos IMT. • Facilitate the provision of relevant IAP and sub-plans originating from the WA DTMI IMT / NT IMT to the Santos IMT. • Assist in the interpretation of Santos' existing resource plans. • Facilitate the provision of relevant components of the resource sub-plan originating from the WA DTMI IMT / NT IMT to the Santos IMT. *(Note this individual must have intimate knowledge of the relevant Santos OPEP and planning processes).*
Environment Support Officer	• As part of the Intelligence Team, assist the Environment Coordinator in the performance of their duties in relation to the provision of environmental support into the planning process • Assist in the interpretation of the Santos OPEP and relevant Tactical Response Plan (TRPs). • Facilitate in requesting, obtaining and interpreting environmental monitoring data originating from the Santos IMT. • Facilitate the provision of relevant environmental information and advice originating from the WA DTMI IMT / NT IMT to the Santos IMT.
Deputy Public Information Officer[11]	• As part of the Public Information Team, provide a direct liaison between the Santos Media team and WA DTMI IMT / NT IMT Media team.

[11] *In the event of an incident, Santos can provide the DoT IMT with a list of agencies, organisations, representative bodies, and other relevant stakeholders that were consulted in the development of the Environment Plan to assist DoT with the management and provision of public information.*

Santos roles embedded within the State MEECC/ WA DTMI IMT / FOB or NT IMT	Main responsibilities
	• Facilitate effective communications and coordination between Santos and WA DTMI / NT IMT media teams.[12] • Assist in the release of joint media statements and conduct of joint media briefings. • Assist in the release of joint information and warnings through the WA DTMI / NT IMT Information and Warnings team. • Offer advice to the WA DTMI / NT IMT Media Coordinator on matters pertaining to Santos media policies and procedures. • Facilitate effective communications and coordination between Santos and WA DTMI / NT IMT Community Liaison teams. • Assist in the conduct of joint community briefings and events. • Offer advice to the WA DTMI / NT IMT Community Liaison Coordinator on matters pertaining to Santos community liaison policies and procedures. • Facilitate the effective transfer of relevant information obtained from the Contact Centre to the Santos IMT.
Deputy Logistics Officer	• As part of the Logistics Team, assist the Logistics Officer in the performance of their duties in relation to the provision of supplies to sustain the response effort. • Facilitate the acquisition of appropriate supplies through Santos' existing OSRL, AMOSC and private contract arrangements. • Collect Request Forms from WA DTMI / NT IMT to action via the Santos IMT. *(Note this individual must have intimate knowledge of the relevant Santos logistics processes and contracts).*
Deputy Waste Management Coordinator	• As part of the Operations Team, assist the Waste Management Coordinator in the performance of their duties in relation to the provision of the management and disposal of waste collected in State waters. • Facilitate the acquisition of appropriate services and supplies through Santos' existing private contract arrangements related to waste management and in line with legislative and regulatory requirements. • Collect Waste Collection Request Forms from WA DTMI / NT IMT to action via the Santos IMT.
Deputy Finance Officer	• As part of the Finance Team, assist the Finance Officer in the performance of their duties in relation to the setting up and payment of accounts for those services acquired through Santos' existing OSRL, AMOSC and private contract arrangements. • Facilitate the communication of financial monitoring information to Santos to allow it to track the overall cost of the response. • Assist the Finance Officer in the tracking of financial commitments through the response, including the supply contracts commissioned directly by WA DTMI / NT IMT and to be charged back to Santos.
Deputy Operations Officer	• As part of the Operations Team, assist the Operations Officer in the performance of their duties in relation to the implementation and management of operational activities undertaken to resolve an incident. • Facilitate effective communications and coordination between the Santos Operations Section and the WA DTMI / NT IMT Operations Section. • Offer advice to the WA DTMI / NT IMT Operations Officer on matters pertaining to Santos incident response procedures and requirements. • Identify efficiencies and assist to resolve potential conflicts around resource allocation and simultaneous operations of Santos and WA DTMI / NT IMT response efforts.
Deputy Division Commander (FOB)	• As part of the Field Operations Team, assist the Division Commander in the performance of their duties in relation to the oversight and coordination of field operational activities undertaken in line with the IMT Operations Section's direction. • Provide a direct liaison between Santos' Forward Operations Base/s (FOB/s) and the WA DTMI FOB / NT IMT.

[12] *In the event DoT assumes the role of Control Agency in State Waters, Santos acknowledges that the DoT IMT will be the lead IMT for public information and warnings and community liaison. In such circumstances, Santos retains the right to manage its own media interests, but acknowledges the strong preference for DoT and Santos to issue joint media statements and conduct joint media conferences and the importance of close liaison between the respective Media Teams.*

Santos roles embedded within the State MEECC/ WA DTMI IMT / FOB or NT IMT	Main responsibilities
	• Facilitate effective communications and coordination between Santos Operations Section Chief and the WA DTMI / NT IMT Division Commander. • Offer advice to the WA DTMI FOB / NT IMT Operations Commander on matters pertaining to Santos incident response policies and procedures. • Assist the Safety Coordinator deployed in the FOB in the performance of their duties, particularly as they relate to Santos employees or contractors. • Offer advice to the Senior Safety Officer deployed in the FOB on matters pertaining to Santos safety policies and procedures.

5.3 Cost recovery

As required under Section 571(2) of the *OPGGS Act 2006*, Santos has financial assurances in place to cover any costs, expenses and liabilities arising from carrying out its petroleum activities, including major oil spills. This includes costs incurred by relevant control agencies (e.g. DTMI) and third-party spill response service providers.

5.4 Training and exercises

In order to refresh IMT roles and responsibilities and provide familiarisation with OPEP processes and arrangements, IMT workshops are conducted as per the *Santos Offshore Division Incident and Crisis Management Training and Exercise Plan* (SO-92-HG-10001).

To familiarise the IMT with functions and processes, an OPEP Desktop and Activation Exercise is undertaken as per the *Santos Offshore Division Incident and Crisis Management Training and Exercise Plan* (SO-92-HG-10001). Exercise planning takes into consideration virtual/remote access requirements.

All workshops and exercises undertaken are recorded in the Santos EHS Toolbox, with the key recommendations recorded and tracked.

5.4.1 Incident management team training and exercises

Santos provides training to its personnel to fill all required positions within the IMT.

Competency is maintained through participation in regular response exercises and workshops. Exercise and training requirements for Santos' IMT members are summarised in Table 5-6.

Table 5-6: Training and exercise requirements for incident management team positions

IMT Role	Exercise	Training
Incident Commander	One Level 3 exercise annually or two Level 2 desktop exercises annually[13]	• PMAOMIR418 • AMOSC – IMO3 equiv. Oil Spill Response Command and Control
Operations Section Chief		• PMAOMIR0322 • AMOSC – IMO3 equiv. Oil Spill Response Command and Control
Planning Section Chief Logistics Section Chief Environment Unit Leader		• PMAOMIR322 • AMOSC – IMO2 equiv. Oil Spill Response Management
Safety Officer Supply Unit Leader GIS Team Leader Data Manager[14] HR Officer Situation Unit Leader		• PMAOMIR322 • AMOSC – Oil Spill Response Familiarisation Training

[13] *All IMT members are required to participate in at least one Level 3 exercise every two years.*

[14] *Data Manager is an administrative support role, not an IMT role, but is included here for completeness.*

IMT Role	Exercise	Training
Documentation Unit Leader IMT Log and Situation		

5.4.2 Oil spill responder training

Santos has an internal capability of trained oil spill responders who can be deployed in the field in a spill response and has access to external, trained spill responder resources (Table 5-7).

Table 5-7: Spill responder personnel resources

Responder	Role	Training	Available Number
Santos AMOSC Core Group Responders	Santos personnel trained and competency assessed by AMOSC as the AMOSC Core Group. Deployed by IMT for spill response operations.	AMOSC Core Group Workshop (refresher training undertaken every two years). AMOSC – IMO1 equiv. Oil Spill Response Operations and/or IMO2 equiv. Oil Spill Response Management	16
Santos Facility ERTs	Present at Varanus Island Facility for first-strike response to incidents.	Internal Santos training and exercises as defined in each facility's Emergency Response Plan Emergency Commander to have AMOSC – Oil Spill Response Familiarisation Training.	One ER team per operational facility per shift
Santos Aerial Observers	Undertake aerial surveillance of spill. Deployed by IMT in the aerial surveillance aircrafts.	AMOSC – Aerial Surveillance Course (refresher training undertaken triennially).	7
Santos IMT	Provides a pool of Santos employees trained to perform leadership roles in the Santos IMT.	As per the Santos training matrix	87
AMOSC Core Group Oil Spill Responders	Industry personnel as the AMOSC Core Group, available to Santos under the AMOSPlan. For providing incident management (IMT) and operations (field response) assistance.	AMOSC Core Group Workshop (refresher training undertaken every two years). AMOSC – IMO1 equiv. Oil Spill Response Operations and/or IMO2 equiv. Oil Spill Response Management	As defined in Core Group Member Reports[15] Target to maintain at least 100 members (minimum 84, maximum 140). (Ref.: AMOSC Core Group Program and Policies V2.0) (AMOSC, 2024)
OSRL Oil Spill Response Personnel	Oil Spill Response Ltd professionals, providing technical, incident management and operational advice and assistance available under Santos-OSRL contract.	As per OSRL training and competency matrix.	18 responders guaranteed
TRG Response Personnel	Emergency response personnel provided by arrangement with Santos	As per TRG training and competency matrix	60
AMOSC Staff	Professionals, providing technical, incident	As per AMOSC training and competency matrix.	16[16]

[15] *A total of 124 personnel in the Core Group as of October 2025 (AMOSC Member's website), plus 16 AMOSC staff members (AMOSPlan 2021).*

[16] *AMOSC has a permanent staff of 16 available on a 24/7 basis (AMOSPlan 2021), 12 of which are available for field response, and 4 for admin/management support roles.*

Responder	Role	Training	Available Number
	management and operational advice and assistance available under Santos-AMOSC contract.		
Oiled Wildlife Response Roles	Refer Section 14 and Appendix M		
OSM Services Provider	Refer to Section 17 and Santos Northern Australia OSM-BIP (7715-650-ERP-0003) Section 9.1		
Level 1 Oiled Wildlife Responders (Workforce Hire)	Provide oiled wildlife support activities under supervision.	No previous training required; on the job training provided.	Nominally over 1,000
Shoreline clean-up personnel (Workforce Hire)	Manual clean-up activities under supervision.		

In addition to the resources listed in Table 5-7, the following resources are available for spill response and may be activated by the relevant Control Agency:

- National Plan: National Response Team – Trained oil spill response specialists, including aerial observers and shoreline clean-up personnel, will be deployed under the direction of the relevant Control Agency in a response. The National Response Team is trained and managed in accordance with the National Response Team Policy, approved by the National Plan Strategic Coordination Committee (AMSA 2021b).
- WA State Hazard Plan for Maritime Environmental Emergencies (SHP-MEE): State Response Team (SRT) – Oil pollution response team available to assist under the jurisdiction of the DTMI in State waters. SRT members remain trained and accredited in line with the State Hazard Plan (SHP-MEE) requirements (WA DoT 2024).
- NT Oil Spill Contingency Plan (NT OSCP): NT Response Team are available to assist under the jurisdiction of the NT IMT. NT Response Team members remain trained and accredited in line with the NT OSCP.

In the event of a spill, the trained spill responders listed in Table 5-7 would be required to undertake various roles in key spill response operations, including monitor and evaluate, shoreline protection, shoreline clean-up and oiled wildlife response.

In the event of a spill, Team Leader roles for protection and deflection and shoreline clean-up would be filled through Santos' AMOSC Core Group Responders and then industry Core Group Responders.

5.5 Response testing arrangements and audits

Santos has oil spill response testing arrangements in place in accordance with the Santos Offshore Oil Spill Response Readiness Guideline (7710-650-GDE-0001) which provides a process for continual monitoring of OSRO capability. This also includes regular oil spill response equipment inventory checks from the various sources. Testing of key response provider arrangements may be done as part of larger exercises or as standalone tests where the capability and availability of resources through the response provider are assessed against the performance requirement.

5.5.1 Testing arrangements

Not all spill preparedness and response arrangements will be tested simultaneously. The frequency of testing will relate to the potential spill level, spill risk and complexity of response.

Santos employs a range of tests to ensure that the various response arrangements function as required. These tests include

- Contract/Plan review
- Audit
- Notification/communication check
- Desktop Exercise
- Deployment exercise
- Level 2/3 IMT Exercise

The above tests and the testing schedule are detailed in full within the Santos Offshore Oil Spill Response Readiness Guideline (7710-650-GDE-0001); an excerpt of the testing arrangements plan is provided in Figure 5-2. Objectives are set for the various tests identified for each of the response arrangements. The effectiveness of response arrangements against these objectives are assessed using pre-identified Key Performance Indicators (KPIs).

All testing activities are documented, and all reports generated will be saved in Santos's EHS Toolbox system. Once completed, records of testing arrangements are entered into the Santos EHS Toolbox and any actions, recommendations or corrective actions identified are assigned a responsible party for completion and tracked to closure. The status of completion is tracked through the 'Action module' in the EHS Toolbox and communicated widely through monthly EHS KPI reporting.

#	Response arrangements and critical components	Type of test	Schedule	Objectives	KPIs
2.	Monitor and Evaluate				
	Monitor and Evaluate - Vessel Surveillance a) Access to vessels	Review – Contract / Agreement	Annually	To confirm access to vessels for surveillance	Review to confirm Master Service Agreements (MSAs) with vessel providers to gain access to vessels
	Monitor and Evaluate - Aerial Surveillance a) Access to aircrafts	Review – Contract / Agreement	Annually	To confirm access to aircrafts for surveillance	Review to confirm Master Service Agreements (MSAs) with aircraft providers to gain access to aircrafts for surveillance
	Monitor and Evaluate - Aerial Surveillance b) Access to trained aerial observers	Review – Contract / Agreement	Annually	To confirm access to trained aerial observers	Review to confirm access to trained aerial observers through; • Trained Santos personnel or • AMOSC Participant Member Contract or • OSRL Associate Member Contract
	Monitor and Evaluate - Unmanned Aerial Vehicles (UAV) a) Access to UAV providers	Review – Contract / Agreement	Annually	To confirm access to UAV providers	Review to confirm access to UAV providers through; • AMOSC Participant Member Contract or • OSRL Associate Member Contract
	Monitor and Evaluate - Fauna observations a) Maintain a list of air charter companies that could provide fauna observation services	Review – List of air charter companies for fauna observations	Annually	To confirm that a list of air charter companies that could provide fauna observation services is maintained	Review to confirm that a list of air charter companies that could provide fauna observation services is maintained
	Monitor and Evaluate – Tracking Buoys a) Access to Tracking Buoys	Review – Contract / Agreement	Prior to activity commencement	To confirm access to tracking buoys	Review to confirm access to Santos owned Tracking Buoys
	Monitor and Evaluate - Tracking Buoys b) Response readiness	Communication/Tracking software Test	6-monthly	To confirm response readiness for Tracking buoys	Tracking Buoys pass functional test as per operational instructions
	Monitor and Evaluate - Oil Spill Modelling a) Access to oil spill modelling service provider	Review – Contract / Agreement	Annually	To confirm access to emergency response oil spill modelling services	Review to confirm access to emergency oil spill modelling services through maintenance of service provision contract

Figure 5-2: Excerpt of testing arrangements plan

Source: Taken from Santos Offshore Oil Spill Response Readiness Guideline (7710-650-GDE-0001)

5.5.2 Audits

Oil spill response audits will follow the Santos Assurance Management Standard (SMS-MS15.1) and are scheduled as per the Santos annual Assurance Schedule. Audits will help identify and address any deficiencies in systems and procedures. At the conclusion of the audit, any opportunities for improvement and corrective actions (non-conformances) will be formally noted and discussed, with corrective actions developed and accepted. In some cases, audits may conclude with potential amendments to the OPEP.

Multiple oil spill response organisations are engaged by Santos. These organisations are responsible for the audit and maintenance of their own capacity. The Santos Oil Spill and Emergency Response Coordinator maintains oversight of the audit and maintenance programs of its service providers through regular reporting requirements and any third-party assurance activities. These include:

- **AMOSC:** The deployment readiness and capability of AMOSC's oil spill response equipment and resources in Geelong, Fremantle, Exmouth and Broome are audited every two years under the direction of AMOSC's participating members. The intent is to provide assurances to Santos and associated members about AMOSC's ability to respond to an oil spill incident as per the methods and responsibilities defined in OPEPs and AMOSC's Service Level Statement.
- **OSRL:** The deployment readiness and capability of OSRL's oil spill response equipment and personnel are audited every two years by the Oil Spill Response Coordinator. The intent of this audit is to provide assurances

to Santos of OSRL's ability to respond to an oil spill incident as per the methods and responsibilities defined in Santos' OPEPs and OSRL's SLA.

6. Response strategy selection

6.1 Spill scenarios

This OPEP outlines strategies, actions and supporting arrangements applicable for all credible oil spill events associated with Eos 3D MSS activities. One credible spill scenario has been identified in the Eos 3D MSS EP (Section 7.1) to represent the worst-case spill from a response perspective, taking into account the following characteristics:

- It represents the hydrocarbon type that could be spilt during Eos 3D MSS activities.
- It represents the maximum credible release volume.
- It represents the greatest spatial extent from a response perspective based on surface oil and shoreline accumulation as these are the key factors contributing to response.
- The proximity to sensitive receptors, shorelines, State/Territory/Commonwealth boundaries etc.

The worst-case credible spill risk selected to inform this OPEP is presented in Table 6-1. The Eos 3D MSS EP (Section 7.1.1) details the derivation of this worst-case credible spill.

For a description of the characteristics and behaviour associated with hydrocarbons that may unintentionally be released refer to Appendix A.

Table 6-1: Maximum credible spill scenarios for Eos 3D MSS activities

Worst-case credible spill scenario	Approx. depth of spill	Hydrocarbon type	Maximum credible volume released (m³)	Release duration
Surface diesel release arising from vessel collision	0 m	MDO	1,065[17]	Instantaneous

6.2 Response planning thresholds

Environmental impact assessment thresholds are addressed in Section 7.1.2.3 of the Eos 3D MSS EP. In addition to the environmental impact assessment thresholds, response thresholds have been developed for response planning to determine the conditions that response strategies would be effective. These are shown in Table 6-2.

Table 6-2: Hydrocarbon thresholds for response planning

Hydrocarbon concentration (g/m²)	Description
≥1	Used (in part) for operational and scientific monitoring planning, as described in the Northern Australia OSM-BIP (7715-650-ERP-0003), Section 2.1.
≥50	Estimated minimum floating hydrocarbon threshold for containment and recovery and surface dispersant application. *Note: Containment and recovery and surface dispersant application are not applicable spill response strategies under this OPEP* (Table 6-5).
≥100	Estimated floating hydrocarbon threshold for effective containment and recovery and surface dispersant application. Estimated minimum shoreline accumulation threshold for shoreline clean-up. *Note: Containment and recovery and surface dispersant application are not applicable spill response strategies under this OPEP* (Table 6-5).

[17] *Value based on the largest MDO tank volume on the survey vessel used during the Eos 3D MSS activity.*

6.3 Stochastic spill modelling results

The selected worst-case spill scenario was modelled for the Eos 3D MSS using a stochastic approach. Two release locations were modelled:

- Location 1: SW midpoint of the operational area;
- Location 2: SE midpoint of the operational area.

A total of 100 spill trajectories at each location per season (three) (i.e. 600 in total) were simulated across all seasons using a number of unique environmental conditions sampled from historical metocean data. Each simulation was tracked for a period of 50 days.

For the purpose of spill response preparedness, outputs relating to floating oil and oil accumulated on the shoreline are most relevant for the allocation and mobilisation of spill response resources. Therefore, these are the results presented in this OPEP for primary consideration.

Modelling results for dissolved and entrained oil for the worst-case scenarios have not been included in this OPEP given there are limited response strategies that will reduce subsurface impacts, however these have been used to define the wider area of potential oil spill impact (the environment that may be affected [EMBA]) – refer to Section 7.1.2.3 of the EP for dissolved and entrained thresholds and Section 7.1.3 for impacts to receptors.

The worst-case shoreline accumulation and/or probability (percentage) of total floating oil contact at more than 1 g/m² for all emergent and intertidal receptors is presented in Table 6-3. For each scenario, these results represent the worst-case loading or floating oil contact probability for each receptor across all seasons from all stochastic modelling runs (300 simulations).

Dissolved and entrained results have been included in Table 6-4 to inform contact times with NT and WA waters. The shortest predicted time to coastal waters jurisdictional boundaries was 6 days, 13 hours for NT waters for entrained hydrocarbons ≥10 ppb for Location 2, with a probability of 11%. Floating oil at the ≥1 g/m² threshold was also predicted to reach NT waters within 8 days, 9 hours for Location 2, however no floating oil contact was predicted for WA state waters (RPS, 2023).

Santos will use these results in the assessment of locations requiring a baseline data review for scientific monitoring (refer to Appendix O).

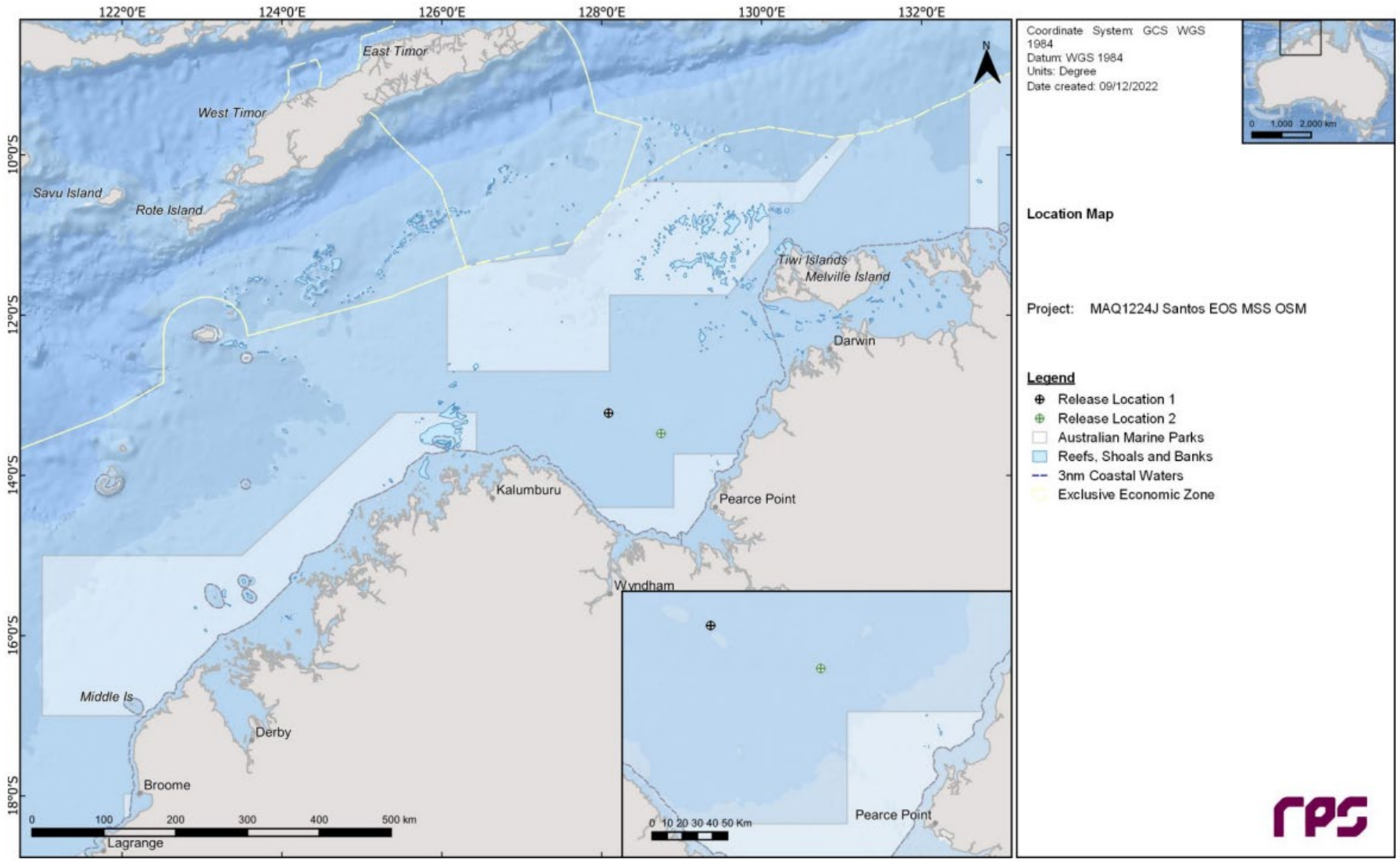

Figure 6-1: Stochastic spill modelling release location selected for Eos 3D MSS

Source: RPS (2023)

Table 6-3: Worst-case spill modelling results – vessel collision (marine diesel oil)

Location	Total contact probability (%) floating oil ≥1 g/m²	Min. arrival time floating oil ≥1 g/m² hours (days)	Total probability (%) shoreline oil accumulation ≥10 g/m²	Min. arrival time shoreline oil accumulation ≥10 g/m² hours (days)	Total probability (%) shoreline oil accumulation ≥100 g/m²	Min. arrival time shoreline oil accumulation ≥100 g/m² hours (days)	Max. total accumulated oil ashore (m³)	Max. length of shoreline oiled (km) ≥100 g/m²	Max. length of shoreline oiled (km) ≥10 g/m²
Location 1: SW midpoint									
Beagle Gulf-Darwin Coast	-	-	0.66	417 (17 days, 9 hours)	<0.33	NC	10	NC	21
JBG East Coast	-	-	0.99	621 (25 days, 21 hours)	<0.33	NC	10	NC	25
Kimberly Coast PMZ	-	-	0.66	575 (23 days, 23 hours)	<0.33	NC	<1	NC	1
Tiwi Islands	-	-	0.66	402 (16 days, 18 hours)	<0.33	NC	6	NC	12
Vernon Islands CR	-	-	0.33	586 (24 days, 10 hours)	<0.33	NC	<1	NC	1
Van Cloon-Deep Shoals	0.33	219 (9 days, 3 hours)	-	-	-	- -	-	-	-
Location 2: SE midpoint									
Beagle Gulf-Darwin Coast	-	-	1.67	327 (13 days, 15 hours)	0.33	396 (16 days, 12 hours)	11	1	20
JBG East Coast	0.33	201 (8 days, 9 hours)	4.33	155 (6 days, 11 hours)	1.67	164 (6 days, 20 hours)	37	10	53
JBG South Coast	-	-	0.33	625 (26 days, 1 hour)	<0.33	NC	3	NC	7

Location	Total contact probability (%) floating oil ≥1 g/m²	Min. arrival time floating oil ≥1 g/m² hours (days)	Total probability (%) shoreline oil accumulation ≥10 g/m²	Min. arrival time shoreline oil accumulation ≥10 g/m² hours (days)	Total probability (%) shoreline oil accumulation ≥100 g/m²	Min. arrival time shoreline oil accumulation ≥100 g/m² hours (days)	Max. total accumulated oil ashore (m³)	Max. length of shoreline oiled (km) ≥100 g/m²	Max. length of shoreline oiled (km) ≥10 g/m²
JBG West Coast	-	-	0.67	432 (18 days)	<0.33	NC	3	NC	5
Tiwi Islands	-	-	1.33	248 (10 days, 8 hours)	0.33	253 (10 days, 13 hours)	17	5	27
Joseph Bonaparte Gulf AMP	2.00	53 (2 days, 5 hours)	-	-	-	-	-	-	-
Northern Territory State Waters	0.33	201 (8 days, 9 hours)	-	-	-	-	-	-	-

-: Not applicable

NC: No contact to receptor predicted for specified threshold.

Source: RPS (2023)

Table 6-4: Entrained and dissolved stochastic modelling results for contact with NT and WA waters

Scenario and coastal waters	Probability (%) entrained hydrocarbon exposure at ≥10 ppb	Minimum time before entrained exposure ≥10 ppb hours (days)	Probability (%) of dissolved hydrocarbon exposure at ≥10 ppb	Minimum time before dissolved exposure at ≥10 ppb hours (days)
Location 1: SW midpoint				
NT waters	3.33	330 (13 days, 18 hours)	-	-
WA waters	11.33	221 (9 days, 5 hours)	0.33	237 (9 days, 21 hours)
Location 2: SE midpoint				
NT waters	10.67	157 (6 days, 13 hours)	0.33	376 (15 days, 16 hours)
WA waters	10	253 (10 days, 13 hours)	0.33	235 (9 days, 19 hours)

Source: RPS (2023)

6.4 Deterministic modelling

Deterministic modelling uses a single spill run from the group of stochastic runs to help understand the likely behaviour and impacts of a single simulation of a worst-case spill scenario.

Deterministic runs were selected based on:

- The largest predicted oil mass accumulated on all shorelines
- The greatest length of shoreline oil accumulation.

The worst-case simulation for the maximum volume of oil ashore was stochastic realisation #72 from release location 2. The highest load was at the Joseph Bonaparte Gulf East Coast shoreline (37 m^3). The minimum shoreline contact time to reach Joseph Bonaparte Gulf East Coast was predicted as 161 hours (~6 days and 17 hours) for shoreline contact above the low exposure threshold of ≥10 g/m^2 and 190 hours (~7 days and 22 hours) above the moderate exposure threshold of ≥100 g/m^2. No shoreline contact was identified above the high exposure threshold of ≥1,000 g/m^2 (RPS 2023).

The worst-case simulation for the greatest length of shoreline oil accumulation (≥10 g/m^2) was stochastic realisation #44 from release location 2, at 53 km for the JBG East Coast shoreline, with the corresponding maximum volume ashore predicted as 17 m^3. No shoreline accumulation with concentrations ≥100 g/m^2 was predicted (RPS 2023).

The deterministic modelling for the largest predicted oil mass accumulated is considered suitable to inform shoreline response strategies, given this was the only deterministic run which covered shoreline accumulation at or above the moderate exposure threshold (≥100 g/m^2) considered required for shoreline response strategies (refer to Table 6-2).

Refer to Section 7.1 of the EP for further description on selection of oil exposure values.

6.5 Evaluation of applicable response strategies

Based on the nature and scale of the credible spill scenarios outlined in Section 6.1 and spill modelling results (Sections 6.3 and 6.4) the following spill response strategies have been assessed as potentially applicable for combatting a spill (Table 6-5).

The information contained in Table 6-5 has been developed by Santos for preparedness purposes. Santos may not be the Control Agency or Lead IMT for implementing a spill response. For example, for Level 2/3 spills within or entering WA State /Territory waters, DTMI / NT Control Agency will ultimately determine the strategies and controls implemented for most WA State/Territory water activities with Santos providing resources and planning assistance.

Table 6-5: Evaluation of applicable response strategies

OSR Strategy	Tactic	Applicability and designated primary (1) or secondary (2) response strategy	Considerations
		MDO	
Source Control	Spill kits	✓ 1	Relevant for containing spills that may arise onboard a vessel.
	Secondary containment	✓ 1	Relevant for spills that may arise due to stored hydrocarbons, and from spills arising from machinery and equipment onboard a vessel. Bunded areas will contain hydrocarbons reducing the potential for a spill escaping to marine waters. Where applicable open deck drainage will be closed to prevent hydrocarbon draining into the marine environment.
	Shipboard Oil Pollution Emergency Plan	✓ 1	MARPOL requirement for applicable vessels. In the event a vessel hydrocarbon storage tank is ruptured, applicable strategies for reducing the volume of hydrocarbon releases will be contained within the vessel SOPEP. This may include securing fuel via transfer to another storage area onboard the vessel, transfer to another vessel, or through pumping in water to affected tank to create a water cushion (tank water bottom). Trimming the vessel may also be used to avoid further damage to intact tanks. These actions will aim to minimise the volume of fuel spilled.
In-Situ Burning	Controlled burning of oil spill	✗	Not applicable to diesel spills due to inability to contain marine diesel making it very difficult to maintain necessary slick thickness for ignition and sustained burning. In addition, in-situ burning is not normally considered as an acceptable response strategy due to the atmospheric emissions created.
Monitor and Evaluate Plan	Vessel surveillance	✓ 1	Provides real-time information on spill trajectory and behaviour (e.g. weathering). Informs implementation of other response strategies. Vessel personnel may not be trained observers. Vessel observers on leaking vessel may not have capacity to observe oil during emergency response procedure implementation. Constrained to daylight. Limited to visual range from the vessel. Limited capacity to evaluate possible interactions with sensitive receptors.
	Aerial surveillance	✓ 1	Provides real-time information on spill trajectory and behaviour (e.g. weathering). May identify environmental sensitivities impacted or at risk of impact (e.g. seabird aggregations, other users such as fishers). Informs implementation of other response strategies.
	Tracking buoys	✓ 1	Can be implemented rapidly. Can provide indication of near-surface entrained/dissolved hydrocarbons (most other monitor and evaluate techniques rely on the hydrocarbon being on the surface or shoreline).
	Trajectory Modelling	✓ 1	Can be implemented rapidly. Predictive – provides estimate of where the oil may go, which can be used to prepare and implement other responses. No additional field personnel required. Not constrained by weather conditions.

OSR Strategy	Tactic	Applicability and designated primary (1) or secondary (2) response strategy MDO	Considerations
			Can predict floating, entrained, dissolved and stranded hydrocarbon fractions. May not be accurate. Requires in-field calibration.
	Satellite Imagery	✓ 1	Can work under large range of weather conditions (e.g. night-time, cloud cover, etc.). Mobilisation restricted to image availability. Requires processing. May return false positives.
Chemical dispersion	Vessel Application	✗	MDO is not a persistent hydrocarbon and has high natural dispersion rates in the marine environment, rapidly spreading to a thin sheen. Dispersant use is not advised on light distillate fuels such as MDO as these oils will evaporate and naturally disperse quite rapidly under most conditions (IPIECA-IOGP 2016a). Therefore, considering the rapid evaporation rates of MDO, the tendency to naturally disperse and the remoteness of the spill location, the addition of chemical dispersants would have little to no net environmental benefit whilst potentially increasing localised toxicity in the water column.
	Aerial Application	✗	
Offshore Containment and Recovery	Use of offshore booms/ skimmers or other collection techniques deployed from vessel/s to contain and collect oil	✗	Containment and recovery effectiveness drops significantly with reduced oil thickness (McKinney and Caplis 2017; NOAA 2013). McKinney and Caplis (2017) tested the effectiveness of various oil skimmers at different oil thicknesses. Their results showed that the oil recovery rate of skimmers dropped significantly when oil thickness was <50 g/m^2. Given the rapid weathering nature of MDO, and its ability to spread quickly to a thin film, containment and recovery would be ineffective.
Mechanical Dispersion	Vessel prop-washing	✓ 2	Safety is a key factor and slicks with potential for high volatile organic compound (VOC) emission are not suitable. Mechanical dispersion may be applicable for the localised entrainment of surface oil but is not considered to have a significant effect on removing oil from the surface. Mechanical dispersion will entrain surface oil into the top layer of the water column. The aim of mechanical dispersion is to reduce the concentration of oil floating at the surface which could potentially contact receptors at the sea surface (e.g. sea birds) or shoreline receptors (e.g. mangroves). Once dispersed in the water column the smaller droplet sizes enhance the biodegradation process. Marine diesel is a light oil that can be easily dispersed in the water column by running vessels through the plume and using the turbulence developed by the propellers to break up the slick. Mechanical dispersion may be considered for targeted small breakaway patches of crude but may have limited effectiveness. The potential disadvantage of mechanical dispersion is that it could temporarily increase the concentration of entrained and dissolved oil in the vicinity of submerged shallow water receptors (e.g. corals, seagrass ad macroalgae). This is most likely in shallow water of a few metres deep. The suitability of mechanical dispersion as a response measure would consider the

OSR Strategy	Tactic	Applicability and designated primary (1) or secondary (2) response strategy	Considerations
		MDO	
			prevailing environmental conditions (it mimics the action of wave induced entrained so is most beneficial in calm conditions) and the type, proximity and depth (as applicable) of sensitivities in the area. Mechanical dispersion will be considered for petroleum activity sourced spills at the discretion of the OSC/IMT or by the relevant Control Agency. It is unlikely that vessels would be specifically allocated for mechanical dispersion but support vessels in the field undertaking primary strategies may be used opportunistically.
Protection and Deflection	Booming in nearshore waters and at shorelines	✓ 2	Considered if monitor and evaluate activities show or predict contact with sensitive shorelines. Modelling predicts low probability of contact with shorelines and minimal shoreline accumulation ≥100 g/m^2 (refer to Table 6-3). Shoreline protection and deflection activities can result in physical disturbance to intertidal and shoreline habitats. Given the high rates of natural biodegradation of marine diesel, it would be better to focus on priority areas for protection. This strategy is considered to be a secondary response strategy where it is safe and practical to implement and where priority protection areas are at risk of impact from marine diesel. Note: *This strategy for marine diesel may not be executed in certain sensitive areas due to the propensity of hydrocarbons to evaporate and disperse naturally, and the risk of damage from spill responders entering these sensitive areas. Therefore, this strategy would only be carried out in these areas for this hydrocarbon type if operational NEBA shows a clear benefit.*
Shoreline clean-up	Activities include physical removal, surf washing, flushing, bioremediation, natural dispersion	✓ 2	Considered if operational monitoring shows or predicts contact with sensitive shorelines. Modelling predicts a maximum probability of shoreline accumulation of 1.67% at ≥100 g/m^2 (refer to Table 6-3). Shoreline clean-up activities can result in physical disturbance to shoreline habitats. Given the relatively small total accumulated volumes predicted to come ashore during the worst-case scenario (refer to Section 6.4), and the high rates of natural biodegradation of marine diesel, it would be better to focus on high priority areas for clean-up. This strategy is considered to be a secondary response strategy where it is safe and practical to implement and where protection priority areas are at risk of impacts from marine diesel. Note: *This strategy for marine diesel may not be executed in certain sensitive areas due to the propensity of hydrocarbons to evaporate and disperse naturally, and the risk of damage from spill responders entering these sensitive areas. Therefore, this strategy would only be carried out in these areas for this hydrocarbon type if operational NEBA shows a clear benefit.*
Oiled wildlife response	Activities include hazing, pre-emptive capture, oiled wildlife capture, cleaning and rehabilitation	✓ 1	Can be used to deter and protect wildlife from contact with oil. Mainly applicable for marine and coastal fauna (e.g. birds) where oil is present at the sea surface or accumulated at coastlines. Surveillance can be carried out as a part of monitor and evaluate activities or the fauna specific operational monitoring. Wildlife may become desensitised to hazing method. Hazing may impact upon animals (e.g. stress, disturb important behaviours such as nesting or foraging). Permitting requirements for hazing and pre-emptive capture.
Operational and Scientific Monitoring	The monitoring of the effectiveness	✓ 1	Operational monitoring activities include: • hydrocarbon properties and weathering behaviour

OSR Strategy	Tactic	Applicability and designated primary (1) or secondary (2) response strategy	Considerations
		MDO	
	and potential impacts of response strategies; and the monitoring of environmental receptors to determine the level of impact from the oil spill and associated response activities that is sufficient to inform any remediation activities		• water and sediment quality assessment • chemical dispersant effectiveness and fate assessment • rapid marine fauna surveillance • shoreline clean-up assessment Scientific monitoring activities include: • water and sediment quality assessment • intertidal and coastal habitat assessment • seabirds and shorebirds assessment • marine megafauna assessment • benthic habitat assessment • marine fish and elasmobranch assemblages assessment • fisheries assessment • heritage features assessment • social impact assessment The type and extent of operational and scientific monitoring will depend upon the nature and scale of hydrocarbon contact to sensitive receptor locations. Pre-defined initiation criteria exist for operational and scientific monitoring plans.

6.6 Identification of priority protection areas and initial response priorities

Combined spill modelling results were used to predict the Environment that may be Affected (EMBA) for activity (refer to Section 3.1 – Eos 3D MSS EP [7710-650-EMP-0011]). The EMBA is the largest area within which effects from hydrocarbons spills associated with this activity, could extend.

Within the EMBA, areas of high environmental value (HEV) and areas of HEV with a high probability and level of oil contact (Hotspots), have been identified (as per Section 7.1.6 of the Eos 3D MSS EP [7710-650-EMP-0011]). Priority protection areas (PPAs) are emergent features (i.e. coastal areas and islands) that are predicted to be contacted above moderate exposure values and would be targeted by nearshore spill response operations such as protection and deflection and shoreline clean-up.

Table 6-6 shows the rationale for the hotspots that were selected as PPAs from the list of contacted receptors

Table 6-6: Determination and rationale for the protection priority areas

Hotspots	Type	HEV ranking	Hotspot	PPA	Rationale
Joseph Bonaparte Gulf AMP	Submerged	3	Y	N	Submerged receptor
Kimberley AMP	Submerged	3	Y	N	Submerged receptor
JBG East Coast	Emergent	4	Y	Y	37 m^3 maximum accumulated shoreline volume and 10 km shoreline oiling (≥100g/m^2). 164 hours (~6 days, 20 hours) until shoreline accumulation (≥100 g/m^2) at 1.7% probability. Discretionary hotspot / PPA on basis of greatest volume of shoreline accumulation.
Van Cloon-Deep Shoals	Submerged	5	Y	N	Submerged receptor
Tiwi Islands	Emergent	5	Y	Y	17 m^3 maximum accumulated shoreline volume and 5 km of shoreline oiled (≥100 g/m^2). 253 hours (~10 days, 12 hours) until shoreline accumulation (100 g/m^2), albeit at very low (0.33%) probability. Discretionary hotspot / PPA on basis of cultural heritage significance.

Table 6-7 lists the key sensitivities and associated locations within the identified priority protection areas. The ranking of these sensitive areas (with the associated 'receptors' taken into consideration) are listed, which is consistent with the rankings in Provision of Western Australian Marine Oil Pollution Risk Assessment – Protection Priorities: Assessment for Zone 1: Kimberley (Advisian, 2018). Using a combination of sensitivities, and their associated rankings; together with the modelled maximum total volumes ashore and minimum time to shoreline contact, an initial response priority is provided in Table 6-7. This information is designed to aid decision-making in the preliminary stages of the response operation, so that initial resources are used for best effect. Note, the PPA areas for response also correspond with the wildlife priority protection areas presented in Section 14.2, with further detail on the species that may be present and key locations provided in Table 14-3.

Note, the PPAs for response also correspond with the wildlife priority protection areas presented in Section 14.2, with further detail on the species that may be present and key locations provided in Appendix B of the Northern Australia OSM-BIP [7715-650-ERP-0003].

Table 6-7: Initial response priorities – Eos 3D MSS vessel collision spill

Protection Priority Area	Key sensitivities	WA DTMI Ranking (Floating oil)[18]	WA DTMI Ranking (Dissolved oil)	Key locations	Relevant key periods	Peak volume ashore (m^3)	Minimum arrival time shoreline oil accumulation ≥100 g/m² (days:hours)	Initial response priority
Joseph Bonaparte Gulf - East Coast	Mangroves	3	3	widespread	N/A	37	6 days, 20 hours	Medium
	Wetlands of National Significance	4	4	Finniss floodplain estuary system	-			High
	Birds Migratory shorebirds	4	3	Refer to Table 14-3	-			Medium
	Birds Seabirds			Refer to Table 14-3	-			
	Marine mammals Dugong Australian snubfin dolphin Indo-Pacific humpback dolphin Indo-Pacific bottlenose dolphin	3	2	-	-			Low
	Saltwater crocodiles	2	1	widespread	-			Low
	Turtles Green turtle Olive ridley Flatback	4	3	Refer to Table 14-3	-			High
Tiwi Islands	Mangroves	3	3	widespread	N/A	17	10 days, 12 hours	Medium
	Turtles Flatback Turtles Olive Ridley Turtles	4	3	Refer to Table 14-3	-			High
	Saltwater crocodile	2	1	widespread	-			Low
	Marine Mammals Australian Snubfin Dolphin	3	2	-	Peak between June – August			Low

[18] *Adapted from Provision of Western Australian Marine Oil Pollution Risk Assessment – Protection Priorities: Assessment for Zone 1: Kimberley (Advisian, 2018).*

Protection Priority Area	Key sensitivities	WA DTMI Ranking (Floating oil)[18]	WA DTMI Ranking (Dissolved oil)	Key locations	Relevant key periods	Peak volume ashore (m^3)	Minimum arrival time shoreline oil accumulation ≥100 g/m^2 (days:hours)	Initial response priority
	Spotted Dolphin Killer Whale/Orca Whale Spotted Bottlenose Dolphin Australian Humpback Dolphin Humpback Whale Common Dolphin Risso's Dolphin Bottlenose Dolphin Indian Ocean Bottlenose Dolphin Blue Whale Bryde's Whale Dugong							
	Birds The Tiwi Islands support exceptionally high densities of the vulnerable Red Goshawk. They also support many migratory shorebirds including more than 1% of the world's Great Knots. Seagull Island has the largest crested tern colony (>30,000) in the NT.	3	2	Refer to Table 14-3	Peak between June – August			Medium
	Coral and other subsea benthic primary producers	3	4	N/A	Coral spawning – March & October			Low
	Socioeconomic Tourism – charter boats, diving and snorkelling Recreational fishing	1	1	N/A	Tourism: April to August			Low
	Cultural heritage	3	3	-	-			Medium

6.6.1 Tactical response plans for priority protection areas

Santos Tactical Response Plans (TRPs) are in place for certain receptors identifying suitable response strategies, equipment requirements, relevant environmental information, and access and permit requirements. TRPs are to be used by the IMT for first strike and ongoing activities and to help inform the appropriate responses for inclusion in an IAP.

Not all PPAs require TRPs in place. In general, the requirement for a TRP considers the hydrocarbon type and predicted time to contact to a PPA from accumulated or floating hydrocarbons in <10 days (above the response planning thresholds defined in Section 6.2). Ten days allows two days to get services procured; six days to draft the TRP; and two days to implement. The Sensitivity Ranking (HEV and NTOWRP), and accessibility (i.e. on mainland compared to a remote island location) are also considered.

A TRP will also be considered if the impact from hydrocarbon will be considerable (high accumulation, large floating oil contact). Where TRPs are unavailable for areas likely to be contacted, refer to other sources of information such as aerial photography, Oil Spill Response Atlas, Kimberley Region Oiled Wildlife Response Plan, NTOWRP and WAMOPRA. Additionally, TRPs for contacted receptors will be sought from other operators where possible.

Although the above criteria are not meet for the EOS activity, a TRP for the Tiwi Islands exists and is located on the Santos ER SharePoint.

6.7 Net environmental benefit analysis

The IMT uses a NEBA, also referred to as a spill impact mitigation assessment (SIMA), to inform the incident action planning process (Section 8), so the most effective response strategies with the least detrimental environmental impacts can be identified, documented and executed.

Within Santos's IMT, the Environment Unit Leader is responsible for reviewing the priority receptors identified within the EP and this OPEP and coordinating the Operational NEBA to identify which response options are preferred for the situation, oil type and behaviour, environmental conditions, direction of plume and priorities for protection.

As a component of the incident action planning process, NEBA is conducted by the Control Agency with responsibility for the spill response activity. Where there are different activities controlled by different IMTs, as in a cross-jurisdictional response between Santos, NT Control Agency, and/or WA DTMI, consultation will be required during the NEBA process such that there is consistency in the sensitivities prioritised for response across the Control Agencies.

A strategic NEBA has been developed for all response strategies identified as applicable to the spill scenarios, with the benefit or potential impact to each sensitivity identified within the EMBA (refer to Table 6-8). While not all spill response activities included in the strategic NEBA would be under the control of Santos during a spill incident, they have been included to assist the planning conducted by the Control Agency.

In the event of a spill, NEBA is applied with supporting information collected as part of the Monitor and Evaluate Plan (Section 10) to:

- Identify sensitivities within the area potentially affected by a spill at that time of the year (noting that the sensitivity of some key receptors, such as birdlife and turtles, varies seasonally).
- Help prioritise and allocate resources to sensitivities with a higher protection and response priority (Table 6-7).
- Help determine appropriate response strategies with support of real-time metocean conditions, oil spill tracking and fate modelling.

When a spill occurs, NEBA is applied to the current situation, or operationalised. Operational NEBA Templates are filed within the Environment Unit Leader folder on the Santos ER Intranet site. To complete the Operational NEBA:

- All ecological and socioeconomic sensitivities identified within the spill trajectory area are recorded.
- Potential effects of response strategies on each sensitivity are assessed in terms of their benefit or otherwise to the socio-economic sensitivities.
- All persons involved and data inputs have been considered for the analysis.

The Operational NEBA Form documents the decisions behind the recommendation to the Incident Commander on which resources at risk to prioritise, and the positives and negatives of response strategies to deploy. The Operational NEBA provides guidance to the IAPs and is revisited each Operational Period.

Table 6-8: Strategic net environmental benefit analysis matrix – Eos 3D MSS diesel spill

Priority for protection area	No controls	Source control	Monitor and evaluate	Mechanical dispersion	Shoreline protection	Shoreline clean-Up	Oiled wildlife response	Operational and Scientific monitoring
Joseph Bonaparte Gulf East								
Turtle habitat – Green, Olive Ridley and Flatback								
Coral and other subsea benthic primary producers					N/A	N/A	N/A	
Marine mammals – Dugong, whale and dolphin migration and populations								
Seabirds								
Beagle-Darwin Gulf								
Turtle habitat – Flatback and Olive Ridley								
Mangroves								
Seabirds and shorebirds								
Tourism – charter boats, diving, snorkelling, recreational fishing								
Tiwi Islands								
Turtle habitat – Green, Flatback and Olive Ridley								
Coral and other subsea benthic primary producers					N/A	N/A	N/A	
Marine mammals – Dugong, whale and dolphin migration and populations								
Seabirds and shorebirds								
Tourism – charter boats, diving, snorkelling, recreational fishing								

Legend	
	Beneficial impact.
	Possible beneficial impact depending on the situation (e.g. time frames and metocean conditions).
	Negative impact.
N/A	Not applicable for the environmental value or not applicable for hydrocarbon type.

6.8 Oil spill response as-low-as-reasonably-practicable assessment

For each response strategy included within this OPEP an environmental performance outcome has been determined and key control measures and performance standards have been identified such that the response can meet the required performance outcome. For each response strategy, an ALARP assessment has been conducted to demonstrate that the control measures mitigate the risk of an oil spill to ALARP.

Appendix B details the ALARP assessment framework and the results of the ALARP assessment conducted to inform the control measures and performance standards contained within this OPEP.

7. External notifications and reporting requirements

For oil spill incidents, the OSC (or Company Site Representative) will notify the Perth-based IMT for delegation of further notifications to relevant regulatory authorities and for further spill response assistance for Level 2/3 spills.

7.1 Regulatory notification and reporting

The Incident Commander (IC) is to delegate the following regulatory reporting requirements. Typical delegated parties will be the Planning Section Chief.

Contact details for the Regulatory agencies outlined in Table 7-1 are provided within the Incident Response Telephone Directory (7700-670-PLA-0016. 20).

Table 7-1 outlines the external regulatory reporting requirements specifically for oil spill incidents outlined within this OPEP in Commonwealth and State/Territory jurisdictions, noting that regulatory reporting may apply to smaller Level 1 spills that can be responded to using on-site resources as well as larger Level 2/3 spills. There are also additional requirements for Vessel Masters to report oil spills from their vessels under relevant marine oil pollution legislation (e.g. MARPOL). This includes, where relevant, reporting oil spills to AMSA (Rescue Coordination Centre) and WA DTMI (MEER unit).

In the event of a Level 2 or 3 spill event, Santos will review the relevant persons identification process described in Section 4.2 of the *Eos 3D MSS Environment Plan* (7710-650-EMP-0011). Relevant Persons, whose functions, interests or activities that may be affected by the spill event or response arrangements will be identified and engaged in accordance with the Santos incident management process, noting notification and communications requests made by Relevant Persons during Environment Plan consultation with respect to emergency situations.

The Incident Response Telephone Directory (7700-670-PLA-0016. 20) contains a more detailed list and contact details for incident response support and is updated every 6 months with up-to-date revisions available within the IMT room and online (intranet procedures and emergency response pages).

7.2 Activation of external oil spill response organisations and support agencies

Table 7-2 outlines notifications that should be made to supporting agencies to assist with spill response activities outlined within this plan. This list contains key OSROs that have pre-established roles in assisting Santos in an oil spill response. It is not an exhaustive list of all providers that Santos may use for assisting an oil spill response.

7.3 Environmental performance

Table 7-3 lists the environmental performance outcome, control measures, performance standards and measurement criteria for external notifications and reporting.

Table 7-1: External notification and reporting requirements (Commonwealth, state and international waters)

Agency or Authority	Type of notification/ timing	Legislation/guidance	Reporting requirements	Responsible person/group	Forms
Reporting requirements for Commonwealth water spills					
NOPSEMA (Incident Notification Office)	Verbal notification within two hours. Written report as soon as practicable, but no later than three days.	*Petroleum and Greenhouse Gas Storage Act 2006* Offshore Petroleum Greenhouse Gas Storage (Environment) Regulations 2023.	A spill associated with the activity in Commonwealth waters that has the potential to cause moderate to significant environmental damage[1].	Notification by Planning Section Chief (or delegate)	Incident reporting requirements: https://www.nopsema.gov.au/environmental-management/notification-and-reporting/
National Offshore Petroleum Titles Administrator (NOPTA) (Titles Administrator)	Written report to NOPTA within seven days of the initial report being submitted to NOPSEMA	Guidance Note (N-03000-GN0926) Notification and Reporting of Environmental Incidents	Spill in Commonwealth waters that is reportable to NOPSEMA.	Notification by Planning Section Chief (or delegate)	Provide same written report as provided to NOPSEMA
AMSA Rescue Coordination Centre (RCC)[2]	Verbal notification within two hours of incident Written POLREP form, within 24 hours on request from AMSA.	MARPOL	Santos to notify AMSA of any marine pollution incident[1].	Notification by Planning Section Chief (or delegate)	https://www.amsa.gov.au/forms/harmful-substances-report-polrep-oil
Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) (Director of monitoring and audit section)	Email notification as soon as practicable.	*Environment Protection and Biodiversity Conservation Act 1999*	If Matters of National Environmental Significance (MNES) are considered at risk from a spill or response strategy, or where there is death or injury to a protected species.	Notification by Planning Section Chief (or delegate)	Not applicable
Parks Australia (24-hour Marine Compliance Duty Officer)	Verbal notification as soon as practicable.	*Environment Protection and Biodiversity Conservation Act 1999*	An oil spill which occurs within a marine park or are likely to impact on an Australian Marine Park.	Notification by Planning Section Chief (or delegate)	Not applicable, but the following information should be provided: • Titleholder's details • Time and location of the incident (including name of marine park likely to be affected) • Proposed response arrangements as per the OPEP • confirmation of providing access to relevant monitoring and

Agency or Authority	Type of notification/ timing	Legislation/guidance	Reporting requirements	Responsible person/group	Forms
					evaluation reports when available • Details of the relevant contact person in the IMT
Australian Fisheries Management Authority (AFMA)	Verbal phone call notification within 24 hours of incident.	For consistency with DPIRD Fisheries notification.	Reporting of marine oil pollution[1] Fisheries within the environment that may be affected (EMBA). Consider a courtesy call if not in exposure zone	Notification by Planning Section Chief (or delegate)	Not applicable
If spill is heading towards WA waters					
Department of Mines, Petroleum and Exploration (DMPE) (Petroleum Environment Duty Officer)	Verbal phone call within two hours of incident being identified Follow up written notification within three days.	Regulations 28, 29 and 30 of the Petroleum (Submerged Lands) (Environment) Regulations 2012 Guidance Note on Environmental Non-compliance and Incident Reporting.	All actual or impending spills in State waters.	Notification by Planning Section Chief (or delegate)	Environmental and Reportable Incident/ Non-compliance Reporting Form https://www.wa.gov.au/organisation/department-of-mines-petroleum-and-exploration/lodge-annual-environmental-report-notification-or-report-incident
WA Department of Transport and Major Infrastructure (WA DTMI)[2] (MEER Duty Officer)	Verbal notification within two hours Follow up with Pollution Report (Appendix C) as soon as practicable after verbal notification If requested, submit Situation Report (Appendix D) within 24 hours of request.	*Emergency Management Act 2005* State Hazard Plan: Maritime Environmental Emergencies Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements.	Santos to notify of actual or impending Marine Pollution Incidents (MOP) that are in, or may impact, State waters. Emergency Management Regulations 2006 define MOP as an actual or impending spillage, release or escape of oil or an oily mixture that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment[1].	Notification by Planning Section Chief (or delegate) MEER Duty Officer contacted per Incident Telephone Directory	WA DTMI POLREP (Appendix C**)**: https://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-PollutionReport.pdf WA DTMI SITREP (Appendix D): https://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-SituationReport.pdf
WA Department of Biodiversity	Verbal notification as soon as reasonably practicable	Western Australian Oiled Wildlife Response Plan	Notify if spill has the potential to impact or has	Notification by Planning Section Chief (or delegate)	Not applicable

Agency or Authority	Type of notification/ timing	Legislation/guidance	Reporting requirements	Responsible person/group	Forms
Conservation and Attractions (State Duty Officer)			impacted wildlife in State waters (to activate the Oiled Wildlife Adviser).		
WA Department of Primary Industry and Regional Development (DPIRD) Fisheries	Verbal phone call notification to DTMI Maritime Environmental Emergencies phone line, and by email to DPIRD, within 24 hours of incident.	As per consultation with DPIRD Fisheries.	Reporting of marine oil pollution[1] Notify if spill has the potential to impact or has impacted fisheries in State waters.	Notification by Planning Section Chief (or delegate)	Not applicable
WA Department of Water and Environmental Regulation (DWER)	Initial verbal or electronic notification of the discharge as soon as practicable Written notification of the incident to the CEO of the DWER, copied to the local DWER Industry Regulation Office, as soon as practicable.	*Environmental Protection Act 1986* (Section 72) Environmental Protection (Unauthorised Discharge) Regulations 2004.	Call DWER 24 hour Pollution Watch hotline Environmental Protection Act: Spill or discharge of hydrocarbons to the environment that has caused, or is likely to cause pollution, or material or serious environmental harm (Level 2 / 3 spills). Environmental Protection (Unauthorised Discharge) Regs.: Unauthorised discharge (where there is potential for significant impact or public interest) to environment of Schedule 1 material.	Notification by Planning Section Chief (or delegate)	Reporting requirements: https://www.wa.gov.au/service/environment/pollutant-prevention/pollution-watch
If spill is heading towards NT waters					
NT Regional Harbourmaster	Verbal notification Follow up with POLREP as soon as practicable after verbal notification.	Northern Territory Oil Spill Contingency Plan. As per Territory legislation (i.e. *Marine Pollution Act 1999*).	All actual or impending spills in NT Darwin harbour, regardless of source or quantity.	Notification by IMT Planning Section Chief (or delegate).	POLREPs to be emailed to rhm@nt.gov.au (Regional Harbourmaster) Instructions for submitting POLREPs (including a POLREP Template) are provided on the NT Government webpage: https://nt.gov.au/marine/marine-safety/report-marine-pollution

Agency or Authority	Type of notification/ timing	Legislation/guidance	Reporting requirements	Responsible person/group	Forms
NT Department of Lands, Planning and Environment (DLPE) (Pollution Response Hotline; Environmental Operations) **Territory Emergency Controller** (NT Police Commissioner or delegate)	Verbal notification as soon as practicable Written report to be provided as soon as practicable after the incident, unless otherwise specified by the Minister	Northern Territory Oil Spill Contingency Plan. As per Territory legislation (i.e. *Marine Pollution Act 1999*).	All actual or impending spills in NT waters. Notify if spill has the potential to impact wildlife in Territory waters (to activate the Oiled Wildlife Coordinator).	Notification by IMT Planning Section Chief (or delegate).	Marine Pollution Reports (POLREPs) are to be emailed to pollution@nt.gov.au (Environmental Operations) Instructions for submitting POLREPs (including a POLREP Template – also refer to Appendix C) are provided on the NT Government web page: https://nt.gov.au/marine/marine-safety/report-marine-pollution https://ntepa.nt.gov.au/make-a-report
NT Department of Primary Industry and Fisheries (DPIF)	Verbal notification, timing not specified.	Not applicable.	Fisheries within the EMBA Consider a courtesy call if not in exposure zone.	Notification by IMT Planning Section Chief (or delegate).	Not applicable
If spill is heading towards international waters					
Department for Foreign Affairs and Trade 24 hour Consular Emergency Centre	Verbal notification within 8 hours if the spill is likely to extend into international waters. Follow up email outlining details of incident.	NP–GUI–007: National Plan coordination of international incidents: notification arrangements guidance (AMSA, 2017b)	Notify DFAT that a spill has occurred and is likely to extend into international waters. Inform DFAT of the measures being undertaken to manage the spill. NOPSEMA, DISR and DFAT will form an inter-agency panel; the Australian Government Control Crisis Centre.	Notification by Planning Section Chief (or delegate).	Email details of incident to globalwatchoffice@dfat.gov.au
Stakeholders (including relevant persons)					
WAFIC and WA commercial fisheries	Phone call within 24 hours of incident being identified with potential impact to the WA commercial fisheries.	As per consultation with WAFIC	Should impact be expected to WA commercial fisheries	Notification by Planning Section Chief (or delegate)	Santos' list of WA commercial fisheries for this activity

Agency or Authority	Type of notification/ timing	Legislation/guidance	Reporting requirements	Responsible person/group	Forms
	Follow up with email where available.				

1: For clarity and consistency across Santos regulatory reporting requirements, Santos will meet the requirement of reporting a marine oil pollution incident by reporting oil spills assessed to have an environmental consequence of moderate or higher in accordance with Santos' environmental impact and risk assessment process outlined in Section 5 of the EP.

2: Santos reporting requirements only listed. For oil spills from vessels, Vessel Masters also have obligations to report spills from their vessels to AMSA Rescue Coordination Centre (RCC) and, in State waters, WA DTMI MEER.

Table 7-2: List of spill response support notifications

Organisation	Indicative timeframe	Type of communication	Resources available	Activation instructions	Santos person responsible for activating
AMOSC Duty Officer	As soon as possible but within two hours of incident having been identified.	Verbal Service Contract	Santos is a Participating Member of AMOSC and can call upon AMOSC personnel and equipment (including oiled wildlife). Under the AMOSPlan, Santos can also call upon mutual aid from other trained industry company personnel and response equipment AMOSC's stockpiles of equipment include dispersant, containment, recovery, shoreline clean-up, oiled wildlife and communications equipment. Equipment is located in Geelong, Fremantle, Exmouth and Broome.	**Step 1.** Obtain approval from Incident Commander to mobilise AMOSC. **Step 2.** Notify AMOSC that a spill has occurred. Put on standby as required – activate if spill response escalates in order to mobilise spill response resources consistent with the AMOSPlan. **Step 3.** Email confirmation and a telephone call to AMOSC will be required for mobilisation of response personnel and equipment. Only a Santos call-out authority (registered with AMOSC) can activate AMOSC, and will be required to supply their credentials to AMOSC. A signed contract note must also be completed by the Santos call-out authority and returned to AMOSC before mobilisation.	Planning Section Chief (or delegate) will notify AMOSC (upon approval from Incident Commander)
Aviation Service Provider	Within two hours of incident having been identified	Verbal	Helicopters/pilots available for aerial surveillance. Contract in place.	Phone call.	Logistics Section Chief (or delegate)
Duty Officers/ Incident Commanders (Woodside, Chevron, Jadestone)	Within two hours of incident having been identified	Verbal	Mutual aid resources (through AMOSC mutual aid arrangement).	Phone call.	Incident Commander (or delegate)

Organisation	Indicative timeframe	Type of communication	Resources available	Activation instructions	Santos person responsible for activating
Exmouth Freight and Logistics	Within two hours of incident having been identified	Verbal	Assistance with mobilising equipment and loading vessels.	Phone call.	Logistics Section Chief (or delegate)
Waste Service Provider	As required for offshore and shoreline clean-up activities	Verbal	Santos has contract arrangements in place to take overall responsibility to transport and dispose of waste material generated through clean-up activities.	Phone call to the Primary Contact Person. In the event the Primary Contact Person is not available, the Secondary Contact Person will be contacted.	Logistics Section Chief (or delegate)
OSM Services Provider	Operational and Scientific Monitoring Plan initiation criteria are met (Tables 9-1 and 9-2 of the Joint Industry OSM Framework [APPEA, 2021])	Verbal and written	Santos is a member of OSRL's OSM Services Supplementary Agreement, providing access to personnel and equipment for operational and scientific monitoring	**Refer Northern Australia OSM-BIP (7715-650-ERP-0003) Part B for full activation instructions** **Step 1**. Obtain approval from Incident Commander to activate OSM Services Provider **Step 2**. Verbally notify OSM Services Provider followed by the submission of the Call Off Order Form **Step 3**. OSM Service Provider commences activation process.	Environment Unit Leader (or delegate)
Intertek Geotech (WA) Environmental Services and Ecotoxicology	OMP: Hydrocarbon Properties and Weathering Behaviour is activated (refer to Section 16)	Verbal	Oil analysis including gas chromatography/mass spectrometry fingerprinting.	Phone call.	Planning Section Chief (or delegate)
Oil Spill Response Limited, OSRL Duty Manager	Within two hours of incident having been identified	Verbal OSRL Mobilisation Authorisation Form	Santos has a Service Level Agreement with OSRL, which includes the provision of support functions, equipment and personnel to meet a wide range of scenarios. At minimum OSRL will provide technical support to the IMT and place resources on standby. Further details available on the OSRL webpage.	**Step 1**. Contact OSRL Duty Manager in Singapore and request assistance from OSRL. **Step 2**. Send notification to OSRL as soon as possible after verbal notification. **Step 3**. Upon completion of the OSRL incident notification form, OSRL will plan and place resources on standby. **Step 4**. Mobilisation of personnel (beyond 5 technical advisors x 5 days) and equipment requires signed mobilisation form by designated call-out authorities.	Designated call-out authorities (including Incident Commanders)

Organisation	Indicative timeframe	Type of communication	Resources available	Activation instructions	Santos person responsible for activating
The Response Group	As soon as possible but within two hours of incident having been identified	Verbal and written	Santos has arrangements with TRG for the provision of trained field response personnel	Contact TRG Duty Officer	Designated call-out authorities (including Incident Commanders)
RPS Group	As soon as possible but within two hours of incident having been identified	Verbal and written	Santos has an agreement in place with RPS Group to allow rapid marine hydrocarbon spill modelling capability to be activated at any time during activities, which will be undertaken for any spill greater than Level 1. AMOSC can also run modelling on behalf of Santos, if required, as part of contracting arrangements with RPS Group.	Contact RPS Group Duty Officer.	Planning Section Chief (or delegate)

Table 7-3: Environmental performance – external notification and reporting

Environmental performance outcome	Make notifications and reports within regulatory and defined timeframes.		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
External notifications and reporting plan	**Response preparedness**		
	Santos Incident Response Telephone Directory (7700-670-PLA-0016.20)	[EPS-RP-001] Incident Response Telephone Directory is revised every 6 months	Incident Response Telephone Directory; Document revision history
	OPEP communications test	[EPS-RP-002] OPEP contact details for regulatory and service provider notifications are checked annually	OPEP communications test records
	Response implementation		
	External notifications and reporting tables	[EPS-RP-003] External notification and reporting undertaken as per Table 7-1 and Table 7-2	Incident log

8. Incident action planning

The incident action planning process is built on the following phases:

- Understand the situation.
- Establish incident priorities, objectives and tasks.
- Develop a plan (IAP).
- Prepare and disseminate the plan.
- Execute, evaluate and revise the plan for the next operational period.

The Santos IMT will use the IAP process to determine and document the appropriate response priorities, objectives, strategies and tasks to guide the incident response which are reviewed and updated as more information becomes available. The IMT will use an IAP for each operational period following the initial first-strike assessments, notifications, and activations undertaken.

When acting as the support agency, Santos may be requested by the Control Agency to develop or support the development of an IAP to help guide the incident response.

The Santos IAP process is built on the phases described in Figure 8-1.

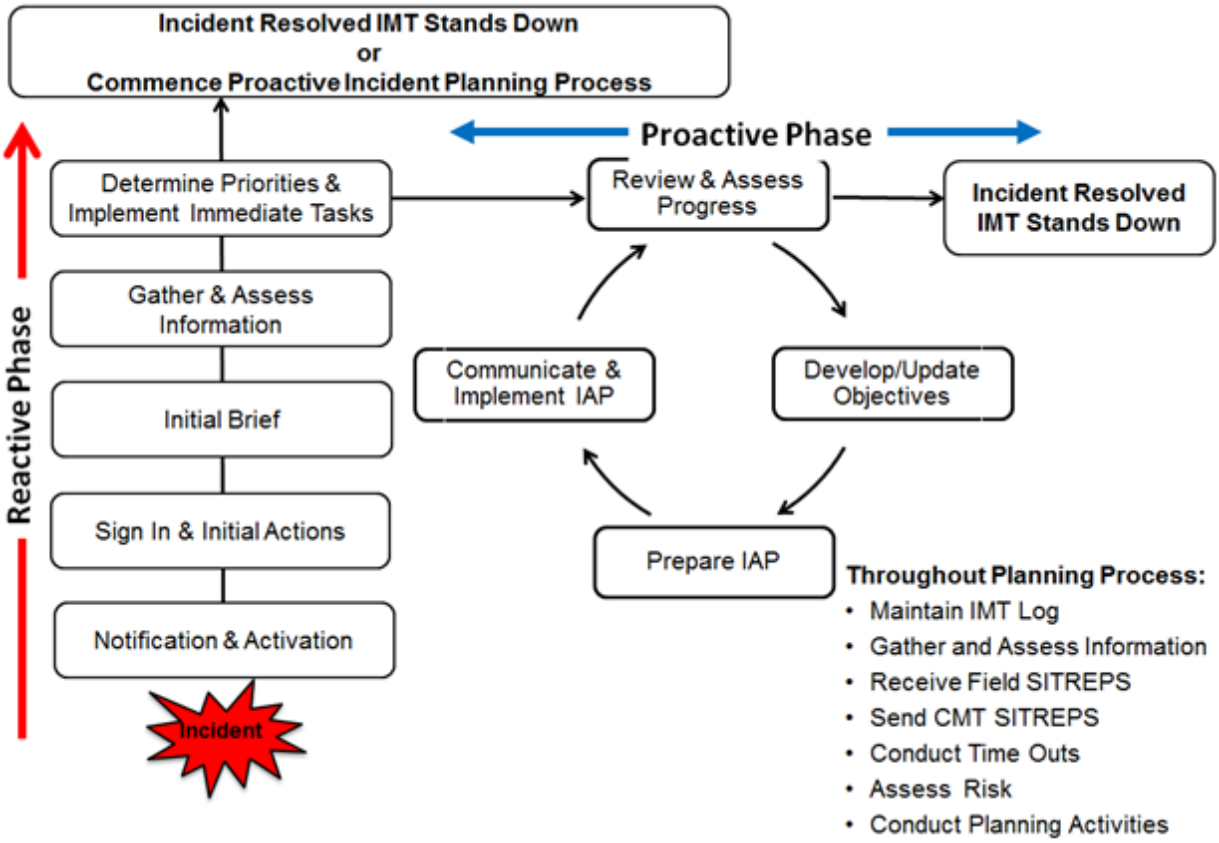

Figure 8-1: Incident action plan process

8.1 Reactive phase planning

The initial phase of the incident action planning process can be considered a reactive phase (indicatively lasting up to 48 hours) where information on the incident is being progressively established through reports coming in from the field. During this phase there is no formal incident action plan to follow (given the incident has just begun and details are still being established) however the OPEP (this document) has been prepared to contain all first-strike oil spill response actions required to be followed during this phase in lieu of a formal IAP.

First-strike response actions are summarised in Section 2 and provide links to relevant oil spill strategy sections within the OPEP which contain a more detailed list of implementation actions and considerations as well as statements of performance (performances standards) that must be followed to ensure the initial response meets regulatory requirements and environmental performance outcomes.

For each credible oil spill scenario covered by this OPEP, the first-strike response actions have been informed by a pre-assessment of applicable oil spill response strategies, priority response locations and a strategic NEBA (also referred to as a SIMA). This pre-planning is included in the activity-specific OPEP Addendums. During the reactive phase the strategic NEBA is to be reviewed and, using the specific information gathered from the spill, operationalised into an operational NEBA. This assessment helps verify that the response strategies pre-selected for each spill scenario are providing the best environmental outcome for the incident response.

8.2 Developing an incident action plan

At the end of the reactive phase where the incident specifics have been determined, a more formal phase of spill response is entered whereby a documented IAP is developed to guide the incident response activities for the next operational period. An operational period is defined as the period scheduled for execution of actions specified in the IAP. The next operational period is nominally a daily period but for long running incidents may be extended further where the pace of the incident response has settled, and the level of new information has decreased.

As IAPs and response strategies are implemented their performance is monitored. The performance measurement results are fed back into the IMT to provide the IMT with greater situational awareness to enable the effective formulation of following IAPs. Those response strategies that are effective are continued or increased, while those strategies that are ineffective are scaled back or ceased.

The performance against the objectives of the IAP must be documented in the Incident log by the IMT. This provides the IMT with information required to assist in formulating the following IAP and provides evidence of Santos' response to the incident for regulatory and legal investigations that will follow the termination of the incident.

IAP performance is monitored through IMT communication with in-field response personnel both verbally and through logs/reports/photos sent throughout the response (e.g. surveillance personnel, team leaders, laboratory chemists) who report on the effectiveness of the response strategies.

IAP forms and processes are documented in the Santos SharePoint Oil Spill Response Tile and in the SO ER Documentation SharePoint site. Access subfolders to display all forms required to conduct incident action planning. Each functional position within the IMT has subfolders carrying forms and processes unique to the functional position on the Oil Spill Tile.

8.3 Environmental performance

Table 8-1 lists the environmental performance outcome, control measures, performance standards and measurement criteria for incident action planning.

Table 8-1: Environmental performance – incident action planning

Environmental performance outcome	Manage incident via a systematic planning process		
Response strategy	**Control measures**	**Performance standards [EPS-ID]**	**Measurement criteria**
Incident action planning	**Response preparedness**		
	IMT Exercise and Training Plan	[EPS-RP-005] Incident action planning and NEBA is practiced by the IMT during exercises	Exercise records
	Response implementation		
	IAP	[EPS-RP-006] IAP is completed for each operational period and approved by the Incident Commander	Incident log; IAP(s)
		[EPS-RP-007] Monitor effectiveness of response strategies being implemented and use information in the development of IAPs	Incident log; IAP(s)
	NEBA	[EPS-RP-008] An operational NEBA will be undertaken for each operational period of the incident	NEBA; IAP

Environmental performance outcome	Manage incident via a systematic planning process		
Response strategy	**Control measures**	**Performance standards [EPS-ID]**	**Measurement criteria**
	IMT activation and de-escalation	[EPS-RP-009] IMT will be activated Immediately once notified of a Level 2/3 spill (to Incident Commander).	Incident Action Plan
		[EPS-RP-010] The decision to de-escalate the IMT will be made in consultation with the relevant Control Agency/s, Jurisdictional Authorities and other Statutory Authorities that play an advisory role.	NEBA IAP
	TRPs	[EPS-RP-011] If monitor and evaluate shows that shoreline contact of Protection Priority Areas is likely, TRPs will be developed or sought from other titleholders/ regional industries prior to shoreline contact.	TRP

9. Source control

The initial and highest priority response to an oil spill incident following the health and safety of on-site personnel is to prevent or limit further loss of hydrocarbons to the environment.

For vessels with a SOPEP, the SOPEP will provide the relevant initial actions to control the source of the spill.

The sections below provide an outline of source control activities noting that the Vessel SOPEP, where applicable, will provide a higher level of detail for specific incidents.

9.1 Vessel collision – fuel tank rupture

Table 9-1 provides the environmental performance outcome, initiation criteria and termination criteria for source control response to a fuel tank rupture. The Emergency Commander and/or Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 9-1: Vessel collision – source control environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome.	Implementation of source control methods to stop the release of hydrocarbons into the marine environment
Initiation criteria	Notification of a spill
Termination criteria	Release of oil to the marine environment has ceased and the workplace environment is deemed environmentally safe and free of hydrocarbons

9.1.1 Implementation guidance

Implementation guidance is summarised in Table 9-2. In the event MDO is released from a vessel due to a tank rupture, the relevant vessel-specific procedures will be applied. For support vessel collisions, the vessel's SOPEP will be followed to control the source, reduce the loss of hydrocarbons and prevent escalation of the incident. Table 9-3 lists the environmental performance standards and measurement criteria for this strategy.

Table 9-2: Implementation guidance – fuel tank rupture

Action		Consideration	Responsibility	Complete
Initial actions	The vessel's SOPEP, as applicable under MARPOL, or procedure for responding to a ruptured tank will be followed, as applicable.	Notwithstanding vessel-specific procedures for source control, the following activities would be evaluated immediately for implementation, providing it is safe to do so: • Reduce the head of fuel by dropping or pumping the tank contents into an empty or slack tank. • Consider pumping water into the leaking tank to create a water cushion to prevent further fuel inventory loss. • If the affected tank is not easily identified, reduce the level of the fuel in the tanks in the vicinity of the suspected area if stability of the vessel will not be compromised. • Evaluate the transfer of fuel to other vessels. • Trim or lighten the vessel to avoid further damage to intact tanks. • Attempt repair and plugging of hole or rupture.	Vessel Master	☐

9.2 Environmental performance

Table 9-3 indicates the environmental performance outcome, control measures, performance standards and measurement criteria for the Source Control response strategy.

Table 9-3: Environmental performance – source control

Environmental Performance Outcome	Implementation of source control methods to stop the release of hydrocarbons into the marine/onshore environment.		
Response Strategy	**Control Measures**	**Performance Standards**	**Measurement Criteria**
Response Preparedness			
Source control – vessel collision spill control	Vessel Spill Response Plan (SOPEP/ ship-board marine pollution emergency plan [SMPEP])	[EPS-SC-001] Activity/ support vessels have a SOPEP or SMPEP that outlines procedures to combat spills	Audit records; Inspection records
		[EPS-SC-002] Spill exercises on activity/ support vessels are conducted as per the vessels' SOPEP or SMPEP	Spill exercise close-out reports
Response Implementation			
Source control – vessel collision spill control	Vessel Spill Response Plan (SOPEP/SMPEP) implemented	[EPS-SC-003] Actions to control spill associated with a vessel incident followed in accordance with SOPEP or SMPEP	Vessel logs

10. Monitor and evaluate

Understanding the behaviour and likely trajectory of an oil spill is critical to evaluate the appropriate response strategy. There are a number of methods that can be used to monitor and evaluate, including:

- vessel surveillance
- aerial surveillance
- tracking buoys
- oil spill trajectory modelling
- satellite imagery

10.1 Vessel surveillance

Table 10-1 lists the environmental performance outcome, initiation and termination criteria for this strategy.

Table 10-1: Vessel surveillance – environmental performance outcome, initiation and termination criteria

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT decision-making
Initiation criteria	Notification of a Level 2/3 spill – may be deployed in a Level 1 incident (to be determined by Emergency Commander)
Termination criteria	• Vessel-based surveillance is undertaken at scheduled intervals during daylight hours and continues for 24 hours after the source is under control and a surface sheen is no longer observable, OR • NEBA is no longer being achieved, OR • Agreement is reached with Jurisdictional Authorities to terminate the response

Direct observations from field support or other vessels can be used to assess the location and visible extent of the hydrocarbon incidents, and to verify modelling predictions and trajectories. Due to the proximity of observers to the water's surface, vessel surveillance is limited in its coverage in comparison to aerial surveillance and may also be compromised in rough sea-state conditions or where fresh hydrocarbons at surface pose safety risks.

10.1.1 Implementation guidance

Table 10-2 provides guidance to the IMT on the actions and responsibilities to be considered when selecting this strategy. Table 10-3 has a list of resources that may be used to implement this strategy. Mobilisation times for the minimum resources that are required to start initial vessel surveillance operations are listed in Table 10-4. The OSC and/or Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 10-35 lists the environmental performance outcome, control measures, performance standards and measurement criteria for this strategy.

Table 10-2: Implementation guidance – vessel surveillance

Action		Consideration	Responsibility	Complete
Initial actions	Notify nearest available Support Vessel to commence surveillance.	Current Santos on hire vessels or Vessels of Opportunity (VOO) can be used. Automatic Identification System (AIS) vessel tracking is available through Emergency Response (ER) intranet page.	On-Scene Commander Operations Section Chief	☐
	Source additional contracted vessels if required for assistance.	Refer to Santos Vessels for Oil Spill Response (7110-650-ERP-0001) for the process for vessel monitoring and guidance on vessel types	Logistics Section Chief	☐
	Record surface slick location and extent, weather conditions, and marine fauna. Complete vessel surveillance forms (Appendix E) and provide to On-Scene Commander (Level 1 spills) or IMT (Level 2/3 spills).	Photographic images are to be taken where possible and included with surveillance forms. Trained observers will not be available immediately – photos and locations will provide initial information that can be interpreted by IMT.	Vessel Observers	☐
	Relay surveillance information (spill location, weather conditions, marine fauna sightings and visual appearance of the slick) to the IMT within 60 minutes of completing vessel surveillance.	Initial reports to the IMT may be verbal (followed by written transmission) if the vessel is out of range or has no facilities for transmitting forms.	Vessel Master and/or On-Scene Commander	☐
Ongoing actions	Review surveillance information to validate spill fate and trajectory.	-	Planning Section Chief (or delegate)	☐
	Use available data to conduct operational NEBA and confirm that pre-identified response options are appropriate.	-	Environment Unit Leader	☐
	Use monitor and evaluate data to periodically reassess the spill and modify the response (through the IAP), as required	Surveillance data is useful in updating the Common Operating Picture	Planning Section Chief	☐

Table 10-3: Vessel surveillance resource capability

Equipment type/ personnel required	Organisation	Quantity available	Location	Mobilisation timeframe
Contracted vessels and vessels of opportunity	Santos Contracted Vessel Providers Vessels of opportunity identified through AIS Vessel Tracking.	Availability dependent upon Santos and Vessel Contractor activities.	Vessels mobilised from Darwin or offshore location. Locations verified through AIS Vessel Tracking Software.	Pending availability and location. Expected within 48 hours.

Table 10-4: Vessel surveillance – first-strike response timeline

Task		Time from IMT call-out
IMT begins sourcing Santos-contracted vessel or VOO for on-water surveillance		<90 minutes
VOO on site for surveillance		<48 hours (daylight dependent)
Minimum resource requirements		
One vessel. No specific vessel or crew requirements.		
Deployment location	**Approx. distance to Operational Area [19] (nm)**	**Approx. steam time[20] (hours)**
Darwin	124	13

10.2 Aerial surveillance

Table 10-5 provides the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 10-5: Aerial surveillance – environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT decision -making
Initiation criteria	Notification of a Level 2/3 spill
Termination criteria	• Aerial surveillance undertaken at scheduled intervals during daylight hours and continues for 24 hours after the source is under control and a surface sheen is no longer observable, OR • As directed by the relevant Control Agency

Aerial surveillance is used to record the presence and size of the hydrocarbon spill at surface as well as other environmental observations including weather conditions, marine fauna and sensitive receptors in the area. Aerial surveillance provides superior coverage over vessel surveillance for estimating the spatial extent of a spill but is generally required only for larger Level 2/3 spills.

10.2.1 Implementation guidance

Table 10-6 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy.

Table 10-7 provides a list of resources that may be used to implement this strategy. Mobilisation times for the minimum resources that are required to commence initial aerial surveillance operations are listed in Table 10-8. The On-Scene Commander and/or Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 10-35 lists the environmental performance outcome, control measures, performance standards and measurement criteria for this strategy.

[19] *As measured to the closest point of Operational Area*

[20] *At average speed of 10 knots*

Table 10-6: Implementation guidance – aerial surveillance

Action		Consideration	Responsibility	Complete
Initial actions	Contact contracted aviation provider – provide details of incident and request mobilisation to spill site for initial surveillance.	If aviation asset is available near spill location, use where possible to gather as much information about the spill. If aviation asset not available at spill location IMT is to seek available resources through existing contractual arrangements. It is possible that the initial surveillance flight will not include a trained aerial surveillance observer. Initial flights can be conducted using a standard crew and initial surveillance should not be delayed waiting for trained personnel. Ensure all safety requirements are met before deployment. There should be an attempt to obtain the following data during initial surveillance: • name of observer, date, time, aircraft type, speed and altitude of aircraft • location of slick or plume (global positioning system [GPS] positions, if possible) • spill source • size of the spill, including approximate length and width of the slick or plume • visual appearance of the slick (e.g. colour) • edge description (clear or blurred) • general description (windrows, patches etc.) • wildlife, habitat or other sensitive receptors observed • basic metocean conditions (e.g. sea state, wind, current) • photographic/video images.	Operations Section Chief Logistics Section Chief	☐
	Source available Santos Aerial Observers, arrange accommodation/logistics and deploy to Forward Operations/Air base location.	Santos Aerial Observer list available from First-strike Resources on Santos Offshore ER Intranet page.	Operations Section Chief Logistics Section Chief	☐
	Develop flight plan (frequency and flight path) to meet IMT expectations and considering other aviation ops. Expected that two overpasses per day of the spill area are completed.	Flight plan to confirm with OSC that aircraft are permitted in the vicinity of the spill. Flights are only to occur during daylight and in weather conditions that do not pose significant safety risks.	Operations Section Chief Air Operations Branch Director	☐
	Pre-flight briefing.	-	Aerial Observers Contracted aircraft provider/ pilots	☐
	Aerial Observers to commence surveillance	Consider procedure for interacting with marine fauna.	Operations Section Chief	☐

Action		Consideration	Responsibility	Complete
	Determine spill extent by completing Aerial Surveillance Log (Appendix F) and Aerial Surveillance Surface Slick Monitoring Template. Calculate volume of oil (Appendix G). Take still and/or video images of the slick.	Thickness estimates are to be based on the Bonn Agreement Oil Appearance Code.	Aerial Observers	☐
	Record presence and type of fauna by completing the Aerial Surveillance Marine Fauna Sighting Record Sheet (Appendix H).	Provide a copy of completed Record Sheets to Environment Unit Leader and OSM Implementation Lead.	Aerial Observers	☐
	Record shoreline habitat type and degree of oiling (if observed) by completing the Shoreline Aerial Observation Log (Appendix I)	Thickness estimates are to be based on the Bonn Agreement Code (Santos ER SharePoint).	Aerial Observers	☐
	Relay all surveillance records: logs, forms, photographic images, video footage to the IMT	Where possible, a verbal report via radio/telephone on-route providing relevant information should be considered if the aircraft has long transits from the spill location to base	Aerial Observers Planning Section Chief Operations Section Chief	☐
Ongoing actions	Update flight schedule for ongoing aerial surveillance as part of broader Aviation Subplan of IAP	Frequency of flights should consider information needs of IMT to help maintain the Common Operating Picture and determine ongoing response operations	Operations Section Chief Air Operations Branch Director Planning Section Chief	☐
	Mobilise additional aircraft and trained observers to the spill location to undertake ongoing surveillance activities	-	Logistics Section Chief	☐
	Update Common Operating Picture with surveillance information and provide updates to spill trajectory modelling provider	-	Planning Section Chief (or delegate)	☐

Table 10-7: Aerial surveillance resource capability

Equipment type/personnel required	Organisation	Quantity available	Location	Mobilisation timeframe
Rotary-Wing Aircraft and flight Crew	Santos contracted provider/s	2 x contracted (1 x primary + 1 x backup) + additional as required	Darwin Karratha	Wheels up within 1 hour for Emergency Response. Spill surveillance <12 hours (daylight dependent)
Aerial Surveillance Crew	Santos aerial observers AMOSC Industry Mutual aid	6 x Santos staff 4 x AMOSC staff	Perth and Varanus Island (VI) (Santos aerial observers)	Santos trained personnel – next day mobilisation to airbase

Equipment type/personnel required	Organisation	Quantity available	Location	Mobilisation timeframe
		2 x AMOSC Core Group personnel available Additional trained industry mutual aid personnel	Australia wide	<24 hours
Drones and pilots ** secondary response to assist vessel-based surveillance	AMOSC OSRL – Third-Party UAV provider Local WA hire companies	1 x pilot; Drones available 24/7 through AMOSC sub-contract 2 x qualified remote pilots, however response is on best endeavour 10+ companies	Fremantle Perth Perth and regional WA	AMOSC - Response via duty officer within 15 minutes of first call – AMOSC personnel available within 1 hour of initial activation call. Equipment logistics varies according to stockpile location (refer to Table 10-12) OSRL – depending on the port of departure, 1-2 days if within Australia

Table 10-8: Aerial surveillance – first-strike response timeline

Task		Time from IMT call-out
Aircraft activated for aerial surveillance		<3 hours
Aircraft on site for aerial surveillance		<12 hours (daylight dependent)
Trained Aerial Observers mobilised to airbase		<24 hours (daylight dependent)
Minimum resource requirements		
• Santos contracted helicopter and pilots (based in Darwin) • Santos trained Aerial Observers		
Airport	**Approx. distance[21] (nm)**	**Approx. flight time[22] (hours: minutes)**
Darwin	230	1: 55

10.3 Tracking buoys

Table 10-9 provides the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 10-9: Tracking buoys – environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT decision-making
Initiation criteria	Notification of a Level 2 or 3 spill May be deployed for a Level 1 spill if deemed beneficial by the OSC
Termination criteria	• Tracking buoy deployment will continue for 24 hours after the source is under control and a surface sheen is no longer observable, OR • As directed by the relevant Control Agency

10.3.1 Implementation guidance

Table 10-10 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy. Table 10-11 provides a list of resources that may be used to implement this strategy. Mobilisation times for first strike resources that are required to commence implementation of this tactic are listed in Table 10-12. The OSC and/or Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned. Table 10-35 lists the environmental performance outcome, control measures, performance standards and measurement criteria for this strategy.

[21] *As measured to closet point of Operational Area*

[22] *At average flight speed of 120 knots*

Table 10-10: Implementation guidance – tracking buoys

Action		Consideration	Responsibility	Complete
Initial actions	Organise support vessel to deploy 2 x tracking buoys.	Personnel and vessel safety is priority. Current Santos on hire vessels or VOOs can be used. AIS vessel tracking is available through ER intranet page.	OSC/Operations Section Chief	☐
	Deploy two tracking buoys at leading edge of slick.	Note deployment details and weather conditions in incident log.	Vessel Master	☐
	Inform IMT that tracking buoys have been deployed and provide deployment details. Monitor movement of tracking buoys.	Refer login details of tracking buoy monitoring website on Santos ER intranet site.	OSC Planning Section Chief (or delegate)	☐
	Use tracking buoy data to maintain Common Operating Picture.	Data tracked online.	Planning Section Chief (or delegate)	☐
	Relay information to spill fate modelling supplier for calibration of trajectory modelling.	-	Planning Section Chief (or delegate)	☐
Ongoing actions	Assess the need for additional tracking buoys in the spill scenario and identify/nominate preferred deployment locations.	Incident Action Plan to provide guidance regarding any additional deployments of tracking buoys.	Planning Section Chief	☐
	Mobilise additional tracking buoys if required from other Santos operations or from AMOSC stockpiles.	-	Logistics Section Chief	☐
	Direct the deployment of the Tracker Buoys.	-	Operations Section Chief	☐
	Deploy tracking buoys.	-	Vessel Master	☐
	Monitor movement of tracking buoys.	-	Planning Section Chief (or delegate)	☐
	Relay information to spill trajectory modelling supplier for calibration of trajectory modelling.	-	Planning Section Chief (or delegate)	☐

Table 10-11: Tracking buoy resource capability

Equipment type / personnel required	Organisation	Quantity available	Location	Mobilisation timeframe
Tracking buoys	Santos	2	Survey Vessel	<2 hours
		2	Darwin	24-48 hours site pending vessel availability
AMOSC tracking buoys	AMOSC	4	Fremantle	Response via duty officer within 15 minutes of first call – AMOSC personnel available within 1 hour of initial activation call. Equipment logistics varies according to stockpile location (refer to Table 10-12)
		4	Geelong	

Table 10-12: Australian Marine Oil Spill Centre estimated equipment mobilisation timeframes

	Perth	Darwin
Geelong	2-3 days 3,395 km	2-3 days 3,730 km
Perth	-	2-3 days 4,040 km
Exmouth	1-2 days 1,250 km	<2 days 3,170 km
Broome	<2 days 2,240 km	1-2 days 1,870 km

Table 10-13: Tracking buoy – first-strike response timeline

Task	Time from IMT call-out
Tracking buoys deployed from survey vessel	<2 hours
OR	
Additional tracking buoys deployed from Darwin using vessels of opportunity	24–48 hours to site pending vessel availability
Minimum Resource Requirements	
• Two tracking buoys for initial deployment	

10.4 Oil spill trajectory modelling

Table 10-14 provides the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 10-14: Oil spill trajectory modelling – environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT decision -making
Initiation criteria	Notification of a Level 2 or 3 spill
Termination criteria	• Spill fate modelling will continue for 24 hours after the source is under control and a surface sheen is no longer observable, or until no longer beneficial to predict spill trajectory and concentrations, OR • As directed by the relevant Control Agency

Oil spill trajectory modelling uses computer modelling (e.g. OILMAP, SIMAP) to estimate the movement, fate and weathering potential of spills. Santos has engaged RPS Group to provide forecast spill fate modelling. RPS Group use SIMAP and OILMAP modelling systems that comply with Australian Standards (ASTM Standard F2067-22 'Standard Practice for Development and Use of Oil Spill Trajectory Models'). RPS Group also provide the capacity

for forecast air quality monitoring to enable an assessment of potential health and safety risks associated with VOCs released from a surface slick.

A particular advantage of spill trajectory modelling is that the transport and weathering of spilled hydrocarbons can be forecast, at all times of the day and night, at any location, and under any type of metocean conditions. By contrast, aerial surveillance and vessel-based monitoring will be constrained to daytime use, and have limits imposed by the operating environment. Aerial surveillance and vessel-based monitoring are, however, essential for model validation, verification and calibration of any modelling or first principal predictions.'

10.4.1 Implementation guidance

Table 10-15 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy.

Table 10-16 provides a list of resources that may be used to implement this strategy. Mobilisation times for the first strike resources that are required to commence implementation of this tactic are listed in Table 10-17. The IMT and/or Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 10-35 lists the environmental performance outcome, control measures, performance standards and measurement criteria for this strategy.

Table 10-15: Implementation guidance – oil spill trajectory modelling

Action		Consideration	Responsibility	Complete
Initial actions	Initiate oil spill trajectory modelling (OSTM) by submission of an oil spill trajectory modelling request form (Santos ER SharePoint). Request for three-day forecast trajectory modelling.	-	Environment Unit Leader	☐
	Determine requirement for gas/VOC modelling and request initiation.	Hydrocarbon releases have human health and safety considerations for responders (volatile gases and organic compounds). This to be considered for any tactics that monitor/recover oil – especially at close proximity to release site.	Safety Officer Environment Unit Leader	☐
	Operational surveillance data (aerial, vessel, tracking buoys) to be given to modelling provider to verify and adjust fate predictions of the spill and improve predictive accuracy.	-	Planning Section Chief (or delegate)	☐
	Login to the RPS Group data sharing website and maintain connection. Download modelling results.	Data should be stored digitally and backed up on to independent digital storage media. All datasets should be accompanied by a metadata summary and documented quality assurance and control procedures.	Planning Section Chief (or delegate)	☐
	Place RPS Group modelling data into GIS/Common Operating Picture.	RPS Group to provide at least daily updates to the IMT of trajectory model outputs to inform response planning. More frequent updates can be provided if weather conditions are highly variable or change suddenly.	Planning Section Chief (or delegate)	☐
	Identify location and sensitivities at risk based on the trajectory modelling and inform IMT. Conduct operational NEBA on proposed response strategies.	-	Environment Unit Leader	☐
Ongoing actions	Request spill trajectory modelling be provided daily throughout the duration of the response and integrate data into Common Operating Picture.	-	Planning Section Chief (or delegate)	☐
	Use results from other monitor and evaluate activities, and/or data derived from hydrocarbon assays of the source hydrocarbon or from other reservoirs in the region (that may be available) as input data (if or when available) to improve model accuracy.	-	Planning Section Chief (or delegate)	

Table 10-16: Oil spill trajectory modelling resource capability

Equipment type / personnel required	Organisation	Quantity available	Location	Mobilisation timeframe
RPS OST modellers and software	RPS under direct contract to Santos, also available through AMOSC	Daily OSTM reports	Perth – digital	2–4 hours from activation

Table 10-17: Oil spill trajectory modelling – first-strike response timeline

Task	Time from IMT call-out
RPS OSTM activated by IMT	<2 hours
OSTM provided to IMT	<4 hours
Minimum Resource Requirements	
• Contracted OST modellers and software • OSTM Activation Form	

10.5 Satellite imagery

Table 10-18 provides the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 10-18: Satellite imagery – environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT decision -making
Initiation criteria	Notification of a Level 2 or 3 spill
Termination criteria	• Satellite monitoring will continue until no further benefit is achieved from continuing; or as advised by relevant Control Agency.

Satellite imagery is considered a supplementary source of information that can improve awareness but is not critical to the response and usage is at the discretion of the IMT.

Suitable imagery may be available via satellite imagery suppliers. This can be done through existing AMOSC and OSRL contracts. The most appropriate images for purchase will be based on the extent and location of the oil spill. Synthetic aperture radar and visible imagery may both be of value. Availability of satellite images for a specific location will be dependent on several factors including satellite current position, satellite availability/tasking, and weather conditions (cloud cover obscures images).

10.5.1 Implementation guidance

Table 10-19 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy. Table 10-20 provides a list of resources that may be used to implement this strategy. The Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 10-35 lists the environmental performance outcome, control measures, performance standards and measurement criteria for this strategy.

Table 10-19: Satellite imagery implementation guide

Action		Consideration	Responsibility	Complete
Initial actions	Assess requirement for satellite imagery.	-	Planning Section Chief	☐
	Notify AMOSC and OSRL Duty Officer to initiate request for available satellite imagery.	Formal written activation of resources from AMOSC and OSRL by designated call-out authorities (Santos Duty	Planning Section Chief	☐

Action		Consideration	Responsibility	Complete
		Managers/Incident Commanders) is required.		
	Assess suitability and order imagery.	-	Planning Section Chief	☐
	Integrate satellite imagery into Common Operating Picture and provide to trajectory modelling provider for model validation.	-	Planning Section Chief (or delegate)	☐
Ongoing actions	Review surveillance information to validate spill fate and trajectory.	-	Planning Section Chief	☐
	Use monitor and evaluate data to periodically reassess the spill and modify the response (through the IAP), as required.	Use surveillance data when updating the Common Operating Picture.	Planning Section Chief	☐

Table 10-20: Satellite imagery resource capability

Equipment type/ personnel required	Organisation	Quantity available	Location	Mobilisation timeframe
Satellite Imagery	KSAT – activated through AMOSC MDA – activated through OSRL	Dependent upon overpass frequency (TBC on activation)	Digital	If satellite images are required, Santos to notify provider within 12 hours

10.6 Environmental performance

Table 10-21: Environmental performance – monitor and evaluate

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT oil spill response decision-making		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
Monitor and Evaluate – vessel and aerial surveillance	**Response preparedness**		
	Maintenance of Master Service Agreements (MSAs) with multiple vessel providers for surveillance vessel capability	[EPS-ME-001] Santos maintains MSAs with multiple vessel providers to provide surveillance vessel capability as specified in Table 10-3.	MSAs with vessel providers
	Minimum specifications list for surveillance vessels	[EPS-ME-002] Maintain minimum specifications list for surveillance vessels to aid in rapid vessel selection	Santos Vessel Requirements for Oil Spill Response (7710-650-ERP-0001)
	Track location of potential surveillance vessels	[EPS-ME-003] Santos maintains access to Automatic Identification System (AIS) Vessel Monitoring System to track potential surveillance vessel locations	AIS live tracking portal
	MSA with aviation supplier for aerial surveillance capability	[EPS-ME-009] MSA in place with helicopter/aircraft provider throughout activity	MSA with aviation supplier
	Trained aerial observers available through Santos personnel	[EPS-ME-010] Santos to maintain a pool of trained aerial observers	Exercise Records Training Records

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT oil spill response decision-making		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
	Trained aerial observers available through mutual aid arrangements facilitated by AMOSC	[EPS-ME-011] Maintenance of AMOSC contract to facilitate mutual aid arrangements for access to Trained Aerial Observers	AMOSC Participating Member Contract
	Access to certified UAV providers	[EPS-ME-012] Maintenance of access to UAV providers	List of certified UAV providers; AMOSC Participating Member contract; OSRL Associate Member contract.
	Aircraft charter companies for fauna observations	[EPS-ME-013] Maintain a list of aircraft charter companies that could potentially provide fauna observation services	List of providers
	Response implementation		
	Vessel surveillance first-strike capability mobilised	[EPS-ME-004] First-strike is mobilised in accordance with details and timings as specified in Table 10-4	Incident log
	Vessel surveillance daily observation reports	[EPS-ME-007] Daily observation reports submitted to IMT until termination criteria are met	Incident log
	Vessels and chartered surveillance aircraft compliant with Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003)	[EPS-ME-006] Vessels comply with Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003) which ensures compliance with Part 8 of the Environment Protection and Biodiversity Conservation Regulations 2000 which includes controls for minimising the risk of collision with marine fauna	Vessel contractor procedures align with Santos's Protected Marine Fauna Interaction and Sighting Procedure
		[EPS-ME-014] Chartered surveillance aircraft comply with Santos' Protected Marine Fauna Interaction and Sighting Procedure (EA-91-11-00003) which ensures compliance with Part 8 of the Environment Protection and Biodiversity Conservation Regulations 2000 which includes controls for minimising interaction with marine fauna	Aircraft contractor procedures align with Santos' Protected Marine Fauna Interaction and Sighting Procedure
	Aerial surveillance first-strike capability mobilised	[EPS-ME-015] First strike is mobilised in accordance with details and timings as specified in Table 10-8	Incident log
	Aerial surveillance – 2 passes per day	[EPS-ME-016] Following initiation of aerial surveillance, 2 passes per day of spill area by observation aircraft provided	Incident log; IAP
	Aerial surveillance trained aerial observers	[EPS-ME-017] Trained aerial observers supplied from Day 2 of response	Incident log
	Aerial surveillance flight schedules	[EPS-ME-019] Flight schedules are maintained throughout response	IAP
	Aerial surveillance observer log	[EPS-ME-020] Observers completed aerial surveillance observer log following completion of flight	Completed Aerial Surveillance Observer Logs
	Response preparedness		

Environmental performance outcome	Implement monitor and evaluate tactics in order to provide situational awareness to inform IMT oil spill response decision-making		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
Monitor and Evaluate – tracking buoys	Tracking buoys available	[EPS-ME-023] Maintenance of 2 tracking buoys throughout the activity	Computer tracking software; Tracking buoy tests
	Response implementation		
	Tracking buoy first-strike capability mobilised	[EPS-ME-024] First strike is mobilised in accordance with details and timings as specified in Table 10-11	Incident log
Monitor and Evaluate – oil spill modelling	**Response preparedness**		
	Maintenance of contract for emergency response modelling	[EPS-ME-027] Maintenance of contract for forecast spill trajectory modelling services throughout activity	Modelling services contract
	Maintenance of access to additional emergency response modelling	[EPS-ME-028] Access to additional spill modelling capability to ensure redundancy.	Membership in place with OSRL
	Response implementation		
	Oil spill modelling provider first contact	[EPS-ME-029] Oil Spill Modelling provider will be contacted within two hours upon notification of a Level 2 or 3 spill	Incident log
	Oil spill modelling provider output minimum timings	[EPS-ME-030] Modelling delivered to IMT within two hours of request to service provider	Incident log
Monitor and Evaluate – satellite imagery	**Response preparedness**		
	Satellite imagery and analysis capability	[EPS-ME-032] Satellite imagery and analysis accessed through third party provider activated through AMOSC and/or OSRL	AMOSC Participating Member contract; OSRL Associate Member contract
	Response implementation		
	Satellite imagery and analysis provided to IMT	[EPS-ME-033] Data incorporated into Common Operating Picture and provided to spill modelling provider	Incident log; IAP

11. Mechanical dispersion

Table 11-1 provides the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 11-1: Mechanical dispersion – environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome	To create mixing for oil and water to enhance natural dispersion
Initiation criteria	Monitor and evaluate identifies thin oil patches at sea surface that are not naturally dissipating in sea surface and is posing risks to wildlife and shorelines by remaining on the surface
Termination criteria	• There is no longer a noticeable reduction of surface oil resulting from the activity, or • NEBA is no longer being achieved, or • Unacceptable safety risks associated with gas and VOCs at the sea surface, or • Agreement is reached with Jurisdictional Authorities to terminate the response

11.1 Overview

This response strategy assists with the natural dispersion process; creating mixing through physical agitation by using a vessel's propellers and wake, which encourages the oil to break into smaller particle sizes that are more easily biodegraded. The two common activities associated with mechanical dispersion are:

- manoeuvring a vessel through the slick, using propeller wash and vessel wake to create mixing in the water body
- spraying water from the fire hose of a vessel and moving the vessel through the water body to create additional mixing and breakup of the slick.

11.2 Implementation guidance

Table 11-2 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy.

Table 11-3 provides a list of resources that may be used to implement this strategy. The OSC/ Vessel Master and/or Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 11-2: Implementation guidance – mechanical dispersion

Action		Consideration	Responsibility	Complete
Initial actions	The operational NEBA will confirm the suitability and environmental benefit of conducting mechanical dispersion at appropriate locations.	Water depth and sea state. Possible impacts to sensitive shorelines and/or wildlife. This activity is to be conducted during daylight hours only and requires a safety plan to be developed prior to implementation.	Operations Section Chief Environment Unit Leader Planning Section Chief	☐
	Safety Officer to develop a safety plan for the activity with respect to potentially dangerous gases and VOCs (including applicable controls).	Ambient gas testing providing safe levels for operation of personnel and vessels	Operations Section Chief Safety Officer	☐
	Notify vessel-based responders to trial mechanical dispersion.	-	Operations Section Chief	☐
	Response personnel on vessels to evaluate the effectiveness of the use of mechanical dispersion operations to reduce the volume of oil on the water surface. Communicate the information to the IMT Operations Section Chief for inclusion in operational NEBA.	-	Vessel Master/s Santos/ AMOSC Core Group Responders	☐

Table 11-3: Mechanical dispersion resource capability

Equipment type / personnel required	Organisation	Quantity available	Location	Mobilisation timeframe
Vessels undertaking other activities Vessel(s) can be specifically contracted for the strategy if required (refer to Santos Vessel Requirements for Oil Spill Response document [7710-650-ERP-0001])	Santos contracted vessel providers	Availability dependent upon Santos and Vessel Contractor activities.	Vessels mobilised from Darwin and/or NW locations. Locations verified through AIS Vessel Tracking Software.	Varies subject to availability and location.

11.3 Environmental performance

Table 11-4 indicates the environmental performance outcome, control measures, performance standards and measurement criteria for this response strategy.

Table 11-4: Environmental performance – mechanical dispersion

Environmental performance outcome	To create mixing for oil and water to enhance natural dispersion		
Response strategy	**Control measures**	**Performance standard**	**Measurement criteria**
Mechanical dispersion	**Response preparedness**		
	Mechanical dispersion capability in place	[EPS-MD-001] Mechanical dispersion capability in place based on Santos-contracted vessels availability	Existing MSA(s) with multiple vessel providers
	Response Implementation		
	Mechanical dispersion procedures in place to ensure safe and effective execution	[EPS-MD-002] Mechanical dispersion to be conducted as per the Mechanical Dispersion Plan	Mechanical Dispersion Plan; IAP; Incident Log
	Operational NEBA to determine net environmental benefit	[EPS-MD-003] Operational NEBA confirms suitability and environmental benefit	Incident Log; IAP

12. Shoreline protection and deflection

Table 12-1 lists the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 12-1: Shoreline protection and deflection – objectives, initiation criteria and termination criteria

Environmental Performance Outcome	Implement shoreline protection and deflection tactics to reduce hydrocarbon contact with coastal protection priorities
Initiation criteria	• Level 2 or Level 3 spills where shorelines with identified or potential protection priorities will potentially be contacted • Approval has been obtained from the relevant Control Agency to initiate the response strategy
Termination criteria	• NEBA has determined that this strategy is unlikely to result in an overall benefit to the affected shoreline/s • Agreement is reached with Jurisdictional Authorities to terminate the response strategy

12.1 Overview

Protection and deflection tactics are used to divert hydrocarbons away from sensitive shoreline receptors and are more effective if they are deployed ahead of spill contact. They are typically used to protect smaller, high priority sections of shoreline.

The effectiveness of this response will be dependent on spill characteristics, hydrocarbon type, and the operating environment. Deployment is subject to safety constraints such as the potential grounding of response vessels.

Protection and deflection is part of an integrated nearshore/shoreline response to be managed by the relevant Control Agency. Where Santos is not the Control Agency (refer to Table 4-2), it will undertake first-strike protection and deflection activities as required. In this circumstance, the relevant Control Agency will direct resources (equipment and personnel) provided by Santos for protecting the shoreline. Santos will provide all relevant information on shoreline character and oiling collected as part of surveillance activities carried out under its control (refer Northern Australia OSM-BIP [7715-650-ERP-0003]).

In the event of a spill with the potential for shoreline contact where Santos is not the Control Agency, the ongoing response objectives, methodology, deployment locations and resource allocation will be controlled by the relevant Control Agency and therefore may differ from that included below.

Information gathered during monitor and evaluate activities and operational monitoring (including shoreline clean-up assessments) and assessed through an Operational NEBA will guide the selection of protection and deflection locations and techniques.

Shoreline protection and deflection techniques include:

- nearshore booming, which can involve different booming arrangements, including:
  - exclusion booming: boom acts as a barrier to exclude the spill from areas requiring protection
  - diversion booming: booms divert the spill to a specific location where it may be removed (e.g. sandy beach)
  - deflection booming: booms deflect the spill away from an area requiring protection.
- berms, dams and dykes – uses sandbags or embankments to exclude oil from sensitive areas
- shoreside recovery – uses nearshore skimmers to collect oil corralled by nearshore booms (also used during shoreline clean-up)
- passive recovery – uses sorbent booms or pads to collect oil and remove it from the environment. This can be used as a pre-impact tactic where sorbents are laid ahead of the spill making contact with the shoreline
- non-oiled debris removal – removes debris from the shoreline before it is impacted to reduce overall waste volumes from shoreline clean-up.

The effectiveness of these techniques will depend on local bathymetry, sea state, currents/tides and wind conditions and available resources.

12.2 Implementation guidance

Table 12-2 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy. Table 12-3 lists the resources that may be used to implement this strategy. Mobilisation

times for the minimum resources that are required to commence initial protection and deflection operations, unless directed otherwise by the relevant Control Agency, are listed in Table 12-4. The OSC and/or Incident Commander of the Control Agency's IMT (once they assume control) is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 12-2: Implementation guidance – shoreline protection and deflection

Action		Consideration	Responsibility	Complete
Initial Actions	Ensure initial notifications to the relevant Control Agency have been made.	Refer to Section 7 for reporting requirements.	Planning Section Chief	☐
	Collect and provide monitor and evaluate information, operational monitoring data and existing sensitivity information/mapping to Control Agency for confirmation of priority protection areas and NEBA.	-	Environment Unit Leader Planning Section Chief	☐
	Actions below are indicative only and are at the final determination of the relevant Control Agency.			
	Conduct Operational NEBA to determine if protection and deflection is likely to result in a net environmental benefit using information from shoreline clean-up assessments (Northern Australia OSM-BIP [7715-650-ERP-0003]).	Further detail on Priority Protection Areas described in Section 6.6. Refer to NTOWRP for information of sensitive areas and site-specific response strategy recommendations. Existing TRPs are available on the Santos ER Intranet page[23].	Environment Unit Leader	☐
	If NEBA indicates that there is an overall environmental benefit, develop a Shoreline Protection Plan (IAP Sub-Plan) for each deployment area.	Shoreline Protection Plan may include: • priority nearshore and shoreline areas for protection (liaise with Control Agency for direction on locations) • locations to deploy protection and deflection equipment • permits required (if applicable) • protection and deflection tactics to be employed for each location • list of resources (personnel and equipment) required • logistical arrangements (e.g. staging areas, accommodation, transport of personnel) • timeframes to undertake deployment • access locations from land or sea • frequency of equipment inspections and maintenance (noting tidal cycles) • waste management information, including logistical information on temporary storage areas, segregation, decontamination zones and disposal routes • no access and demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird	Operations Section Chief Planning Section Chief Environment Unit Leader	☐

[23] *Where TRPs are unavailable for areas likely to be contacted, refer to other sources of information such as aerial photography, Oil Spill Response Atlas, Pilbara Region Oiled Wildlife Response Plan, WAMOPRA and the NTOWRP which has information for the determination of protection priorities and shoreline response planning in NT.*

Action		Consideration	Responsibility	Complete
		nesting/roosting areas and turtle nesting habitat (use existing roads and tracks first) • shift rotation requirements		
	If required identify vessels with relevant capabilities (e.g. shallow draft) for equipment deployment in consultation with Control Agency.	Ensure vessels have shallow draft and/or a suitable tender (with adequate towing capacity and tie-points) if they are required to access shorelines.	Operations Section Chief Logistics Section Chief	☐
	Deploy shoreline protection response teams to each shoreline location selected and implement response.	If passive recovery and/or non-oiled debris removal has been selected as a tactic, ensure deployment activities prioritise their implementation prior to hydrocarbon contact.	Operations Section Chief Shoreline Response Group Supervisor Deputy Division Commander (DTMI FOB) On-Scene Commander	☐
Ongoing Actions	Conduct daily re-evaluation of NEBA to assess varying net benefits and impacts of continuing to conduct shoreline protection and deflection activities.	-	Environment Unit Leader	☐
	Report to the Operations Section Chief on the effectiveness of the tactics employed.	-	Shoreline Response Group Supervisor – AMOSC core group responder	☐
	Response teams to conduct daily inspections and maintenance of equipment.	Shoreline protection efforts will be maintained through the forward operation(s) facilities set-up at mainland locations under direction of the Control Agency. Response crews will be rotated on a roster basis, with new personnel procured on an as needs basis from existing human resource suppliers.	Shoreline Response Group Supervisor Deputy Division Commander (DTMI FOB)	☐

Table 12-3: Shoreline protection and deflection – resource capability

Equipment type/ Personnel required	Organisation	Equipment specifications / Total quantity available	Location / Quantity available	Mobilisation timeframe
Santos owned nearshore boom equipment	Santos	Beach Guardian (25 m lengths) Total – 6	Varanus Island – 4 Exmouth – 2	Within 120 hours for deployment by vessel from Varanus Island / Exmouth
		Zoom Boom (25 m lengths) Total – 13	Varanus Island – 8 Exmouth - 5	
AMSA nearshore boom equipment	AMSA	Canadyne inflatable Total – 10	Darwin – 5 Karratha – 5	

Equipment type/ Personnel required	Organisation	Equipment specifications / Total quantity available	Location / Quantity available	Mobilisation timeframe
		Structureflex inflatable Total – 34	Darwin – 9 Karratha – 10 Fremantle – 15	Access to National Plan equipment[24] through AMOSC[25] Equipment mobilisation times vary according to stockpile location.
		Versatech zoom inflatable Total – 28	Darwin – 10 Karratha – 5 Fremantle – 13	
		Slickbar – solid buoyancy Total – 2	Karratha – 2	
		Structureflex – solid buoyancy Total – 13	Karratha – 3 Fremantle – 10	
		Structureflex – land sea Total – 69	Darwin – 9 Karratha – 30 Fremantle – 30 other locations around Australia	
AMOSC nearshore boom and skimming equipment	AMOSC[26]	Beach Guardian Shoreseal boom (25 m lengths) Total – 89	Broome – 4 Exmouth – 20 Fremantle – 19 Geelong – 46	Response via duty officer within 15 minutes of first call; AMOSC personnel available within one hour of initial activation call. Equipment logistics varies according to stockpile location For mobilisation timeframes refer to Table 10-12
		Zoom Boom (25 m lengths) Total – 185	Broome – 6 Exmouth – 19 Fremantle – 34 Geelong - 126	
		Lamor HDB 1300 Boom (200 m) on reel Total – 2	Broome – 2	
		Lamor HDB 1500 Boom (100 m) on reel Total – 3	Fremantle – 1 Geelong – 2	

[24] *Updated AMSA Equipment listings for locations around Australia can be found at the AMSA National Environmental Maritime Operations Portal - https://www.amsa.gov.au/marine-environment/pollution-response/national-environmental-maritime-operations.*

[25] *Santos will enter a contractual arrangement with AMSA to access the National Plan resources.*

[26] *The latest AMOSC equipment inventory available to members can be found on the AMOSC Members Hub: https://amosc.sharepoint.com/sites/HUB/SitePages/CollabHome.aspx*

Equipment type/ Personnel required	Organisation	Equipment specifications / Total quantity available	Location / Quantity available	Mobilisation timeframe
		Lamor SFB-18 GP Solid Flotation Curtain Boom (30 m lengths) Total – 58	Fremantle – 18 Geelong – 40	
		Desmi Ro-mop 240 oil mop skimmer Total - 2	Exmouth – 1 Geelong - 1	
		Desmi Ro-mop 260 oil mop skimmer Total - 2	Fremantle – 1 Geelong - 1	
		Skimmer-Lamor Rock Cleaner-Brush Total - 4	Fremantle – 2 Geelong - 2	
Industry Mutual Aid nearshore boom and skimming equipment	Facilitated by AMOSC	Nearshore boom and skimmers	WA / NT	Access to Industry Mutual Aid through AMOSPlan and facilitated by AMOSC
OSRL nearshore boom/skimming equipment (Note: further booms are available; the listed items are shown as an example). Guaranteed access to 50% of stockpile by equipment type. Access to more than 50% on a case-by-case basis.	OSRL[27]	Air-skirt boom 10 m: 228 Air-skirt boom 20 m: 658 Air-skirt boom 200 m: 4 Beach sealing boom 10 m: 154 Beach sealing boom 15 m: 65 Beach sealing boom 20 m: 113 Inshore recovery skimmers: 126 Range of ancillaries to support above equipment	OSRL global stockpiles at base locations: • UK • Singapore • Bahrain • Fort Lauderdale	Response from OSRL Duty Manager within 10 minutes. Equipment logistics varies according to stockpile location.
Personnel (field responders) for OSR strategies	AMOSC Staff	Total – 12	Fremantle – 5 Geelong – 7	Response via duty officer within 15 minutes of first call. Timeframe for availability of AMOSC personnel dependent on location of spill and transport to site
	AMOSC Core Group (Santos)	Total – 16	Perth/NW Australia facilities – 14 Port Bonython (South Australia) – 2	From 24 hours <48 hours to WA/NT locations
	AMOSC Core Group (Industry)	As per monthly availability	Office and facility location across Australia	Location dependent. Confirmed at time of activation

[27] *The latest OSRL equipment inventory available to members can be found in the SLA equipment stockpile status report.*

Table 12-4: Shoreline protection and deflection – first-strike response timeline

Task	Time from shoreline contact (predicted or observed)
IMT confirms shoreline contact prediction, confirm if protection of shoreline sensitivity/s is required and begins sourcing resources	<4 hours
Santos Core Group mobilised to deployment port location	<24 hours
Protection booming equipment mobilised to deployment port location	24-48 hours
Waste storage equipment mobilised to deployment port location	<24 hours
Boom deployment vessel mobilised to deployment port location	24-48 hours
AMOSC Staff and Industry Core Group mobilised to deployment port location	24–48 hours
Protection/deflection operation deployed to protection location	60–72 hours (weather/daylight dependent)
Minimum resource requirements	
NB: Resource requirements for protection and deflection will be situation/receptor specific[28]. Indicative first-strike resources for a single site protection area are: • One small vessel suitable for boom deployment • Shoreline (e.g. Beach Guardian) and nearshore booms (e.g. Zoom Boom) plus ancillary equipment (e.g. anchors, stakes) sufficient for protection of shoreline resource • One skimmer appropriate for oil type • Waste storage equipment • One Protection and Deflection Team • Personal protective equipment	

12.3 Environmental performance

Table 12-5 indicates the environmental performance outcome, control measures, performance standards and measurement criteria for this response strategy.

Table 12-5: Environmental performance – shoreline protection and deflection

Environmental Performance Outcome	Implement shoreline protection and deflection tactics to reduce hydrocarbon contact with coastal protection priorities		
Response Strategy	**Control Measures**	**Performance Standards**	**Measurement Criteria**
Shoreline Protection and Deflection	**Response Preparedness**		
	Access to Santos protection and deflection equipment and personnel	[EPS-PD-001] Santos personnel and equipment stored and maintained / available as per Table 12-3	Santos oil spill response team database; Santos equipment register; Exercise reports
	Access to protection and deflection equipment and personnel	[EPS-PD-002] Maintenance of access to protection and deflection equipment and personnel through AMOSC, AMSA National Plan, OSRL and TRG throughout activity as per Table 12-3.	Access to National Plan resources through AMSA
			AMOSC Participating Member Contract
			OSRL Associate Member Contract
			TRG arrangements
	Protection and deflection small vessel providers for nearshore booming operations are identified	[EPS-PD-004] Maintenance of a list of small vessel providers operating in the Darwin region that could be used for nearshore booming	List of small vessel providers

[28] *Where TRPs are unavailable for areas likely to be contacted, refer to other sources of information such as aerial photography, Oil Spill Response Atlas, Pilbara Region Oiled Wildlife Response Plan, WAMOPRA and the NTOWRP which has information for the determination of protection priorities and shoreline response planning in NT.*

Environmental Performance Outcome	Implement shoreline protection and deflection tactics to reduce hydrocarbon contact with coastal protection priorities		
Response Strategy	**Control Measures**	**Performance Standards**	**Measurement Criteria**
	Response Implementation		
	First strike capability mobilised	[EPS-PD-005] First strike is mobilised in accordance with details and timings as specified in Table 12-4 unless directed otherwise by Control Agency	Incident log
	IMT and Control Agency to agree protection priorities	[EPS-PD-007] Santos IMT to confirm protection priorities in consultation with the Control Agency	IAP; Incident Log
	Prepare operational NEBA to determine if shoreline protection and deflection activities are likely to result in a net environmental benefit	[EPS-PD-008] Records indicate operational NEBA completed prior to shoreline protection and deflection activities commencing. Operational NEBA to be undertaken each operational period. Ensure NEBA considers waste management and the possibility of secondary contamination.	Operational NEBA; Incident Log; IAP
	IAP Protection and Deflection Sub-plan is developed to ensure effective execution and environmental impacts from response are minimised	[EPS-PD-006] IAP Shoreline Protection and Deflection Sub-plan including shoreline/nearshore habitat/bathymetry assessment and waste management is developed to provide oversight and management of shoreline protection and deflection operation, prior to shoreline protection and deflection operations commencing	Incident Log; IAP Shoreline Protection and Deflection Sub-plan
	Use of shallow draft vessels for shoreline and nearshore operations	[EPS-PD-009] Shallow draft vessels are used for shoreline and nearshore operations, unless directed otherwise by the relevant Control Agency	Vessel specifications documented in IAP.
	Conduct rapid shoreline/ nearshore habitat/ bathymetry assessment	[EPS-PD-010] Unless directed otherwise by the relevant Control Agency, a rapid shoreline/ nearshore habitat/ bathymetry assessment is conducted prior to nearshore activities	IAP records; Assessment records

13. Shoreline clean-up

Table 13-1 lists the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 13-1: Shoreline clean-up – environmental performance outcome, initiation criteria and termination criteria

Environmental Performance Outcome	Implement shoreline clean-up tactics to remove stranded hydrocarbons from shorelines in order to reduce impact on coastal protection priorities and facilitate habitat recovery
Initiation criteria	• Level 2 or Level 3 spills where shorelines with identified or potential protection priorities that will be, or have been, contacted • NEBA indicates shoreline clean-up will benefit receptors • Approval has been obtained from the Control Agency to initiate response strategy
Termination criteria	• NEBA has determined that this strategy is unlikely to result in an overall benefit to the affected shoreline/s • Agreement is reached with Jurisdictional Authorities and/or Control Agency to terminate the response strategy

13.1 Overview

Shoreline clean-up aims to remove hydrocarbons from shorelines and intertidal habitat to achieve a net environmental benefit. Removal of these hydrocarbons helps reduce remobilisation of hydrocarbons and contamination of wildlife, habitat and other sensitive receptors. Shoreline clean-up is often a lengthy and cyclical process, requiring regular shoreline clean-up assessments (Northern Australia OSM-BIP [7715-650-ERP-0003]) to monitor the effectiveness of clean-up activities and assess if they are resulting in any adverse impacts.

Shoreline clean-up is part of an integrated nearshore/ shoreline response to be managed by the relevant Control Agency. Where Santos is not the Control Agency (refer to Table 4-2), it will undertake first-strike activations as required. In this circumstance, the relevant Control Agency will direct resources (equipment and personnel) provided by Santos for the purposes of shoreline clean-up. The information obtained from monitor and evaluate tactics (refer Section 10) and operational monitoring (refer Section 16), will be used by the IMT in the development of the operational NEBA to inform the most effective clean-up tactics (if any) to apply to individual sites. Intrusive shoreline clean-up techniques have the potential to damage sensitive shorelines. The appropriateness of clean-up tactics will be assessed against natural attenuation for sensitive sites. Selection of shoreline clean-up methods and controls to prevent further damage from the clean-up activities are to be undertaken in consultation with the Control Agency and selected based on NEBA.

MDO is a light and volatile hydrocarbon with a low proportion of residue following weathering. MDO/MGO is difficult to handle for removal given its light nature and is readily washed from sediments by wave and tidal flushing. Contaminated sand and debris are the likely waste products from a shoreline response involving MDO.

Shoreline clean-up techniques include:

- Shoreline Clean-up Assessment – uses assessment processes (refer to Northern Australia OSM-BIP [7715-650-ERP-0003]) to assess shoreline character, assess shoreline oiling and develop recommendations for response. Typically, this should be the first step in any shoreline clean-up response.
- Natural Recovery – oiled shorelines are left untreated and the oil naturally degrades over time.
- Manual and Mechanical Removal – removes oil and contaminated materials using machinery, hand tools, or a combination of both.
- Washing, Flooding and Flushing – uses water, steam, or sand to flush oil from impacted shoreline areas.
- Sediment Reworking and Surf Washing – uses various methods to accelerate natural degradation of oil by manipulating the sediment.

13.2 Implementation guidance

Table 13-1 provides the environmental performance outcome, initiation criteria and termination criteria for this strategy. Table 13-2 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy.

Table 13-3 provides a list of resources that may be used to implement this strategy. Mobilisation times for the minimum resources that are required to commence initial shoreline clean-up operations, unless directed otherwise

by the relevant Control Agency, are listed in Table 13-4. The OSC and/or Incident Commander of the Control Agency's IMT is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 13-2: Implementation guidance – shoreline clean-up

Action		Consideration	Responsibility	Complete
Initial Actions	**Actions below are indicative only and are at the final determination of the Control Agency.**			
	Initiate Shoreline Clean-up Assessment (if not already activated).	Refer to Northern Australia OSM-BIP (7715-650-ERP-0003) for additional information. Unmanned Aerial Vehicles (UAVs) may be necessary for some sensitive environments and where personnel safety is at risk (e.g. dangerous fauna in remote locations).	Environment Unit Leader	☐
	Using results from Shoreline Clean-up Assessment, conduct Operational NEBA to assess shoreline clean-up suitability and recommended tactics for each shoreline location.	Shoreline Clean-up Assessment Teams are responsible for preparing field maps and forms detailing the area surveyed and make specific clean-up recommendations. The condition of affected shorelines will be constantly changing. Results of shoreline surveys should be reported as quickly as possible to the IMT to help inform real-time decision-making. Engage a Heritage Adviser if spill response activities overlap with potential areas of cultural significance.	Environment Unit Leader	☐
	If operational NEBA supports shoreline clean-up, prepare a Shoreline Clean-up Plan for inclusion in the IAP.	Shoreline Clean-up Plan may include: • clean-up objectives • clean-up end points (may be derived from Shoreline Clean-up Assessment) • clean-up priorities (may be derived from Shoreline Clean-up Assessment) • assessment and location of staging areas and worksites (including health and safety constraints, zoning) • utility resource assessment and support (to be conducted if activity is of significant size in comparison to the size of the coastal community) • permits required (if applicable) • chain of command for on-site personnel • list of resources (personnel, equipment, personal protective equipment) required for selected clean-up tactics at each site • details of accommodation and transport management • security management • waste management information, including logistical information on temporary storage areas, segregation, decontamination zones and disposal routes • establish no access and demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird nesting/roosting areas and turtle nesting habitat (use existing roads and tracks first) • shift rotation requirements.	Environment Unit Leader Planning Section Chief Operations Section Chief	☐

Action		Consideration	Responsibility	Complete
		Refer to IPIECA guide: A Guide to Oiled Shoreline Clean-up Techniques (IPIECA-IOGP 2016b) for additional guidance on shoreline clean-up planning and implementation.		
	In consultation with the Control Agency, procure and mobilise resources to a designated port location for deployment, or directly to location via road transport.	-	Logistics Section Chief Supply Unit Leader Deputy Logistics Officer (DTMI IMT) Deputy Division Commander (DTMI FOB)	☐
	Deploy shoreline clean-up response teams to each shoreline location to begin operations under direction of the Control Agency.	Each clean-up team to be led by a Shoreline Response Team Leader, who could be an AMOSC Core Group Member or trained member of the AMSA administered National Response Team. Clean-up teams and equipment will be deployed and positioned as per those observations by the Shoreline Clean-up Assessment Teams in consultation with the Control Agency. Team members will verify the effectiveness of clean-up, modifying guidelines as needed if conditions change.	Operations Section Chief SCAT Specialist / Coordinator Logistics Section Chief Deputy Logistics Officer (DTMI IMT)	☐
Ongoing Actions	Shoreline Response Team Leader shall communicate daily reports to the IMT Operations Section Chief to inform of effectiveness of existing tactics and any proposed tactics and required resources.	Where possible, maintain some consistency in personnel within Shoreline Response Teams. If the same personnel are involved in Shoreline Clean-up Assessment and clean-up, they will be better placed to adapt their recommendations as the clean-up progresses and judge when the agreed end points have been met.	Shoreline Response Group Supervisor Operations Section Chief	☐
	The IMT Operations Section Chief shall work with the Planning Section Chief to incorporate recommendations into the Incident Action Plans for the following operational period, and ensure all required resources are released and activated through the Supply Unit Leader and Logistics Section Chief.	-	Operations Section Chief Planning Section Chief Supply Unit Leader Logistics Section Chief	☐
	Monitor progress of clean-up efforts and report to the Control Agency.	-	Operations Section Chief On-Scene Commander Deputy Division Commander (DTMI FOB)	☐

Table 13-3: Shoreline clean-up – resource capability

Equipment Type / Personnel Required	Organisation	Quantity Available	Location	Mobilisation Timeframe
Manual clean-up tools (shovels, rakes, wheelbarrows, bags, etc.)	AMOSC[29]	Boom accessories beach guardian deployment kit Total - 14	Fremantle – 2 Geelong – 8 Broome – 1 Exmouth – 3	Response via duty officer within 15 minutes of first call – AMOSC personnel available within one hour of initial activation call; equipment logistics varies according to stockpile location (Table 10-12)
	Hardware suppliers	As available	Darwin, Karratha, Exmouth, Perth	-
Shoreline flushing (pumps/hoses)	AMOSC	Shoreline flushing kit 3” Total - 2	Fremantle –1; Geelong – 1	Response via duty officer within 15 minutes of first call – AMOSC personnel available within one hour of initial activation call For mobilisation timeframes see Table 10-12
		Shoreline flushing kit 4” Total – 1	Geelong -1	
		Shoreline impact lance kit Total - 1	Geelong – 1	
Nearshore skimmers/hoses	AMOSC AMSA Industry Mutual Aid	Refer to Protection and Deflection (Table 12-3)		
Decontamination/staging site equipment	AMOSC	Decontamination Kit (PPE) Total – 3	Broome –1 Exmouth –1 Geelong – 1	Response via duty officer within 15 minutes of first call – AMOSC personnel available within one hour of initial activation call For mobilisation timeframes see Table 10-12
		Decontamination kit Locker Total – 3	Exmouth – 1 Fremantle – 1 Geelong – 1	
		Decontamination – vehicle washdown trailer Total – 2	Fremantle – 1 Geelong – 1	
		Decontamination – Decon. Support trailer Total – 1	Geelong – 1	

[29] *The latest AMOSC equipment inventory available to members can be found on the AMOSC Members Hub: https://amosc.sharepoint.com/sites/HUB/SitePages/CollabHome.aspx*

Equipment Type / Personnel Required	Organisation	Quantity Available	Location	Mobilisation Timeframe
	AMSA	Decontamination station Total – 5	Darwin – 1 Karratha –2 Fremantle – 2	Access to National Plan equipment[30] through AMOSC[31] Equipment mobilisation times vary according to stockpile location.
	Oil spill equipment provider (e.g. Global Spill., PPS)	As available	Perth	Subject to availability
Waste storage (including temporary storage and waste skips and tanks for transport)	AMOSC temporary storage	Fast tanks – (9,000 L and 3,000 L) Total - 8	Geelong –4 Fremantle –2 Exmouth – 2	Response via duty officer within 15 minutes of first call – AMOSC personnel available within one hour of initial activation call For mobilisation timeframes see Table 10-12
		Vikotank (13,000 L) Total - 2	Broome – 1 Geelong – 1	
		Lamor (11,400 L) Total – 4	Fremantle – 4	
		IBCs (1 m^3) Total - 18	Geelong – 18	
	AMSA temporary storage	Fast tanks – (10 m^3) Total - 22	Darwin –2 Karratha –2 Fremantle – 4 Adelaide – 1 Brisbane – 2 Devonport – 2 Melbourne – 1 Sydney – 4 Townsville – 4	Access to National Plan equipment through AMOSC. Equipment mobilisation times vary according to stockpile location.
		Structureflex – (10 m^3) Total – 3	Brisbane – 1 Adelaide – 2	
		Vikoma – (10 m^3) Total - 20	Darwin – 1 Adelaide – 1	

[30] Updated AMSA Equipment listings for locations around Australia can be found at the AMSA National Environmental Maritime Operations Portal - https://www.amsa.gov.au/marine-environment/pollution-response/national-environmental-maritime-operations.

[31] Santos will enter a contractual arrangement with AMSA to access the National Plan resources.

Equipment Type / Personnel Required	Organisation	Quantity Available	Location	Mobilisation Timeframe
			Brisbane – 1 Devonport – 2 Fremantle – 7 Melbourne – 2 Sydney – 2 Townsville – 4	
	Santos Waste Management Service Provider	Refer to Waste management (Section 15)	Darwin, Karratha, Perth	<24 hours
Personnel (field responders) for OSR strategies	AMOSC Staff	12	Fremantle – 5 Geelong – 7	Response via duty officer within 15 minutes of first call. Timeframe for availability of AMOSC personnel dependent on location of spill and transport to site
	AMOSC Core Group (Santos)	16	Perth/NW Australia facilities – 14 Port Bonython (South Australia) – 2	12+ hours <48 hours to WA/NT locations
	AMOSC Core Group (Industry)	As per monthly availability	Office and facility locations across Australia	Location dependent. Confirmed at time of activation
	Santos contracted Work Force Hire company (e.g. Dare)	As per availability (up to 2,000)	Australia-wide	Subject to availability (indicatively 72+ hours)

Table 13-4: Shoreline clean-up – first-strike response timeline

Task	Time from shoreline contact (predicted or observed)
IMT confirms shoreline contact prediction, confirms applicability of strategy and begins sourcing resources.	<4 hours
Santos Offshore Core Group mobilised to deployment port location.	<24 hours
Clean-up equipment mobilised to deployment port location.	24–48 hours
Waste storage equipment mobilised to deployment port location.	<24 hours
Remote island transfer vessel (if required) mobilised to deployment port location.	24-48 hours
AMOSC Staff, Industry Core Group and Labour Hire mobilised to site/deployment port location.	<48 hours
Clean-up operation deployed to clean-up area under advice from Shoreline Assessment Team.	<60–72 hours (weather/daylight dependent)
Minimum resource requirements	
NB: Resource requirements for shoreline clean-up will be situation/receptor specific. If developed for the area/receptor, TRPs will outline suggested resource requirements and shoreline assessments (as part of operational monitoring) to be conducted prior to clean-up to confirm techniques. Indicative minimum requirements for one Santos-activated shoreline clean-up team are: • manual clean-up/shoreline flushing equipment kit • waste storage (bags, temporary storage tanks, skips as appropriate) • decontamination/staging equipment kit • personal protective equipment. One clean-up team comprises: • one Team Leader (AMOSC staff, Industry Core Group or Santos Core Group) • 4-6[32] shoreline clean-up responders for remote sensitive islands and 10 responders for accessible mainland sites (AMOSC Core Group, Santos contracted labour hire personnel).	

13.3 Shoreline clean-up resources

Shoreline clean-up equipment available for use by Santos is a combination of Santos owned, AMOSC, AMSA, DTMI and OSRL equipment as well as other industry resources available through the AMOSPlan mutual aid arrangements. Shoreline consumables are available through hardware, PPE and specialist oil/chemical spill suppliers and mobile plant equipment is available through hire outlets in Darwin, Dampier, Broome, Perth and other regional centres. Where vessel deployments are required, Santos will leverage from existing contracted vessel providers in the first instance, and if required will source vessels from vendors that Santos already has a master service agreement with, or spot hiring vessels as needed. The Santos Vessel Requirements for Oil Spill Response (7710-650-ERP-0001) contains the specification for various types of vessel that may be required in an oil spill response, including vessels for shoreline clean-up support.

Shoreline clean-up personnel available to Santos is a combination of AMOSC Staff, AMOSC Core Group Responders (comprising AMOSC trained Santos and Industry personnel), OSRL responders, State Response Team members and National Response Team members. Personnel for manual clean-up and mobile plant operation can be accessed through Santos' labour hire arrangements.

The level of deployment of equipment and personnel for clean-up will be commensurate to the spatial extent of shoreline contact, the volume of oil arriving and the sensitivity and access constraints of the shoreline in question. Deployment will be under the direction of the relevant Control Agency and the advice of shoreline clean-up specialists from AMOSC Core Group and National/State response teams. Shoreline clean-up assessments (Northern Australia OSM-BIP [7715-650-ERP-0003]) will provide information to guide the clean-up strategy and deployment of resources.

[32] *Remote islands and ecologically sensitive locations will have this reduced number of personnel to reduce impacts from clean-up operations.*

13.4 Shoreline clean-up decision guides

To assist with planning purposes, guidance for the selection of appropriate shoreline response strategies based on shoreline sensitivities is provided within Appendix K.

Operational guidelines for shoreline response activities including worksite preparation, manual and mechanical oil removal and vessel access for remote shorelines are included in Appendix L.

The WA DTMI Incident Management Plan – Marine Oil Pollution (WA DoT 2023) also provides guidance on shoreline clean-up techniques.

13.5 Environmental performance

Table 13-5 indicates the environmental performance outcome, control measures, performance standards and measurement criteria for this response strategy.

Table 13-5: Environmental performance – shoreline clean-up

Environmental Performance Outcome	Implement shoreline clean-up tactics to remove stranded hydrocarbons from shorelines in order to reduce impact on coastal protection priorities and facilitate habitat recovery		
Response Strategy	**Control Measures**	**Performance Standards [EPS-ID]**	**Measurement Criteria**
Shoreline Clean-Up	**Response Preparedness**		
	Access to shoreline clean-up equipment and trained personnel	[EPS-SCU-001] Access to shoreline clean-up equipment and personnel through AMOSC, AMSA National Plan, OSRL and TRG maintained throughout activity.	Access to National Plan resources through AMSA
			AMOSC Participating Member Contract
			OSRL Associate Member Contract
			TRG Arrangements
	Access to Santos shoreline clean-up personnel	[EPS-SCU-002] Santos personnel available as per Table 13-3	Santos oil spill response team database
	Access to vessels suitable for remote island transfers of equipment, personnel and waste	[EPS-SCU-005] MSAs with multiple vessel providers maintained throughout activity	MSAs with multiple vessel providers; Vessel details show suitability
	Vessel requirements for offshore island shoreline clean-up operations are identified	[EPS-SCU-006] Maintenance of vessel specification for remote island shoreline clean-up operations	Vessel Specifications within Santos Vessel Requirements for Oil Spill Response (7710-650-ERP-0001)
	Access to shoreline clean-up labour hire personnel	[EPS-SCU-003] Maintenance of contract with labour hire provider	Labour Hire Contract
	Onboarding procedure to access shoreline clean-up labour hire personnel	[EPS-SCU-004] Maintenance of an onboarding procedure for oil spill response labour hire	Onboarding procedure
	Response Implementation		
	First-strike capability mobilised	[EPS-SCU-007] First strike is mobilised in accordance with details and timings as specified in Table 13-4 unless directed otherwise by the Control Agency	Incident Log
	IMT and Control Agency to agree protection priorities	[EPS-SCU-012] Santos IMT to confirm protection priorities in consultation with the Control Agency	IAP; Incident Log

Environmental Performance Outcome	Implement shoreline clean-up tactics to remove stranded hydrocarbons from shorelines in order to reduce impact on coastal protection priorities and facilitate habitat recovery		
Response Strategy	**Control Measures**	**Performance Standards [EPS-ID]**	**Measurement Criteria**
	Prepare operational NEBA to determine if shoreline clean-up activities are likely to result in a net environmental benefit	[EPS-SCU-013] Records indicate operational NEBA completed prior to shoreline activities commencing. Operational NEBA to be undertaken each operational period. Ensure NEBA considers waste management and the possibility of secondary contamination	Operational NEBA; Incident Log; IAP.
	IAP Shoreline Clean-up Sub-plan is developed to ensure effective execution and minimise environmental impacts from response	[EPS-SCU-015] IAP Shoreline Clean-up Sub-plan including waste management is developed to provide oversight and management of shoreline clean-up operation	Incident Log; IAP Shoreline Protection and Deflection Sub-plan.
	Shoreline clean-up operations will be implemented under the direction of the Control Agency to ensure effective and coordinated execution	[EPS-SCU-008] Clean-up strategies will be implemented under the direction of the Control Agency. Santos will make resources available to the Control Agency.	Incident Log
	Santos AMOSC Core Group responders available to the Control Agency for shoreline clean-up positions.	[EPS-SCU-016] Santos will make available AMOSC Core Group responders, or other appropriately trained responders, for shoreline clean-up team positions to the Control Agency	Incident Log
	Equipment for shoreline clean-up made available to the Control Agency from Santos, AMOSC and OSRL stockpiles	[EPS-SCU-017] Santos will make available to the Control Agency equipment from AMOSC and OSRL stockpiles	Incident Log
	NEBA included in development of following operational period IAP	[EPS-SCU-014] Effectiveness of shoreline clean-up to be evaluated by team leaders and reported to IMT for inclusion in NEBA. NEBA undertaken every operational period by the relevant Control Agency to determine if response strategy is having a net environmental benefit. NEBA included in development of following period IAP	IAP; Incident Log
	Access plans are developed to ensure effective execution and minimise environmental impacts from response	[EPS-SCU-018] Access plans for shoreline operations will be developed. Unless directed otherwise by the Control Agency, Access plans will prioritise use of existing roads and tracks, establish demarcation zones to protect sensitive areas and select vehicles appropriate to conditions	IAP demonstrates requirement is met
	Soil profile assessment is undertaken prior to earthworks to ensure effective execution and minimise environmental impacts from response	[EPS-SCU-020] Unless directed otherwise by the relevant Control Agency, a soil profile assessment is conducted prior to earthworks	Soil profile assessment; IAP; Incident Log
	Pre-cleaning and inspection of equipment (quarantine) is undertaken to minimise environmental impacts from response on offshore islands	[EPS-SCU-021] Vehicles and equipment provided by Santos are verified as clean and invasive species free prior to deployment to offshore islands	Quarantine documentation; IAP; Incident Log

Environmental Performance Outcome	Implement shoreline clean-up tactics to remove stranded hydrocarbons from shorelines in order to reduce impact on coastal protection priorities and facilitate habitat recovery		
Response Strategy	**Control Measures**	**Performance Standards [EPS-ID]**	**Measurement Criteria**
	If spill response activities overlap with potential areas of cultural significance, a Heritage Advisor will be engaged	[EPS-SCU-022] In consultation with Control Agency, engage a Heritage Advisor to provide advice on any sites of cultural significance that may be affected directly by the spill, or indirectly through implementation of spill response measures.	Documented in IAP; Incident Log
	Select forward staging areas in consultation with the Control Agency	[EPS-SCU-023] Any establishment of forward staging areas at shoreline areas done under direction or in consultation with the Control Agency	Incident Log; IAP
	Establish demarcation zones in sensitive areas	[EPS-SCU-024] Unless directed otherwise by the Control Agency, demarcation zones are mapped out in sensitive habitat areas for vehicle and personnel movement, considering sensitive vegetation, bird nesting/ roosting areas and turtle nesting habitat	IAP demonstrates requirement is met
	Operational restrictions of vehicle and personnel movement are established to limit erosion and compaction	[EPS-SCU-019] Unless directed otherwise by the designated Control Agency, operational restrictions on movement of personnel and vehicles, including vehicle types and traffic volumes, are established to minimise impacts from erosion and compaction	IAP demonstrates requirement is met
	Stakeholder consultation for deployments in coastal areas	[EPS-SCU-025] Consultation is undertaken with relevant stakeholders prior to deployment of resources to townships and marine/coastal areas	Consultation records

14. Oiled wildlife response

Note: The WA DTMI is the Control Agency and DBCA is the Jurisdictional Authority for oiled wildlife response within WA State waters. The NT Control Agency is the Control Agency and the Department of Lands, Planning and Environment (DLPE) is the Jurisdictional Authority for oil wildlife response within NT waters. AMSA is the Control Agency for oiled wildlife response within Commonwealth waters from vessel spills.

Table 14-1 provides the environmental performance outcome, initiation criteria and termination criteria for this strategy.

Table 14-1: Oiled wildlife response – environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome	Implement tactics in accordance with relevant Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) to prevent or reduce impacts, and to humanely treat, house, and release or euthanise wildlife
Initiation criteria	Monitor and evaluate information and/or operational monitoring data shows that wildlife is contacted or is predicted to be contacted by a spill
Termination criteria	• Oiling of wildlife have not been observed over a 48-hour period, and • Oiled wildlife have been successfully rehabilitated, and • Agreement is reached with Jurisdictional Authorities and stakeholders to terminate the incident response

14.1 Overview

The short-term effects of hydrocarbons on wildlife may be direct such as the external impacts from coating or internal effects from ingestion and inhalation. Oiled wildlife response (OWR) includes wildlife surveillance/reconnaissance, wildlife hazing, pre-emptive capture and the capture, cleaning, treatment, and rehabilitation of animals that have been oiled. In addition, it includes the collection, post-mortem examination, and disposal of deceased animals that are found in the vicinity of an oil spill or are reasonably suspected of have succumbed to the effects of oiling.

Long-term effects of a spill on wildlife may be associated with loss/degradation of habitat, impacts to food sources, and impacts to reproduction. An assessment of such impacts is covered in Section 7.1.3 of the Eos 3D MSS EP (7710-650-EMP-0011) and post-spill via scientific monitoring (Section 16).

Table 14-2 provides guidance on the designated Control Agency and Jurisdictional Authority for OWR in Commonwealth, Territory and State waters. For a petroleum activity spill in Commonwealth waters, Santos act as the Control Agency and will be responsible for the wildlife response. The Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) will be referred to for guidance for coordinating an OWR when Santos is the Control Agency and for the OWA first strike response, otherwise the relevant WA State / Territory OWR Plan will be referred to, as described below.

WA Waters and Shorelines

The key plan for OWR in WA is the WA Oiled Wildlife Response Plan (WAOWRP) (DBCA 2022a). The WAOWRP establishes the framework for preparing and responding to potential or actual wildlife impacts during a spill and sets out the management arrangements for implementing an OWR in conjunction with the SHP-MEE. It is the responsibility of DBCA to administer the WAOWRP under the direction of the DTMI (Table 14-2). The Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) is consistent with and interfaces the WAOWRP and WA Oiled Wildlife Response Manual (WA OWR Manual) (DBCA 2022b).

If a spill occurs in WA State waters or enters State waters, DBCA is the Jurisdictional Authority for wildlife, and for Level 2/3 spills, will also lead the oiled wildlife response under the control of the DTMI. DBCA is the State Government agency responsible for administering the *Biodiversity Conservation Act (WA) 2016* (BC Act), which has provisions for authorising activities that affect wildlife.

For Level 1 spills in WA State waters, Santos will be the Control Agency, including for wildlife response. It is however also an expectation that for Level 2/3 petroleum activity spills, Santos will conduct the initial first-strike response actions for wildlife and continue to manage those operations until DBCA is activated as the lead agency for wildlife response and formal handover occurs. Following formal handover, Santos will function as a support organisation for the OWR and will be expected to continue to provide planning and resources as required.

In this Section, the WA Oiled Wildlife Response Plan (WAOWRP) (DBCA 2022a) has been used to guide the OWR planning. There is general support across industry to adopt the WAOWRP for use across Australia in the future.

Meanwhile, the Northern Territory Oiled Wildlife Response Plan (NTOWRP) (AMOSC 2019) will be used to provide OWR operational guidance during an incident in NT waters and shorelines.

NT Waters and Shorelines

The NTOWRP (AMOSC 2019) is the key plan for OWR in the NT and provides operational OWR guidance during an incident resulting from a marine based hydrocarbon spill due to petroleum activities within the NTOWRP area of operation. The NTOWRP is primarily designed to be utilised by the Titleholder as an operational OWR plan, but the plan also aims to provide operational guidance to any relevant government and non-government agencies located throughout the NTOWRP area of operation. The plan was developed by AMOSC and was commissioned by Shell Australia, ConocoPhillips and INPEX, and is consistent with regional OWR plans produced by AMOSC, DBCA (WA) and the Department for Environment and Water (DEW), South Australia (SA) (AMOSC 2019).

The Parks and Wildlife Commission of the Northern Territory (PWC) is the Territory Government agency responsible for administering the *Parks and Wildlife Commission Act 2013*, which has provisions for the protection, conservation and sustainable use of wildlife. For Level 1 spills in Territory waters, Santos will be the Control Agency, including for wildlife response. For Level 2/3 petroleum activity spills, Santos will conduct the initial first-strike response actions for wildlife and continue to manage those operations until the NT Control Agency is activated as the lead agency for OWR and a formal handover occurs. Following formal handover, Santos will function as a support organisation for the OWR and will be expected to continue to provide planning and resources as required when requested by the NT Control Agency for OWR.

Table 14-2: Jurisdictional and control agencies for oiled wildlife response

<table>
<tr><th rowspan="2">Jurisdictional boundary</th><th rowspan="2">Spill source</th><th rowspan="2">Jurisdictional authority for OWR</th><th colspan="2">Control Agency</th><th rowspan="2">Relevant documentation</th></tr>
<tr><th>Level 1</th><th>Level 2/3</th></tr>
<tr><td rowspan="2">Commonwealth waters (three to 200 nautical miles from territorial/state sea baseline)</td><td>Vessel</td><td rowspan="2">DCCEEW</td><td colspan="2">AMSA</td><td rowspan="3">Western Australian Oiled Wildlife Response Plan (WAOWRP)
Western Australia Oiled Wildlife Response Manual</td></tr>
<tr><td>Petroleum activities</td><td colspan="2">Titleholder</td></tr>
<tr><td rowspan="2">Western Australian (WA) state waters (State waters to three nautical miles and some areas around offshore atolls and islands)</td><td>Vessel</td><td rowspan="2">DBCA</td><td colspan="2">WA DTMI[33]</td></tr>
<tr><td>Petroleum activities</td><td>Titleholder</td><td>WA DTMI</td></tr>
<tr><td rowspan="2">Northern Territory waters (Territory waters to three nautical miles and some areas around offshore atolls and islands)</td><td>Vessel</td><td rowspan="2">DLPE</td><td>Vessel</td><td>NT IMT</td><td rowspan="2">NT Oiled Wildlife Response Plan (NTOWRP)</td></tr>
<tr><td>Petroleum activities</td><td>Titleholder[34]</td><td>NT IMT[35]</td></tr>
<tr><td>International waters[36]</td><td>Vessel
Petroleum activities</td><td>Relevant foreign authority</td><td colspan="3">Santos will liaise with the Australian Government Department of Foreign Affairs and Trade (DFAT) if an oil spill enters international waters. Santos will work with DFAT and the respective governments to support response operations.</td></tr>
</table>

14.2 Wildlife priority protection areas

For planning purposes, determination of wildlife priority protection areas is based on stochastic modelling of the worst-case spill scenarios, the known presence of wildlife, and in consideration of the following:

- Presence of high densities of wildlife, threatened species, and/or endemic species with high site fidelity
- Greatest probability and level of contact from floating oil and/or shoreline accumulation
- Shortest timeframe to contact

The wildlife priority protection areas for Eos 3D MSS activities include Joseph Bonaparte Gulf – East Coast and the Tiwi Islands. These wildlife priority protection areas are outlined in Table 14-3 and align with the priority protection

[33] *If an OWR is required in WA State waters, the DBCA is responsible for the administration of the Western Australian Oiled Wildlife Response Plan (WAOWRP) under the direction of the DoT.*

[34] *Titleholder will be the Control Agency but will request approval of IAPs from the NT IC.*

[35] *NT IMT will be the Control Agency but will be supported by the Titleholder (additional support from AMOSC if required).*

[36] *As per AMSA (2017b), Coordination of International Incidents: Notification Arrangements Guidance NP-GUI-007.*

sites for spill response described in Section 6.6. Also refer to Appendix B of the Northern Australia OSM-BIP (7715-650-ERP-0003) for background information on species at these locations, including any known key locations and seasonality.

Depending on the timing of a potential hydrocarbon spill, certain species could be more impacted because of key seasonal biological activities such as breeding, mating, nesting hatching or migrating. Table 14-4 provides further detail of key wildlife activities in the Pilbara/Kimberley regions and the corresponding time of year.

Table 14-3: Wildlife priority protection areas

Wildlife priority protection area	Key locations	Key wildlife	Reference
Joseph Bonaparte Gulf – East Coast	Wadeye Coast Hyland Bay Moyle Rivermouth Cape Dombey Mangrove Creek Little Moyle River Mouth Dooley Point Cape Scott Anson Bay Daly River Mouth Peron Island Channel Point Fog Bay Finnis River Mouth Five Mile Beach Windirr Island Bare Sand Island	+ Support large numbers of migratory shorebirds during their non-breeding season, including internationally significant numbers of Greater sand plover (*Charadrius leschenaultia*), grey-tailed tattler (*Tringa brevipes*), great knot (*Calidris tenuirostris*), terek sandpiper (*Xenus cinereus*) black-tailed godwit *(Limosa limosa*)). + Various other shorebird species	AMOSC (2019)
	Bare Sand Island	+ White-winged (*Chlidonias leucopterus*) and/or Whiskered Tern (*Chlidonias hybrida*)	AMOSC (2019)
	-	+ Dugong (*Dugong dugon*) + Australian snubfin dolphin (*Orcaella heinsohni*) + Indo-Pacific humpback dolphin (*Sousa sahulenis*) + Indo-Pacific bottlenose dolphin (*Tursiops aduncus*)	Groom *et al*. (2017)
	-	+ Saltwater crocodile (*Crocodylus porosus*)	Fukuda and Cuff (2013)
	Wadeye Coast Dorcherty Island Anson Bay South Peron Island Channel Point to Point Jenny Native Point to Five Mile Beach Bare Island Quail Island Indian Island	+ Green turtle (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), flatback turtle (*Natator depressus*)	AMOSC (2019)
Tiwi Islands	East of Cape Gambier to Shoal Bay SW coast of Melville Island Buchanan Island West Bathurst Island	+ Flatback turtle (*Natator depressus*), olive ridley turtle (*Lepidochelys olivacea*) and green turtle (*Chelonia mydas*) nesting	AMOSC (2019) Pendoley Environmental (2023)

Wildlife priority protection area	Key locations	Key wildlife	Reference
	Gordon Bay to Dudwell Creek Seagull Island NW tip Melville Island Johnson Point to Lethbridge Bay Lethridge Bay to Brenton Bay Point Jahleel Biradu Bay to Pululoo Bay		
	Puwanapi Seagull Island Lethbridge Bay Quanipiri Bay	+ Shorebirds: great knot (*Calidris tenuirostris*), red-necked stint (*C. ruficollis*), great sand plover (*Charadrius leschenaultii*), bar-tailed godwit (*Limosa lapponica*), lesser sand plover (*Charadrius mongolus*), various other shorebirds + Seagull Island has the largest crested tern (*Thalasseus bergii*) colony (>30,000) in the NT	AMOSC (2019)
	-	+ Saltwater crocodile (*Crocodylus porosus*)	Fukuda and Cuff (2013)

Table 14-4: Key wildlife activities in the Pilbara and Kimberley regions and corresponding time of year

Wildlife type	Activity	Period
Humpback whales	Migration pathway to and from Kimberley calving grounds	Peak between Jun–Aug
Dugong	Breeding Mating	Mar–Aug Aug–Mar
Marine turtles	Nesting Hatching	Sep–Dec Jan–Apr
Shorebirds	Migratory pathway stop over	Sep–Apr

14.3 Magnitude of wildlife impact

Given the distribution and behaviour of wildlife in the marine environment, a spill which only impacts Commonwealth offshore waters is likely to result in limited opportunities to rescue wildlife. In such instances, continued wildlife reconnaissance and scientific monitoring are more likely to be the focus of response efforts. In contrast, a spill which results in shoreline accumulation is likely to result in far greater wildlife impacts and opportunities to rescue wildlife.

The stochastic modelling for the worst-case spill scenarios for Eos 3D MSS activities predicts that the greatest accumulation of hydrocarbons could potentially occur at JBG East Coast and Tiwi Islands, with up to 37 m^3 and 17 m^3 of shoreline oiling accumulated at each site respectively. Using the WAOWRP (DBCA 2022a) *Guide for Rating the Wildlife Impact of an Oil Spill* (Table 14-5), and stochastic modelling for the worst-case spill scenarios (Section 6.3), it is predicted that medium wildlife impacts have the potential to occur as a result of a worst-case spill scenario associated with this activity.

Table 14-5: WAOWRP Guide for rating the wildlife impact of an oil spill (DBCA 2022a)

Wildlife impact rating	Low	Medium	High
What is the likely duration of the wildlife response?	<3 days	3–10 days	>10 days
What is the likely total intake of animals?	<10	11–25	>25
What is the likely daily intake of animals?	0–2	2–5	>5

Are threatened species, or species protected by treaty, likely to be impacted, either directly or by pollution of habitat or breeding areas?	No	Yes – possible	Yes – likely
Is there likely to be a requirement for building primary care facility for treatment, cleaning and rehabilitation?	No	Yes – possible	Yes – likely

14.4 Implementation guidance

Refer to Section 6 of the Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) for guidance on the tasks and responsibilities that should be considered when implementing an OWR when Santos is the Control Agency or prior to formal hand over to the relevant Control Agency. The implementation guidance within the Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) includes:

- Record keeping
- Situational awareness
- Activation of Santos IMT Wildlife Branch
- Notifications
- Santos Oiled Wildlife Rapid Assessment Teams (RATs)
- Wildlife Reconnaissance
- Santos Oiled Wildlife Sample Collection Protocol
- Mobilisation of required resources
- Handover to external Control Agency (if relevant).

The OWR first strike plan will focus on notifications, wildlife reconnaissance and response preparation (refer to Section 6.1 of the Santos Oiled Wildlife Response Framework Plan [7700-650-PLA-0017]). Refer to Table 14-6 for an indicative timeframe and Appendix M for resource capability. Preventative actions, such as hazing, along with capture, intake and treatment require a higher degree of planning, approval (licences) and skills and will be planned for and carried out under the wildlife portion of the IAP (refer to Section 6.2 of the Santos Oiled Wildlife Response Framework Plan [7700-650-PLA-0017]).

Table 14-6: Oiled wildlife response – first-strike response timeline

Task	Time from oiled wildlife contact (predicted or observed)
IMT notifies regulatory authorities and AMOSC of oiled wildlife / potential for contact	<2 hours
Mobilise Santos personnel for oiled wildlife reconnaissance **this will be already occurring through Aerial Observer mobilisation**	24-48 hours
Mobilisation of AMOSC oiled wildlife equipment and industry OWR team to forward staging area	<48 hours
Minimum resource requirements	
The requirements for oiled wildlife response will be situation specific and dependent upon reconnaissance reports. <u>First strike resources:</u> • Reconnaissance platforms (Refer to Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) • 6 x trained industry oiled wildlife response team personnel (AMOSC staff and contractors/ AMOSC Industry OWR group) <u>Additional resources:</u> • Refer to Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) • Refer to Appendix M for information on OWR capability and equipment	

14.5 Environmental performance

Table 14-7 indicates the environmental performance outcome, control measures, performance standards and measurement criteria for this response strategy.

Table 14-7: Environmental performance – oiled wildlife response

Environmental performance outcome	Implement tactics in accordance with relevant Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) to prevent or reduce impacts, and to humanely treat, house, and release or euthanise wildlife		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
OWR	**Response preparedness**		
	Access to oiled wildlife response equipment and personnel	[EPS-OWR-001] Access to oiled wildlife response equipment and personnel through Santos, AMOSC, AMSA National Plan and OSRL maintained throughout activity as per Appendix M	Access to National Plan resources through AMSA
			AMOSC Participating Member Contract.
			OSRL Associate Member Contract.
	Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017)	[EPS-OWR-005] Santos Oiled Wildlife Response Framework (7700-650-PLA-0017) provides guidance for coordinating an OWR when Santos is the Control Agency and outlines Santos's response arrangements	Santos Wildlife Response Framework Plan (7700-650-PLA-0017); Revision records
	Access to labour hire personnel	[EPS-OWR-003] Maintenance of contract with labour hire provider	Labour hire contract
	Labour hire onboarding procedure to access labour hire personnel	[EPS-OWR-004] Maintenance of an onboarding procedure for oil spill response labour hire	Onboarding procedure
	Access to Santos-trained OWR personnel	[EPS-OWR-002] Maintain Santos personnel trained on OWR and positioned at Perth and VI	Training records
	Response implementation		
	First strike capability mobilised	[EPS-OWR-006] First strike is mobilised in accordance with details and timings as specified in Table 14-6 unless directed otherwise by relevant Control Agency	Incident log
	OWR Management	[EPS-OWR-007] OWR managed in accordance with the Santos Oiled Wildlife Framework Plan (7700-650-PLA-0017)	Incident log
	Prepare operational NEBA prior to operations commencing	[EPS-OWR-008] Prepare operational NEBA to determine magnitude of wildlife impact and determine if OWR activities are likely to result in a net environmental benefit (particularly in relation to hazing/pre-emptive capture). Operational NEBA to be undertaken each operational period.	IAP; Incident log
	IAP Oiled Wildlife Response Sub-plan developed, including waste management, to provide oversight and management of OWR operations	[EPS-OWR-009] IAP Oiled Wildlife Response Sub-plan is developed to ensure effective, coordinated execution with the Santos Oiled Wildlife Framework Plan (7700-650-PLA-0017) and minimise	Incident log indicates IAP Oiled Wildlife Response Sub-plan prepared prior to Oiled Wildlife Response operations commencing

Environmental performance outcome	Implement tactics in accordance with relevant Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) to prevent or reduce impacts, and to humanely treat, house, and release or euthanise wildlife		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
		environmental impacts from response	
	Oiled Wildlife Sample Collection Protocol	[EPS-OWR-010] Oiled wildlife sample collection carried out in accordance with the Santos Oiled Wildlife Sample Collection Protocol	Incident log

15. Waste management

Table 15-1 lists the environmental performance outcome, initiation and termination criteria for this strategy.

Table 15-1: Waste management – environmental performance outcome, initiation criteria and termination criteria

Environmental performance outcome	Comply with waste treatment, transport and disposal regulations and prevent secondary contamination while reducing, re-using and recycling waste where possible
Initiation criteria	Response activities that will be generating waste have been initiated
Termination criteria	• All waste generated from the oil spill response has been stored, transported and disposed as per the regulatory requirements, and • Agreement is reached with Jurisdictional Authorities to terminate the response

15.1 Overview

The implementation of some spill response strategies will generate solid and liquid waste that will require rapid management, storage, transport and disposal. It is important that waste is collected and removed efficiently to ensure waste management does not create a bottleneck in response operations.

The type and amount of waste generated during a spill response will vary depending on the spill type/characteristics, volume released, and response strategies implemented. To account for this potential variability, waste management (including handling and capacity) needs to be scalable to allow a continuous response to be maintained.

Potential waste management requirements are likely to be limited to oiled wildlife response and water quality monitoring activities. Significant volumes of waste from the applicable response activities for this OPEP are not anticipated due to the propensity of MDO/MGO to disperse naturally, although there may be some limited volumes of oiled sediment and/or PPE waste if a shoreline clean-up response is implemented.

Where Santos is the Control Agency, or at the request of the designated Control Agency, Santos will engage its contracted Waste Service Provider (WSP) to provide sufficient waste receptacles to store collected waste and manage oily waste collection, transport and disposal associated with spill response activities. The WSP will arrange for all personnel, equipment and vehicles to carry out these activities from nominated collection points to licensed waste management facilities. All transport will be undertaken via controlled-waste-licensed vehicles and in accordance with the *Waste Management and Pollution Control Act 1998* (NT) in the NT jurisdiction; or the *Environmental Protection (Controlled Waste) Regulations 2004* (WA) in the WA jurisdiction. Santos' Oil Pollution Waste Management Plans (7715-650-ERP-0001 for WA State waters, and BAA-201_0027 for NT Waters) provides detailed guidance to the WSP in the event of a spill.

Where DTMI is the Control Agency Santos will provide the Deputy Waste Management Coordinator to the DTMI IMT Logistics Unit to support the DTMI IMT in coordinating waste management services (refer Table 5-5). A similar role may also be provided to the NT IMT.

15.2 Implementation guidance

Table 15-2 provides guidance to the IMT on the actions and responsibilities that should be considered when selecting this strategy. The Incident Commander is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 15-2: Implementation guidance – waste management

Action		Consideration	Responsibility	Complete
Initial actions	Contact WSP (Primary or Secondary Contact Person) and activate Waste Project Manager.	Refer to Incident Response Telephone Directory (7700-670-PLA-0016.20) for contact details.	Logistics Section Chief	☐
	Based on operational modelling and applicable response strategies communicate the type and quantity of empty liquid and solid waste receptacles required to support planned operations.	It is better to overestimate volumes and scale back resources then to underestimate waste volumes.	Logistics Section Chief Planning Section Chief	☐
	Using most recent monitor and evaluate data and any existing and future response activities, determine most suitable locations for waste receptacles to be positioned and for temporary storage locations to be established.	Shoreline waste collection points (temporary storage site) will be determined by the relevant Control Agency and will depend upon the location of shoreline clean-up activities and staging areas and the availability of vehicle access routes. Consideration would be given to positioning receptacles and locating temporary storage sites to ensure secondary contamination of sensitive receptors is avoided or minimised. The approval of temporary storage sites would be given through Department of Water and Environmental Regulation (DWER) for the WA jurisdiction and NT DLPE via the NT Environment Protection Authority (EPA) for the NT jurisdiction.	Logistics Section Chief Planning Section Chief Environmental Unit Leader	☐
	For each receival location indicate the anticipated: • material types • material generation rates • material generation quantities • commencement date/time • anticipated clean-up duration • receptacle types required • logistical support requirements • any approvals required from Ports, Local Governments, Landowners, State and/or NT Government Agencies (Refer to relevant Oil Pollution Waste Management Plan [7715-650-ERP-0001 for WA, BAA-201_0027 for NT]).	Consider facilities for waste segregation at source.	Logistics Section Chief Planning Section Chief	☐
	Once the above information is obtained, ensure all necessary waste management information is included in the IAP.	Waste management should be done in accordance with the relevant Santos Oil Pollution Waste Management Plan (7715-650-ERP-0001 for WA, BAA-201_0027 for NT); and where relevant, the DTMI Waste Management Guidelines (WA), the respective Port, Port Operator and/or Ship Owner's waste management plan.	Logistics Section Chief (or delegate) Planning Section Chief Deputy Waste Management Coordinator (DTMI IMT) WSP location Responsible Person or Operations Supervisor	☐

Action		Consideration	Responsibility	Complete
	Mobilise waste management resources and services to agreed priority locations.	-	WSP location Responsible Person or Operations Supervisor Logistics Section Chief Deputy Waste Management Coordinator (DTMI IMT)	☐
Ongoing actions	Provide ongoing point of contact between IMT and WSP.	If DTMI is the Control Agency, the Deputy Waste Management Coordinator shall be the point of contact between DTMI and the WSP. If NT IMT is the Control Agency then the NT IMT shall advise the point of contact between them and the WSP.	Logistics Section Chief	☐
	Ensure all waste handling, transport and disposal practices comply with legislative requirements.	Alert Logistics Section Chief (or delegate)/Deputy Waste Management Coordinator (if DTMI is the Control Agency) if any non-compliance is anticipated or detected. Site clean-up, removal and disposal of response waste should be conducted in accordance with the relevant Santos Oil Pollution Waste Management Plan (7715-650-ERP-0001 for WA, BAA-201_0027 for NT); and where relevant, the DTMI Waste Management Guidelines (WA), the respective Port, Port Operator and/or Ship Owner's waste management plan.	WSP location Responsible Person or Operations Supervisor	☐
	Ensure records are maintained for all waste management activities, including but not limited to: • waste movements (e.g. types of receptacles, receival points, temporary storage points, final disposal locations) • volumes generated at each site (including total volume and generation rates) • types of waste generated at each site • approvals obtained (as required).	-	WSP location Responsible Person or Operations Supervisor	☐

15.3 Waste approvals

Site clean-up and removal and disposal of response waste should be conducted in accordance with the relevant Santos Oil Pollution Waste Management Plan (7715-650-ERP-0001 for WA, BAA-201_0027 for NT); and where relevant, the *Waste Management and Pollution Control Act 1998* (NT), the *Environmental Protection (Controlled Waste) Regulations 2004* (WA) and WA DTMI Waste Management Guidelines, and the respective Port, Port Operator and/or Ship Owner's waste management plan. In addition, regulatory approval may be required for the temporary storage, transport, disposal and treatment of waste, through the NT EPA or WA Department of Water and Environment Regulation (DWER).

DWER administers the *Environmental Protection Act 1986* (WA) and is the relevant authority for waste management in WA, while the NT DLPE manages waste and pollution under the *Waste Management and Pollution Control Act 1998*. The relevant Santos Oil Pollution Waste Management Plan (7715-650-ERP-0001 for WA, BAA-201_0027 for NT) provides detail on the regulatory requirements for each port/location likely to be used for waste management during any spill response operation associated with Santos' activities.

15.4 Waste management resources

Based on the worst-case credible spill scenarios for the Eos 3D MSS, Santos do not anticipate that large volumes of waste will be generated. The potential types and total volumes of waste anticipated for each response option are provided in Table 15-3.

Table 15-4 summarises the waste storage, treatment and disposal options available to manage waste associated with the spill response options.

Given that large volumes of a waste are not anticipated, storage space on any spill response vessels used is anticipated to be adequate. However, as soon as the details of an actual spill are available, waste management arrangements to allow a continuous response to be maintained should be reviewed.

The waste products are likely to be transported by vessel from the response location to Darwin Port. Waste will be transported from Darwin Port to licensed waste disposal facilities by a dedicated waste contractor. Santos has existing service agreements with a WSP which include the provision of waste management services during a spill response. Transport to the licensed waste management facilities would be undertaken via controlled-waste-licensed vehicles and in accordance with the Waste Management and Pollution Control Act 1998.

Table 15-3: Waste types and volumes anticipated during a spill response

Spill response option	Oily liquid waste	Solid oily waste	PPE and consumables
Monitor and evaluate	None	None	<1 m^3/day
Mechanical dispersion	None	None	<1 m^3/day
Shoreline clean-up[37]	8–12 m^3/day	8–12 m^3/day	4–24 m^3/day
Wildlife response	<1 m^3/day	<2 m^3/day	<1 m^3/day

Table 15-4: Spill response waste storage, treatment and disposal options

Waste category	On-site storage	Treatment/disposal option
Liquid waste (e.g. recovered oil/water mixture)	Holding on vessels, oil drums, tanks, oil barges and flexible bladders	Wastewater treatment process and discharge (e.g. dust suppression) Incineration
Solid waste – oiled organic matter/sediment, PPE and consumables (e.g. oily gloves)	Lined skips, oil drums, industrial waste bags, plastic rubbish bags	Recovery (e.g. thermal desorption or fixation process) and recycling Incineration Landfill
Oiled wildlife response	Industrial waste bags, plastic rubbish bags	Incineration Landfill

[37] *Based on one small clean-up team of 4-6 people removing approximately 1 m^3/person/day at each priority protection area*

15.5 Waste service provider capability

Detailed guidance on Santos' WSP responsibilities for spill response waste management is provided in the relevant Santos Oil Pollution Waste Management Plan (7715-650-ERP-0001 for WA, BAA-201_0027 for NT).

Key responsibilities of the WSP include:

- Maintain emergency response standby preparedness arrangements, including:
  - Have access to personnel, equipment and vehicles required for a first-strike and ongoing response commensurate to Santos worse case spill and waste requirements.
  - Provide primary and secondary contact details for activation of spill response waste management services.
  - Have suitably trained personnel for completing critical tasks in spill response waste management.
  - Participate in exercises undertaken by Santos.
- Maintain ability to assist in the Control Agency's IAP and Waste Management Sub-plan process as required.
- Mobilise resources to waste collection points identified by the Control Agency.
- Ensure waste handling, transport and disposal practices meet legislative requirements.
- Keep auditable records of waste streams from collection points to final disposal points.
- Provide regular progress reporting to the Control Agency IMT and a final report relating to quantities and destinations of collected waste.
- Provide a project manager responsible for the rollout of spill response resources to meet spill response waste management objectives.
- Provide location-specific Operations Supervisor/s to handle on-site operational aspects (management of personnel and equipment, reporting, liaison with relevant field-based spill responders).

15.6 Environmental performance

Table 15-5 indicates the environmental performance outcome, control measures, performance standards and measurement criteria for this response strategy.

Table 15-5: Environmental performance – waste management

Environmental performance outcome	Comply with waste treatment, transport and disposal regulations and prevent secondary contamination while reducing, re-using and recycling waste where possible		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
Waste management	**Response preparedness**		
	Access to waste management equipment, personnel, transport and disposal facilities	[EPS-WM-001] Waste management sourced through contract with waste service provider. Contract with waste service provider to be maintained throughout activity.	Contract with WSP for emergency response services; Annual desktop assurance report.
	Access to vessels for waste transport	[EPS-WM-002] MSAs with multiple vessel providers maintained throughout activity	MSAs with vessel providers
	Response implementation		
	Implement Oil Pollution Waste Management Plans (7715-650-ERP-0001 for WA, BAA-201_0027 for NT)	[EPS-WM-004] WSP shall: • Appoint a Project Manager within 24 hours of activation • Track all wastes from point of generation to final destination • Provide monthly waste management reports and more regular situation reports during the response until termination criteria are met	Incident log; Waste tracking records

Environmental performance outcome	Comply with waste treatment, transport and disposal regulations and prevent secondary contamination while reducing, re-using and recycling waste where possible		
Response strategy	**Control measures**	**Performance standards [EPS ID]**	**Measurement criteria**
		[EPS-WM-007] WSP to provide waste bins for oil and oily waste for shoreline clean-up operations to clean-up site or deployment port, if requested, within 24 hours	Incident Log

16. Operational and Scientific monitoring

OSM is a key component of the environmental management document framework for offshore petroleum activities, which includes activity EPs and OPEPs. Operational monitoring is instrumental in providing situational awareness of a hydrocarbon spill, enabling the IMT to mount a timely and effective spill response and continually monitor the effectiveness of the response. Scientific monitoring is also the principal tool for determining the extent, severity and persistence of environmental impacts from a hydrocarbon spill and for informing resultant remediation activities.

Santos has developed a Northern Australia OSM-BIP (7715-650-ERP-0003) which describes a program of monitoring oil pollution that will be adopted in the event of a hydrocarbon spill incident (Level 2–3) to marine waters. It aligns with the Joint Industry Operational and Scientific Monitoring Framework (APPEA, 2021) and describes how this Framework applies to Santos activities and spill risks for the geographic extent of the Northern Australia OSM-BIP (7715-650-ERP-0003>. The relationship between the Joint Industry OSM Framework and Santos environmental management framework is illustrated in Figure 16-1.

The Santos OSM-BIPs can be found on the Santos ER SharePoint site.

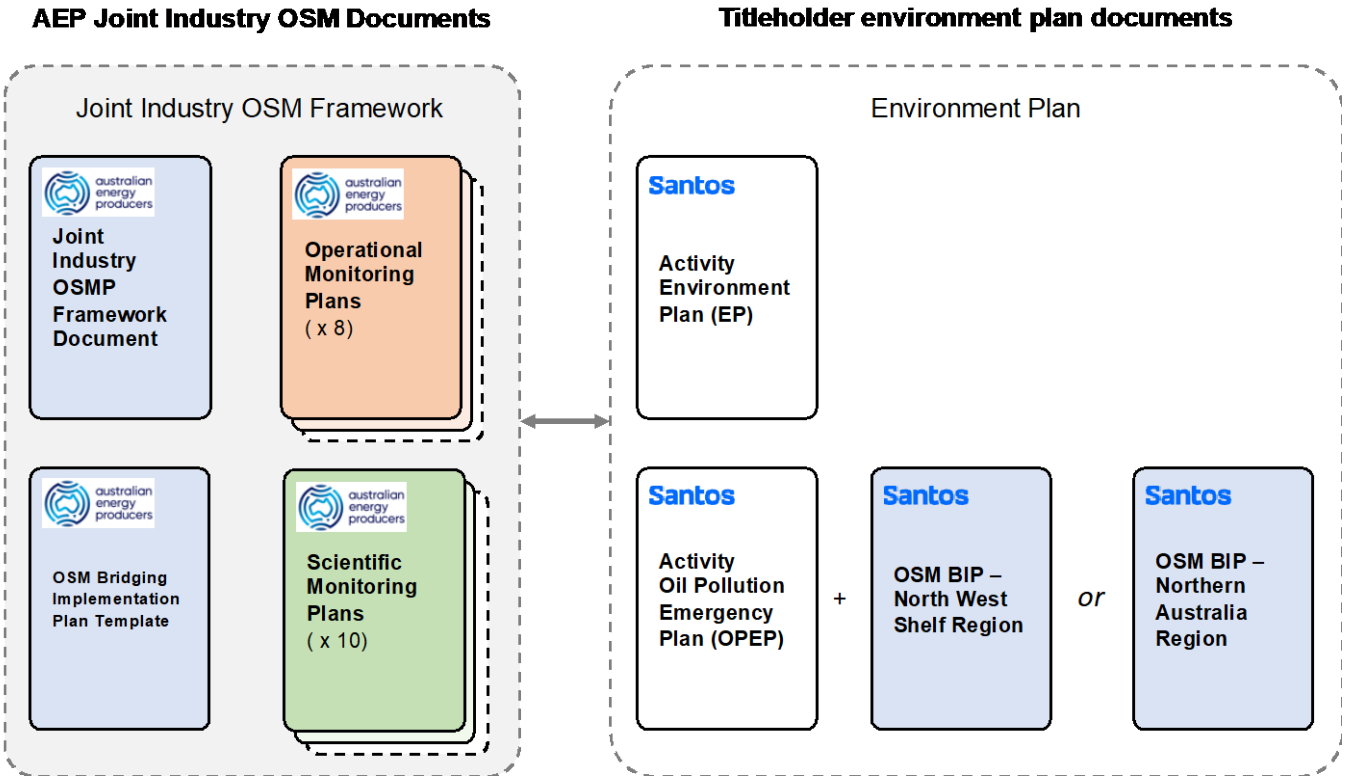

Figure 16-1: Relationship of Joint Industry and Titleholder OSM Documentation

The Northern Australia OSM-BIP is structured so that it can provide a flexible framework that can be adapted to individual spill incidents. A series of Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs) form part of the Joint Industry OSM Framework and provide detail on monitoring design, standard operating procedures, data management, quality assurance and quality control and reporting.

There are two types of monitoring that would occur following a Level 2–3 spill event:

- **Operational Monitoring** – which is undertaken during the course of the spill and includes any physical, chemical and biological assessments that may guide operational decisions such as selecting the appropriate response and mitigation methods and / or to determine when to terminate a response activity. This monitoring is additional to the activities (aerial/vessel surveillance, tracking buoys, oil spill trajectory modelling and satellite tracking) performed as part of the Monitor and Evaluate Strategy (Section 10). The design of operational monitoring requires judgements to be made about scope, methods, data inputs and outputs that are specific to the individual spill incident, balancing the operational needs of the response with the logistical and time constraints of gathering and processing information. Information needs to be collected and processed rapidly to suit response needs, with a lower level of sampling and accuracy needed than for scientific purposes. For details on initiation and termination criteria for OMPs refer to the Northern Australia OSM-BIP (7715-650-ERP-0003).
- **Scientific Monitoring** – which can extend beyond the termination of response operations. Scientific monitoring has objectives relating to attributing cause-effect interactions of the spill or associated response with changes

to the surrounding environment. SM will be conducted on a wider study area, extending beyond the spill footprint, will be more systematic and quantitative, and aim to account for natural or sampling variation. For further details on the SMPs refer to the Northern Australia OSM-BIP (7715-650-ERP-0003).

Table 16-1 lists the Joint Industry OMPs and SMPs that are relevant to Santos' Eos 3DMSS activities. Santos confirms that it has reviewed the aims and objectives of these relevant OMPs and SMPs, and determined that they are appropriate to meet the monitoring requirements of this activity, addressing potential impacts, risks and response activities.

The Northern Australia OSM-BIP (7715-650-ERP-0003) is tailored to Santos' activities in the north of Australia. It includes details on priority locations for monitoring, resourcing requirements; and operational guidance including logistics, mobilisation and permitting; with the exception of capability requirements for OM6: Shoreline Clean-up Assessment. The capability requirements for OM6: Shoreline Clean-up Assessment are typically assessed for each activity, according to deterministic modelling for the worst-case scenario that shows the simulation with the longest length of shoreline contacted, as this criterion influences the number of assessment teams required. The capability assessment for the remaining OMPs and SMPs is assessed against different deterministic modelling criteria, as described in the Northern Australia OSM-BIP (7715-650-ERP-0003). Resourcing requirements for OMP: Shoreline Clean-up Assessment for the Eos 3DMSS activity are provided in Appendix N.

The Northern Australia OSM-BIP (7715-650-ERP-0003) describes the methodology for assessing the worst-case OSM capability requirements for Santos activities in this region. In summary, Santos assessed the worst-case spill scenario for OSM capability as the scenario predicted to contact the greatest number of receptors at the low hydrocarbon thresholds for floating, shoreline or dissolved hydrocarbon contact within 7 days; followed by the greatest number of receptors contacted within 7-14 days; and at the highest contact probabilities. If a receptor is only contacted by low concentrations of entrained hydrocarbons and not by any other hydrocarbon phase, it will be considered a lower priority during the initial monitoring response as outlined in Section 2.2 of the Northern Australia OSM-BIP (7715-650-ERP-0003).. Santos confirms that all of the Eos 3DMSS spill scenarios (Section 6.1) fit within the OSM combined EMBA and assessment criteria defined within Appendix B of the Northern Australia OSM-BIP (7715-650-ERP-0003). Further, receptors contacted are all included within the baseline priority list in Section 2.2 of the Northern Australia OSM-BIP (7715-650-ERP-0003). This assessment is detailed in Appendix O.

Santos will review the initiation criteria for OMPs and SMPs (Provided in Table 9-1 (OMPs) and Table 9-2 (SMPs) of the Joint Industry Operational and Scientific Monitoring Framework (APPEA, 2021)) when preparing the initial IAPs, and subsequent IAPs. If any initiation criteria are met, then that relevant OMP and/or SMP will be activated via the OSM Services Provider.

Table 16-1: Joint Industry OSM Plans relevant to the Eos 3D MSS activity

Operational monitoring	Relevant for Eos 3DMSS	Scientific Monitoring	Relevant for Eos 3DMSS
OM1: Hydrocarbon Characterisation	✓	SM1: Water Quality Impact Assessment	✓
OM2: Hydrocarbon in water assessment	✓	SM2: Sediment Quality Impact Assessment	✓
OM3: Hydrocarbon in sediment assessment	✓	SM3: Intertidal and Coastal Habitat Assessment	✓
OM4a: Surface dispersant effectiveness monitoring	×	SM4: Seabirds and Shorebirds Assessment	✓
OM4b: Subsea dispersant injection effectiveness monitoring	×	SM5: Marine Mega-fauna Assessment	✓
OM5: Rapid Marine Fauna Surveillance	✓	SM6: Benthic Habitat Assessment	✓
OM6: Shoreline Clean-up Assessment	✓	SM7: Marine fish and elasmobranch assemblages assessment	✓
OM7: Air Quality Modelling	✓	SM8: Fisheries Impact Assessment	✓
-	-	SM9: Heritage Features Assessment	✓
-	-	SM10: Social Impact Assessment	✓

16.1 Environmental performance

Table 16-2 indicates the environmental performance outcome, control measures, performance standards and measurement criteria for this response strategy.

Table 16-2: Environmental performance – operational and scientific monitoring

Environmental performance outcome	Implement monitoring programs to assess and report on the impact, extent, severity, persistence and recovery of sensitive receptors contacted by a spill		
Response strategy	**Control measures**	**Performance standards**	**Measurement criteria**
	Response preparedness		
OSM – Preparedness	Maintenance of Monitoring Services Provider contract	[EPS-OSM-002] Maintain contracts with third-party provider/s to provide access to suitably qualified and competent personnel and equipment to assist in the implementation of monitoring in accordance with the capability and resourcing requirements described in Sections 8-10 of the Northern Australia OSM-BIP (7715-650-ERP-0003	Contract with OSM Services Provider
	OSM Services Provider capability verified through regular capability reporting	[EPS-OSM-003] Obtain monthly capability reports from OSM Services Provider to demonstrate that the capability outlined in Section 10 of the Northern Australia OSM-BIP (7715-650-ERP-0003) is available throughout the activity	Monthly capability reports from OSM Services Provider
	Adequacy of existing baseline data sources across the Santos combined EMBA reviewed periodically	[EPS-OSM-004] Regular review of existing baseline data	Baseline data review report
	Water quality monitoring vessels requirements identified	[EPS-OSM-006] Maintenance of vessel specification for water quality monitoring vessels within Santos Vessel Requirements for Oil Spill Response (7710-650-ERP-0001)	Vessel specification
	Access to Santos oil sampling kit	[EPS-OSM-001] Oil sampling kit pre-positioned at Darwin. Equipment contents as per Appendix C of the Santos Oil and Water Sampling Procedures (7710-650-PRO-0008)	Evidence of deployment to site
	OSM Services Provider testing and exercising	[EPS-OSM-005] Annual testing of OSM Services Provider arrangements and capability	Exercise and testing records
	OSM-BIP reviewed annually	[EPS-OSM-030] Annual review of OSM-BIP will be conducted in accordance with Section 11 of the Northern Australia OSM-BIP (7715-650-ERP-0003)	Record of revision
	Pre-completed risk assessment for OSM activities	[EPS-OSM-016] Pre completed and approved risk assessment is in place with	OSM Services Provider pre-completed and

Environmental performance outcome	Implement monitoring programs to assess and report on the impact, extent, severity, persistence and recovery of sensitive receptors contacted by a spill		
Response strategy	**Control measures**	**Performance standards**	**Measurement criteria**
		the OSM Services Provider for OSM activities.	approved risk assessment
	Response implementation		
OSM – Activation and Mobilisation	Activate OSM plans	[EPS-OSM-010] OMPs and SMPs will be activated in accordance with the initiation criteria provided in Table 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021)	IAP and Incident Log confirm OMPs and SMPs are activated in accordance with the initiation criteria provided in Table 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021)
	Activation of OSM plans according to OMPs and SMPs initiation criteria	[EPS-OSM-009] Initiation criteria of SMPs will be reviewed during the preparation of the initial IAP and subsequent IAPs; and if any criteria are met, relevant SMPs will be activated	IAP(s); Incident log
	Mobilisation and implementation of OMPs and SMPs	[EPS-OSM-031] Mobilisation and implementation of OMPs and SMPs will be undertaken in accordance with the indicative timeframes and sequencing described in Part B of the Northern Australia OSM-BIP (7715-650-ERP-0003)	Incident log; Monitoring records.
	OSM-BIP	[EPS-OSM-025] Monitoring to be conducted in accordance with the Santos Northern Australia OSM-BIP (7715-650-ERP-0003)	Incident log; Monitoring records
	OSM implementation Minimum Standards	[EPS-OSM-026] Implementation of OSM will comply with the Minimum Standards listed in Appendix A of the Joint Industry OSM Framework (APPEA, 2021)	Incident log; Monitoring records
	OSM Services Provider to commence activation within specified time from initial notification	[EPS-OSM-011] OSM Services Provider shall commence activation process within 30 mins of initial Call-off Order Form being received from Santos	OSM Services Provider records
	Scalable OSM capability	[EPS-OSM-032] If the OSM Implementation Lead identifies that additional monitoring capability is required beyond that described in Section 10 of the Northern Australia OSM-BIP (7715-650-ERP-0003), the need for these resources will be identified as soon as practicable and mobilised through Santos resources including the OSM Services Provider Contract	Incident log; OSM services provider records.

Environmental performance outcome	Implement monitoring programs to assess and report on the impact, extent, severity, persistence and recovery of sensitive receptors contacted by a spill		
Response strategy	**Control measures**	**Performance standards**	**Measurement criteria**
	Co-mobilised monitoring teams	[EPS-OSM-033] Decisions regarding co-mobilisation of monitoring teams will be determined following a spill event, as part of the Incident Action Planning process. These decisions will be made by the IMT in consultation with the OSM Services Provider and relevant stakeholders, with due consideration given to safety, access to sensitive receptors, timing, and data quality requirements	Incident log; OSM services provider records.
	Santos to provide support to OSM Services Provider	[EPS-OSM-012] Santos personnel to support OSM Services Provider through the provision of monitor and evaluate information and relative location of sensitive receptors to the spill	Incident log; OSM Services Provider records
	Mobilisation of appropriately specified monitoring vessels	[EPS-OSM-017] Source monitoring vessel(s) with specifications in accordance with Section 5.2 of Santos Vessel Requirements for Oil Spill Response (7710-650-ERP-0001)	Incident log
OSM –Shoreline Assessment and Nearshore Operations	Use of shallow draft vessels for shoreline and nearshore operations	[EPS-OSM-020] Shallow draft vessels are used for shoreline and nearshore operations unless directed otherwise by the relevant Control Agency	Vessel specification documentation contained in IAP
	Shoreline clean-up assessment direction and leadership	[EPS-OSM-018] OMP: Shoreline Clean-up Assessment will be implemented under the direction of the relevant Control Agency	Incident log
	SCAT Specialist/ Coordinator assessment/selection of vehicle appropriate to shoreline conditions	[EPS-OSM-021] SCAT Specialist/ Co-ordinator assess/select vehicles appropriate to shoreline conditions	IAP demonstrates requirement is met
	Conduct shoreline/ nearshore habitat/ bathymetry assessment	[EPS-OSM-022] Unless directed otherwise by the designated Control Agency, a rapid shoreline/ nearshore habitat/ bathymetry assessment is conducted prior to nearshore activities	IAP records Assessment records
	Establish demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird nesting/ roosting areas and turtle nesting habitat	[EPS-OSM-023] Unless directed otherwise by the designated Control Agency, demarcation zones are mapped out in sensitive habitat areas	IAP demonstrates requirement is met
	Operational restriction of vehicle and personnel	[EPS-OSM-024] Unless directed otherwise by the designated Control Agency,	IAP demonstrates requirement is met

Environmental performance outcome	Implement monitoring programs to assess and report on the impact, extent, severity, persistence and recovery of sensitive receptors contacted by a spill		
Response strategy	**Control measures**	**Performance standards**	**Measurement criteria**
	movement to limit erosion and compaction	action plans for shoreline operations include operational restrictions on vehicle and personnel movement	
	Daily SCAT reports issued during SCAT operations	[EPS-OSM-019] Reports from OM6: Shoreline Clean-up Assessment will be provided to the IMT daily, detailing the assessed areas to maximise effective utilisation of resources	Incident log
OSM – Stand-down and termination	Stand-down, termination and post-spill activities	[EPS-OSM-027] Once post-spill SMP monitoring reports are drafted they will be peer reviewed by an expert panel	Monitoring records
	Stand-down, termination and post-spill activities	[EPS-OSM-028] OMPs and SMPs will be terminated in accordance with the termination criteria provided in Tables 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021)	IAP and Incident Log confirm OMPs and SMPs are terminated in accordance with the termination criteria provided in Tables 9-1 and 9-2 of the Joint Industry OSM Framework (APPEA, 2021)

17. Response termination

The decision to terminate the spill response is made in consultation with the relevant Control Agency/s, Jurisdictional Authorities and other Statutory Authorities that play an advisory role. This decision will be made with consideration of:

- the efficacy and benefit of current response options
- any potential for additional pollution
- any potential for additional environmental damage caused by further clean-up efforts
- an assessment of prevailing weather conditions that can increase risk to response teams or increase the efficacy in weathering hydrocarbon.

An operational NEBA will be conducted to inform the decision-making process. Termination criteria are defined within each section of contingency response activities defined within the OPEP.

Upon conclusion of the spill response activity, Santos will:

- prepare detailed reports and collate all documents
- report on the performance objectives of each individual spill response that was mobilised
- undertake an inventory of consumables and prepare accounts
- arrange for the return of equipment
- arrange for the refurbishment of consumed equipment
- investigate the cause of the incident and report to relevant authorities
- assess long-term scientific monitoring requirements.

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Appendix A Hydrocarbon characteristics and behaviour

Marine diesel oil (MDO)

ITOPF (2023) and AMSA (2023) categorises MDO as a light group II (light-persistent) hydrocarbon. The physical characteristics of MDO are summarised in Table A-1. In the marine environment, a 5% residual of the total quantity of MDO spilt will remain after the volatilisation and solubilisation processes associated with weathering. For full details on the properties of MDO, refer to Section 7.1.2.1 of the Eos 3D MSS EP (7710-650-EMP-0011).

In summary, in the marine environment MDO will behave as follows:

- Will spread rapidly in the direction of the prevailing wind and waves
- In calm conditions evaporation is the dominant process contributing to the fate of spilled MDO from the sea surface and will account for 60–80% reduction of the net hydrocarbon balance
- Has a strong tendency to entrain into the upper water column (0 m–10 m) (and consequently reduce evaporative loss) in the presence of moderate winds (>10 knots) and breaking waves. However, it re-surfaces when the conditions calm.
- The evaporation rate of MDO will increase in warmer air and sea temperatures such as those present around the area
- MDO residues usually consist of heavy compounds that may persist longer and will tend to disperse as oil droplets into the upper layers of the water column.

Figure A-1 and Figure A-2 provides the predicted weathering and fates of surface MDO. Figure A-1 shows that under calm winds (2.6 m/s) 36.1% of the surface slick is forecast to evaporate within 24 hours. Entrainment of the MDO is not expected under these conditions. Under variable-wind conditions, as shown in Figure A-2, where winds are on average stronger, 80.5% of the MDO is forecast to be entrained within the water column, 15% will evaporate, and only <1% of the surface slick will remain after 24 hours. The proportion within the water column is expected to decay over several weeks (RPS 2023).

Table A-1: Properties of MDO (RPS 2023)

Hydrocarbon type	Hydrocarbon category	Density (kg/m^3)	Dynamic viscosity (cP)	API	Wax content (%)	Pour point °C
MDO	Group II	829.1 (at 25 °C)	4.0 (at 25 25 °C)	37.6	0	−14

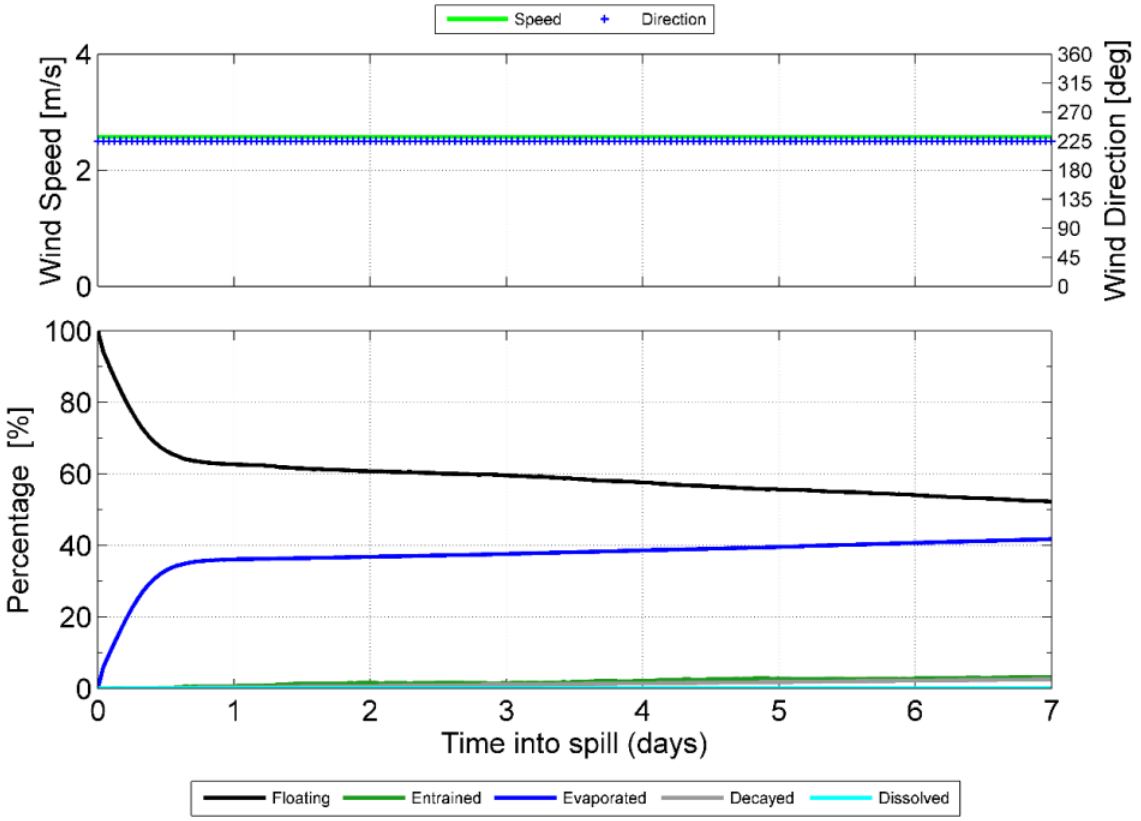


Figure A-1: Predicted weathering and fates of MDO under constant wind conditions

Source: RPS (2023)

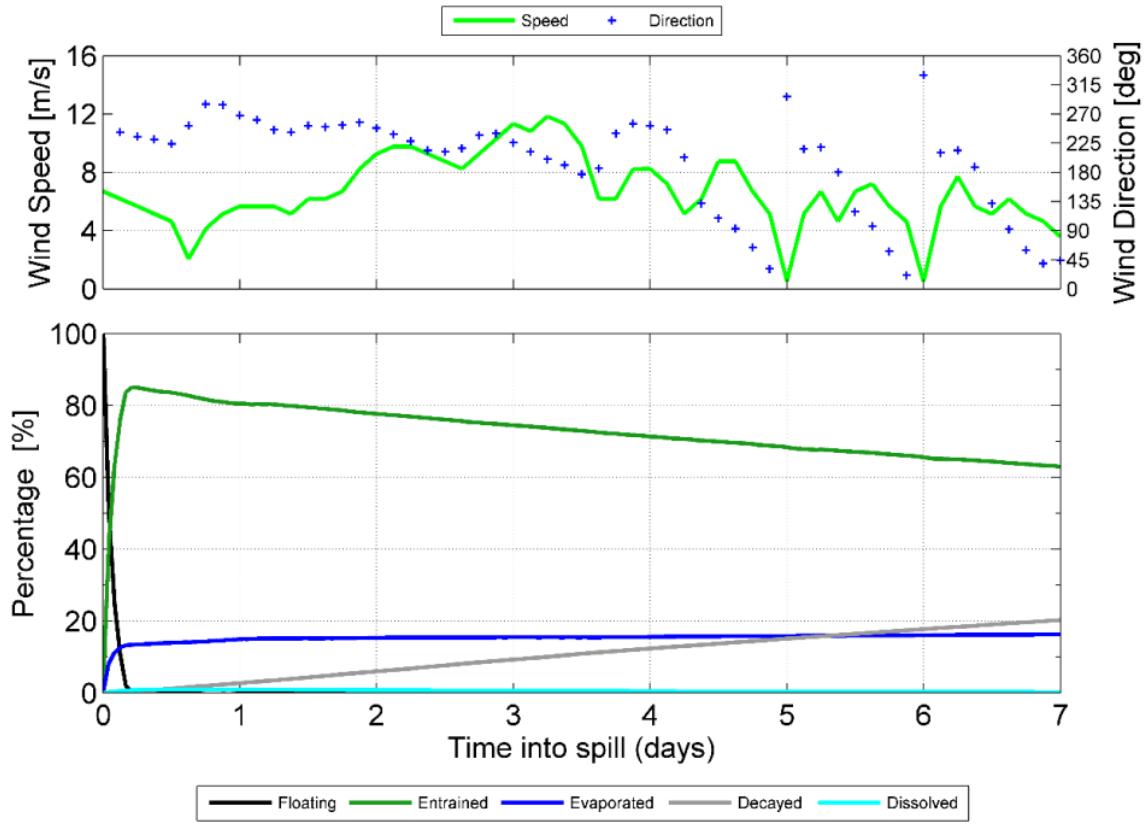


Figure A-2: Predicted weathering and fates of MDO under variable-wind conditions

Source: RPS (2023)

Appendix B ALARP assessment framework

Rationale

As part regulatory approval requirements for petroleum activities, the Environment Plan (EP) and/or Oil Pollution Emergency Plan (OPEP) must demonstrate that through the implementation of all reasonable control measures, environmental risks have been reduced to a level that is As Low As Reasonably Practicable (ALARP).

With respect to hydrocarbon spill risk and response planning, this includes an assessment to demonstrate that the oil spill response control measures are reducing risk to a level that is ALARP.

This ALARP Assessment Framework provides a process to facilitate the identification of all existing and potential spill response control measures, the selection or rejection of which are supported by reasoned arguments.

Guidance documents

Guidance documents used in the preparation of this framework include:

- Santos Oil Spill Risk Assessment and Response Planning Procedure SO-91-II-20003
- NOPSEMA Guidance Note ALARP (N-04300-GN0166, 1 August 2022)
- NOPSEMA Guidance Note Control Measures and Performance Standards (N04300-GN0271, 26 June 2020)
- NOPSEMA Guideline Environment Plan Decision Making (N-04750-GL1721, January 2024)
- NOPSEMA Guidance Note Risk Assessment (GN0165, 24 June 2020)
- NOPSEMA Oil Pollution Risk Management (GN1488, 7 October 2024).

Overview

The ALARP Assessment Framework uses activity-specific information to systematically assess existing and potential control measures and ensure that all practicable control measures are identified and documented.

When selecting controls to reduce risk is it good practice to apply a preferential order; elimination, substitution, prevention, reduction and mitigation. In the context of this ALARP Assessment Framework for oil spill response, all control measures are response strategies to reduce the impacts of an unplanned event that has already occurred. All source control response measures may be classed as ‘reduction’ in the hierarchy of controls with all other response measures classed as ‘mitigation’.

The ALARP Assessment Framework is shown in Figure B-1.

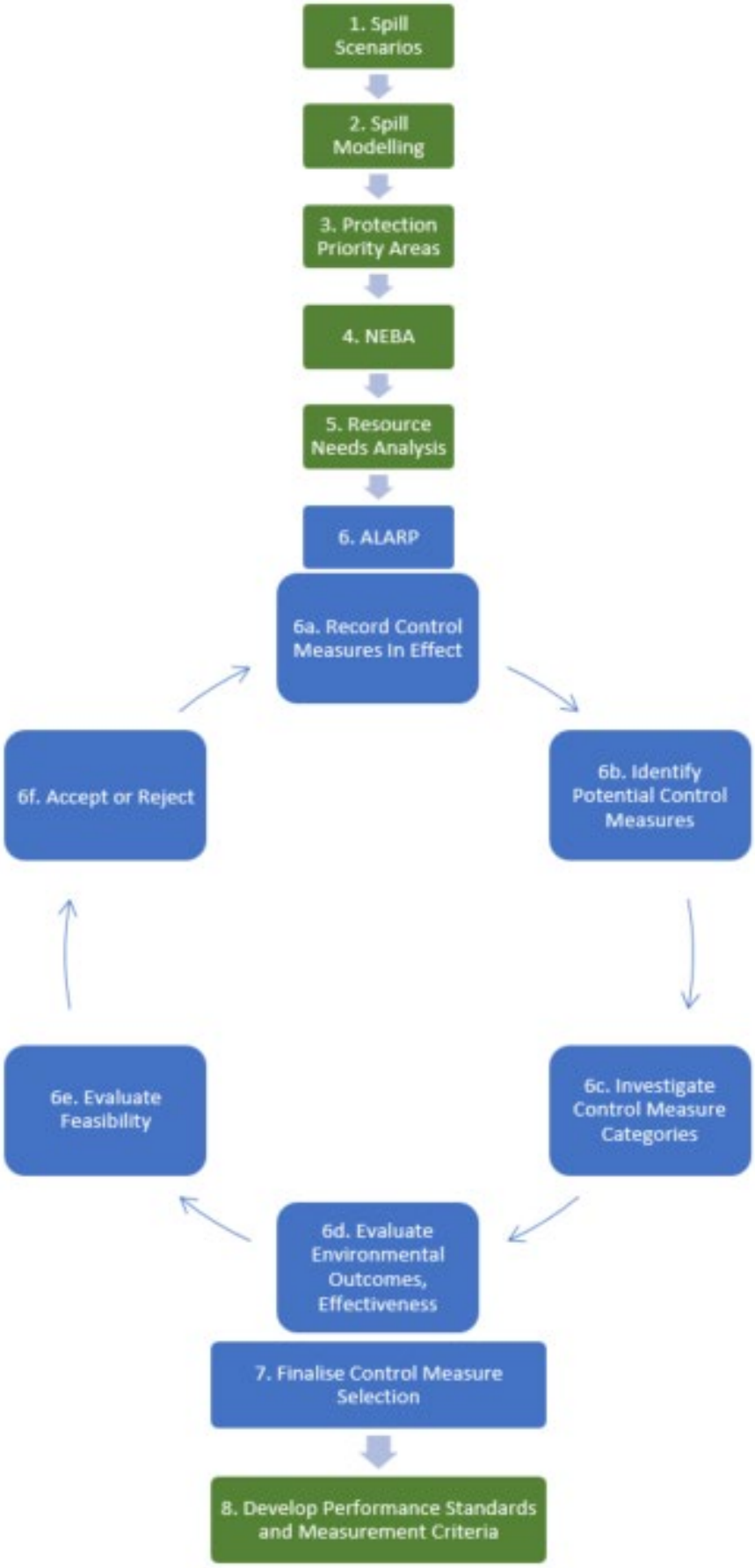


Figure B-1: ALARP assessment framework

In Figure B-1, Steps 1 to 5 (in GREEN) denote input information into the ALARP Assessment Framework. This information comprises:

1. Spill Scenarios: This step will involve assessing all possible spill scenarios from the activity and identifying the worst-case credible scenarios as a basis for pollution response planning.
2. Spill Modelling: A quantitative spill modelling assessment is conducted for the worst-case credible scenarios identified in Step 1.
3. Protection Priority Areas: The Environment that may be Affected (EMBA) is the largest area within which impacts from hydrocarbon spills associated with the activity could extend. The EMBA is predicted using spill modelling results from Step 2. Protection Priority Areas are locations of high ecological value within the EMBA that would be targeted in response. Selection of Protection Priority Areas is detailed in the Oil Spill Risk Assessment and Response Planning Procedure SO-91-II-20003
4. NEBA: Net Environmental Benefit Analysis (NEBA) is used to select the most effective response strategies to protect the Protection Priority Areas identified in Step 3.
5. Resource Needs Analysis: For the response strategies identified through NEBA, the worst-case resource, timing, and location requirements are determined, using quantitative spill modelling information where applicable. An Implementation Guidance is then developed to detail what arrangements and actions are required to be initiated by the Incident Management Team (IMT) to meet the incident requirements up to a worst-case incident.

Through the development of the Implementation Guidance, it may be possible to identify resource, timing and location requirements that could be improved. These areas of improvement should be noted in the ALARP so that additional, alternative or improved control measures can be considered in this context.

A detailed ALARP Assessment Framework for the evaluation of control measures is shown in Figure B-1, Step 6 (in BLUE). Criteria and definitions used to evaluate control measures are shown in Table B-1.

6a) Record Control Measures In Effect: The spill response control measures currently in place for Santos Offshore are listed here. The environmental outcomes and effectiveness of the in-effect control measures are noted, using the Resource Needs Analysis to assess whether there are any areas of improvement. Environmental outcomes include potential harmful effects of control measures.
6b) Identify Potential Additional Control Measures: Potential control measures are identified, with a focus on any control measures that address areas of improvement identified in Step 6a.
6c) Investigate Control Measure Categories: In-effect and potential control measures from Steps 6a and 6b are classified as either additional, alternative or improved, and as either people, system, equipment or procedures. This step serves as a prompt to ensure that potential control measures from all categories are explored.
6d) Evaluate Environmental Outcomes, Effectiveness: The environmental outcomes and effectiveness are assessed for all control measures identified and described through Steps 6a, b, and c.
6e) Evaluate Feasibility: Time, cost and effort required for implementation are assessed for all control measures identified and described through Steps 6a, b, and c.
6f) Accept or Reject: The potential control measure will be accepted or rejected on the basis of environmental outcomes and effectiveness described in Step 6d and whether cost is grossly disproportionate, as described in Step 6e.

When evaluating potential control measures, implementation plans of in-effect control measures are carefully considered to ensure that any accepted control measures will equal or improve Santos capacity to meet resource needs. Potential control measures are also considered within the context of current Santos response arrangements to determine if synergies or resource conflicts might occur.

As control measures are evaluated for selection or rejection, they can be compared with industry good practice to ensure that all practicable control measures were implemented. Where unique circumstances exist and further analysis is required, a different evaluation technique may be used, such as technical analysis, detailed cost benefit analysis or combination of approaches.

New information on risks, impacts and response strategies obtained through analysis of operations, exercises and scheduled documentation reviews can be incorporated into the ALARP Assessment Framework cycle in a process of continual improvement.

In Figure B-1, Steps 7 and 8 show the conclusion of the ALARP Assessment Framework:

7. Finalised Control Measure Selection: Outputs from the ALARP Assessment shown in Step 6 comprise finalised control measures (in BLUE).
8. Develop Performance Standards and Measurement Criteria: For each control measure finalised in Step 7, performance standards and measurement criteria are then developed and documented in the OPEP (in GREEN).

Performance standards for all accepted control measures should be written to enable the operator to measure, monitor and test effectiveness. Only the key aspects of any given control will require performance standards and these may include the various measures of effectiveness; functionality, availability, reliability, survivability, dependency and compatibility. Parameters set in the performance standard should be 'SMART'; specific, measurable, appropriate, realistic and timely.

Corrective action based on deviations or trends in performance should be taken by amending either the performance standard or the control measure, as appropriate.

Criteria and definitions

Standardised criteria and definitions are used to bring consistency to the ALARP assessment across diverse activities and response strategies. Criteria and definitions are shown in Table B-1.

Table B-1: Criteria and definitions of ALARP Assessment Framework

Column	Description
Strategy	Response Strategy
Control Measure	Aspect of Response Strategy being evaluated Description of the control measure that is In Effect or description of the potential control measure
In Effect, Alternative, Additional, Improved	In Effect control measures are already in place. Alternative control measures are evaluated as replacements for the control already in effect. Additional control measures are evaluated in terms of their ability to reduce an impact or risk when added to the existing suite of control measures. Improved control measures are evaluated for improvements they could bring to the effectiveness of adopted control measures. Adapted from NOPSEMA Guideline Environment Plan Decision Making N-04750-GL1721, January 2024.
Control Measure Category	A range of different types of controls generally provide effective protection as they provide independence and multiple layers of protection. The OPGGS(S) Regulations refer to technical and 'other' controls where technical control measures involve hardware like shutdown valves and alarms. 'Other' control measures include administrative and procedural control measures such as inductions, a drug and alcohol policy or an inspection regime. Industry practice has further developed this concept of a range of different types of controls based on a POiSTED framework to assess organisational capability: • People – personnel • System – organisation, information/communications, support facilities, training/ competency • Equipment – equipment • Procedures – doctrine Santos aims to implement a range of different types of controls where possible.
Environmental Outcomes	Assessment of environmental benefits, particularly those over and above those environmental benefits documented in the Control Measure that is in effect. Environmental impacts of the Control Measure are also considered here.
Effectiveness	The effectiveness of a Control Measure in reducing the risk to ALARP is evaluated using the following six criteria. Functionality The functional performance of a control measure is what it is required to do. How does the control perform in order to achieve the required risk reduction? Availability Probability that the control measure will be available when required and has not failed or is undergoing a maintenance or repair. Reliability The reliability of a control measure is the probability that at any point in time it will operate correctly for a further specified length of time. Reliability is all to do with the probability that the system will function correctly and is usually measured by the mean time between failure. Survivability Whether or not a control measure is able to survive a potentially damaging event such as fire or explosion is relevant for all control measures that are required to function after an incident has occurred.

Column	Description
	To achieve their purpose, oil spill response control measures should have high survivability. However, some control measures, such as those involving equipment deployment from an FPSO would have low survivability in an incident that involves an FPSO explosion or fire. Dependency The dependency of the control measure is its degree of reliance on other systems in order for it to be able to perform its intended function. If several control measures can be disabled by one failure mechanism (common mode failure), or the failure of one control measure is likely to cause the failure of others, then the control measures are not independent, and it may not be appropriate to count such measures as separate. Several control measures are reliant on equipment, people and vessels, hence have high dependence. Compatibility Whether or not a control measure is compatible takes into account how alternative control measures may interact with other controls and the rest of the facility, if introduced. Consideration should be given to whether new control measures are compatible with the facility and any other control measures already in use. Adapted from NOPSEMA Guidance Note Control Measures and Performance Standards N04300-GN0271, 26 June 2020
Feasibility	Feasibility describes the time, cost and/or effort required to implement the Control Measure.
Accept/ Reject	Outcome of assessment and key reasons for the decision

ALARP Assessment Summaries

ALARP assessment summary
Source control
Source control is limited to minimising potential volumes of MDO lost to the marine environment and no areas of improvement were identified. No additional Control Measures were identified and assessed. Performance Standards and Measurement Criteria that have been developed for the in-effect Control Measures are shown in Table 9-3. The key performance requirements are to follow the response actions listed in the respective vessel SOPEP and conduct spill exercises in line with the vessel's SOPEP.
Monitor and evaluate
For the monitor and evaluate strategy, various, independent inputs from multiple service providers are used to build a detailed Common Operating Picture (COP) during the incident. Three additional potential Control Measures were identified and assessed. No additional Control Measures were accepted. Three Control Measures were rejected as grossly disproportionate. Rejected Control Measures were: • Purchase of oil spill modelling system and internal personnel trained to use system; • Trained aerial observers based in in strategic locations such as Darwin; • Purchase additional satellite tracking buoys. Performance Standards and Measurement Criteria that have been developed for the in-effect and accepted Control Measures are shown in Table 10-21. The key areas of effectiveness for the identified Control Measures, during times of preparedness, focus on maintaining access to equipment and personnel through contractual arrangements with vessel providers, aircraft providers, aerial observers, UAV providers, tracking buoys, oil spill trajectory modelling providers, satellite imagery providers and spill responders. Additional key areas for effectiveness during preparedness are following relevant procedures such as the Protected Marine Fauna Interaction and Sighting Procedure, and limiting environmental impacts from response activity through personnel and vehicle management. During response, a key area for ensuring effectiveness is the mobilisation of requirements in order to commence monitor and evaluate operations. These key areas of effectiveness have been represented in Performance Standards for monitor and evaluate operations.
Mechanical dispersion
Mechanical dispersion is a secondary strategy that could be undertaken by vessels undertaking primary response strategies without the requirement for additional equipment, and no areas of improvement were identified. The use of mechanical dispersion in a response would be assessed as part of an operational NEBA. No potential additional Control Measures were identified and assessed. Performance standards and measurement criteria that have been developed for the in-effect control measures are shown in Table 11-4. The key areas of effectiveness for the identified Control Measures during a response are around the development of an operational NEBA to confirm suitability and environmental benefit, and the mobilisation of vessels. These key areas of effectiveness are reflected in the Performance Standards.

ALARP assessment summary

Shoreline protection and deflection

Large quantities of various types of nearshore booms and skimmers from Darwin, Exmouth, Dampier and Fremantle ensures that equipment is in place to implement this response strategy within 60-72 hrs of shoreline contact (predicted or observed) in a wide range of metocean conditions. Trained regional Santos personnel can be quickly mobilised to appropriate locations using helicopter and transport services, followed by AMOSC staff and AMOSC Core Group. These regional and state resources ensure that equipment and personnel are not a limiting factor in this response strategy. An area of improvement is availability of shallow draft vessels. A review of Control Measures associated with vessels identified that improvement could be made by adding a provision for shallow draft boom-tow vessels in existing Master Service Agreements with vessel providers.

Three potential additional/improved Control Measures were identified and assessed, however all were rejected as grossly disproportionate. The rejected control measures were:

- Santos to purchase additional shoreline and nearshore booms and ancillary equipment;
- Access to additional shallow draft boom-tow vessels owned by Santos;
- Ensure trained personnel are based at strategic locations such as Darwin.

Performance Standards and Measurement Criteria that have been developed for the in-effect and accepted Control Measures are shown in Table 12-5. The key areas of effectiveness for the identified Control Measures, during times of preparedness, are around maintaining access to equipment and personnel through contractual arrangements. During response, a key area for ensuring effectiveness is the mobilisation of requirements in order to commence protection and deflection operations and the preparation of an operational NEBA for each operational period that takes into account protection priorities and the ongoing effectiveness of the response strategy. These key areas of effectiveness have been represented in Performance Standards for protection and deflection operations.

Shoreline clean-up

Performance Standards and Measurement Criteria that have been developed for the in-effect and accepted Control Measures are shown in the OPEP. The key areas of effectiveness for the identified Control Measures, during times of preparedness, are around maintaining access to equipment and personnel through contractual arrangements. During response, a key area for ensuring effectiveness is the mobilisation of resources in order to commence shoreline clean-up operations and the preparation of an operational NEBA for each operational period that takes into account protection priorities and the ongoing effectiveness of the response strategy. These key areas of effectiveness have been represented in Performance Standards for shoreline clean-up operations.

Seven potential additional/improved Control Measures were identified and assessed, however all were rejected as grossly disproportionate. Rejected control measures were:

- Mechanical mobile plant equipment for clean-up pre purchased and positioned at strategic locations (e.g. in Darwin);
- Pre-purchase and storage of equipment (decontamination/ staging equipment, clean-up and flushing, PPE) at strategic locations (e.g. Darwin or Broome);
- Access to additional shallow draft vessels owned by Santos to transport personnel to key sensitive areas on offshore islands;
- Access to additional team leaders that are locally based at strategic locations (e.g. Darwin) or can be mobilised within short time frames;
- Faster access to clean-up personnel via Perth-based labour hire contractor;
- Faster access to clean-up personnel via locally based labour hire companies (e.g. in Darwin or Broome) or emergency response organisations;
- Faster access to clean-up personnel via Santos employment of local personnel.

Performance Standards and Measurement Criteria that have been developed for the in effect and accepted Control Measures are shown in Table 13-5. The key areas of effectiveness for the identified Control Measures, during times of preparedness, are around maintaining access to suitable equipment and personnel through contractual arrangements. During response, a key area of effectiveness is the rapid mobilisation of equipment and personnel and preparation of a Shoreline Clean-up Sub-plan and NEBA to ensure that impacts from response activities are minimised and operations are conducted in accordance with protection priorities as confirmed by the Control Agency.

Oiled wildlife

Santos has developed the Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) as a Control Measure to ensure that a procedure is in place for OWR, where Santos are the Control Agency or Support Organisation, in order to provide an effective and coordinated OWR. Santos has access to the indicative resource requirements for the worst-case scenario in this OPEP as per the WA Oiled Wildlife Response Plan and the NT Oiled Wildlife Response Plan, including mobilisation of AMOSC oiled wildlife equipment and industry OWR team to a forward staging area within 48 hours. AMSA also maintains an oiled wildlife response container/ mobile washing facility in Darwin. The availability of trained personnel in the initial stages of an incident is a limiting factor for this response strategy. Potential Control Measures around additional responders through pre-hiring or contracts with additional service providers were investigated but were found to be not beneficial and/or the cost was grossly disproportionate to risk reduction.

Two potential additional Control Measures were identified and assessed. Both were rejected as grossly disproportionate to the potential reduction in environmental risk:

- Pre-hire and/or prepositioning of staging areas and responders;

ALARP assessment summary
• Direct contracts with service providers. Performance Standards and Measurement Criteria that have been developed for the in-effect Control Measures are shown in Table 14-7.
Waste
The Santos contract with the waste service provider has provisions for waste management operations for the worst-case scenario detailed in Table 6-1. Further detail is captured in the relevant Santos Waste Management Plan (7715-650-ERP-0001 for WA, and BAA-201_0027 for NT). The waste service provider can mobilise waste receptacles to Darwin Port within 24 hrs. Given the waste service provider arrangements and pre-planning already undertaken, waste storage facilities, road transport and logistics are not expected to be limiting factors in the response. For these components, potential Control Measures were identified and evaluated but were found to either make no improvement in capability or cost was grossly disproportionate to the potential reduction in environmental risk. Three potential additional Control Measures were identified and assessed, however no additional Control Measures were accepted as reasonably practicable. The rejected Control Measures were: • Maintain contract with multiple service providers; • Procure temporary waste storage for Santos stockpile; • Contract additional vessels on standby for waste transport. Performance Standards and Measurement Criteria that have been developed for the in-effect Control Measures are shown in Table 15-5.
Operational and Scientific monitoring
Oil spill operational and scientific monitoring will be conducted on behalf of Santos by a contracted OSM Services Provider via the OSM Services Supplementary Agreement, as detailed in the Northern Australia OSM-BIP (7715-650-ERP-0003). Santos has determined the vessel specifications required for Operational and Scientific Monitoring implementation to assist marine logistics teams in sourcing suitable vessels via the vessel tracking system. An oil sampling kit has been purchased and is positioned at Darwin. Three additional potential Control Measure were identified and assessed. All three were rejected as grossly disproportionate. The rejected Control Measures were: • Scientific monitoring personnel and equipment on standby in Darwin; • Trained marine mammal/fauna observers based in Darwin; • Trained water quality monitoring specialists available in Darwin. Performance Standards and Measurement criteria that have been developed for the in effect and accepted Control Measures are shown in Table 16-2.

Appendix C Pollution report

NT POLREP

Harmful Substances Report – oil (POLREP)

Marine Pollution Regulations 2003 s37(4)

This form is to be submitted to the NT Government **and** Australian Maritime Safety Authority:

NT Government

Email to:

- pollution@nt.gov.au and
- marinesafety@nt.gov.au and
- rhm@nt.gov.au

Australian Maritime Safety Authority

General Manager, Response
through Joint Rescue Coordination Centre (JRCC) Australia

Facsimile: +61 2 6230 6868
AFTN: YSARYCYX

Email: rccaus@amsa.gov.au

Note: sections of the ship reporting form that are not relevant should be omitted from the report. If there is insufficient space on this form, attach additional information.

A. **Name of Ship**

Call Sign

Ship's IMO

Flag State

Name of Ship's Master

Ship's Master contact details

B. **Date and time of event (time must be expressed as Coordinated Universal Time UTC)**

C. **Position: latitude and longitude**

or

D. **Position: true bearing and distance**

E. **True course (as a three digit group)**

F. Speed (in knots and tenths of a knot as a 3-digit group)

L. Route information (details of intended track)

M. Full details of radio stations and frequencies being guarded

N. Time of next report (time must be expressed as Coordinated Universal Time UTC)

P. Types and quantities of cargo and bunkers on board

Q. Brief details of defects, damage, deficiencies or other limitations (this must include the condition of the vessel and the ability to transfer cargo, ballast or fuel)

R. Brief details of actual pollution (this must include the type of oil, an estimate of the quantity discharged, whether the discharge is continuing, the cause of the discharge and if possible, an estimate of the movement of the slick)

S. Weather and sea conditions including wind force and direction, and relevant tidal or current details

T. Name, address, telephone and facsimile numbers of the vessel's owner and representative (manager, operator, or their agents)

Owner		**Representative**	
Company IMO		**Company IMO**	
Address		**Address**	
Telephone	**Facsimile**	**Telephone**	**Facsimile**

U. Details of length, breadth, tonnage and type of ship

Type of vessel	**Length**	**Breadth**	**Tonnage**

X. 1. Action being taken with regard to the discharge and movement of the ship

2. Assistance or salvage efforts which have been requested or which have been provided by others

3. The master of an assisting or salvaging vessel should report the particulars of the action undertaken or planned

WA DTMI POLREP

Government of **Western Australia**
Department of **Transport**

Marine Pollution Report (POLREP)
MEER

When blank, this form is classed as **OFFICIAL**, when filled out, this form is classed as **OFFICIAL-SENSITIVE.**

BEFORE completing this form please contact the MEER duty officer on (08) 9480 9924 (24hrs). Immediate reporting will enable a rapid response.

Return completed form to:
Maritime Environmental Emergency Response
Department of Transport
Email: marine.pollution@transport.wa.gov.au and rccaus@amsa.gov.au
Phone (08) 9480 9924

INCIDENT DESCRIPTION

Incident Name: _____ Date and Time of Incident (24 hr format): _____

Location name/description: _____

Incident Coordinates: Latitude of spill _____ Longitude of spill _____

Description of Incident: _____

Weather conditions at site: _____

OIL DETAILS

Pollutant source

Amount of fuel/pollutant on board: _____

☐ Vessel ☐ Land (Specify) _____ ☐ Other (Specify) _____ ☐ Unknown

Vessel type (if known) ☐ Tanker ☐ Container ☐ Bulk ☐ Cargo

☐ Fishing ☐ Defence ☐ Recreational ☐ Other (Specify) _____

Vessel name: _____ Flag State / Callsign: _____ Australian vessel? ☐ Yes ☐ No

Pollutant

☐ Oil (type) ☐ Bilge ☐ Diesel ☐ HFO bunker ☐ Crude ☐ Unknown ☐ Other (Specify)_____

☐ Chemical Name: _____ MARPOL cat / UN Nos:_____

☐ Garbage Details/description: _____

☐ Packaged Details/description: _____

☐ Sewage Details/description: _____

☐ Other Details/description: _____

Extent

Size of spill (length & width in metres): _____

Amount of pollutant spilt, if known (litres): _____

Has the discharge stopped? ☐ Yes ☐ No ☐ Unknown

☐ Photos taken Details: _____ held by:_____

☐ Video taken Details: _____ held by:_____

☐ Samples taken Description: _____ held by:_____

☐ Items retrieved Description: _____ held by:_____

To attach photos, this form must be opened in acrobat, or alternatively, photos can be attached to the submission email before sending.

ADDITIONAL INFORMATION

Response action undertaken? ☐ Yes ☐ No If yes, provide details below, please include any environmental impact.

Equipment used? ☐ AMSA ☐ State ☐ Industry

Is assistance for an investigation required from DoT ☐ Yes ☐ No

KEY CONTACT DETAILS

Name:_____ Position: _____ Phone: _____

Control Agency: Select the Control Agency _____ Jurisdictional Authority: Select the Jurisdictional Authority _____

PRIVACY STATEMENT

The Department of Transport is collecting the information on this form to enable it to carry out its role as Jurisdictional Authority as per State Hazard Plan - Maritime Environmental Emergency.
The Department of Transport and/or AMSA may give some or all of this information to other government bodies, non-government organisations who have responsibilities under the National Plan, and law enforcement agencies.

Pollution Report (POLREP)		
Reporter's Signature:		
Name:	Agency:	Role:

Once you have completed the form please check that all relevant fields have been filled with accurate data.
Please email completed form to marine.pollution@transport.wa.gov.au

Appendix D Situation report

WA DTMI SITREP

Government of **Western Australia**
Department of **Transport**

Maritime Environmental Emergency Situation Report (SITREP)
MEER

When blank, this form is classed as **OFFICIAL**, when filled out, this form is classed as **OFFICIAL-SENSITIVE.**

Return completed form to:
Maritime Environmental Emergency Response
Department of Transport
Email: marine.pollution@transport.wa.gov.au and rccaus@amsa.gov.au
Phone (08) 9480 9924

MARITIME ENVIRONMENTAL EMERGENCY SITUATION REPORT (SITREP)

This is advice from the Control Agency of the current status of the incident and the response.
This form is transmitted to all relevant agencies including:

- Jurisdictional Authority
- Support Agencies

INCIDENT DESCRIPTION

Incident Name: _____ Ref. No. _____

Incident Controller: _____

Incident Declaration Level: Please select _____ Controlling Agency: Please select _____

Priority ☐ Urgent ☐ Immediate ☐ Standard

Final SITREP? ☐ Yes ☐ No

Next SITREP on: _____

Date and Time of Incident (24 hr format): _____

POLREP or AMSA Form 18 Reference : _____

Incident location: _____ Latitude: _____ Longitude: _____

Brief description of incident and impact: _____

Overall weather conditions: _____

Summary of response actions to date: _____

Current Strategies: _____

Summary of resources available/deployed:_____

Expected developments: _____

Other Information:_____

Maritime Environmental Emergency Situation Report (SITREP)		
Reporter's Signature:		
Name:	**Agency:**	**Role:**

Once you have completed the form please check that all relevant fields have been filled with accurate data.
Please email completed form to marine.pollution@transport.wa.gov.au

Appendix E Vessel surveillance observer log

Vessel Surveillance Observer Log – Oil Spill

Survey Details			
Date	Start time:	End Time:	Observers:
Incident:			Area of Survey:
Vessel:			Master:

Weather Conditions	
Wind speed (knots):	Wind direction:
Time high water and height (LAT):	Current direction:
Time low water and height (LAT):	Current speed (nM):
Tide during observations:	Sea state:
Stage of tide during observations (incoming/falling):	Other weather observations:

Slick Details											
Slick grid parameters by lat/long:					Slick grid parameters (vessel speed)			Slick grid dimensions: N/A			
Length Axis:		Width Axis:			Length Axis: N/A			Width Axis	Length		nm
Start Latitude		Start Latitude			Time (seconds)			Time (seconds)	Width		nm
Start Longitude		Start Longitude							Length		nm
End Latitude		End Latitude			Speed (knots)			Speed (knots)	Width		nm
End Longitude		End Longitude							Grid area		km^2
Code	Colour	%age cover observed	Total grid area		Area per oil code			Factor	Oil volume		
1	Silver			km^2		km^2		40-300 L/ km^2		L	
2	Iridescent (rainbow)			km^2		km^2		300-5,000 L/ km^2		L	
3	Discontinuous true oil colour (Brown to black)			km^2		km^2		5,000-50,000L/ km^2		L	
4	Continuous true oil colour (Brown to black)			km^2		km^2		50,000 – 200,000 L/ km^2		L	
5	Brown / orange			km^2		km^2		>200,000 L/ km^2		L	

Timeline of observations:

Time	Description

Appendix F Aerial surveillance observer log

Santos

Aerial Surveillance Observer Log – Oil Spill

Survey Details				
Date:	Start time:	End Time:	Observer/s:	
Incident:			Area of Survey:	
Aircraft type:	Call sign:		Average Altitude:	Remote sensing used:

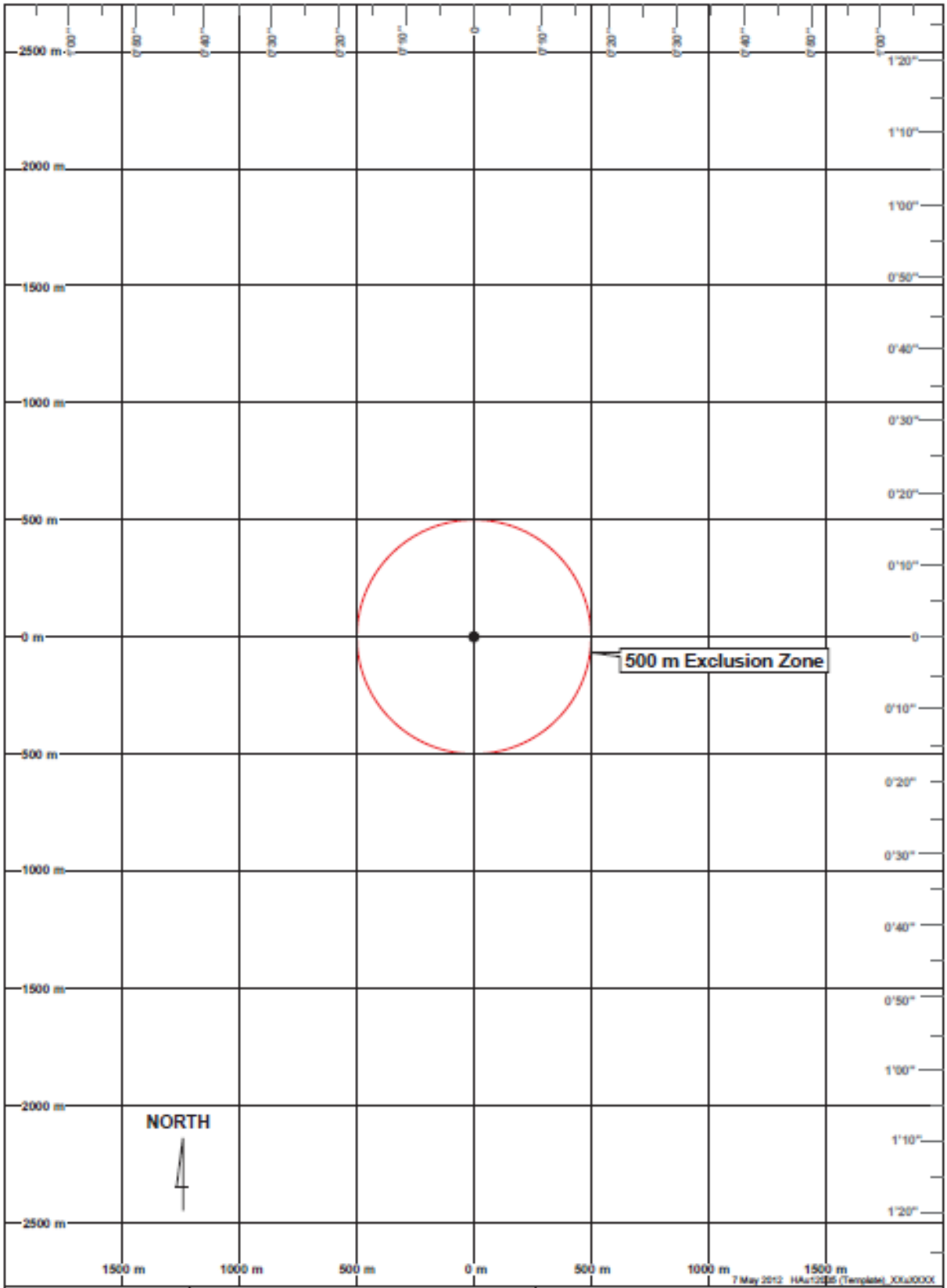
Weather Conditions	
Wind speed (knots)	Wind direction
Cloud base (feet)	Visibility
Time high water	Current direction
Time low water	Current speed (nM)

Slick Details											
Slick grid parameters (lat/long)				Slick grid parameters (air speed)		Slick grid dimensions					
Length Axis		Width Axis		Length Axis		Width Axis	Length	nm			
Start Latitude		Start Latitude		Time (seconds)		Time (seconds)	Width	nm			
Start Longitude		Start Longitude					Length	nm			
End Latitude		End Latitude		Air Speed (knots)		Air Speed (knots)	Width	nm			
End Longitude		End Longitude					Grid area	km^2			

Code	**Colour**	**% cover observed**	**Total grid area**		**Area per oil code**		**Factor**	**Oil volume**	
1	Silver			km^2		km^2	40-300 L/ km^2		L
2	Iridescent (rainbow)			km^2		km^2	300-5,000 L/ km^2		L
3	Discontinuous true oil colour (Brown to black)			km^2		km^2	5,000-50,000L/ km^2		L
4	Continuous true oil colour (Brown to black)			km^2		km^2	50,000 – 200,000 L/ km^2		L
5	Brown / orange			km^2		km^2	>200,000 L/ km^2		L

Appendix G Aerial surveillance surface slick monitoring template

AERIAL SURVEILLANCE SURFACE SLICK MONITORING TEMPLATE



	NAME:	VESSEL / AIRCRAFT:
	DATE / HOUR:	OTHER REFERENCE:

Appendix H Aerial surveillance marine fauna sighting record

Santos

OIL SPILL SURVIELLANCE - MARINE FAUNA SIGHTING RECORD SHEET

Date:		**Time:**	
Latitude:		**Longitude:**	

MARINE FAUNA ID GUIDE

○ Humpback whale

○ Blue whale

○ Minke whale

○ Sperm whale

○ Killer whale

○ Bryde's whale

○ Whale species unknown

○ Whale shark

○ Dugong

○ Hawksbill turtle

○ Loggerhead turtle

○ Green turtle

○ Flatback turtle

○ Bottlenose dolphin

○ Spinner dolphin

○ Dolphin species unknown

○ Leatherback turtle

○ Turtle species unknown

FAUNA DETAILS					
Category	**Type/species?** **Adult/juvenile?** **ID confidence?**	**Number**	**Date/Time**	**Photo/ video taken?** **Reference No.**	**Behaviour / Comments.** **Proximity to oil? Oiled?** **Milling? Feeding? Transiting?**
Cetaceans (Whales/ Dolphins)					
Turtles					
Birds					
Dugongs					
Sharks					
Other					

Other details for each observation location

WEATHER DETAILS

Sea State ◯ Mirror calm ◯ Small waves ◯ Slight ripples ◯ Large waves some whitecaps ◯ Large waves, many whitecaps

Visibility ◯ Excellent ◯ Good ◯ Moderate ◯ Poor ◯ Very Poor

OBSERVER DETAILS

Observer Name	Observer signature	**Observer** ◯ Inexperienced ◯ Experienced

Appendix I Aerial surveillance shoreline observation log

Aerial Surveillance Reconnaissance Log – Oil Spill

Survey Details				
Incident:	Date:	Start time:	End Time:	Observer/s:

Area of Survey	
Start GPS LATITUDE: LONGITUDE:	End GPS LATITUDE: LONGITUDE:

Aircraft type	Call sign	Average Altitude	Remote sensing used (if any)

Weather Conditions		
Sun/Cloud/Rain/Windy	Visibility	Tide Height L/M/H
Time high water	Time low water	Other

Shoreline Type - Select only ONE primary (P) and ANY secondary (S) types present					
	Rocky Cliffs		Boulder and cobble beaches		Sheltered tidal flats
	Exposed artificial structures		Riprap		Mixed sand and gravel beaches
	Inter-tidal platforms		Exposed tidal flats		Fine-Medium sand grained beaches
	Mangroves		Sheltered rocky shores		Other
	Wetlands		Sheltered artificial structures		

Operational Features (tick appropriate box)					
	Direct backshore access		Alongshore access		Suitable backshore staging
Other					

Appendix J Shoreline clean-up equipment

Table J-1: Recommended equipment for an initial deployment of a 6-person shoreline clean-up team

Shore clean-up Tools	Quantity
Disposal Bag Labelled, 140 cm x50cm x 100µm	1,000
Disposal Bag large fit 205ltr drum, 100cm x 150cm x 100µm	50
Polyethylene Safety Shovel 247mm z 978mm	2
Steel Shovel	4
Steel Rake	2
Landscapers Rake	2
Barrier Tape – “Caution Spill Area”	10
Pool scoop with extendable handle – flat solid	2
Poly Mop Handle	2
Safety Retractable Blade Knife	2
Poly Rope 20m	6
Star Pickets	24
Star Picket driver	1
Hand Cleaner	1
Cable ties – general use	1,000
Wheel Barrow	2
Galvanised Bucket	4
Pruning secateurs	2
Hedge Shears	1
Personal Protection Equipment (PPE) – Team of 6	
Spill Crew Hazguard water resistant coveralls (assorted sizes)	36
Respirator dust/mist/fume and valve	40
Disposable box light nitrile gloves (100bx)	2
Alpha Tec gloves (assort size)	24
Ear Plugs (200bx)	1
Safety Glasses	18
Safety Goggles non vented	6
Gum Boots (assort size)	18
Rigger Gloves (assort size)	18
Day/Night Vest	6
Storage Equipment	
Collapsible Bund 1.6m x 1.2m	2
Collapsible bund 4m x 2.4m	1
Misc. sizes of ground sheets / tarps.	6
Absorbents	
Absorbent Roll ‘oil and fuel only’ 40m x 9m	6
Absorbent Pad “oil and fuel only” 45cm x 45cm	400
Poly Mops (snags)	150
Poly Absorbent Wipes	10
Additional Items	
Folding Deck Chair 6	6
Folding Table 1	1
Shelter open side 1	1
6 Person first aid kit 1	1
Wide Brim Hat with cord 6	6
Sunburn Cream 1 litre pump bottle 1	1
Personal Eyewash bottle 500mls 6	6
Personal Drink bottle 750mls 6	6
Boxes, Bin and Lid Storage/transport assorted	-
Optional items	
Inflatable tent 9 square metres	1

Table J-2: Recommended equipment list for a decontamination unit for a shoreline clean-up team

Shore clean-up Tools	Quantity
Inflatable Decon Tent	1
Inflatable Tent 9 square metres – Modesty or Control tent	1
Misc sizes of ground sheets/tarps	4
Collapsible Bund 1.6m x 1.2m (two stages)	2
2 stools in each bund	4
Collapsible Bund 4m x 2.4m (for used PPE and clothing into DB's)	1
Long Handled Scrub brush	2
Scrub Brush	2
Simple Green 20 ltr	2
Poly Absorbent Wipes	10
Wet Wipe Canister	6
Disposal Bag for Clothing, 140cm x 50cm x 100µm	100
Bath towel	6
Liquid soap in push dispenser (citrus based)	1
Track mat – Absorbent for Corridor/walkway	1
Star pickets	16
Star picket driver	1
Barrier tape to create corridors	4
Safety Goggles non vented (used during decon)	6
Additional items	
Folding Deck Chair	6
Folding Table	1
Shelter open side	1
6 Person first aid kit	1
Wide Brim Hat with cord	6
Sunburn Cream 1 litre pump bottle	1
Personal Eyewash bottle 500mls	6
Personal Drink bottle 750mls	6
Boxes, Bin and Lid Storage/transport assorted	-

Table J-3: Recommended equipment list for deployment of a 6-person team for shoreline flushing or recovery

Flushing Equipment	Quantity
Diesel self prime semi trash pump, 25-35 psi, 4.8hp	1
Perforated 2" lay flat hose, 20 m sections	2
Section Hose 2", 20m sections	5
Hose End Strainer	1
Recovery Equipment	
Tidal Boom (shoreline boom) 25m lengths	2 (50m)
Tidal Boom Accessories pack 1	1
Versatech Zoom Curtin Boom 300mm chamber, 450mm skirt 25m section 2 (50m)	2 (50m)
Towing Bridle 2	2
Danforth Sand Anchor Kit, 30m lines, 15m trip lines 3	3
Diesel Powered pump with hose 1	1
Manta Ray skimmer 1	1
Personal Protection Equipment (PPE) – Team of 6	
Spill Crew Hazguard water resistant coveralls (assorted sizes)	36
Respirator dust/mist/fume and valve	40
Disposable box light nitrile gloves (100 box)	2
Ear Plugs (200 box)	1
Safety Glasses	18
Gum Boots (assorted sizes)	18
Hyflex Oil Restraint Gloves (assorted sizes)	18
Day/Night Vest	6
Storage Equipment	
Collapsible Bund 1.6m x1.2m	1
Misc sizes of ground sheets/tarps	6
Collapsible Tank 5,000 litres	2
Absorbents	
Absorbent Boom 'oil and fuel only' 3 or 6m x 180,mm	200 m
Absorbent Roll 'oil and fuel only' 40m x 9m	10
Absorbent Pad "oil and fuel only" 45cm x 45cm	1,000
Poly Absorbent Wipes	10
Additional Items	
Folding Deck Chair	6
Folding Table	1
Shelter open side	1
6 Person first aid kit	1
Wide Brim Hat with cord	6
Sunburn Cream 1 litre pump bottle	1
Personal Eyewash bottle 500mls	6
Personal Drink bottle 750mls	6
Boxes, Bin and Lid Storage/transport assorted	-
Inflatable Tent 9 square metres	1

Table J-4: Recommended equipment list for a 6-person team for near shore clean-up

Absorbents	Quantity
Absorbent Roll ‘oil and fuel only’ 40m x 9m	20
Absorbent Pad “oil and fuel only” 45cm x 45cm	2,000
Absorbent Boom “oil and fuel only” 3or6m z 180mm	200 m
Poly Mops (snags)	150
Poly Absorbent Wipes	20
Recovery Equipment	
Tidal Boom (shoreline boom) 25m lengths	4 (100 m)
Tidal Boom Accessories pack	2
Versatech Zoom Curtin Boom 300mm chamber, 450mm skirt 25m section	8 (200 m)
Towing Bridle	2
Danforth Sand Anchor Kit 15kg 30m lines, 15m trip lines	10
Weir Skimmer 30T hr	1
Trash Screen for above	1
Diesel Powered pump with hose	1
Manta Ray skimmer	1
Shore Clean-up Tools	
Disposal Bag large fit 205ltr drum, 100cm x 150cm x 100µm	200
Pool scoop with extendable handle – flat solid	2
Poly Mop Handle	2
Poly Rope 20m	10
Star Pickets	24
Star Picket driver	1
Intrinsic Safe Torch	6
Hand Cleaner	1
Cable ties (to add extra join to absorbent booms)	150
Personal Protective Equipment (PPE) Team of 6	
Spill Crew Hazguard water resistant coveralls (assorted sizes)	36
Disposable box light nitrile gloves (100 box)	2
Alpha Tec gloves (assorted sizes)	24
Ear Plugs (200bx)	1
Safety Glasses – with head strap	18
Gum Boots (worn extra large or as advised by skipper)	18
Steel cap waders	2
Personal Flotation Device	6
Rigger Gloves (assort size)	18
Storage equipment	
Collapsible Bund 1.6 m x 1.2 m	2
Collapsible bund 4 m x 2.4 m	1
Collapsible Tank 5,000 litres	2
Alum box, Bin & lid Storage/transport cases	10
Misc. sizes of ground sheets/tarps	6
Additional Items	
6 Person first aid kit 1	1
Wide Brim Hat with cord 6	6
Sunburn Cream 1 litre pump bottle 1	1
Personal Eyewash bottle 500mls 6	6
Personal Drink bottle 750mls 6	6

Appendix K Shoreline response strategy guidance

Guidance on response methods for sensitive coastal habitats is provided in Table K-1.

Guidance on applicable shoreline clean-up techniques based on shoreline substrate and degree of oiling are presented in Figure K-1 to Figure K-4.

Table K-1: Strategy Guidance for shoreline response at coastal sensitivities

Sensitive receptors	Strategy guidance
Mangroves	• All efforts should be mounted to prevent any oil from moving towards this area by using booms to divert the oil away from this area. • However, if oil is expected to move into this area, multiple rows of booms, or earthen booms can be deployed at the entrance of creeks or along the mangrove fringe to prevent/minimise oiling. • Sorbents can be used to wipe heavy oil coating from roots in areas of firm substrate. Close supervision of clean-up is required. • Where thick oil accumulations are not being naturally removed, low-pressure flushing may be attempted at the outer fringe – sorbent pads and sorbent sweeps can be used to recover the sheen. • No attempt should be made to clean interior mangroves, except where access to the oil is possible from terrestrial areas. • Oily debris should be removed; it is extremely important to prevent disturbance of the substrate by foot traffic; thus most activities should be conducted from boats. • Live vegetation should not be cut or otherwise removed.
Mudflats	• All efforts should be mounted to prevent any oil from moving towards this area by using booms to divert the oil away from this area. • However, if oil is expected to move into this area, multiple rows of booms, or earthen booms can be deployed at the entrance of channels filling/ draining mudflats. • Efforts to manually clean mudflats may result in further damage due to trampling of the oil into sediments which typically rich in biota and provide a food source for fish and birds. • Therefore, natural remediation may be the preferred approach and if removal is required, the flushing of oil into open water, if feasible, may be preferred to manual collection • The presence of wildlife (e.g. shorebirds) and sensitive flora (e.g. mangroves) which are often associated with mudflats needs to be considered in determining the best approach.
Sandy beaches	• Clean-up techniques will depend upon the degree of infiltration into sand or and degree of burial which will require surveying/mapping • Clean-up will also depend upon sensitivity of environment (existing ecological features), access to the beach and potential for additional erosion. • Oil and oiled sediments can be physically removed offsite, moved to surf zone for surf washing of sediment or assisted to move to water edge by ploughing of channels or flushing. • Recovery of oil can be by manual means (hand tools) or mechanical means (earth moving, pumping equipment). • The sensitivity of the environment is a key factor, with manual removal creating less waste and disturbance but more consuming in time and resources.
Seabirds, shorebirds and migratory waders	• All efforts should focus on deflecting oil away from this area or dispersing the oil offshore or using booms offshore to divert the oil away from this area. • If oil is expected to move into the coastal colonies and roosting areas, multiple booms can be deployed along the reserve to prevent/minimise oiling.
Turtle nesting beaches during or near nesting season	• All efforts should be mounted to prevent any oil from moving towards this area by using booms to divert the oil away from this area. • However, if oil is expected to move into this area, booms can be deployed along the reserve to prevent/minimise oiling.
Fringing coral reef communities	• Little can be done to protect coral reef beds along exposed sections of shoreline. • Floating oil would potentially coat living reef communities, which are usually slightly elevated and are consequently exposed at low tide.

Sensitive receptors	Strategy guidance
(Note: submerged coral reef communities are less susceptible to oiling)	• Natural recovery with a close monitoring program is the preferred clean-up technique. Clean-up of the reef itself by natural processes is expected to be rapid. • As much as practicable, oil should be removed from adjacent intertidal areas to prevent chronic exposure of the corals to oil leaching from these sites. • Use of sorbents should be limited to those that can be contained and recovered.
Macroalgal and seagrass beds	• All efforts should focus on deflecting oil away from this area, dispersing the oil offshore, or using booms to divert the oil away from this area. • Extreme care should be taken not to disturb the sediments during clean-up operations in the vicinity of macroalgal and seagrass beds, which could result in total loss of the macroalgal and seagrass beds. • Removal of oiled parts of the macroalgal and seagrass beds should only be considered when it can be demonstrated that special species are at significant risk of injury from contact or grazing on the macroalgal and seagrass beds. • Otherwise, the best strategy for oiled seaweed is to allow natural recovery.
Rocky coast	• Where practicable, booms can be deployed parallel to the rocky coasts to prevent/minimise oiling. • Flushing rocky shoreline is considered the most effective method of cleaning. Care must be taken to assess the fate and transport of the flushed oil and sorbent snares can be used to recover if deemed necessary to reduce impacts to ALARP. • For small areas of contamination, rocky structure can be manually wiped with sorbent pads or scraped to remove oil.

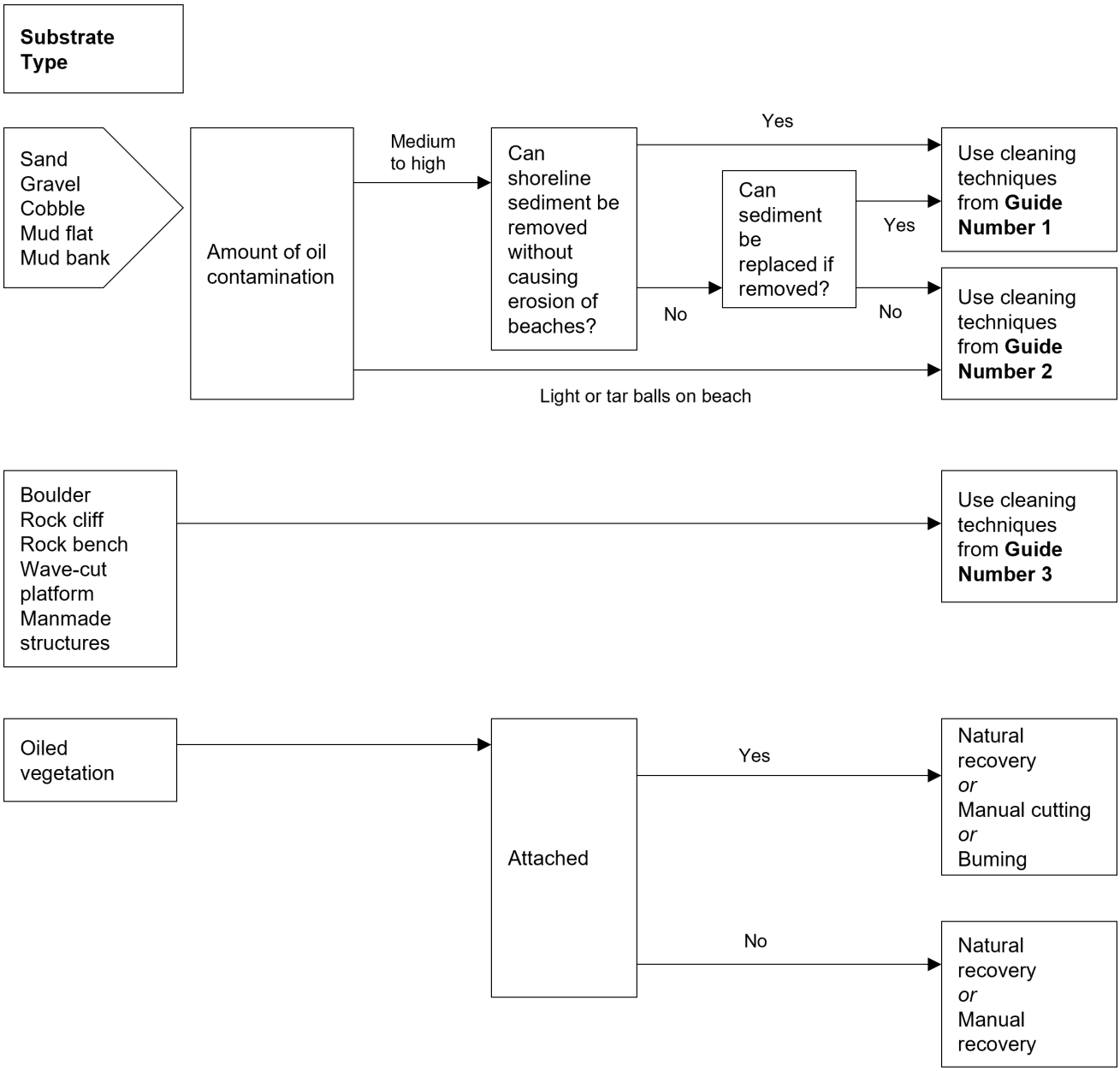


Figure K-1: Shoreline Clean-up Master Decision Guide

Trafficability		Substrate type	Depth of penetration	Clean-up techniques in order of preference	Access	
1. Can rubber-tyred equipment operate on beach?	→ Yes	Sand, Gravel. Mud	Less than 3 cm	Motor-grader and elevated scraper combination. Elevated Scraper, Motor-grader and Front-end loader (Rubber-tyred) combination.	**3. Is there access to beach for heavy equipment or can access be constructed?**	→ Yes ↓
			Greater than 3 cm	Elevated Scraper. Front-end loader (Rubber-tyred). Bulldozer and Front-end loader (Rubber-tyred) combination.		Select most preferable technique
		Cobble	Less than 30 cm	Front-end loader (Rubber-tyred).		
			Greater than 30 cm	Bulldozer and Front-end loader (Rubber-tyred) combination. Front-end loader (Rubber-tyred).		
		Mud bank	Not applicable	Backhoe. Front-end loader (Rubber-tyred).		
↓ No						
2. Can tracked equipment operate on beach?	→ Yes	Sand, Gravel, Mud, Cobble	Less than 30 cm	Front-end loader (Tracked). Bulldozer and Front-end loader (Tracked) combination.		
			Greater than 30 cm	Bulldozer and Front-end loader (Tracked) combination. Front-end loader (Tracked).		
↓ No					↓ No	
Use dragline or hydraulic grader or leave to natural recovery				Go to next Figure – Decision guide No. 2, Question 4.		

Figure K-2: Shoreline Clean-Up Decision Guide 1

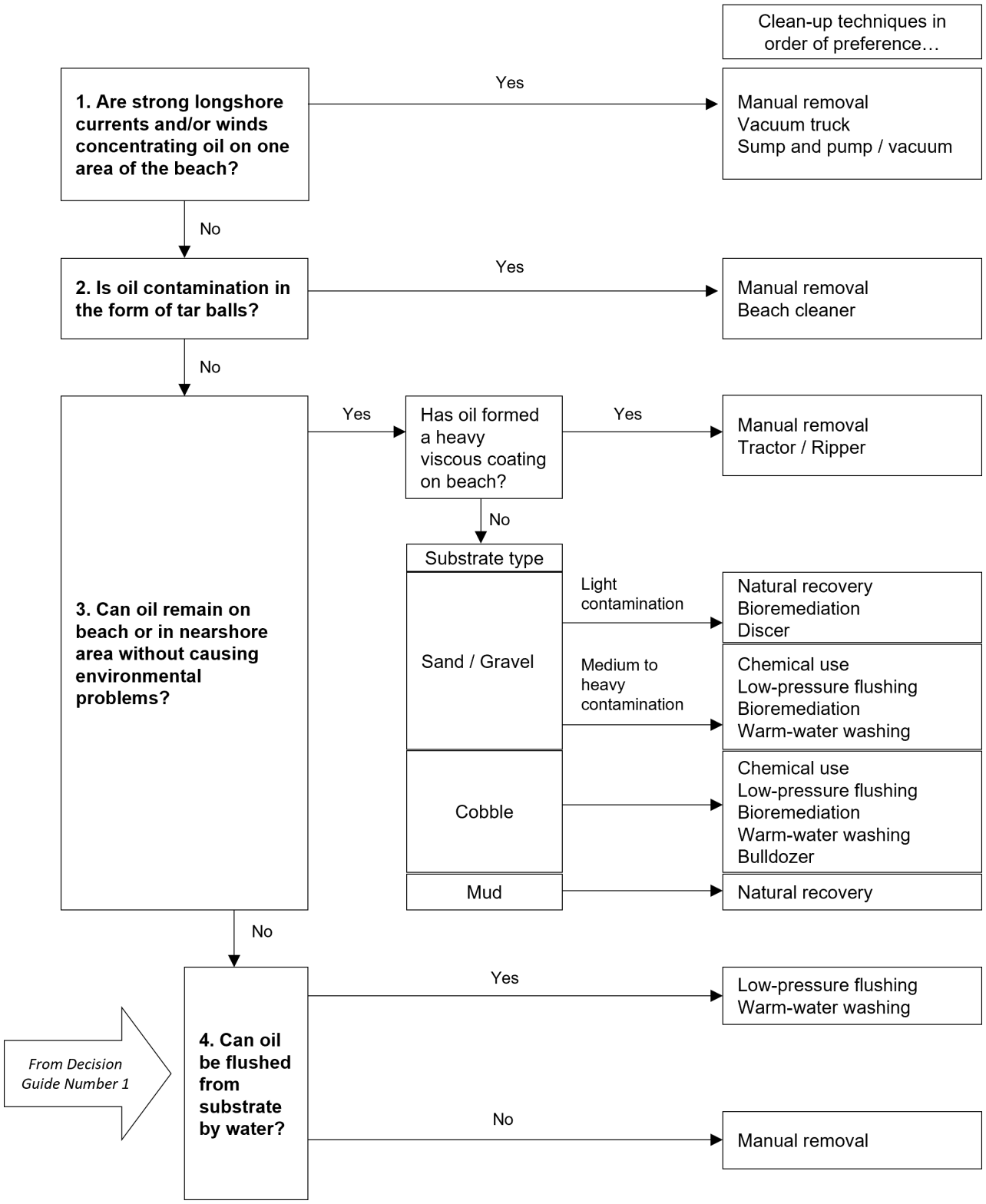


Figure K-3: Shoreline Clean-Up Decision Guide 2

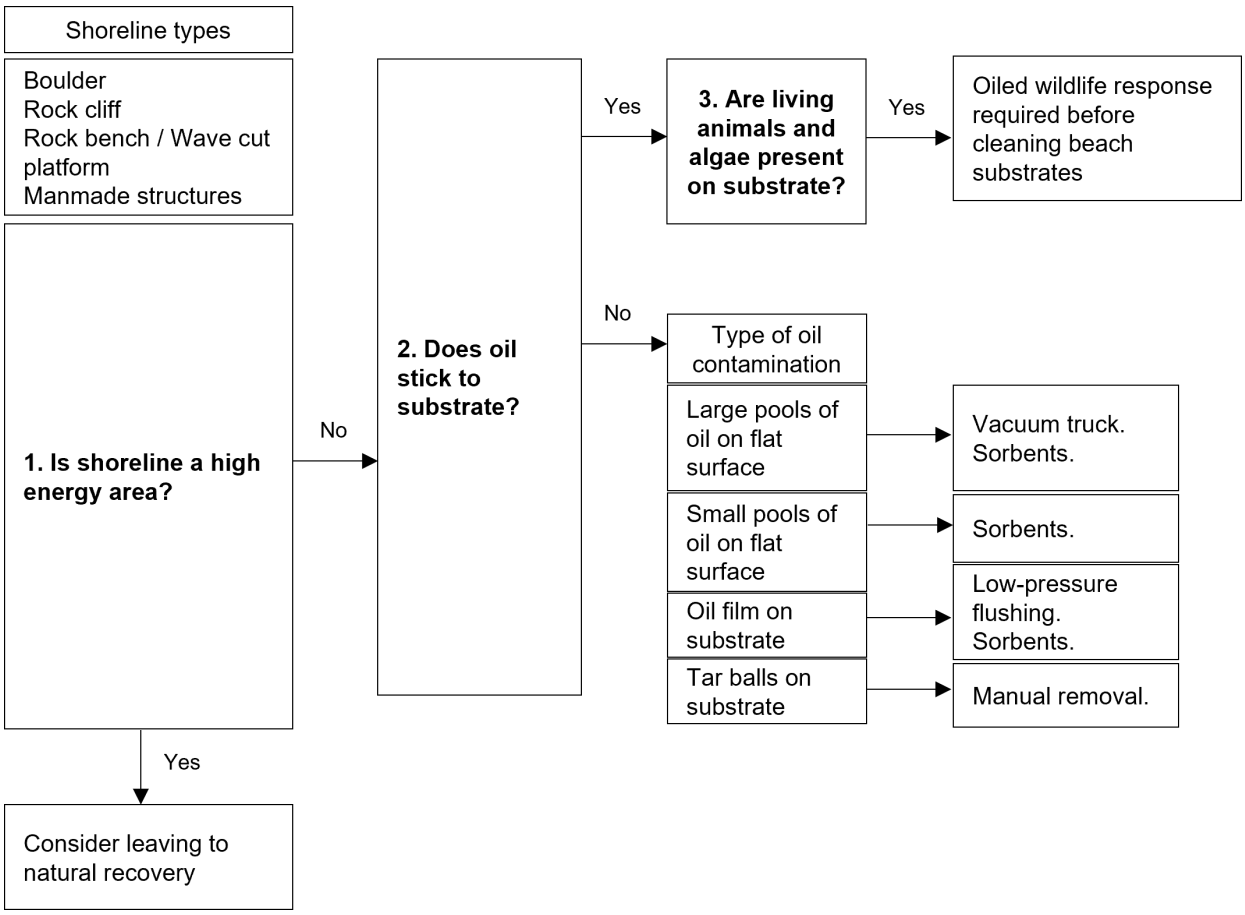


Figure K-4: Shoreline Clean-Up decision Guide 3

Appendix L Operational guidelines for shoreline response

L-1 Worksite preparation guidelines

The following provides guidelines for the preparation of staging areas supporting shoreline clean-up operations.

Organisation and worksite set-up

The worksite does not only include the polluted areas that require cleaning. Several other specific areas must be identified and cordoned off and routes for pedestrians and vehicles should be signposted.

These specific areas are:

- The polluted area;
- The waste storage area, with different types of containers suitable for the different kinds of waste;
- The decontamination area: whatever the size of the spill, a decontamination phase for operational personnel, equipment and tools must be carried out in order to provide some comfort to personnel after each work session, avoiding oiling clean areas, and group together personal clean-up equipment and protective gear, to facilitate the management of the site (cleaning, storage, re-use);
- A rest area, with at least changing rooms, toilets, a first aid kit and cold and hot beverages. Cold or even hot meals can also be organised on the spot provided that a canteen tent or temporary building is available; and
- A storage area for tools and machinery (or equipment warehouse).

Access to the worksite should be restricted and traffic of vehicles should be strictly regulated to avoid accidents.

Preparation

- Prevent the general public from accessing the worksite;
- Delineate accesses for vehicles and machinery (check load-bearing capacity) and routes;
- Channel vehicle and pedestrian traffic;
- Protect the ground (geotextile, roll out mat system…) during operations in sensitive areas (dunes...);
- Prepare and signpost the different areas of activity (on the beach), living areas (locker room, meals, showers, toilets...) and stockpiling areas presenting a risk (fuel, equipment, waste pit....);
- Define a site for fluid storage away from the locker room:
  - Provide an extinguisher for each cabin
  - Set up a recovery system for fuel leaks
- Provide at least minimum lighting for installations and the surrounding area during the winter.

Basic Equipment	Extra Equipment
• Plastic liners, geotextiles • Barrier tape and stakes • Signposting equipment	• Bins, barrels, skips, tanks • Hot and cold beverages Welfare) • Cooking oil, soap (Welfare) • Earthmoving equipment

Primary Storage of Waste

A primary storage site is:

- An emergency staging area of the immediate deposit of the waste collected before its transfer to either an intermediate long term storage site or if possible directly to a treatment facility; and
- A key stage in the waste management process for sorting, labelling and quantifying the types and volumes of waste collected and when possible, reducing volumes to be transported by pre-treatment.

The storage site must be closed as soon as clean-up operations are completed.

The return of the site to its original condition implies:

- A contamination diagnosis made by an organisation specialised in ground pollution, decontamination operations if needed and the approval of the authorities; and
- In some cases, botanical evaluations to define a plant cover restoration operation.

- Segregate the different types of waste
- Protect containers from rain water and to contain odours
- Protect containers from prolonged exposure to sunlight if necessary
- Ensure security to prevent unauthorised dumping

Primary waste storage sites should meet certain criteria:

- Close proximity to the site of clean-up;
- Good access to roads for heavy lorries; and
- A flat area with enough space away from environmentally-sensitive areas (vegetation, groundwater) and out of reach of the sea tides and waves.

- Depending on the volume of waste, site characteristics and availability of containers, prepare:
  - Staging areas
  - Pits if necessary
  - Platform within earth berms
  - Platform for bagged solids and liquids in tank.
- Protect areas using watertight plastic liners
- Lay fine gravel or sand at the base of the storage area to protect the membranes
- Prepare rain water or effluent management
- Ensure correct labelling of the containers to avoid mixing the different types of waste (liquid, solid, non-biodegradable – oiled plastics, contaminated cleanup equipment, biodegradable – oiled seaweed, faunal)
- Control access to the cleanup sites and protect access routes using lining and/or geotextiles

Base Camp / Rest Area

The rest area (base camp) should at least consist of:

- Changing rooms;
- Toilets; and
- A rest area.

At base camp, operators must be provided with:

- A first aid kit; and
- Hot and cold beverages, meals.

Selection of the rest area must meet certain criteria:

- Close proximity to the clean-up site;
- Easy access; and
- A flat area with enough space away from environmentally sensitive areas.

Equipment

- Shelter/rest area (tent, temporary building;
- Portable toilets (at least one for men and one for women);
- Locker rooms;
- First aid kit;
- Fire extinguisher; and
- Communication equipment.

Storage Area for Equipment and Machinery

This area consists of and equipped repair and maintenance site.

In order to avoid incidents and clean-up equipment failures, equipment should only be used by trained personnel and all equipment should regularly be checked for conformity with standard operating procedures and safety.

- Check and adjust daily levels of gasoline, diesel, oil, water and other fluids
- Regularly maintain the machines (pumps, pressure washers...)
- Equipment must be checked, counted by the person in charge of logistics and stored daily at the end of the work day
- Some pieces of equipment must be washed or at least rinsed daily, with proper recovery of cleaning effluent, other kinds of equipment should be washed weekly or at the end of operations
- Set up a systematic maintenance-cleaning-repair operation at the end of each week
- Small tools and equipment and even detachable parts of all equipment remaining outside should be securely stored away (eg stainless steel bucket of small sand screeners)
- In case of interruption of operations, large pieces of equipment should be moved to a supervised site
- Regularly check equipment for conformity and safety

The storage area for equipment and machinery must meet certain criteria:

- Close proximity to the site of clean-up;
- Easy access; and
- A flat area with enough space away from environmentally-sensitive areas.

Equipment

- Cabins;
- Hut;
- Maintenance equipment and tools; and
- Cleaning equipment.

L-2 Manual clean-up guidelines

Oil, polluted sediment and debris are removed by hand or with the help of manual tools and then stored for disposal.

Conditions of use

- Pollution : all types ; most often scattered pollution; on large spills, if implementation of other techniques is impossible;
- Pollutant : all types;
- Substrate : all types; sufficient load bearing capacity for pedestrians and light equipment; and
- Site: all types sufficiently accessible and which tolerate intensive traffic.

Equipment

Basic Equipment:

- Scrapers (paint scrapers, long handle scrapers...), rakes, brushes, forks; and
- Landing nets, shovels, trowels.

Extra Equipment:

- Waste containers, big bags, bins, plastic bags; and
- Front-end loader (for disposal).

PPE: At least protective clothing: overalls, boots, gloves, etc. depending on the nature of the pollutant, expose and responder activity.

- Divide the response personnel among three functions:
  - Collection/scraping/gathering
  - Placing in bags/waste containers
  - Disposal
- Rotate the teams among the three functions;
- The waste can be disposed of manually or with the use of mechanical means if possible;
- Don’t overfill bins, plastic bags; and
- Don’t remove excessive quantities of sediments.

Impact

- Impact insignificant to heavy, depending on the type of substrate. Risk of destroying the structure of the substrate in marshes. Erosion;
- Potentially destructive effects on vegetation (dunes, marshland);
- Deconstruction and destabilisation of the foot of the dune (upper end of beach); erosion, destruction of the dune and the associated vegetation, decrease in biodiversity and fertility by reduction of the low water mark; and
- Can tend to fragment the oil in certain conditions.

Performance

This is a highly selective technique, but requires a lot of time and personnel. If not done correctly, there is a risk of removal of large quantities of clean sediment.

L-3 Mechanical clean-up guidelines

This technique consists of collecting the oil in order to facilitate its removal from the beach. Collection is carried out using a tractor, ATV or earthmoving vehicle or earthmoving equipment.

Conditions of use

- Pollution : heavy pollution, continuous slick;
- Pollutant : slightly to very viscous oil;
- Substrate : vast, flat foreshore with wet fine-grain sand (very damp to saturated) and a good load-bearing capacity, without ripple marks; and
- Site: accessible and sufficient load bearing capacity for earthmoving equipment, sufficiently large to allow vehicles to manoeuvre.

Equipment

Basic equipment:

- Backhoe loader;
- Grader/bulldozer;
- Tractor or loader with front blade; and
- Front-end loader or lorry (for removal).
- PPE: At least suitable for heavy machinery operation

Impact

- Normally only removes the oil, but some sediment may also be taken with it (if the operator is poorly supervised or inexperienced), especially if used on light pollution or an unsuitable site;
- High risk of disturbance due to traffic and mixing of oil with sediment; and
- May lead to reduction of beach stability and beach erosion/loss of beach area.

Minimum workforce required: 2 people per vehicle (1 drive + 1 assistant).

Waste: oil mixed with a varying quantity of sediment; but can rapidly become unselective if scraping is carried out on moderate pollution (should be avoided).

- Consists of bringing the oil together in order to facilitate its removal from the beach. Scraping is carried out using a tractor or earthmoving equipment fitted with a front end blade in an oblique position. According to the viscosity of the oil, two options are available:
  - (case 1) fluid oil: radial or converging scraping towards a collection point on the foreshore; removal by pumping
  - (case 2) more viscous oil /solids: concentration to form windrows, by successive slightly curing passes parallel to the water line; subsequent removal of windrows
- Should only be carried out on heavy pollution; do not use on moderate to light pollution
- Inform and supervise operators; use experienced operators
- Work methodically
- Set up traffic lanes on the beach in order to reduce oil and sediment mixing
- Don’t remove excessive amounts of non-contaminated materials
- Don’t fill the bucket of loader more than 2/3 capacity
- Don’t drive on polluted materials

L-4 Shoreline vessel access guidelines

There are numerous landing craft vessels available in the North West Shelf area. These vessels are capable of grounding out; therefore the vessels can access a contacted area on high tide, ground out, unload equipment and personnel, reload with waste oil then depart on the next high tide. The Santos Offshore - Vessel Requirements for Oil Spill Response (7710-650-ERP-0001) describes the specifications for beach landing craft, and describes Santos vessel monitoring processes.

Mechanical equipment and PPE are to be mobilised to the nominated marine operational base for onward movement to the affected locations.

For shoreline clean-up of remote islands, the following guidelines will be considered so as to minimise the secondary impacts of high numbers of spill response personnel on shorelines:

Vessels are to be mobilised to the designated deployment Port to mobilise shoreline clean-up teams by water. The shoreline clean-up will be undertaken through on-water deployment to the defined shorelines in 4 stages:

1) Drop off of 6-person clean-up containers to shoreline contact locations defined by IMT through observation data;
2) Deployment of marine and environmental specialists to demarcate the clean-up zones with barrier posts and tape to prevent secondary contamination impacts to flora and fauna by the clean-up teams;
3) Deployment of small clean-up teams with a trained/competent shoreline responder as a Team Leader to conduct clean-up methods (flushing, bag and retrieve, etc.) with all waste being bagged and stored in temporary bunding made of HDPE above the high-tide mark; and
4) Deployment of waste pickup barges to retrieve collected wastes from the temporary bunding and to complete the shoreline clean-up and final polishing.

Appendix M Oiled wildlife response personnel and equipment

In the event of a spill impacting wildlife, Santos will commence arrangements to mobilise personnel and equipment to fill responder positions as identified in the Santos Oiled Wildlife Response Framework Plan (7700-650-PLA-0017) and WAOWRP.

This appendix outlines the current OWR equipment, personnel and services available to Santos through current arrangements.

Overall oiled wildlife response capability per OWR strategy

The overall OWR capability of Santos is outlined in Table M-1. Santos has access to aircraft that could be used for wildlife reconnaissance within hours of a spill. This would be followed by further access to vessels and Santos personnel trained in OWR that could be mobilised within 24 hours for vessel and wildlife shoreline reconnaissance, demonstrating Santos' ability to mount a swift response that could also be sustained as long as required.

Santos has the capability to set up oiled wildlife field stations within 3–4 days of a spill through access to AMOSC equipment and equipment purchased at the time of a spill. Santos could also arrange the transport of wildlife from the field to a primary care facility.

The indicative personnel required for a medium impact-rated response is 55 personnel (as per the WAOWRP) (DBCA 2022a), however depending on the number and species impacted, may require many more. Santos' current arrangements could support a medium impact scale OWR (requiring >55 personnel) mainly through support staff, such as, non-technical wildlife support roles (management, logistics, planning, human resourcing, transporter, cleaners, trades persons, security etc). These roles could be filled by Santos personnel and labour hire agencies that can provide workers that undergo an induction and basic training. In addition, many of the roles required for an OWR require technical expertise and Santos will need to activate OWR arrangements with AMOSC and OSRL to fulfil roles, as well as make contractor arrangements for accessing skilled wildlife personnel at the time of a spill.

Table M-1: Santos oiled wildlife response capability per OWR strategy

OWR strategy	Considerations	Equipment / Personnel	Location	Mobilisation timeframe
Reconnaissance	Identify opportunities to create synergies with surveys required for Monitor and Evaluate and Operational and Scientific Monitoring activities	Rotary Wing Aircraft and flight Crew	Karratha Learmonth Onslow	Wheels up within 1 hour for Emergency Response.
		Drones and pilots	Local WA hire companies	1-2 days
		Contracted vessels and vessels of opportunity Santos Contracted Vessel Providers Vessels of opportunity identified through AIS Vessel Tracking.	Vessels mobilised from Exmouth, Dampier, Varanus Island or offshore location. Locations verified through AIS Vessel Tracking Software.	Pending availability and location. Expected within 12 hours.
		Aerial surveillance crew Santos staff AMOSC staff AMOSC Core Group personnel available Additional trained industry mutual aid personnel available	Perth and Varanus Island (VI) (Santos aerial observers) Australia wide	Santos trained personnel – next day mobilisation to airbase <24 hours
Preventative actions	Mainly effective for bird species Requires DBCA permit/licence approval	2 x AMOSC Wildlife fauna hazing and exclusion kits 1x AMOSC Breco buoy	1 x Fremantle, 1 x Geelong 1 x Fremantle	Location dependent
Rescue and field processing	Wildlife handling and first aid should only be done by persons with appropriate skills and experience or under the direction of DBCA	4 x AMOSC Oiled Fauna Kits (basic medical supplies, cleaning/rehab, PPE)	1 x Exmouth, 1 x Broome, 2 x Geelong	Location dependent
		2 x DBCA OWR trailers	1 x Kensington WA 1 x Karratha WA	Location dependent
		50% of OSRL OWR response packages (Wildlife Search and Rescue kits / Cleaning and Rehab. kits (including field first aid)	5 x Singapore, 2 x Bahrain, 5 x Fort Lauderdale, 7 x Southampton	Location dependent
Transport	Transport of oiled animals by aeroplane or helicopter may be restricted due to Civil Aviation Safety Authority (CASA) regulations; such transport will depend on the level of oiling remaining on animals. Therefore, consultation with the air transport provider must take	Contracted vessels and vessels of opportunity Santos Contracted Vessel Providers Vessels of opportunity identified through AIS Vessel Tracking.	Vessels mobilised from Exmouth, Dampier, Varanus Island or offshore location. Locations verified through AIS Vessel Tracking Software.	Pending availability and location. Expected within 12 hours.

OWR strategy	Considerations	Equipment / Personnel	Location	Mobilisation timeframe
	place before transport to ensure the safest and most efficient means.			
Primary care facility	OWR container could be placed on the deck of a suitably sized vessel for field processing in remote locations (benefits associated with temperature regulation and access to water and electricity) An OWR container on a vessel could also be used to aide transport form offshore islands.	OWR container/mobile washing facility 2 x AMOSC 4 x AMSA 2 x DTMI	AMOSC – 1 x Fremantle, 1 x Geelong AMSA 1 x Dampier, 1 x Darwin, 1 x Devonport, 1 x Townsville DTMI – 2 x Fremantle (1 x Primary Care Kit [20ft container]; 1 x Sustainment Kit [20ft container])	Location dependent
		AMOSC call off contract with DWYERTech NZ – a facilities management group	New Zealand	Availability within 24 hrs of call-off
Personnel				
As required	Untrained personnel would receive an induction, on-the-job training and work under the supervision of an experienced supervisor	Santos provides OWR training to staff, and to-date, 16 personnel have received OWR training.	Perth and Varanus Island	<24 hours
		Santos maintains labour hire arrangements for access to untrained personnel		
		1 x AMOSC Oiled Wildlife Advisor	Perth, Western Australia	<48 hours
		62 x trained industry personnel (AMOSC OWR Strike Team members)	-	<48 hours
		AMOSC MOU with Phillip Island National Park (PINP) (best-endeavours availability)	Victoria, Australia	Best-endeavour availability
		AMOSC MOU's – WA organisations	WA	Best-endeavour availability
	Sea Alarm Via OSRL's contract with the Sea Alarm Foundation, two oiled wildlife response technical advisors are on call to support Members. Sea Alarm staff act in a technical advisory role and do not engage in hands-on OWR activities but work impartially with all parties (titleholder, local authorities, mobilised experts and local experts, and response	1 x OWR Technical Advisor available for deployment in-field or at the Command Post (typically supporting the Wildlife Branch Director or the Planning and Operations sections) 1 x OWR Technical Advisor available to support remotely.	Sea Alarm Belgium	Location dependent. Notification via existing OSRL notification and mobilisation process.

OWR strategy	Considerations	Equipment / Personnel	Location	Mobilisation timeframe
	groups), aiming to maximise the effectiveness of the wildlife response.			
	GOWRS Oiled Wildlife Assessment Service Through OSRL's ongoing funding of the Global Oiled Wildlife Response System (GOWRS) project, a wildlife assessment team of four wildlife experts can be mobilised in-field to provide an on-the-ground technical assessment of wildlife response needs and the professional capabilities of local responders.	4 x wildlife experts can be mobilised in-field for up to 4 days. Access to additional oiled wildlife resources on a 'reasonable endeavours' only basis through the GOWRS partners	Various locations in northern and southern hemisphere	Location dependent. Notification via existing OSRL notification and mobilisation process.

Australian Maritime Safety Authority (AMSA)

AMSA maintains four oiled wildlife response containers/ mobile washing facilities in Dampier, Darwin, Devonport and Townsville. All resources under the National Plan (including the four OWR containers) are available to Santos through formal request to AMSA under the arrangements of the National Plan. The containers also include some limited PPE and fresh and wastewater pools.

Western Australia Department of Transport and Major Infrastructure (DTMI)

The WA DTMI maintains 2 x OWR containers (located at Port of Fremantle in D-shed) which are available through the SHP-MEE and the AMSA National Plan on request.

Australian Marine Oil Spill Centre (AMOSC)

Santos is a participating Member of AMOSC and as such has access to AMOSC's Level 2/3 oiled wildlife equipment and personnel as outlined in the AMOSPlan and the AMOSC OWR Stateboard.

Equipment

Table M-2 summarises the oiled wildlife response equipment maintained by AMOSC.

Table M-2: AMOSC Wildlife Equipment

Location	Oiled fauna kits (basic medical supplies, cleaning/rehab, PPE)	Fauna hazing and exclusion equipment	Oiled wildlife washdown container (mobile washing facility)
Fremantle	-	1 x fauna hazing and exclusion kit 1 x Breco bird hazing buoy	1 x Oiled Wildlife Washdown Container
Exmouth	1 x Oiled fauna kit	-	-
Broome	1 x Oiled fauna kit	-	-
Geelong	2 x Oiled fauna kit	1 x fauna hazing and exclusion kit	1 x Oiled Wildlife Washdown Container
Total	**4 x Oiled fauna kit**	**5 x fauna hazing and exclusion kits** 1 x Breco bird hazing buoy	**2 x Oiled Wildlife Washdown Containers**

Personnel

AMOSC currently has the following arrangements in place for OWR personnel:

- 1 x AMOSC OWR Officer available to act as an Industry Oiled Wildlife Advisor (OWA)
- 62 x trained industry personnel (AMOSC OWR Strike Team members)
  - Volunteer OWR trained industry personnel
- Wildlife Care Groups
  - 35 introductory trained personnel
  - 24 completed management course
  - 16 completed Responder course
- AMOSC call off contract with DWYERtech Response NZ
  - A facilities management group with availability within 24 hours of call off – 2 x personnel

AMOSC has the following MoU's in place:

- Phillip Island National Park (PINP), (VIC) (best-endeavours availability)

  - Approx. 50 PINP staff – collection/facility ops/rehabilitation
  - Approx. 45 volunteers – collection/facility ops/rehabilitation
  - Approx. 20 staff – animal feeding
  - 6 x PINP staff – wildlife emergency response including cetacean stranding/entanglement
  - 17 x PINP staff – wildlife team leaders
  - 5 x PINP staff – IMT Training
- Blue Planet Marine (WA)
  - 10-20 Personnel (best endeavours to respond)
- WA Seabird Rescue
  - No permanent staff, ~30 volunteers
- WA Native Animal Rescue
  - 5 staff, ~80 volunteers
  - Wangara – Avifauna and mammals
  - Broome – Marine turtles
- WA Wildlife
  - 10 staff, ~80 volunteers
- Darling Range Wildlife (WA)
  - 5 staff, ~50 volunteers
- Mandurah Wildlife (WA)
- 5 staff, ~30 volunteers

Oil Spill Response Limited (OSRL)

Through the associate membership, Santos has access to OWR equipment and personnel services from OSRL.

Equipment

OSRL maintains a Level 3 wildlife equipment stockpile, which is stored across the OSRL locations. This equipment is designed to support the first 48 hours of the response and to ensure availability of critical equipment items that may be difficult to source locally (Note: this equipment does not provide everything that will be required to successfully operate a primary care facility and it focuses primarily on bird casualties [n=100]). Equipment is sorted according to search and rescue (including field first aid), medical, and cleaning and rehabilitation (Table M-3).

Table M-3: OSRL Wildlife Equipment (as per OSRL Equipment Stockpile Status Report, August 2025)

OWR Response Package	UK	Singapore	Bahrain	Fort Lauderdale
Wildlife Search and Rescue BHR	-	-	-	-
Wildlife Cleaning and Rehabilitation Part 1	2	1	1	1
Wildlife Cleaning and Rehabilitation Part 2	2	1	-	1
Wildlife Cleaning and Rehabilitation Medical	1	1	1	1
Wildlife Search and Capture	1	1	1	1
Wildlife Search and Capture Medical	1	1	-	1

The latest OSRL equipment inventory available to members can be found in the SLA equipment stockpile status report: https://www.osrl.com/in-action/publications/.

Personnel

Through the OSRL SLA, Santos has access to 24/7 technical advice (remote or on-site) from the Sea Alarm Foundation, a small non-governmental organisation based in Brussels, Belgium that works to improve global preparedness and response for oiled wildlife incidents. 2 x Technical Advisors are available, with one providing

remote support and the other available to be mobilised for on-site support, either in-field or at the Command Post (typically working with the Wildlife Branch Director or the Planning and Operations sections as appropriate. Sea Alarm staff will act in a technical advisory role at the incident management level and will work impartially with all parties (titleholder, local authorities, mobilised experts and local experts, and response groups), with the aim of maximising the effectiveness of the wildlife response.

Through OSRL's ongoing funding of the Global Oiled Wildlife Response System (GOWRS) Project, a wildlife assessment team of four wildlife experts can be mobilised in-field for up to four days in addition to the Sea Alarm resources noted above. The GOWRS Oiled Wildlife Assessment Service is a ready-to-deploy 4-person team delivered by a network of 10 leading wildlife response organisations. The four-person team will initially deploy for four days to provide an on-the-ground technical assessment of wildlife response needs and the professional capabilities of local responders. The team will inform the client of the feasibility of a full-scale professional response and the details of the GOWRS expertise that is available to deliver to the scale of such a response. There is also access to additional oiled wildlife resources on a 'reasonable endeavours' only basis through the GOWRS partners.

In addition, through the SLA, Santos has the option to access OSRL's internal staff with OWR expertise (1 x UK) as part of the 18 personnel commitment for any single incident.

Appendix N Resourcing Requirements for OMP: Shoreline Clean-up Assessment

Shoreline clean-up assessment teams will comprise two to three members per team and are assumed to be able to cover 10 km per team per day. Teams may be able to exceed this distance, especially if remote sensing techniques (e.g. UAVs) are employed to cover shorelines that have access limitations, which includes many receptor locations in the EMBA.

Santos has used stochastic modelling data for shoreline contact to plan for the worst-case shoreline and habitat assessment personnel requirements. Table N-1 presents all receptors contacted with shoreline accumulation at ≥100 g/m² using the stochastic modelling results for the surface release of MDO arising from vessel collision at location 2, along with the SCAT planning considerations and estimated number of SCAT teams required (note, there was no shoreline accumulation predicted at ≥100 g/m² from the spill release at location 1).

It should be noted that not all of the receptors listed in Table N-1 will be contacted by one single spill. These results are presenting the range of possible worst-case timeframes to contact and length contacted based on all runs that make up the stochastic model. Santos will use initial monitor and evaluate data (e.g. trajectory modelling and aerial surveillance) to determine where resources should be allocated. This may include directing resources to conduct SCAT at locations not identified as protection priority areas, to determine if protection and clean-up activities may be required at these receptors.

Initially, shoreline clean-up assessment may be conducted via reconnaissance surveys and later confirmed via ground and/or vessel surveys.

Deterministic run #44 (selected from release location 2) (Table N-2) was selected to guide resourcing estimates for SCAT as this run results in the greatest length of shoreline oil accumulation (at ≥10 g/m^2). Based on run #44, the worst-case personnel requirements for SCAT for this activity are for 12–18 personnel; 6 teams with 2–3 personnel each (1 Team Leader and 1–2 Team Members).

Table N-3 provides the resource capability available to Santos that may be used to implement SCAT.

Table N-1: Resource requirements for shoreline clean-up assessment for all locations contacted ≥100 g/m² based on stochastic results from release location 2

Location	Min. arrival time shoreline oil accumulation ≥100 g/m² hours (days)	Max. length of shoreline oiled ≥100 g/m² km	Planning considerations	Estimated No. of teams required
Location 2: SE midpoint				
Beagle Gulf – Darwin Coast	396 (16 days, 12 hours)	1	Dynamic coastline with estuaries of Darwin natural harbour, mangroves and sandy beaches	1
JBG East Coast	164 (6 days, 20 hours)	10	A varied coastline with sandy beaches, mangroves, estuaries, marshes wave-cut platforms and cliffs	2
Tiwi Islands	253 (10 days, 13 hours)	5	Dynamic and unique coastline with estuaries, mangroves and sandy beaches.	1

Note: SCAT numbers not to be added up from this table as spill will not contact all receptors modelled (as these are stochastic results). Number of personnel required will be based on direction of spill and timeframes to contact.

Source: RPS (2023)

Table N-2: Resource requirements for shoreline clean-up assessment for protection priority areas based on deterministic run #44 (selected from release location 2 stochastic results)

Location	Minimum arrival time shoreline oil accumulation ≥10 g/m² (days)	Maximum length of shoreline oiled (km) ≥10 g/m²	Planning considerations	Estimated No. of teams required
JBG East Coast	219 (9 days, 3 hours)	53	A varied coastline with sandy beaches, mangroves, estuaries, marshes wave-cut platforms and cliffs	6
Total estimated SCAT teams required			**6**	

Source: RPS (2023)

Table N-3: Shoreline clean-up assessment – resource capability

Equipment Type/Personnel Required	Organisation	Quantity Available	Location	Mobilisation Timeframe
Shoreline assessment team leaders	Santos	12	Perth, Varanus Island	24-72 hours from time of shoreline contact prediction (WA-based, Santos personnel, AMOSC staff and Core Group personnel)
	AMOSC Core Group	As per monthly availability (minimum 84 members)	Perth, Dampier and other Australian locations	
	AMOSC staff	12 trained in SCAT	Perth and Geelong	
	OSRL	18	Perth and international	5 personnel available from 2–3 days, remaining personnel available from 4–5 days (subject to approvals/ clearances)
Shoreline assessment team members	Santos contracted work force hire company (e.g. Dare)	As per availability (up to 2,000)	Australia-wide	Subject to availability (indicatively 72+ hours)
Drones and pilots ** To assist shoreline and vessel-based surveillance	AMOSC	Drones available 24/7 through AMOSC sub-contract 1 x pilot	Fremantle	Response via duty officer within 15 minutes of first call – AMOSC personnel available within 1 hour of initial activation call. Equipment logistics varies according to stockpile location (refer to Table 10 12)
	OSRL – Third-Party UAV provider	2 x qualified remote pilots, however response is on best endeavours basis	Perth	Depending on the port of departure, 1–2 days if within Australia
	Local WA hire companies	10+	Perth and regional WA	<48 hours

Appendix O Operational and scientific monitoring assessment

The Northern Australia Operational and Scientific Monitoring Bridging Implementation Plan (OSM-BIP) (7715-650-ERP-0003) defines the 3-step process for ensuring that OSM capabilities of each activity are adequately covered by the existing information described within the OSM-BIP (Section 1.1 and Appendix B of the Northern Australia OSM-BIP).

Step 1: Determine if the new activity Scientific Monitoring Planning Area fits within the Northern Australia OSM-BIP consolidated Scientific Monitoring Planning Area

Comparison of the Scientific Monitoring Planning Area for the EOS 3DMSS activities (Figure O-1), shows that this fits within the Northern Australia OSM-BIP consolidated Scientific Monitoring Planning Area (Figure 2-1 in the Northern Australia OSM-BIP).

Step 2: Determine the monitoring priorities for the activity, by identifying receptors predicted to be contacted >5% probability within 7 days, determining whether these receptors are already noted as monitoring priorities in Section 2 and have been assessed for baseline data adequacy in Section 4 of the Northern Australia OSM-BIP

As per Section 2.2 of the Northern Australia OSM-BIP, monitoring prioritisation during a spill should focus on sensitive receptors (which Santos identifies through its Oil Spill Risk Assessment and Response Planning Procedure [SO-91-II-20003]) with the highest risk of adverse consequences and where oil spill modelling predicts high probability of rapid contact. Additionally, receptors that have little to no existing baseline are given a higher scientific monitoring priority.

The monitoring priorities for Eos 3DMSS activities include sensitive receptors contacted by hydrocarbons at either the low threshold for floating (≥1 g/m^2), shoreline contact (≥10 g/m^2), entrained (≥10 ppb), or dissolved (≥10 ppb) within 7.0 days at a probability >5%, as identified in Table O-1. These receptors are all included in Table 2-1 of the Northern Australia OSM-BIP and have therefore been assessed for baseline data adequacy and also in the background information for key sensitivities (Appendix C of the Northern Australia OSM-BIP).

The results of the baseline data assessment for these monitoring priorities is provided in Table O-2, which is an excerpt from Table 4-3 of the Northern Australia OSM-BIP (but only includes monitoring priorities for Eos 3DMSS activities).

Note that stochastic modelling of the MDO scenarios did not predict any receptors meeting the criteria of >5% probability of contact in <7 days for floating, shoreline or dissolved oil. However, the criteria were met for entrained oil for a limited number of receptors (Table O-1). The inclusion of entrained hydrocarbons at concentrations greater than 10 ppb is used to denote exposure to hydrocarbons, but does not necessarily imply toxicity. For entrained whole-oil droplets, the toxic fraction is small, as many hydrocarbon constituents remain sequestered and not bioavailable (French-McCay 2024). During the initial monitoring response, emphasis will be placed on receptors contacted by floating, shoreline, and dissolved hydrocarbon phases. If a receptor is only contacted by low concentrations of entrained hydrocarbons and not by any other hydrocarbon phase, it will be considered a lower priority during the initial monitoring response.

Step 3: Determine whether the capability requirements and monitoring arrangements of the new activity exceed or are met by the capability requirements outlined in Section 8 and capability arrangements described in Sections 9 and 10 of the Northern Australia OSM-BIP

As per Step 3, Appendix B of the Northern Australia OSM-BIP, Santos has reviewed the following worst-case OSM capability assessment criteria for Eos 3DMSS activities:

- Review stochastic modelling results to determine if more than 4 floating, 1 shoreline or 4 dissolved locations are contacted within 7 days: Table O-1 shows that no floating, shoreline or dissolved receptors are contacted within 7 days at a probability >5%;
- Is the hydrocarbon type adequately represented in the existing suite of hydrocarbons analysed in Section 8 of the OSM-BIP: Section 8 of the OSM-BIP (Resourcing Requirements) includes an MDO scenario which is located much closer to sensitive shoreline receptors than the Eos 3DMSS activity. Although the Eos 3DMSS activity MDO spill is of a larger volume that the MDO scenario represented in Table 8-1 of the Northern Australia OSM-BIP, the EOS activity is located +100 km offshore, allowing additional time for the hydrocarbon product to weather and degrade prior to contacting sensitive receptors. The MDO scenario in Table 8-1 of the Northern Australia OSM-BIP occurs within Darwin Harbour, contacting receptors within 3 hours and at greater probabilities than the EOS 3DMSS scenarios.

Given the above results, Santos confirms the OSM capability requirements for the Eos 3DMSS activities are met by the worst-case capability requirements presented in Sections 8 to 10 of the Northern Australia OSM-BIP. Consequently, additional deterministic modelling for Eos 3DMSS activities is not required to inform initial OSM capabilities.

The results of the baseline assessment are provided within the Environment Functional Team Folder on the Santos ER SharePoint so that this information is accessible to guide Santos IMT Environmental roles and OSM Services Provider roles in the event of activating oil spill operational and scientific monitoring.

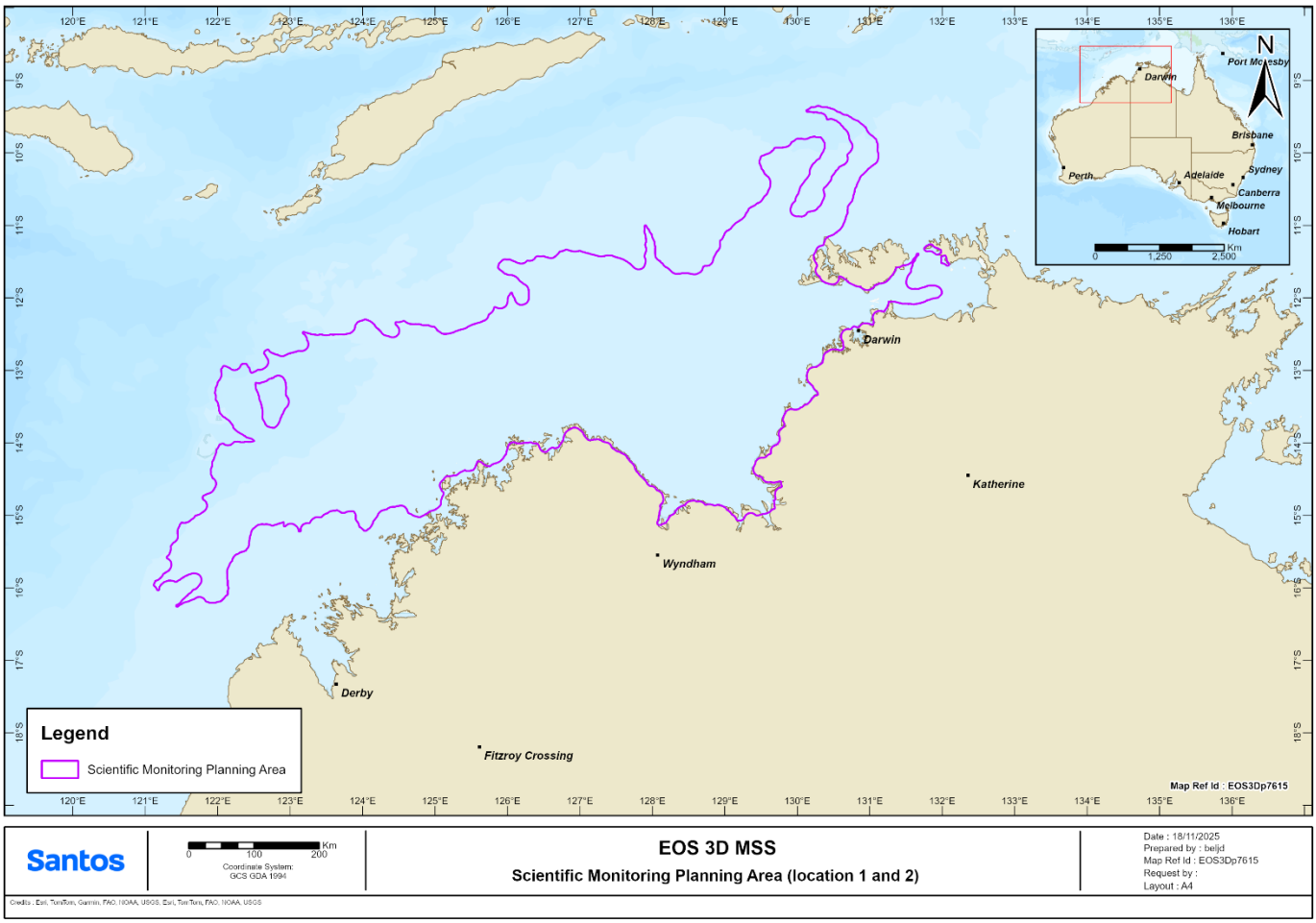


Figure O-1: EOS 3DMSS Scientific Monitoring Planning Area

Table O-1: Locations requiring a baseline review for the EOS 3DMSS activities based on stochastic modelling results (RPS, 2023)

Floating oil contact locations	Contact probability (%) floating oil ≥1 g/m²	Minimum arrival time ≥1 g/m² (hours)
Location 1: SW midpoint		
No locations contacted >5% probability <7 days		
Location 2: SE midpoint		
No locations contacted >5% probability <7 days		
Shoreline contact locations	**Contact probability (%) shoreline oil >10 g/m²**	**Minimum arrival time >10 g/m² (hours)**
Location 1: SW midpoint		
No locations contacted >5% probability <7 days		
Location 2: SE midpoint		
No locations contacted >5% probability <7 days		

Floating oil contact locations	Contact probability (%) floating oil ≥1 g/m²	Minimum arrival time ≥1 g/m² (hours)
Entrained hydrocarbon contact locations	**Contact probability (%) entrained hydrocarbons ≥10 ppb**	**Minimum arrival time ≥10 ppb (hours)**
Location 1: SW midpoint		
Kimberley AMP (*submerged*)	18.00	163
Outer Oceanic Shoals AMP (*submerged*)	8.00	158
Van Cloon-Deep Shoals (*submerged*)	12.67	98
Location 2: SE midpoint		
JBG East Coast	10.33	157
Joseph Bonaparte Gulf AMP (*submerged*)	17.67	41
Dissolved hydrocarbon contact locations	**Contact probability (%) dissolved hydrocarbons ≥10 ppb**	**Minimum arrival time ≥10 ppb (hours)**
Location 1: SW midpoint		
No locations contacted >5% probability <7 days		
Location 2: SE midpoint		
No locations contacted >5% probability <7 days		

Source: RPS (2023)

Table O-2 - Baseline data assessment for EOS 3DMSS activities - monitoring priorities versus SMPs

Receptor	SMP									
	SM1: Water quality impact assessment	SM2: Sediment quality impact assessment	SM3: Intertidal and coastal habitat assessment	SM4: Seabirds and shorebirds	SM5a: Marine mega-fauna assessment – reptiles	SM5b: Marine mega-fauna assessment – whale sharks, dugong and cetaceans	SM6: Benthic habitat assessment	SM7: Marine fish and elasmobranch assemblages assessment	SM8: Fisheries impact assessment[+]	SM9 & 10: Heritage and social impact assessment[^]
Kimberley AMP*										
Oceanic Shoals AMP*										
Joseph Bonaparte Gulf					Saltwater crocodile in the Daly River					
Reefs, shoals and banks*										

Key	
	Priority survey: Current baseline data is not in place, not suitable or not sufficient; and post-spill pre-impact baseline data collection should be prioritised
	Survey: Collectively there is substantial baseline data or on-going monitoring from within the last 5 years, therefore current monitoring/knowledge is considered adequate (i.e. could be used to detect level of change in the event of a significant impact) and is considered a lower priority for post-spill, pre-impact data collection
	N/A: not applicable

Appendix P Forward operations guidance

The IMT operate from Perth within the Santos IMT room. These rooms are equipped and subject to reviews and updates as detailed in the Santos Incident Management Plan – WANATL (7700-670-PLA-0016).

To facilitate a streamlined response, forward operational bases are required close to the response activity locations equipped with near duplicated IMT equipment and personnel. Further information on FOBs is provided in the Santos Oil Spill Response – Forward Operating Base Guideline (SO-91-IF-20017).

Forward Operating Base (FOB)

For a significant Level 2/3 response requiring coordination of resources to be deployed to the field, Santos will establish an FOB. For a Level 2/3 spill crossing from Commonwealth to State/Territory waters (cross-jurisdictional spills) DTMI/NT Control Agency will establish a FOB.

For an Eos 3D MSS activity spill response, Santos will establish an FOB at the Santos Darwin facilities.

Additional FOBs may be set up as operational requirements dictate. Based on shoreline areas that might be impacted, potential additional FOB locations include Dampier or Exmouth. Refer to Santos Oil Spill Response – Forward Operating Base Guideline (SO-91-IF-20017) for details on the potential FOB locations.