Minerva Field Decommissioning Oil Pollution Emergency Plan

Document No: 00MC-BHP-N00-0002

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A	20/06/22	Draft issued for internal review
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Acronyms and Glossary

Term	Description
µ	Micron
AFMA	Australian Fisheries Management Authority
AHTS	Anchor handling tug supply (vessel)
ALARP	As low as reasonably practicable
AMOSC	Australian Maritime Oil Spill Centre
AMSA	Australian Maritime Safety Associations
APPEA	Australian Petroleum Production and Exploration Association
APU	Australian Production Unit
AUV	Autonomous underwater vehicle
bbl/day	Barrels per day
BACI	Before-After-Control-Impact
BHP	BHP Petroleum Pty Ltd / BHP Petroleum (Victoria) Pty Ltd
BIA	Biologically important area
BOD	Basis of Design
BOP	Blowout preventer
CA	Controlling Agency
CEM	Crisis and emergency management
CHARM	Chemical hazard and risk management
CICC	Corporate Incident Coordination Centre (Woodside)
Cwlth	Commonwealth
CWTS	Controlled waste tracking system
DAWE	Department of Agriculture, Water and the Environment
DELWP	Department of Environment, Land, Water and Planning (Victoria)
DIIS	Department of Industry Innovation and Science
DJPR	Department of Jobs, Precincts and Regions (Victoria)
DJPR ERR	Earth Resourecs Regulation (DJPR)
DNP	Director of National Parks
DoEE	Department of Environment and Energy
DoT	Vic Department of Transport
DP	Dynamic positioning
DSS	Dispersant spraying system
EERM	Environmental Emergency Response Manual
EMBA	Environment that may be affected
EMLO	Emergency Liaison Officer
EMT	Emergency Management Team
EP	Environment Plan
EPA	Environmental Protection Agency (Victoria)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPO	Environmental Performance Outcome
EPS	Environmental Performance Standard
ERP	Emergency Response Plan
FOB	Forward Operating Base
FRT	Field Response Team
FWADC	Fixed wing aerial dispersant capability
HMA	Hazard Management Agency
IAP	Incident Action Plan
IAPP	International air pollution prevention
IBC	International bulk carriers
IC	Incident Commander
ICS	Incident Command Structure
IGN	Industry Guidance Note
IMO	International Maritime Organisation
IMP	Incident Management Plan
IMR	Integrity Management & Response
IMS	Introduced marine species
IMT	Incident Management Team
IOGP	International Oil and Gas Producers
IOPP	International oil pollution prevention
ISPP	International sewage prevention pollution
ITOPF	International Tank Owners Federation
JRCC	AMSA's Joint Rescue Coordination Centre
JSCC	Joint Strategic Coordination Committee
KEF	Key ecological feature
km	Kilometre
L	Litre
LOWC	Loss of Well Control
m	Metre
mm	Millimetre
m^3	Cubic metre
m/s	Metres per second
MC	Measurement Criteria
MEE	Maritime environment emergency

MEER	Maritime Environmental Emergency Response
MENSAR	State Maritime Emergencies (non-search and rescue) Plan
MARPOL	The Convention for the Prevention of Pollution from Ships (MARPOL Convention)
MDO	Marine diesel oil
MNES	Matters of National Environmental Significance, according to the EPBC Act
MODU	Mobile Offshore Drilling Unit
MOP	Marine oil pollution
MoU	Memorandum of Understanding
nm	Nautical mile
NAT-DET	National Plan dispersant effectiveness field test kit
NEBA	Net Environmental Benefit Analysis
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NOPTA	National Petroleum Titles Administrator
OCNS	Offshore Chemical Notification Scheme
OIM	Offshore Installation Manager
OIW	Oil-in-water
OPGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act
OPEP	Oil Pollution Emergency Plan
OPICC	Offshore Petroleum Incident Coordination Committee
OSCP	Oil Spill Contingency Plan
OSMBIP	Operational and Scientific Bridging Implementation Plan
OSMP	Operational and Scientific Monitoring Plan
OSRA	Oil Spill Response Agency
OSRL	Oil Spill Response Limited
OSTB	Oil spill tracking buoys
OSTM	Oil spill trajectory modelling
ppb	Parts per billion
ppm	Parts per million
ppt	Parts per thousand
PIC	Person in charge
PMS	Preventative maintenance system
POSOW	Preparedness for Oil Pollution Shoreline Clean-up & Oiled Wildlife Interventions
PPE	Personal protective equipment
QET	Quick-effectiveness test
ROV	Remotely operated vehicle
RS	Response Strategy
SAR	Search and rescue

SCAT	Shoreline clean-up assessment technique
SCC	State Control Centre (Victoria)
SCERP	Source Control Emergency Response Plan
SCME	State Controller Maritime Emergencies (Victoria)
SCS	Source Control Section
SCSC	Source Control Section Chief
SDO	State Duty Officer (Victoria)
SEMR	South East Marine Region
SFRT	Subsea first response toolkit
SINTEF	The Foundation for Scientific Research at the Norwegian Institute of Technology
SIMA	Spill Impact Mitigation Assessment
SIRT	Subsea Incident Response Toolkit
SMPEP	Shipboard Marine Pollution Emergency Plan
SOPEP	Shipboard Oil Pollution Emergency Plan
SSDI	Subsea dispersant injection
TPH	Total petroleum hydrocarbons
TRP	Tactical Response Plan
TSV	Transport Safety Victoria
Vic	Victoria
VOC	Volatile organic compound
VEAWP	Victorian Emergency Animal Welfare Plan
VFA	Victoria Fisheries Authority
WCD	Worst Case Discharge
Woodside	Woodside Energy Limited/ BHP Petroleum (Victoria) Pty Ltd
WMP	Waste Management Plan
WOMP	Well Operations Management Plan
WWC	Wild Well Control

1 Introduction

1.1 Overview and Timing of the Proposed Activity

BHP Petroleum (Australia) Pty Ltd (Woodside) proposes to undertake decommissioning activities within production license VIC/L22 and pipeline licence VIC PL33 in waters within the Otway Basin. The activities will occur within the Minerva gas field, which is located 11 km offshore from Port Campbell, Victoria. The water depth in the offshore operational area is approximately 60 m (Figure 1-1).

Since the merger completion on 1 June 2022, BHP Petroleum (Australia) Pty Ltd, BHP Petroleum (Victoria) Pty Ltd, and parent company BHP Petroleum International Pty Ltd are owned 100% by Woodside Energy Group Ltd.

All BHP Petroleum policies, standards, processes and procedures were included in the merger agreement and remain valid. Harmonisation of processes between BHP Petroleum and Woodside commenced planning upon the completion of the merger and will be conducted in a staged manner. The BHP Petroleum HSE Management system will continue to be used by ‘heritage’ BHP operations until potential changes have been assessed. References to BHP, BHP Petroleum, Australian Production Unit (APU) and Woodside are interchangeable throughout this document.

This document has been developed to ensure BHP Petroleum spill response arrangements have been integrated with the Woodside Incident and Crisis Management (I&CM) Process in relation to a potential oil pollution emergency in the Minerva Field, operated by BHP Petroleum (Victoria) Pty Ltd.

The proposed petroleum activity represents the first phase of the decommissioning within the Minerva field. The operational area for the petroleum activity includes the Petroleum Safety Zone (PSZ) which extends a 500 m radius around the cessation activities at each of the well centres, and a 100 m wide corridor extending either side of the outermost asset along the pipeline until the Commonwealth-State waters boundary. The operational area sets the spatial boundary within which the activity will occur.

The earliest expected commenment date for decommissioning activities is Q3 2023.

The activity will be undertaken 24 hours a day, 7 days a week for period of approximately 2 months.

The Minerva-4 well has the potential for the largest volume of released reservoir hydrocarbons.

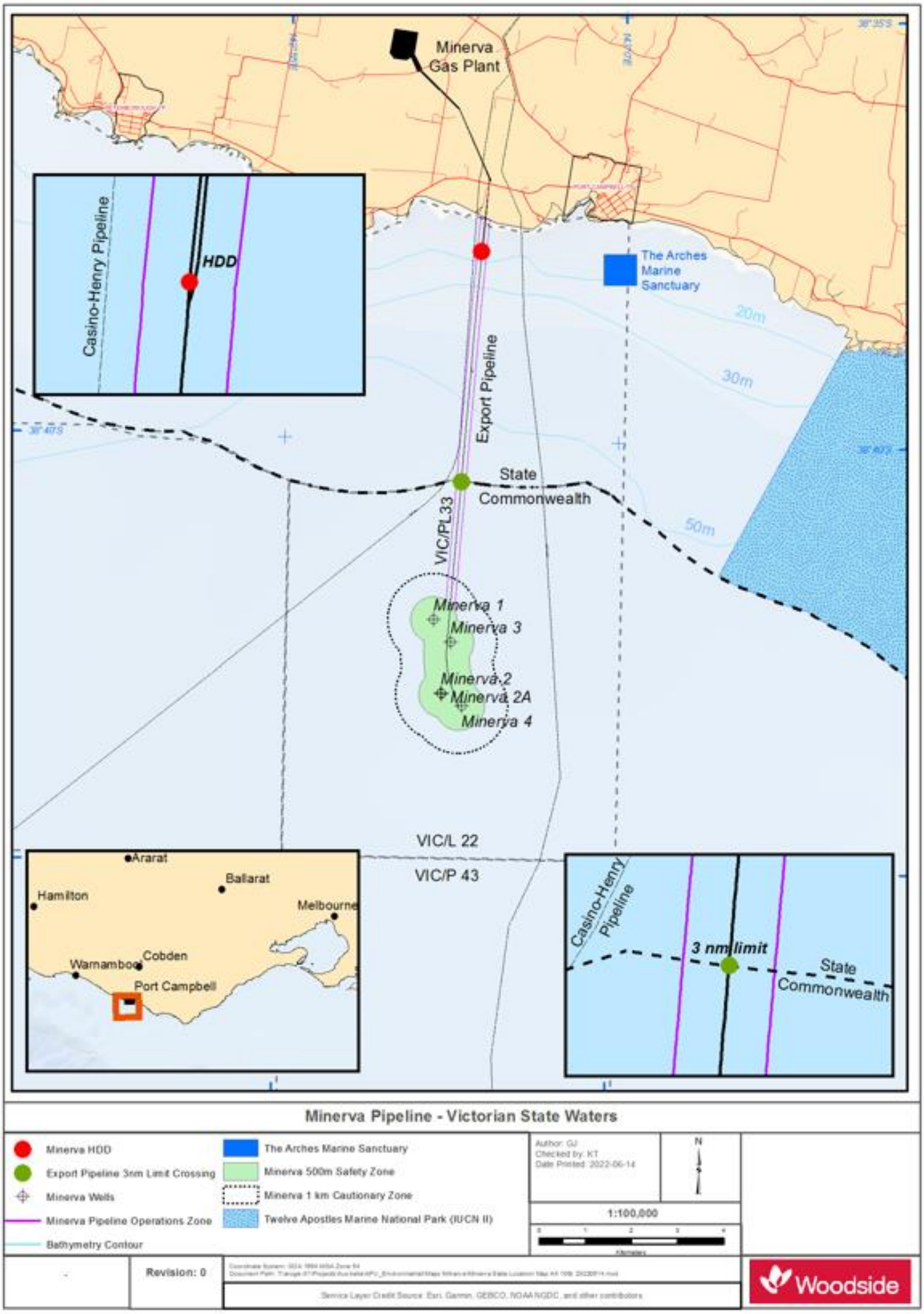

Figure 1-1: The Minerva export pipeline & well locations

1.2 Purpose of Oil Pollution Emergency Plan

This Oil Pollution Emergency Plan (OPEP) has been developed to establish the processes and procedures to respond to and effectively manage oil pollution emergencies that may occur during Minerva Field decommissioing activities in petroleum production licence VIC/L22, VIC PL33, and VIC PL33(v) offshore Victoria.

This OPEP details the spill response capability to implement each spill response strategy in a timely manner both in State and Commonwealth jurisdictions.

This OPEP is required under both the Commonwealth and Victorian State Offshore Petroleum and Greenhouse Gas Storage Regulations (the Regulations) for petroleum activities in Commonwealth ans State waters. This OPEP fulfils the requirement for an Environmental Emergency Response Manual (EERM) in Victorian State jurisdiction.

1.3 Scope of Oil Pollution Emergency Plan

This OPEP applies to the Minerva Field Deccommissiong Program accepted or operating under an instrument of the OPGGS Act and potential oil pollution emergencies resulting from these activities.

This OPEP applies to all field-based response strategies (RS) with the exception of Source Control which is covered separately within the *Source Control Emergency Response Plan* (SCERP). However, consistent with NOPSEMA Information Paper A787102: Source Control Planning and Procedures (June 2021), relevant information demonstrating preparedness and timeliness of Source Control measures are summarised within this OPEP and Appendix B – Minerva Field Emergency Response: Basis of Design and Field Capability Analysis.

This plan considers the Victoria's State Emergency Management Plan (SEMP), the associated SEMP Maritime Emergencies (non-search and rescue (NSR)) Sub-plan ('VicPlan') developed in accordance with the Emergency Management Act 2013, Industry Guidance Note (IGN) on Marine Oil Pollution (MOP): Response and Consultation Arrangements (July, 2020), and *Emergency Management Act 2005* (as amended April, 2020).

Woodside acknowledge that as per the IGN, Vic Department of Transport (DoT), will be the Controlling Agency (CA) in State waters (up to 3nm) and lands. Woodside will provide all necessary resources including personnel and equipment to resource Vic DoT's Incident Management Team (IMT) and response, as requested by DoT.

Woodside acknowledges that as per the V*ictorian Offshore Petroleum and Greenhouse Gas Storage Act 2010* the Department of Jobs, Precents and Regions (DJPR) retains responsibility for titles administration, well integrity and environment within State waters.

This plan is to be reviewed and implemented in conjunction with the activity-specific Minerva Environment Plan (EP).

1.4 Emergency Response Document Framework

The inter-relationship between this document and other oil spill response documentation is presented in Figure 1-2 and Table 1-1.

This OPEP supports arrangements under the National Plan for Maritime Environmental Emergencies (NatPlan), AMOSPlan, Victoria State Emergency Management Plan (SEMP) and sub-plans, Victorian Marine Pollution Contingency Plan (VicPlan), and Victorian Emergency Animal Welfare Plan (Department of Land, Water and Environment).

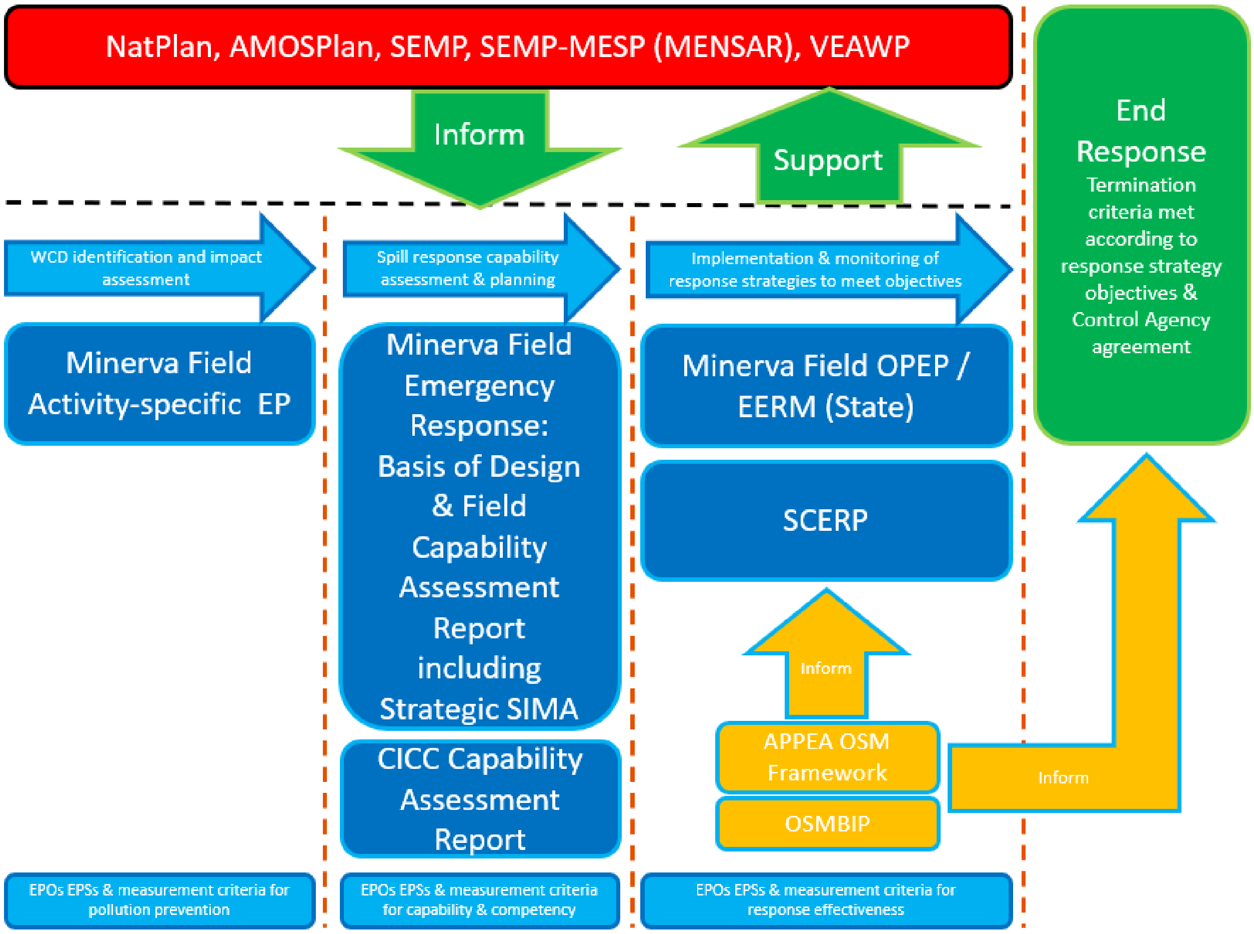

Figure 1-2: Spill response document framework for Minerva Field

Table 1-1: Spill response document framework

Document Title	Document Number	Purpose
Woodside Incident and Crisis Management Procedure (I&CMP)		The I&CMP describes the process requirements intended to ensure the Company remains prepared to manage incidents and crises effectively and details the prevention, preparedness, response and recovery aspects of incident and crisis management, which are relevant to all sites and activities operated or managed by the Company.
Activity-specific Environment Plan (EP)	Varies	The EP contains the following: • detailed activity description; • detailed description of the environment that may be affected (EMBA) by a credible worst-case discharge (WCD) scenario; • description and risk assessment of oil spills on environmental values and sensitivities; and • evaluation of controls to prevent oil pollution from the described activity and associated EPOs / EPSs and measurement criteria
Minerva Field Emergency Response: Basis of Design and Field Capability Assessment (Appendix B)	00MC-BHP-N00-0003	The BOD presents an overview of the petroleum activity and associated oil spill risks. It includes an evaluation of modelling outcomes from the identified WCD scenarios. It includes a strategic SIMA for the identified WCD scenarios associated with the Minerva Field Decommisioning Program. It also provides a detailed evaluation of response needs based upon WCD scenarios and presents an oil spill response field capability analysis, inclusive of Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurements Criteria for response preparedness.
Corporate Incident Coordination Centre (CICC) Capability Assessment (Appendix A)	AOHSE-ER-0071	The CICC Capability Assessment evaluates the size and structure of the Woodside CICC (inclusive of Source Control Branch) necessary to mobilise and maintain the field capability for a protracted worst-case oil pollution emergency i.e., a LOWC scenario. It provides a detailed evaluation of CICC capability and competency to enable the implementation of response strategies for the full duration of the oil pollution emergency inclusive of EPOs, EPSs and Measurement Criteria for maintenance of CICC capability and competency.
Minerva Field Decommisioning Oil Pollution Emergency Plan (OPEP) (this document)	00MC-BHP-N00-0002	The OPEP / EERM is the tool which would be utilised by the Woodside CICC during any impending/actual oil spill event to implement the detailed Response Strategies. The OPEP / EERM provides a detailed framework for spill response implementation inclusive of EPOs, EPSs and Measurement Criteria for the effectiveness of response strategy implementation.

Document Title	Document Number	Purpose
Source Control Emergency Response Plan (SCERP)	Varies	The Source Control Emergency Response Plan (SCERP) is consistent with the requirements of the Critical Control Performance Standards: Source Control (PET-GDC20-DR-PRD-00063), the Source Control Framework detailed within the International Oil and Gas Producers (IOGP) Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (IOGP, 2019) and the APPEA Australian Offshore Titleholder's Source Control Guideline (June 2021). The SCERP includes: • Subsea First Response Toolkit Plan; and • Relief Well Plan. Refer directly to SCERP for the implementation of all source control operations.
Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP) (Appendix C)	00MC-BHP-N00-0004	This document consistent with the APPEA Operational and Scientific Monitoring Bridging Implementation Plan Template (APPEA, 2021a) and acts as a Bridging Implementation Plan to the Joint Industry OSMP Framework for petroleum activities undertaken by Woodside in the Minerva gas field off the Southern coast of Victoria.

1.5 Spill Response Levels

To establish oil spill response arrangements that can be scaled depending on the nature of the incident by integrating with other local, regional, national and industry plans and resources, Woodside uses a tiered response approach. The criteria for determining the hydrocarbon spill 'levels' for the purpose of the spill response have been adopted from the NatPlan and are described in Table 1-2. The 'level-rating' for oil spill response provides a magnitude description of the potential impact and the effort to support oil spill response.

The 'Level' is determined by the relevant Incident Command Leader, such as the CICC Leader (for a small spill) or by the Corporate Incident Coordination Centre (CICC) Leader for larger spills.

Typically, Level 1 spill responses can be resourced using MODU or shipboard spill kits. Vessels are required to maintain a current Shipboard Oil Pollution Emergency Plan (SOPEP) and appropriate spill kits, response capabilities and trained personnel. Likewise, designated ports and harbours are required to have as a minimum Level 1 response capability on site.

For Level 2 / Level 3 spills, Woodside maintains a broad set of spill response capabilities. Woodside also has contracts and Memorandum of Understanding (MoU's) with National and International third-party spill response providers to ensure response capabilities can be drawn upon.

Table 1-2: Spill incident classification used to inform response

Level	Level Definition	Activity Spill Scenarios
1	**An incident will have minor or limited impacts on the environment which can be controlled by the resources normally available onsite without the need to mobilise Woodside or other external resources.**	
	An incident: • Occurs within a single jurisdiction; • Simple Incident Action Plan (IAP) required; • Resourced from within one area; • Environmental would be isolated and/or natural recovery expected within weeks; • Wildlife impacts limited to individual fauna; • That has no immediate concern of shoreline impact; and • With a low consequence level according to the HSE Risk Matrix.	Refined oil/ hazardous chemicals (e.g. surface release from hose / container / drum etc.)
2	**An incident will have substantial impacts to the environment and cannot be controlled by the use of onsite resources alone and required external resources and support to combat the situation.**	
	An incident: • Occurs across multiple jurisdictions; • Outline of the IAP required; • Requires intra-state resources; • Significant environmental impacts, recovery may take months, remediation required; • Wildlife impacts to groups of fauna or threatened fauna; • Shoreline impact is expected; and • With a moderate to high consequence level according to the HSE Risk Matrix.	Marine diesel oil (MDO) spill from vessel collision
3	**An incident will have serious impacts to the environment and occurs across multiple/ international jurisdictions and requires mobilisation of state, national or international resources and support to combat the situation.**	

Level	Level Definition	Activity Spill Scenarios
	An incident: • Occurs across multiple / international jurisdictions; • Detailed IAP required; • Requires national / international resources; • Significant environmental area impacted, recovery may take months, remediation required; • Wildlife impacts to large numbers of fauna; • With a high to catestrophic consequence level according to the HSE Risk Matrix	Uncontrolled subsea low of well control (LOWC)

1.6 Worst-Case Discharge Scenarios & Hydrocarbon Properties

There are two worst-case discharge (WCD) scenarios identified for Minerva decommissioning (refer Table 1-3):

- Scenario 1- Complete loss of well control during well plug and abandonment operations
- Scenario 2- Vessel collision resulting in a complete loss from the largest tank onboard

Table 1-3: Summary of worst-case hydrocarbon spill scenarios

Scenario	Hydrocarbon Type	Worst-case Maximum Spill Volume	Comment	Response Level
Loss of Well Control (LOWC)	Minerva 4 Condensate	Liquid Volume: 52,634 bbl ($8,368\ m^3$) Gas Volume: 15,618 MMscf over 81 days	Estimates of the gas flow rates and the gas flow rate decrease over the 81 days	3
Vessel Collision	Marine Diesel Oil (MDO)	A surface spill over a 6-hours resulting in the complete loss of MSO from the vessel's largest tank ($330\ m^3$)	Maximum credible volume based on the largest tank capacity for the project vessels	2

Table 1-4 presents the hydrocarbon properties for Minerva 4 Condensate (LOWC scenario) and Marine Diesel Oil (vessel collision scenario).

Table 1-4: Hydrocarbon properties

Parameter	Minerva 4 Condensate [1]	Marine Diesel Oil [2]
API Gravity	49.9	0.843
Specific Gravity	0.7802	36.4
Viscosity (@ *20°C*)	1.204 cSt	3.9 cP
Pour Point (°C)	-36	-36
Wax Content (%)	<0.1	0.05
Asphaltene (%)	-	0.05

Note 1: Data from ITS (2003)

Note 2: Data from SINTEF's *Marine Diesel* IKU

2 Jurisdictional Authority and Control Agency

Any agency which has jurisdictional or legislative responsibilities for maritime environmental emergencies is obligated to work closely with the Control Agency to ensure that incident response actions are adequate.

In the event of an oil spill, Control Agencies are assigned to respond to the various levels of spills. The arrangements for oil spill is outlined in Table 2-1. The ‘Statutory Agency’ and ‘Control Agency’ are defined as follows:

> **Jurisdictional Authority:** *the State or Commonwealth Agency assigned by legislation, administrative arrangements or within the relevant contingency plan, to control response activities to a maritime environmental emergency in their area of jurisdiction.*
>
> **Control Agency:** *is the agency with operational responsibility in accordance with the relevant contingency plan to take action to respond to an oil and/or chemical spill in the marine environment.*

Table 2-1: Statutory and lead control agencies for oil spill pollution incidents

Area	Spill Source	Jurisdictional Authority	Lead Control Agency	
			Level 1	Level 2/3
Commonwealth Waters	Offshore Petroleum Activity	NOPSEMA	Woodside	
	Vessels	AMSA	Vessel	AMSA
	Wildlife affected by marine pollution	DAWE	Woodside	
State Waters	Offshore Petroleum Activity	Vic DJPR	Woodside / Vic DoT (JSCC)	
	Marine Pollution Oil spills in Victorian Coastal waters up to three nautical miles	Vic DoT	Vic DoT	
	Wildlife affected by marine pollution	DELWP	DELWP	
Port Waters	Vessels	Port Authority	Port Authority / Vic DoT	

Note: When a wildlife response is required in State waters, the Department of Environment, Land, Water and Planning (DELWP) will act as the lead agency and follow the relevant state based legislation.

2.1 Cross Jurisdictional Arrangements

Detailed cross jurisdiction arrangements are available in the Victorian State Maritime Emergencies (non-search and rescue) (MENSAR) Subplan Edition 2 which acts as the *Victorian Marine Pollution Contingency Plan* in accordance with the National Plan and the Marine (Drug, Alcohol and Pollution Control) Act 1988.

Cross Jurisdictional arrangements described in these documents are summarised as follows:

- Vic DoT will only assume the role of Controlling Agency for the portion of the response that occurs within State waters as per its jurisdictional responsibilities.
- A Vic DOT officer will be appointed the role of the State Controller Maritime Emergencies (SCME), otherwise known as the State Controller under the SEMP, who has overall responsibility for ensuring there is an adequate response in State waters.

- The SCME will be responsible for authorising the activation of National Plan resources (including the National Response Team (NRT), trajectory modelling, and specialist equipment) via AMSA.
- The Emergency Management Commissioner (EMC) is responsible for ensuring effective control arrangements are in place for a maritime emergencies.

To facilitate effective coordination between the two Controlling Agencies and their respective IMT's, a Joint Strategic Coordination Committee (JSCC) will be established (

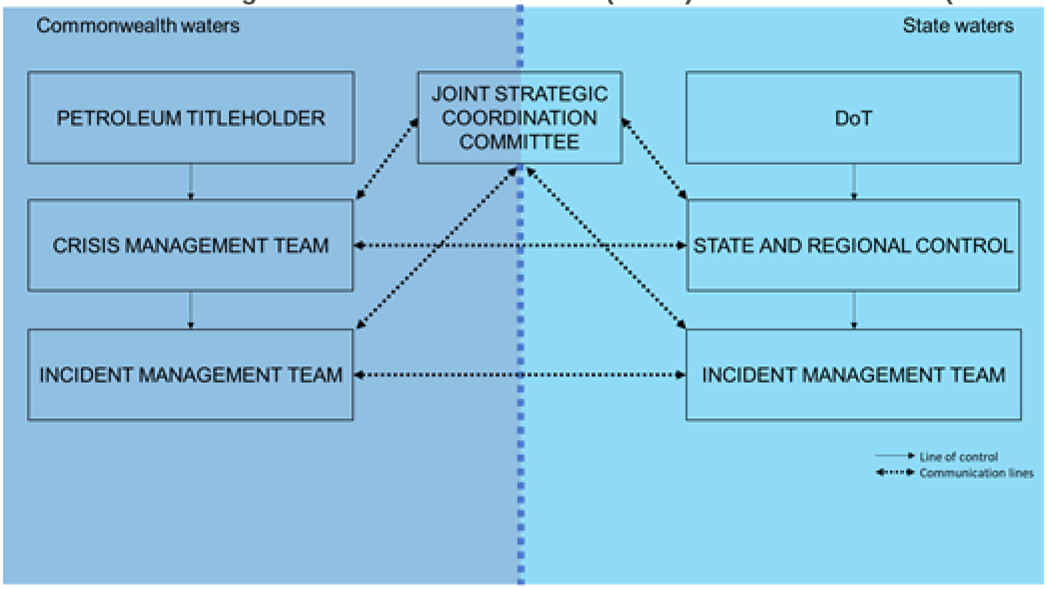

Figure 2-1: Cross-jurisdictional control and coordination structure

-). The JSCC will be jointly chaired by the State Emergency Management Committee (SEMC) and the Woodside's nominated senior representative and will comprise of individuals deemed necessary by the chairs to ensure an effective coordinated response across both jurisdictions.
- Vic DOT and Woodside will each provide a Emergency Management Liaison Officer (EMLO) into the corresponding CICCs for effective communication between DOT and Woodside.

Vic DoT will establish an Incident Control Centre (ICC) and provide a number of emergency management support personnel to work within the Vic DoT IMT (the Woodside CICC would still function and lead the response in Commonwealth waters and liaise with Vic DoT IMT).

Woodside will continue to provide initial response actions for State waters, until such time that Vic DoT assumes control, and subsequently will provide resources in line with the Woodside Incident and Crisis Management (I&CM) organisational structure and the OPEP.

The CICC, based in Woodside's head office in Perth, is the onshore coordination point for an offshore emergency. The CICC is staffed by an appropriately skilled team available on call 24-hours a day.

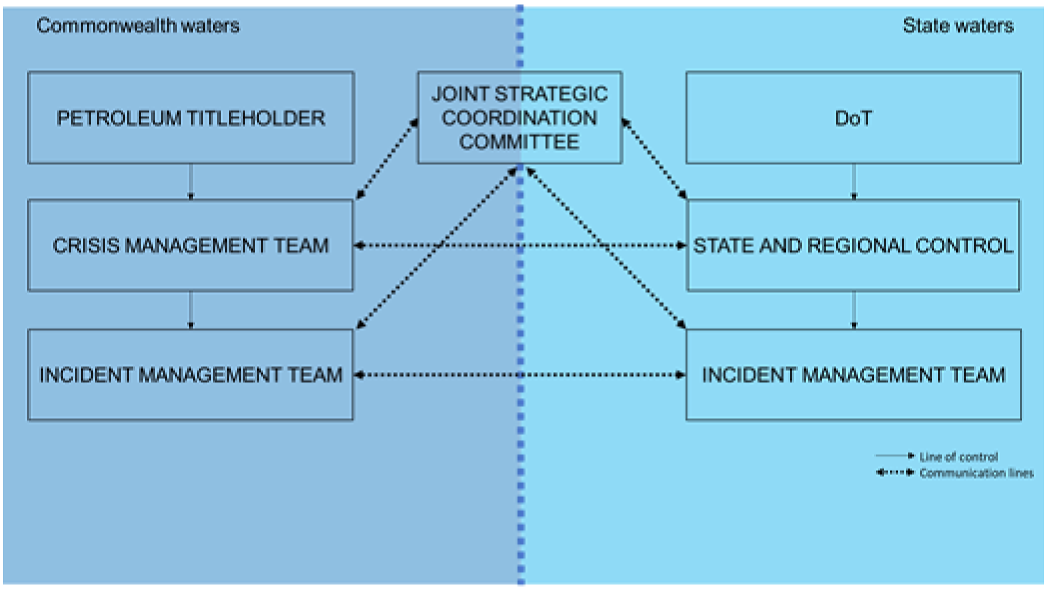

Figure 2-1: Cross-jurisdictional control and coordination structure

3 Notification and CICC Activation

3.1 Initial Spill notifications

For Level 1 spills to the marine environment, the MODU Offshore Installation Manager (OIM) and/or Vessel Master are considered the Emergency Response Team (EMT) Leader and must immediately notify the Woodside Drilling Supervisor / Project Manager.

For Level 2/3 spills, the ERT Leader must notify the Woodside Communications Centre (WCC) who in-turn activate the Woodside CICC – see Sections 3.3 and 3.4 below.

It is the responsibility of the Woodside HSE Lead to ensure that reporting of environmental incidents meets both regulatory reporting requirements and Woodside Standards.

3.2 External Agency Notification

All hydrocarbon spills must be reported to external agencies as provided in the following sub-sections.

3.2.1 NOPSEMA

The Woodside EMT Leader (or delegate) is responsible for reporting all hydrocarbon spills >80L orally to NOPSEMA, as soon as practicable, and in any case not later than 2 hours after the first occurrence of the reportable incident; or if the reportable incident was not detected at the time of the first occurrence, the time of becoming aware of the reportable incident.

Oral notifications of a reportable incident to NOPSEMA will be via telephone: 1300 674 472.

The oral notification must contain:

- All material facts and circumstances concerning the reportable incident known or could be obtained by reasonable search or enquiry; and
- Any action taken to avoid or mitigate any adverse environment impacts of the reportable incident; and
- The corrective action that has been taken, or is proposed to be taken, to stop, control or remedy the reportable incident.

3.2.2 AMSA

For vessel spills, and in accordance with the *Navigation Act 2012*, any oil pollution incidents in Commonwealth waters will be reported by the Vessel Master to AMSA within 2 hours via the national emergency notification contacts and a written report within 24 hours of the request by AMSA. The national 24-hour emergency notification contact details are:

Freecall: 1800 641 792

Fax: (02) 6230 6868

Email: mdo@amsa.gov.au

3.2.3 DoT / DELWP / DAWE

The Vessel Master / Woodside EMT Leader (or delegate) is responsible for reporting any oil pollution incident affecting or likely to affect State waters to the Vic DoT State Duty Officer (SDO) via the 24-hour reporting number 0409 858 715. The Duty Officer will then advise whether the following forms are required to be submitted:

- Marine Pollution Form (POLREP) and/ or
- Marine Pollution Situation Report (SITREP)

Woodside EMT Leader (or delegate) is responsible for notifying Department of Environment, Land, Water and Planning (DWELP) duty officer immediately, or whenever wildlife within Victoria's jurisdiction is expected to be impacted.

Woodside EMT Leader (or Delegate) is responsible for notifying the Department of Agricultuure, Water and Environment (DAWE) as soon as practicable following the discovery of impact to wildlife of national environmental significance, and/or as directed by the relevant state authority.

3.2.4 DNP

Director of National Parks (DNP) must be made aware of oil/gas pollution incidences that occur within an Australian Marine Park (Commonwealth) or are likely to impact on a Marine Park as soon as possible. Notification should be made to:

Marine Compliance Duty Officer on 0419 293 465 (24 hours).

The notification should include:

- titleholder details;
- time and location of the incident (including name of Marine Park likely to be effected);
- proposed response arrangements as per the Oil Pollution Emergency Plan (e.g. dispersant, containment, etc.);
- confirmation of providing access to relevant monitoring and evaluation reports when available; and
- contact details for the response coordinator.

3.3 EMT Activation

For Level 1 incidents, the Emergency Management Team (EMT) Leader (MODU OIM or AHTS Vessel Master) responds to the incident and immediately notifies the Woodside Drilling Supervisor / Project Manager.

3.4 CICC Activation

For Level 2/3 incidents, the ERT Leader must notify the Woodside Communications Centre (WCC) who in-turn activate the Woodside CICC.

The WCC is a 24/7, central communication and coordination point for personnel and sites. Initial notification of a potential or actual incident must be made through the WCC. The activation of the CICC/Woodside Crisis Management Team (CMT) will be actioned by the WCC.

Given in-field response arrangements for Level 2/3 incident shall be mounted from Victoria, Woodside will also establish a satellite office in Geelong, Victoria.

3.5 Emergency Contacts Directory

The Woodside CICC houses the Emergency Contacts Directory.

3.6 Oil Spill Response Agencies (OSRA)

Woodside maintains contracts with a number of Oil Spill Response Agencies (OSRAs):

3.6.1 AMOSC

The CICC Leader can request the assistance of AMOSC via the Duty Officer (24/7): 0438 379 328

AMOSC can be placed on the levels of advice listed in Table 3-1.

Should the response require mutual aid from equipment owned and personnel employed by another company, the request for assistance is made directly company to company via each company's nominated Mutual Aid Contact.

The CICC Leader can contact AMOSC to activate the Standing Agreement and the Service Contract (for the borrowing company), in the event that Woodside require equipment from another company.

Table 3-1: AMOSC advice levels

AMOSC Advice Level	Status	AMOSC Requirements
Level 1	Forward Notice	Advise a potential problem. Provide or update data on oil spill. Update information on spill and advise 4 hourly.
Level 2	Standby	AMOSC resources may be required. Assessment of resources and destination to be made. Update information on spill and advise 2 hourly.
Level 3	Callout	AMOSC resources are required. Detail required resources and destination.

3.6.2 Oil Spill Response Limited (OSRL)

Woodside is a member of the OSRL group. OSRL have capacity to mobilise additional equipment and personnel to Australia from their Singapore location. Only nominated Woodside personnel may request the assistance of OSRL via the CICC Leader under OSRL's Service Level Agreement (SLA).

OSRL Singapore Duty Manager (24/7): +65 6266 1566

3.6.3 Well Control Specialists

Perth-based Woodside employees will fill the roles of Source Control Section Chief and the Relief Well Group Supervisor. Woodside has retained Integrity Management & Response (IMR) to staff SIMOPS Group Supervisor, Well Capping Group Supervisor, and Flow Engineering Group Supervisor roles and associated functions reporting to those roles.

IMR will fulfil these roles remotely from their dedicated Emergency Operations Centre (EOC) in Houston, USA and link into the Perth-based CICC and Source Control Section Chief virtually via platforms such as Microsoft Teams or Webex. Contact (24/7): +1 (866) 578-7253

Woodside has a contract in place with The Response Group, located in USA, for the provision of oil spill response personnel and resources to support the CICC Source Control Section. Contact (24/7): +1 (281) 880-5000.

3.6.4 Technical Support (Environmental Monitoring)

Woodside maintains a list of pre-approved vendors (OSM Service Providers) who can be called upon at short notice to provide environmental monitoring services in the event of an oil spill.

Woodside has a Service Level Agreement (SLA) with OSRL under which a framework agreement enables CSA Ocean Sciences to provide in-field SSDI monitoring services*.

*N.B. SSDI is not a feasible response option for Minerva Gas Condensate.

4 Resources at Risk

4.1 Environment that May Be Affected (EMBA)

Figure 4-1 represents the outer geographical boundaries of the environment that may be affected (EMBA) by potential hydrocarbon exposure from a combined stochastic model (200 model realisations for LOWC scenario and 200 realisations for the MDO scenario). The EMBA does not represent the area of contact at actionable thresholds, rather the out geographical of potential contact at conservatively low thresholds.

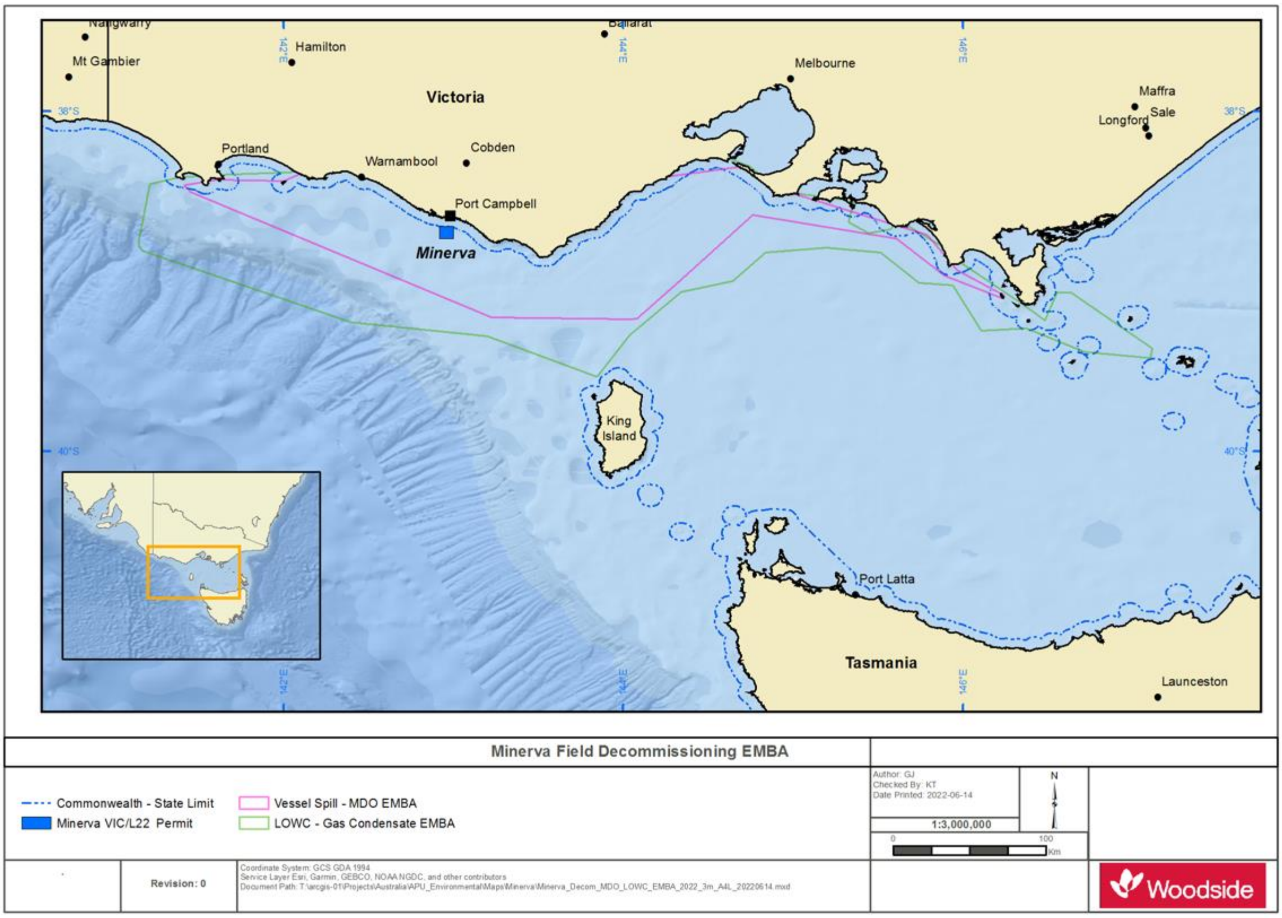

Figure 4-1: EMBA for WCD condensate and marine diesel oil spill scenarios

Modelling results presented in Section 4.1.1 and 4.1.2 below present potential worst-case shoreline exposures from selected simulations at actionable hydrocarbon thresholds.

4.1.1 Loss of Well Control (Condensate)

Modelling was conducted for a potential worst case discharge (WCD) condensate LOWC 8,368 m^3 release from the Minerva-4 well. Modelling was undertaken across all months of the year to allow flexibility in the activity period, results were separated into autumn-winter period (April to September) and spring-summer period (November-March).

For the purpose of oil spill preparedness and response planning the modelling outputs for shoreline oiling and surface oiling have been considered the most relevant for the allocation of response strategies. The modelling outputs below demonstrate the probabilities and locations of shoreline thickness ≥100 g/m^2, as

AMSA guidance indicates that wave action alone is sufficient to clean shorelines with thickness <100 g/m^2 (AMSA, 2022).

The response strategies for the presence of submerged oil and dissolved hydrcarbons are relatively limited, besides the initiation triggers for Operational and Scientific Monitoring (OSMP) for the condensate hydrocarbon and therefore these results have not been included.

No surface oiling exceeding any thresholds (1 g/m^2 /10 g/m^2 /50 g/m^2) was predicted to occur for any of the stochastic modelling realisations.

Table 4-1 provides worst-case stochastic spill modelling results that should be considered in the event of a LOWC scenario at any of the Minerva well locations. These modelled simulations represent potential shoreline oiling outcomes for response planning purposes. Monitoring and Evaluation must be undertaken in the event of a Level 2 / Level 3 spill to inform actual spill trajectories and identify protection priorities via the Operational SIMA process.

Table 4-1 Summary of shoreline exposure at actionable thresholds - LOWC Scenario (GHD, 2022)

Receptor	Shoreline Total Contact Probability (%) >100 g/m^2	Maximum Total Accumulated Oil Ashore (tonnes)	Minimum Arrival Time (Days)	Maximum Length of oil Shoreline (km) 100 g/m^2
Autumn-Winter Period				
Otway Plain	39	3	3.1	8
Warrnambool Plain	88	9.6	0.5	25
Otway Ranges	24	1.4	4.1	5
All shorelines	**95**	**12.3**	**0.5**	**31**
Spring-Summer Period				
Otway Plain	13	2.2	1.8	5
Warrnambool Plain	100	8.4	0.6	23
Otway Ranges	11	1.2	2.8	3
All shorelines	**100**	**9.6**	**0.6**	**28**

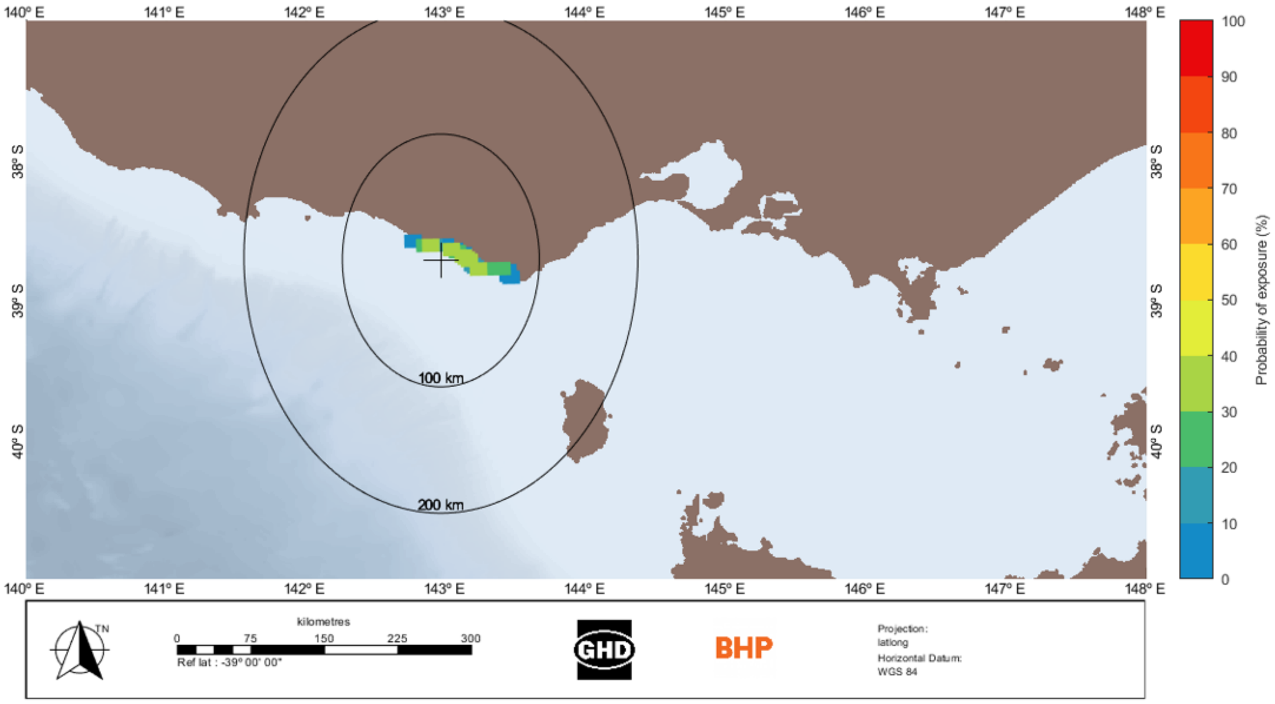

Figure 4-2: Probability of shoreline loading at >100 g/m^2 – Autumn / Winter (GHD, 2022)

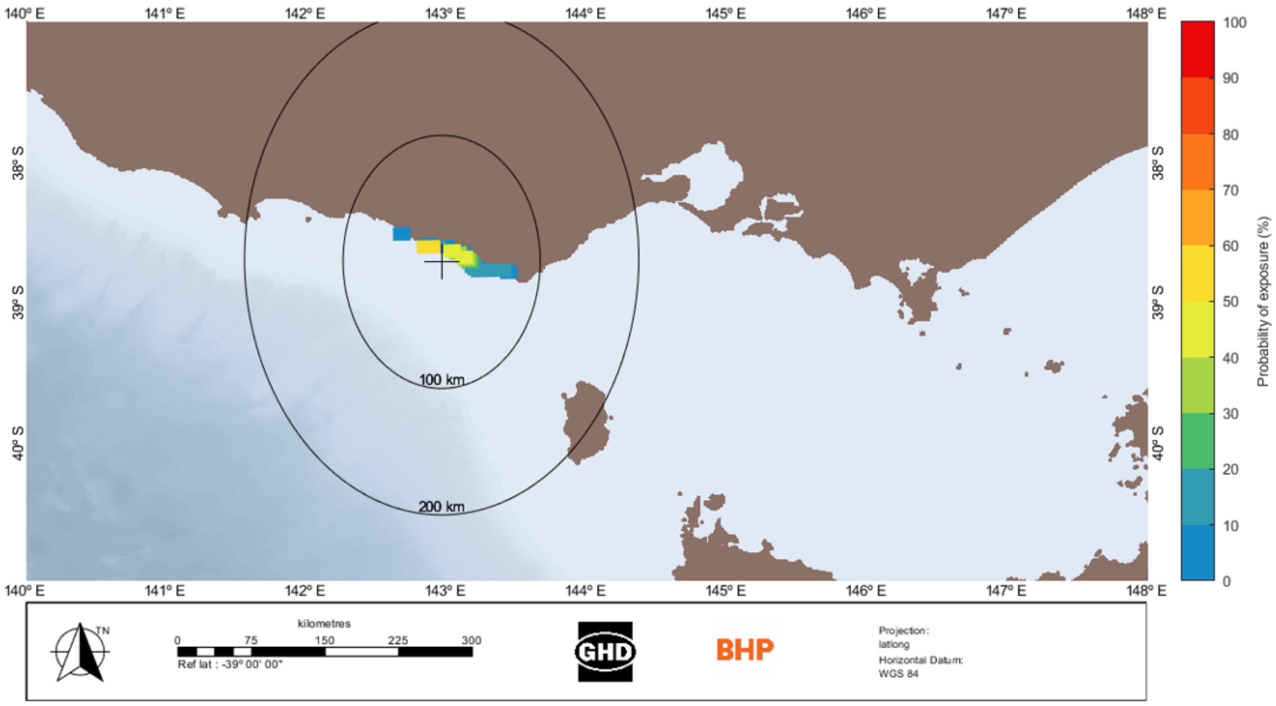

Figure 4-3: Probability of shoreline loading at >100 g/m^2 – Summer / Spring (GHD, 2022)

4.1.2 Vessel Collision (MDO)

Modelling was conducted for a potential worst case discharge (WCD) vessel collision scenario of 330 m^3 release of MDO from a project vessel onboard tank. Modelling was undertaken across all months of the year to allow flexibility in the activity period, results were separated into autumn-winter period (April to September) and spring-summer period (November-March).

For the purpose of oil spill preparedness and response planning the modelling outputs for shoreline oiling and surface oiling have been considered the most relevant for the allocation of response strategies. The modelling outputs below demonstrate the probabilities and locations of shoreline thickness ≥100 g/m^2, as AMSA guidance indicates that wave action alone is sufficient to clean shorelines with thickness <100 g/m^2.

Surface oiling at 10 g/m^2 is the lower limit for ecological impacts to occur, with 50 g/m^2 considered the threshold that can be targeted for response strategies. However, MDO is not amenable for dispersant application.

The response strategies for the presence of submerged oil and dissolved hydrcarbons are relatively limited for the condensate hydrocarbon and therefore these results have not been included.

Table 4-2 provides worst-case stochastic spill modelling results that should be considered in the event of a vessel collision in the Minerva Field. These modelled simulations represent potential shoreline oiling outcomes for response planning purposes. Monitoring and Evaluation must be undertaken in the event of a Level 2 / Level 3 spill to inform actual spill trajectories and identify protection priorities via the Operational SIMA process.

Table 4-2 Summary of shoreline exposure at actionable thresholds - MDO Scenario (GHD, 2022)

Receptor	**Shoreline Oil Total Contact Probability (%) >100 g/m^2**	**Shoreline Oil Maximum Total Accumulated Oil Ashore (tonnes)**	**Shoreline Oil Minimum Arrival Time (Days)**	**Shoreline Oil Maximum Length of oil Shoreline (km) 100 g/m^2**
Autumn-Winter Period				
Otway Plain	29	27	1.0	21
Warrnambool Plain	63	187	0.2	30
Otway Ranges	13	7	0.8	9
All shorelines	**74**	**187**	**0.2**	**35**
Spring-Summer Period				
Otway Plain	16	24	1.4	17
Warrnambool Plain	74	152	0.2	30
Otway Ranges	10	5	1.2	10
All shorelines	**76**	**152**	**0.2**	**33**

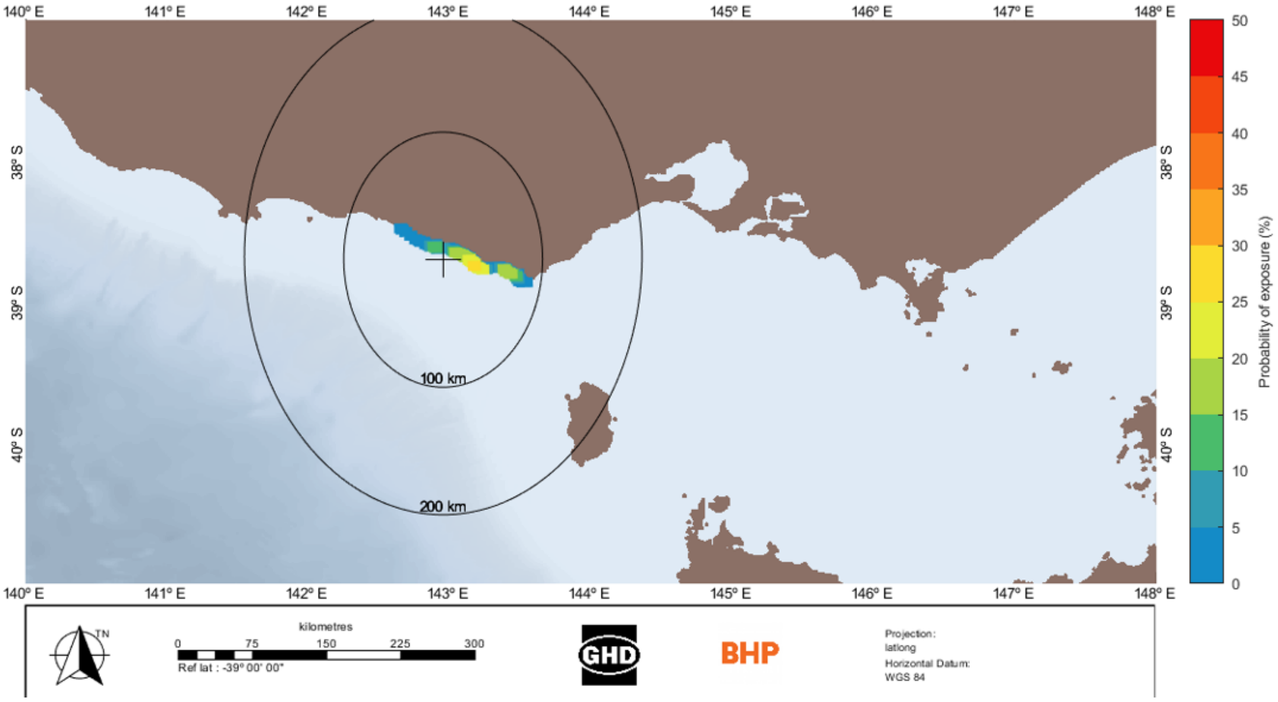

Figure 4-4: Probability of shoreline loading (MDO) at >100 g/m^2 – Autumn / Winter (GHD, 2022)

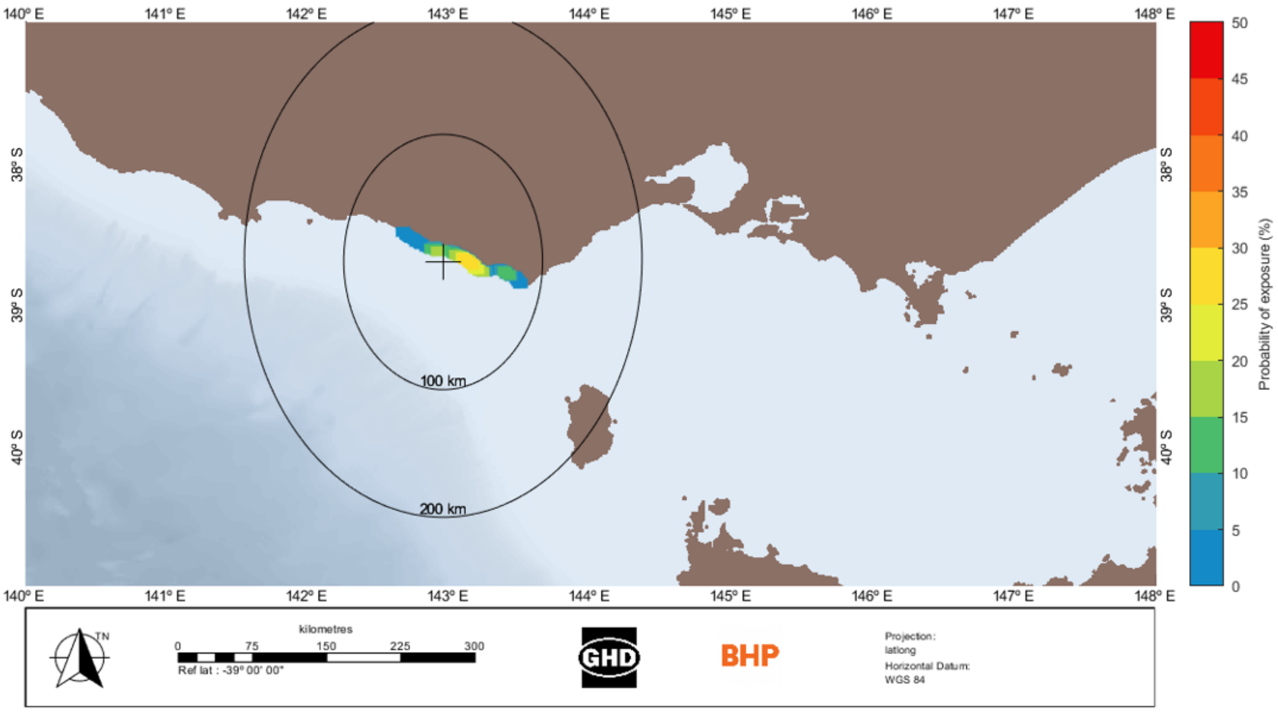

Figure 4-5: Probability of shoreline loading (MDO) at >100 g/m^2 – Summer / Spring (GHD, 2022)

4.2 Protection Priorities

For any oil spill entering or within Vic State waters/shorelines, the Vic Controlling Agency is the ultimate decision-maker regarding identification and selection of protection priorities.

The Vic Controlling Agency 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 Vic Oil Spill Response Atlas (OSRA) (including Web Map Application) and any other relevant Vic/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
- All information is utilised in a NEBA/SIMA type process, to determine protection priorities and response strategies.

The Vic Controlling Agency will adjust/amend their internal processes to suit the spill situation at the time.

Additional information available to assist Vic DoT identify and prioritise protection priorities include:

- *Description of Environment for the Minerva Field* – refer activity-specific EP; and
- EPBC Protected Matters searches undertaken to inform the environment that may be affected (EMBA) refer activity-specific EP.

4.3 Sensitivities of Resources at Risk

The location of environmental receptors and high conservation species, oil toxicity information, and the impact and risk assessment for potential oil pollution events are provided in activity-specific EPs. To support development of this OPEP, the environmental resources (receptors) have been ranked based on their sensitivity. The ranking has then been used to assist prioritisation of oil spill response techniques or allocation of resources (Table 4-3).

Table 4-3: Sensitivity ranking of resources at risk and response strategy objective

Sensitivity Ranking	Open Ocean	Shallow Water	Response Objective
Extreme	Migratory shorebirds and their habitat	Migratory shorebirds and their habitat	The EMBA intersects with migratory shorebirds and their habitats. The purpose of the response measures will be to manage these impacts through monitor, evaluate, and source control responses. Oiled wildlife response may be initiated.
	Threatened Ecological Community (TEC)	TEC	There are giant kelp marine forests in South Eastern Australia that may occur within the EMBA during a spill. The best assessed course of action for remediation of microalgae from smothering is to allow natural wave energy to assist in the natural dispersion of weathered hydrocarbon; any mechanical recovery or dispersant use may only increase the impact to the reef system (IPIECA, 1990-2005 Volume 3).

Sensitivity Ranking	Open Ocean	Shallow Water	Response Objective
High	Marine mammals (whales, dolphins, seals) and sharks	Marine mammals (whales, dolphins, seals) and sharks	It has been identified that marine mammals and sharks may be present within the EMBA. The purpose of the response measures will be to manage these impacts through monitor and evaluate and source control responses. Oiled wildlife response may be initiated.
	Avifauna	Avifauna	There are many species of seabirds within the EMBA that could be affected by an oil spill. The purpose of the response measures will be to manage these impacts through monitor, evaluate, and source control responses. Oiled wildlife response may be initiated.
	Marine reptiles (e.g. turtles)	Marine reptiles (e.g. turtles)	No natal beaches, mating areas nor feeding areas fall within the EMBAs, however there may be some marginal feeding and pelagic habitats. The purpose of the response measures will be to manage these impacts through monitor, evaluate, and source control responses. Oiled wildlife response may be initiated.
	Twelve Apostles Marine National Park	Twelve Apostles Marine National Park	There are unique limestone formation including the twelve apostles, and a range of marine habitats mainly subtidal soft sediments or sand supporting communities of bivalves, polychaetes and amphipods with the EMBA. Due to the nature of marine diesel in the environment (rapid evaporation) and the low volumes predicted, response strategies will be limited and the best assessed course of action for remediation is through natural dispersion / recovery.
	N/A	Arches Marine Sanctuary	There are underwater limestone formations of arches and canyons that support giant kelp hard, and associated fauna communities such as seastars, sponges, gorgonians, hydroids and bryozoans. Due to the nature of marine diesel in the environment (rapid evaporation) and the low volumes predicted, response strategies will be limited and the best assessed course of action for remediation is through natural dispersion / recovery.
Moderate	Commercial Fisheries	Commercial Fisheries	Commercial fishery activity does occur within the EMBA and could be affected by a hydrocarbon spill. The purpose of the response measures will be to manage these impacts through monitor, evaluate, and source control responses. Environmental monitoring (including fish-tainting) may be undertaken to assess lasting impact.
Low	N/A	Exposed Rocky Shores and Cliffs	Within these areas the natural degradation of oil would be rapid due to strong wave action. Beaching of oil residue may result in the mortality of the marine fauna (e.g. seabirds) and crustaceans inhabiting the shores. Recovery rates are considered moderate to fast.

5 Applicable Response Strategies

A summary of the Response Strategies selected during the strategic SIMA process and their applicability to various spill scenarios is presented in Table 5-1.

Details for the implementation of each applicable Response Strategy including first-strike actions and associated Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and measurement criteria are presented in Section 6.

Supporting information regarding response capability and environmental impacts and risks can be found in Appendix B – Minerva Field Emergency Response: Basis of Design and Field Capability Analysis.

Table 5-1: Applicable response strategies for Minerva operations spill scenarios

Response Strategy	330m^3 MDO Loss from Vessel Storage Tank (Level 2)	8,368 m^3 Condensate Loss of Well Control (Level 3)
Source Control – Vessel-based	✓	✗
Source Control – Subsea Intervention	✗	✓
Source Control – Relief Well	✗	✓
Source Control – Capping Stack	✗	✗[1]
Source Control – Subsea First Response Toolkit (SFRT)	✗	✓
Monitor and Evaluate	✓	✓
Dispersant - Surface Application	✗	✗
Dispersant – Subsea Application	✗	✗
Marine Recovery	✗	✗
Shoreline Protection	✓*	✓*
Mechanical Dispersion	✗	✗
In-Situ Burning	✗	✗
Shoreline Clean-up	✓*	✓*
Natural Recovery	✓	✓
Environmental Monitoring	✓	✓
Oiled Wildlife Response	✓	✓
Forward Command Post	✓	✓
Oil Contaminated Waste Management	✓	✓

✗ Not effective or N/A
✓ Activate Response Strategy (Refer Section 6 for Response Strategy Implementation).
[1] Capping stack system (including offset technology) unable to be deployed at waters depths shallower than 75m – wells at approx. 60m water depth.
* Potentially activated depending on reports/observations of Monitor and Evaluate and direction from Vic DoT.

6 Response Strategy First Strike Plans

6.1 Source Control – Vessel-based

Response Implementation

Table 6-1: Response implementation – Source control: vessel-based

Source Control – Vessel-based	
Response Objective	Halt the discharge of hydrocarbons to the marine environment
Initiation Criteria	Vessel spill (Level 1 / 2 / 3)
Responsible	Vessel Master
Controlling Agency	AMSA (Commonwealth) Vic DoT (State)
Emergency Contact	AMSA national 24-hour emergency notification contact details are: Freecall: 1800 641 792 Fax: (02) 6230 6868 Email: mdo@amsa.gov.au
	Vic DoT State Duty Officer (SDO) 24-hour reporting: Marine pollution incidents that are in, or may impact, state waters as soon as reasonably practicable Mobile: 0409 858 715 Marine Pollution Incident Report Form to email: semdincidentroom@transport.vic.gov.au
Activation Time	ASAP
Implementation Plan / Guidance Document	MARPOL-compliant Shipboard Oil Pollution Emergency Plan (SOPEP) or Shipboard Marine Pollution Emergency Plan (SMPEP - for noxious liquid) – the latter may be combined with a SOPEP.
Termination Criteria	Discharge controlled.

First Strike Plan

2 h

- Immediately implement vessel-specific Shipboard Oil Pollution Emergency Plan (SOPEP) or Shipboard Marine Pollution Emergency Plan (SMPEP) and notify AMSA / Vic DoT within 2 hours.

Figure 6-1: First strike plan – Source control: vessel-based

Environmental Performance Standards

Table 6-2 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of vessel-base source control response strategy.

Table 6-2: Environmental performance – Source control: vessel-based

Source Control – Vessel-based		
Environmental Performance Outcome	**Reduce, control or halt the discharge of hydrocarbons in a timely manner by the implementation of source control methods.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Vessel Master to report spill to AMSA and/or Vic DoT within 2 hours of incident.	Vessel incident report records	Vessel Master
Vessel-based source control shall be managed in accordance with vessel-specific (SOPEP/SMPEP for vessels, in line with MARPOL Annex I).	Vessel incident records	Vessel Master
Response shall only terminate when discharge has been controlled.	Vessel incident records	Vessel Master

6.2 Source Control – Subsea Intervention

Response Implementation

Table 6-3: Response implementation – Source control: subsea intervention

Source Control – Subsea Intervention	
Response Objective	Halt the discharge of hydrocarbons to the marine environment
Initiation Criteria	Condensate release (Level 1 / 2 / 3)
Responsible	MODU OIM (On-scene Commander)
Controlling Agency	Woodside
Emergency Contact	Woodside Communications Centre (WCC) 24/7
	Vic DoT State Duty Officer (SDO) 24-hour reporting: Marine pollution incidents that are in, or may impact, state waters as soon as reasonably practicable Mobile: 0409 858 715 Marine Pollution Incident Report Form to email: semdincidentroom@transport.vic.gov.au
Activation Time	Within 2 hours of incident.
Implementation Plan / Guidance Document	MODU Safety Case / Well Control Procedures.
Termination Criteria	Discharge controlled and barriers reinstated.

First Strike Plan – LOWC

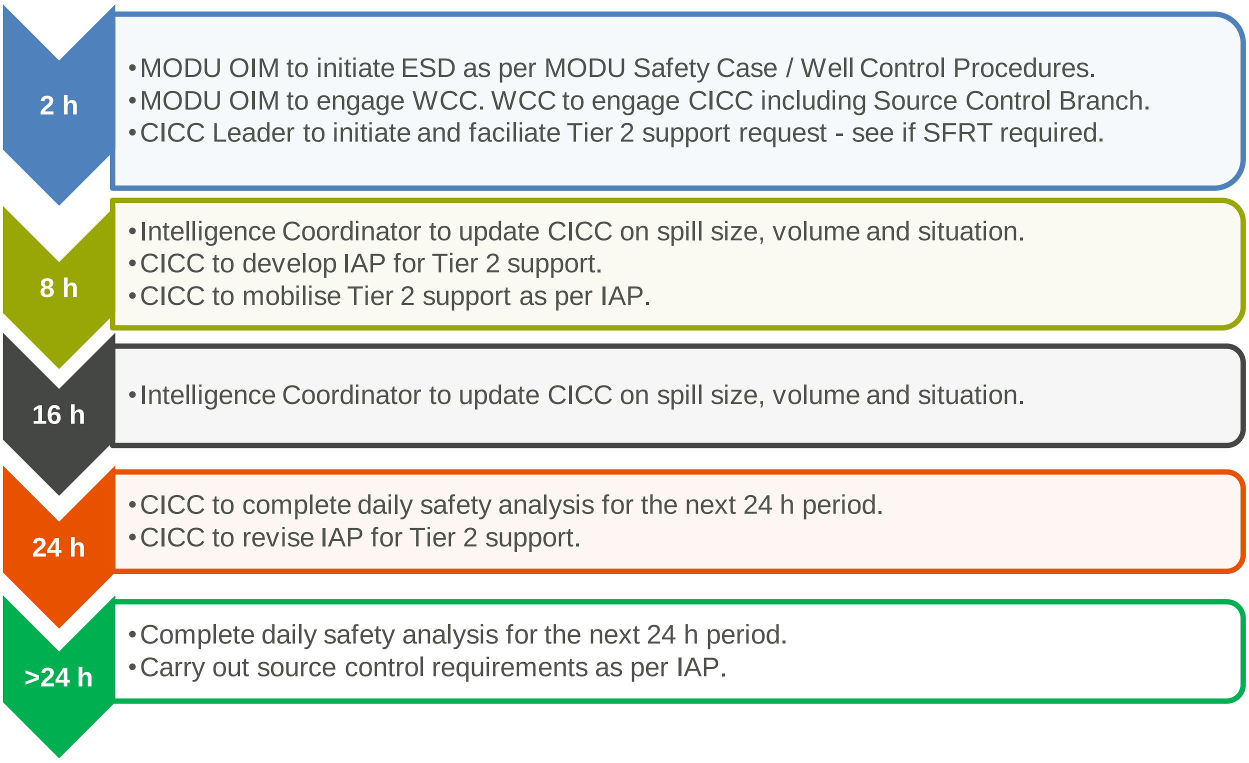

Figure 6-2: First strike plan – Source control: subsea intervention (LOWC)

Environmental Performance Standards

Table 6-4 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of subsea intervention source control response strategy.

Table 6-4: Environmental performance – Source control: subsea intervention

Source Control – Subsea Intervention		
Environmental Performance Outcome	**Discharge of hydrocarbons to the marine environment halted via source control**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate subsea intervention for any condensate release from Minerva wells.	Incident log	MODU OIM / CICC Leader
Woodside shall undertake all subsea intervention tasks within the defined timeframes as per the subsea intervention first strike plan.	Incident log / communication records	CICC Leader
MODU OIM shall initiate Emergency Shutdown as per MODU Safety Case / Well Control Procedures for any LOWC scenario where MODU is connected to well, the MODU is operable, and it is safe to do so.	Incident log / communication records	MODU OIM
Response shall only terminate when discharge has been controlled and barriers reinstated.	Incident log	CICC Leader

6.3 Source Control – Relief Well

Response Implementation

Table 6-5: Response implementation – Source control: relief well

Source Control – Relief Well	
Response Objective	Halt the discharge of hydrocarbons to the marine environment
Initiation Criteria	LOWC (Level 3)
Responsible	CICC Leader / Source Control Section Chief (SCSC)
Controlling Agency	Woodside
Emergency Contact	Woodside Communications Centre (WCC) 24/7 Integrity Management & Response (IMR) - Houston
	Vic DoT State Duty Officer (SDO) 24-hour reporting: Marine pollution incidents that are in, or may impact, state waters as soon as reasonably practicable Mobile: 0409 858 715 Marine Pollution Incident Report Form to email: semdincidentroom@transport.vic.gov.au
Activation Time	Within 2 hours of notification
Implementation Plan / Guidance Document	Source Control Emergency Response Plan (SCERP)
Termination Criteria	Well kill achieved and barriers reinstated

Supporting Information

The Source Control Emergency Response Plan (SCERP) contains all required information and checklists for drilling a relief well and should be referred to in the first instance.

Environmental Performance Standards

Table 6-6 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of Relief Well Source Control response strategy.

Table 6-6: Environmental performance – Source control: relief well

Source Control – Relief Well		
Environmental Performance Outcome	**Discharge of hydrocarbons to the marine environment halted via well kill**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate relief well planning for a LOWC scenario not contained via subsea intervention within 2 hours of notification of event.	Incident log	CICC Leader
Woodside shall implement relief well operations in accordance with the Source Control Emergency Response Plan (SCERP)	Incident log	SCSC
If mobilising an alternate MODU from within the region best endeavours will be made by Woodside to kill the well via relief well drilling by day 45 following a LOWC event.	Incident log	SCSC
If mobilising an alternate MODU from outside the region best endeavours will be made by Woodside to well kill via relief well drilling by day 81 following a LOWC event.	Incident log	SCSC
Response shall only terminate when well kill has been achieved and barriers reinstated.	Incident log	CICC Leader

6.4 Source Control – Subsea First Response Toolkit (SFRT / SIRT)

Response Implementation

Table 6-7: Response implementation – Source control: SFRT / SIRT

Source Control – SFRT	
Response Objective	Debris clearance (as required)
Initiation Criteria	LOWC (Level 3) where debris clearance may be required
Responsible	CICC Leader / Source Control Section Chief (SCSC)
Controlling Agency	Woodside
Emergency Contact	Woodside Communications Centre (WCC) 24/7
	OSRL Singapore Duty Manager (24/7): +65 6266 1566
	AMOSC Duty Manager (24/7): 0438 379 328
Activation Time	Within 2 hours of notification
Implementation Plan / Guidance Document	Source Control Emergency Response Plan (SCERP)
Termination Criteria	Debris cleared

Supporting Information

The Source Control Emergency Response Plan (SCERP) contains all required information and checklists for the mobilisation and deployment of the SRFT (from AMOSC) and the SIRT (from OSRL) and should be referred to in the first instance.

Environmental Performance Standards

Table 6-8 provides the environmental performance outcomes, performance standards and measurement criteria for the Source Control response strategy.

Table 6-8 Environmental performance – Source control: SFRT / SIRT

Source Control – SFRT / SIRT		
Environmental Performance Outcome	**Reduce, control or halt the discharge of hydrocarbons in a timely manner by the implementation of source control methods.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate source control via SFRT and / or subsea incident response toolkit (SIRT) for a condensate release from a LOWC (where debris clearance may be required) within 2 hours of notifying Source Control Section Chief (SCSC).	Incident log	CICC Leader
Woodside shall implement the mobilisation and deployment of the AMOSC SFRT and/or OSRL SIRT in accordance with the Source Control Emergency Response Plan (SCERP).	Incident log	SCSC
Woodside shall mobilise the SFRT to the field (via AMOSC) to commence debris clearance (if required) by day 4 following a LOWC event.	Incident log	SCSC
Response shall only terminate once debris is cleared.	Incident log	CICC Leader

6.5 Monitor and Evaluate

Response Implementation

Table 6-9 Response implementation – Monitor and evaluate

Monitor and Evaluate	
Response Objective	Gain situational awareness to inform Operational SIMA & IAP
Initiation Criteria	Hydrocarbon spill (Level 2 / 3)
Responsible	CICC Leader / Vic DoT (State)
Controlling Agency	Woodside (Commonwealth) Vic DoT (State)
Emergency Contact	AMOSC Duty Manager (24/7): 0438 379 328
	RPS-Asia-Pacific Applied Science Associates (RPS-APASA)
	OSRL Singapore Duty Manager (24/7): +65 6266 1566
	Aircraft Service Provider, Warrnambool
	Marine Vessel Service provider
Activation Time	Within 2 hours of standing up CICC
Implementation Plan / Guidance Document	Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP) (Appendix C) Operational Response Guideline 4: Oil Spill Tracking - Buoy Deployment/Tracking (AOHSE-ER-0033) Woodside Operational Monitoring: Operational Plans OM01-5
Task-specific Termination Criteria	Oil spill tracking buoy (OSTB) monitoring to continue for 24 hours after the spill source is under control and a surface sheen is no longer observable. Visual observation will continue for 24 hours after the spill source is under control and a surface sheen is no longer observable. 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. Satellite monitoring to continue until no further benefit is achieved from receiving satellite imagery.

First Strike Plan

Aerial Surveillance

2 h

- Logistics Coordinator notify Aircraft Service Provider and provide spill location. Options include mobilising from Warrnambool / Geelong / Melbourne.
- Inform shire / RAAF of additional aircraft movements.

8 h

- Complete first aerial observation flights (daylight hours).
- Aerial surveillance observer logs to be submitted to CICC Intelligence.

16 h

- Planning second flight based on trajectory modelling and spill tracking buoy locations.

24 h

- Establish long-term aerial observation plans with additional aircraft and trained observers from Woodside, AMOSC or OSRL.

>24 h

- Complete daily safety analysis for the next 24 h period.
- Complete surveillance requirements as per IAP.

Figure 6-3: First strike plan – Aerial surveillance

Supporting Information

Woodside has a contract with Aircraft Service Provider, who provides crew change helicopters, 24/7 medevac and Search and Rescue (SAR) coverage. These helicopters can be used for aerial surveillance in a spill incident. Observers will be sourced from Woodside, AMOSC and OSRL.

Vessel Surveillance

2 h
- Logistics Coordinator request for fast response vessel or AHTS vessel in the area the need to mobilise for oil spill response.
- Advise surveillance of location of spill and any safety precautions.

8 h
- Spill location information and observations reported to Intelligence Coordinator.

16 h
- Spill location information and observations reported to Intelligence Coordinator.

24 h
- Continue to provide surveilance until directed by Intelligence Coordinator.

>24 h
- Complete daily safety analysis for the next 24 h period.
- Complete surveillance requirements as per IAP.

Figure 6-4: First strike plan – Vessel surveillance

Supporting Information

Vessel service providers supporting operations will be located from Melbourne or Geelong Port.

Oil Spill Tracking Buoys

2 h
- Deploy oil spill tracker buoys from MODU.

Figure 6-5: First strike plan – Oil spill tracking buoys

Supporting Information:

Equipment Name	Self-Locating Datum Marker Buoy
Location**	Contracted MODU
Number	1
Response Time	2 ~ 5 h depending on the weather
Deployment	Side of a vessel / MODU (low point)
Result Acquisition	Globstar, near real time
Operating Condition	Beaufort 4-5
Operating Life	30/45 days

*Oil spill modelling contractor may vary depending operational needs during a spill response.

** AMOSC has additional OSTB's in Geelong.

Oil Spill Trajectory Modelling

2 h

- Confirm deployment of oil spill tracker buoy.
- Planning Coordinator to contact AMOSC, activate OSTM standby contract.
- Planning Coordinator to obtain and communicate necessary modelling input data to AMOSC.

8 h

- Oil spill trajectory modelling report received.
- Provide trajectory model results to Logistic Coordinator for aerial surveillance planning.
- Identify EMBA and determine areas for 'post-spill / pre-impact' monitoring.
- Confirm hydrocarbon characteristics and confirm with AMOSC.

16 h

- Obtain spill tracker data.
- Correlate spill trajectory modelling with real time data from oil spill tracker buoy and communicate to AMOSC for update of trajectory modelling.
- Determine need and, if required, frequency of additional tracker buoy deployments.

24 h

- Obtain most recent spill trajectory modelling and communicate to Logistics Coordinator for planning.

>24 h

- Complete daily safety analysis for the next 24 h period.
- Complete modelling requirements as per IAP.

Figure 6-6: First strike plan – Oil spill trajectory modelling

Supporting Information

Contact AMOSC Duty Manager to initiate oil spill trajectory modelling. Contact: 0438 379 328.

Data Needed for Initial Modelling	Hydrocarbon type, discharge rate / volume
	Discharge release point - coordinates and depth
	Wind conditions (strength and direction)

Satellite Imagery

2 h

Planning Coordinator to place request to OSRL for provision of satellite images.

8 h

- Planning Coordinator and CICC Leader to determine image acquisition frequency e.g. daily.

16 h

- Third-party satellite image provider to inform OSRL of the first available satellite image acquisition time and advise CICC accordingly.

24 h

- OSRL / third party deliver satellite image.
- Satellite imagery showing oil spill trajectory used in development of the IAP to inform all response strategies, and used as an input to any OSTM.

>24 h

- Communicate satellite imagery requirements to OSRL for the next 24 h period.
- Complete surveillance requirements as per IAP.

Figure 6-7: First strike plan – Satellite imagery

Supporting Information

Contact OSRL Singapore Duty Manager (24/7): +65 6266 1566.

Environmental Performance Standards

Table 6-10 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of Monitor and Evaluate response strategy.

Table 6-10: Environmental performance – Monitor and evaluate

Monitor and Evaluate		
Environmental Performance Outcome	**Implementation of monitor and evaluate activities in order to provide situational awareness to inform CICC decision-making.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate monitoring and evaluation, inclusive of the Operational Monitoring Plans detailed in Table 5-1 of the APPEA Joint Industry Operational and Scientific Monitoring (OSM) Plan Framework, following a Level 2 or Level 3 hydrocarbon spill within 2 hours of forming CICC and in a manner consistent with the initiation criteria detailed within Table 9-1 of the of the APPEA Joint Industry OSM Plan Framework.	Incident log	CICC Leader
Woodside shall undertake all monitoring and evaluation tasks within the defined timeframes as per the monitoring and evaluation first strike plans.	Incident log / communication records	CICC Leader
Woodside shall implement operational monitoring as per Part B of the Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP) (Appendix C).	Incident log	CICC Leader
Woodside shall meet all minimum standards relating to operational monitoring as per Appendix A of the APPEA Joint Industry OSM Plan Framework.	Incident log	CICC Leader
Woodside shall terminate monitoring and evaluation, inclusive of the Operational Monitoring Plans detailed in Table 5-1 of the APPEA Joint Industry OSM Plan Framework, in accordance with the task-specific termination criteria detailed within the response implementation (**Table 6-9**) of this OPEP and in a manner consistent with the termination criteria detailed within Table 9-1 of the APPEA Joint Industry OSM Plan Framework.	Sign-off reports	CICC Leader

6.6 Shoreline Protection

Response Implementation

Table 6-11: Response implementation – Shoreline protection

Shoreline Protection	
Response Objective	Protection of priority shorelines from contact from surface (floating) hydrocarbons and reduced hydrocarbon loading on shorelines.
Initiation Criteria	Hydrocarbon spill (Level 2 / 3)
Responsible	DoT IMT / Joint Strategic Coordination Committee (JSCC)
Controlling Agency	Vic DoT (State)
Emergency Contact	AMOSC Duty Manager (24/7): 0438 379 328
	Vic DoT State Duty Officer (SDO) 24-hour reporting: Marine pollution incidents that are in, or may impact, state waters as soon as reasonably practicable Mobile: 0409 858 715 Marine Pollution Incident Report Form to email: semdincidentroom@transport.vic.gov.au Cultural Heritage Permits – First Peoples State Relations **www.firstpeoplesrelations.vic.gov.au** Phone: 03 9651 5111
Activation Time	Within 2 hours of standing up CICC
Implementation Plan / Guidance Document	Woodside Shoreline Protection and Deflection Operational Plan APU Oil Spill Response Strategy – RS5 Shoreline Protection (AOHSE-ER-0057) Primary Tactical Response Plans: • Aire River • Curdies Inlet • Gellibrand River • Warrnambool
Termination Criteria	Outcomes of the operational SIMA determine that shoreline protection is no longer effective at protecting sensitive resources and in agreement with the Jurisdictional Authority.

First Strike Plan

2 h
- Logistics Coordinator request AMOSC to prepare shoreline protection equipment & determined operating base.
- Activate AMOSC Core Group for trained oil spill operations personnel to act as Field Supervisors and Operators.

8 h
- Undertake Operational SIMA & develop IAP (in consultation & agreement with Vic DoT).
- Identify protection priorities in agreement with Vic DoT (based upon monitoring results).
- Engage labour-hire contract.

16 h
- Confirm receipt of AMOSC equipment.
- Confirm priority protection areas (in agreement with Vic DoT).
- Arrange logistics / accomodation for response personnel.

24 - 96 h
- Confirm logistics / accomodation for first-strike (Core Group) response personnel.
- Mobilise boom equipment from Geelong to protection priority locations.
- Initiate shoreline protection as per IAP.
- Complete daily safety analysis and Operational SIMA for the next 24 h.
- Assess efficiency of booming and build response actions into IAP.
- Identify further additional requirements e.g. logistics / personnel / accomodation / equipment.

>96 h
- Provide induction for labour-hire personnel.
- Mobilise additional labour-hire personnel / equipment to priority protection areas.
- Complete daily safety analysis and Operational SIMA for the next 24 h.
- Assess efficiency of booming and build response actions into IAP.
- Continue as directed by Vic DoT.

Figure 6-8: First strike plan – Shoreline protection

Supporting Information

Mobilise AMOSC shoreline response team to coordinate delivery of shoreline response equipment from Geelong.

Primary Tactical Response Plans:

- Aire River
- Curdies Inlet
- Gellibrand River
- Warrnambool

Environmental Performance Standards

Table 6-12 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of Shoreline Protection response strategy.

Table 6-12: Environmental performance – Shoreline protection

Shoreline Protection		
Environmental Performance Outcome	**Timely implementation of shoreline protection to reduce overall shoreline accumulation.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate shoreline protection within 2 hours of forming CICC following a Level 2 or Level 3 hydrocarbon spill and at the direction of the Controlling Agency.	Incident log	CICC Leader
Woodside shall undertake all shoreline protection tasks within the defined timeframes as per the shoreline protection first strike plan.	Incident log / communication records	CICC Leader / JSCC
At a minimum, shoreline response IAPs shall consider: • Responder HSE requirements; • Suitability of shoreline response strategies in relation to coastal features and potential environmental risks; • Management of personnel and equipment on nesting beaches; • Potential impacts from night time operations (light spill / glow) on listed species; and • Potential disturbance to intertidal habitats from response operations.	IAP	CICC Leader / JSCC
Woodside shall undertake shoreline protection as directed by Vic DoT.	Incident log / communication records	CICC Leader
Response personnel induction shall include: • Activity-specific controls; • Overview of EPBC listed / threatened / migratory species and fauna handling requirements and reporting protocols; • Hazards to shoreline environments due to response operations; • Hazards associated with artificial lighting and overview of National Light Pollution Guidelines (DoEE, 2020) and light reduction measures for night time operations; and • Oil contaminated waste containment and equipment cleaning measures; and	Training records.	Woodside
Project induction for Vessel Masters shall include: • EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans;	Training records	Woodside

Shoreline Protection		
Environmental Performance Outcome	**Timely implementation of shoreline protection to reduce overall shoreline accumulation.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
• Hazards to nearshore benthic environments due to mooring activities; • Hazards associated with artificial lighting and overview of National Light Pollution Guidelines (DoEE, 2020) and light reduction measures for night time operations; • Speed limitations in nearshore environments to reduce engine noise; • Overview of Marine Order 91 (Pollution Prevention – Oil), Marine Order 94 (Pollution Prevention – Packaged Harmful Substances), Marine Order 95 (Pollution Prevention – Garbage) and Marine Order 96 (Pollution Prevention – Sewage); • Waste containment measures for small vessels and onshore waste disposal options; and • An overview of Australian Ballast Water Management Requirements (Rev 8).		
Shoreline protection equipment including boats shall be selected that are fit for purpose (i.e., shallow-bottom) and no anchoring of vessels or booms will occur on emergent reefs or other fragile/ sensitive benthic habitats.	Contracts for use of shoreline protection equipment with OSRAs.	Woodside
Woodside shall provide demarcation of identified values and sensitivities to mitigate potential impacts from response personnel and equipment.	Incident log	Woodside
Shoreline protection operations shall avoid cultural heritage sensitivities, or where entry is required shall be done in consultation with, and approval of, the First Peoples – State Relations prior to entry.	Records of IAPs and field reports include review and management of heritage values.	CICC Leader / JSCC
All response vessels shall be subject to Introduced Marine Species Risk Assessment and Approval Procedure (AOHSE-E-0018-001).	Assessment records	Woodside
Woodside shall terminate shoreline protection when the outcomes of the Operational SIMA determine that shoreline protection is no longer effective at protecting sensitive resources as agreed with the Jurisdictional Authority.	Sign-off report	CICC Leader / JSCC

6.7 Shoreline Clean-Up

Response Implementation

Table 6-13: Response implementation – Shoreline clean-up

Shoreline Clean-up	
Response Objective	Shoreline clean-up of hydrocarbons
Initiation Criteria	Hydrocarbon spill (Level 2 / 3)
Responsible	DoT IMT / Joint Strategic Coordination Committee (JSCC)
Controlling Agency	Vic DoT (State)
Emergency Contact	AMOSC Duty Manager (24/7): 0438 379 328
	Vic DoT State Duty Officer (SDO) 24-hour reporting: Marine pollution incidents that are in, or may impact, state waters as soon as reasonably practicable Mobile: 0409 858 715 Marine Pollution Incident Report Form to email: semdincidentroom@transport.vic.gov.au Cultural Heritage Permits – First Peoples State Relations **www.firstpeoplesrelations.vic.gov.au** Phone: 03 9651 5111
Activation Time	Within 2 hours of standing up CICC
Implementation Plan / Guidance Document	Woodside Shoreline Clean-up Operational Plan OSR Shoreline Operations Field Guide: A guide to operational and monitoring requirements for shoreline clean-up operations (2011) POSOW Oiled Shoreline Assessment Manual: https://www.posow.org/documentation/assessmentmanual.pdf POSOW Oiled Shoreline Clean-up Manual: https://www.posow.org/documentation/cleanupmanual.pdf
Termination Criteria	When acceptable levels of cleanliness (endpoint criteria), as agreed with Controlling Agency, have been met and signed off consistent with National Plan Response, Assessment and Termination of Cleaning for Oil Contaminated Foreshores (NP-GUI-025) (2015).

First Strike Plan

2 h

- Logistics Coordinator request AMOSC to prepare shoreline protection equipment & determined operating base.
- Activate AMOSC Core Group for trained oil spill operations personnel to act as Field Supervisors (SCAT & clean-up) and Operators.

8 h

- Undertake Operational SIMA & develop IAP (in consultation & agreement with Vic DoT).
- Identify protection priorities in agreement with Vic.
- Engage labour-hire contract.

16 h

- Confirm receipt of AMOSC equipment.
- Confirm shoreline clean-up kits mobilised - mobilise additional equipment if required.
- Confirm priority protection areas (in agreement with Vic DoT).
- Arrange logistics / accomodation for response personnel.

24 - 96 h

- Confirm logistics / accomodation for first-strike (Core Group) response personnel.
- Mobilise equipment from Geelong to protection priority locations.
- Initiate shoreline clean-up as per IAP.
- Complete daily safety analysis and Operational SIMA for the next 24 h.
- Assess efficiency of booming and build response actions into IAP.
- Identify further additional requirements e.g. logistics / personnel / accomodation / equipment.

>96 h

- Provide induction for labour-hire personnel.
- Mobilise additional labour-hire personnel / equipment to priority protection areas.
- Complete daily safety analysis and Operational SIMA for the next 24 h.
- Assess efficiency of booming and build response actions into IAP.
- Continue as directed by Vic DoT until endpoint criteria met.

Figure 6-9: First strike plan – Shoreline clean-up

Environmental Performance Standards

Table 6-14 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of Shoreline Clean-up response strategy.

Table 6-14: Environmental performance – Shoreline clean-up

Shoreline Clean-up		
Environmental Performance Outcome	**Timely implementation of shoreline clean-up to remove stranded hydrocarbons to accelerate habitat recovery.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate shoreline cleanup within 2 hours of forming CICC following a Level 2 or Level 3 hydrocarbon spill and at the direction of the Controlling Agency	Incident log	CICC Leader
Woodside shall undertake all shoreline clean-up tasks within the defined timeframes as per the shoreline clean-up first strike plan	Incident log / communication records	CICC Leader / JSCC
At a minimum, shoreline response IAPs shall consider: • Responder HSE requirements; • Suitability of shoreline response strategies in relation to coastal features and potential environmental risks; • Management of personnel and equipment on nesting beaches; • Potential impacts from night time operations (light spill / glow) on listed species; and • Potential disturbance to intertidal habitats from response operations.	IAP	CICC Leader / JSCC
Woodside shall undertake shoreline clean-up as directed by Vic DoT.	Incident log / communication records	CICC Leader
Response personnel induction shall include: • Activity-specific controls; • Overview of EPBC listed / threatened / migratory species and fauna handling requirements and reporting protocols; • Hazards to shoreline environments due to response operations; • Hazards associated with artificial lighting and overview of National Light Pollution Guidelines (DoEE, 2020) and light reduction measures for night time operations; and • Oil contaminated waste containment and equipment cleaning measures.	Training records.	Woodside
The type and size of shoreline clean-up equipment shall be appropriate for the nature and scale of response operation and objective of IAP.	Incident log	Woodside

Shoreline Clean-up		
Environmental Performance Outcome	**Timely implementation of shoreline clean-up to remove stranded hydrocarbons to accelerate habitat recovery.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall provide demarcation of identified values and sensitivities to mitigate potential impacts from response personnel and equipment.	Incident log	Woodside
Shoreline clean-up operations shall avoid cultural heritage sensitivities, or where entry is required shall be done in consultation with, and approval of, the First Peoples State Relations prior to entry.	Records of IAPs and field reports include review and management of heritage values.	CICC Leader / JSCC
Woodside shall terminate shoreline clean-up when acceptable levels of cleanliness (endpoint criteria) have been met, as agreed with Controlling Agency, and signed off consistent with National Plan Response, Assessment and Termination of Cleaning for Oil Contaminated Foreshores (NP-GUI-025) (2015).	Sign-off report	CICC Leader / JSCC

6.8 Environmental Monitoring

Response Implementation

Table 6-15: Response implementation – Environmental monitoring

Environmental Monitoring	
Response Objective	Identify areas potentially exposed to hydrocarbon, assess the effects of hydrocarbon exposure and monitor post-spill recovery of sensitive environmental receptors.
Initiation Criteria	Hydrocarbon spill (Level 2 / 3)
Responsible	CICC Planning Coordinator
Controlling Agency	Woodside (Commonwealth) WA DoT (State)
Emergency Contact	OSM Service Providers
Activation Time	<8 hours after notification from Woodside CICC
Implementation Plan / Guidance Document	Woodside Oil Spill Scientific Monitoring Program – Operational Plan Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP) (Appendix C).
Program-Specific Termination Criteria	Environmental Monitoring – Water Quality, Sediment Quality and Benthic Infauna: • Oil concentrations in marine waters must not exceed normal background concentrations; and (if activated) • No statistical difference in hydrocarbon concentrations in sediments between impact and reference locations; and (if activated). • No statistical difference in benthic infauna abundance and diversity between impact and reference locations; • Deemed unsafe to continue implementing activities; and • Agreement is reached with the Jurisdictional Authority. Environmental Monitoring – Benthic Habitats and Benthic Primary Producers: • Oil concentrations in marine waters must not exceed normal background concentrations; and • No statistical difference in species diversity, abundance, distribution and percentage cover of benthic habitats (e.g. corals, macroalgae and seagrasses) between impact and reference locations; and (if activated) • No statistical difference in mangrove bioindicators (e.g. faunal burrows, pneumatophore counts, leaf health status) between impact and reference locations; • Deemed unsafe to continue implementing activities; and • Agreement is reached with the Jurisdictional Authority. Environmental Monitoring – Seabirds and Migratory Shorebirds: • Oil concentrations in marine waters must not exceed normal background concentrations; and • No statistical difference in oiled seabird or migratory shorebird abundance and diversity between impact and reference locations. • Deemed unsafe to continue implementing activities; and • Agreement is reached with the Jurisdictional Authority. Environmental Monitoring – Marine Mammals and Megafauna:

	• Oil concentrations in marine waters must not exceed normal background concentrations; • No statistical difference in marine mammal, shark abundance between impact and reference locations. • Deemed unsafe to continue implementing activities; and • Agreement is reached with the Jurisdictional Authority. Environmental Monitoring – Marine Reptiles: • Oil concentrations in marine waters must not exceed normal background concentrations; and • Deemed unsafe to continue implementing activities; and • Agreement is reached with the Jurisdictional Authority. Environmental Monitoring – Commercial and Recreational Fish Species: • Oil concentrations in marine waters must not exceed normal background concentrations; and • Hydrocarbon levels in representative commercial and recreational fish species tissue meet statutory specification for food products as per Yender et al. (2002); • No statistical difference in hydrocarbon levels in representative commercial and recreational fish species tissue between impact and reference locations; • Victorian Fisheries Authority (State) AFMA (Cwth) is satisfied that levels of hydrocarbons in targeted fish species are no longer related to the oil spill event. • Deemed unsafe to continue implementing activities; and • Agreement is reached with the Jurisdictional Authority. Environmental Monitoring – Effects of an Oil Spill on Fishes: • Oil concentrations in marine waters must not exceed normal background concentrations; and • No statistical difference in species diversity and abundance, of mobile and site-attached fishes between impact and reference locations; and • Fisheries is satisfied that the patterns of species diversity and abundance of fishes associated with seagrasses, macroalgal beds and deep-water sponge gardens (to a depth of 100 m) are no longer related to the oil spill event. • Deemed unsafe to continue implementing activities; and • Agreement is reached with the Jurisdictional Authority.

OSM Activation Process

Responsibility	Task	Timeframe
CICC Environment Lead (Planning)	Review initiation criteria of OMPs and SMPs during the preparation of the initial Incident Action Plan (IAPs) and subsequent IAPs; and if any criteria are met, activate relevant OMPs and SMPs.	Within 4 hours of spill notification
	Obtain approval from CICC Leader to initiate OSM.	Within 4 hours of spill notification
	Contact OSM Services Provider and notify on-call officer of incident, requesting provision of OSM Implementation Lead to the CICC.	Within 4 hours of spill notification
	Provide monitor and evaluate data (e.g. aerial surveillance, fate and weathering modelling, tracking buoy data) to OSM Services Provider.	Within 1 hour of data being received by CICC
	Liaise directly with OSM Services Provider to confirm which OMPs and SMPs are to be fully activated.	Within 3 hours of monitor and evaluate data being received by CICC
	Provide purchase order to OSM Services Provider (cross reference OSM Standby Services Scope of Work).	Within 72 hours of initial notification to OSM Services Provider
	Record tasks in Personal Log.	At time of completion of task
OSM Service Provider	On-call officer to notify Service Provider Manager of activation and contact OSM Implementation Lead and Scientific Logistics Coordinator.	Within 8 hours of notification being made to OSM Services Provider
	Send OSM Implementation Lead and Scientific Logistics Coordinator to CICC.	Within 12 hours of notification being made to OSM Services Provider
	Liaise directly with CICC Environment Lead to confirm which OMPs and SMPs are to be fully activated.	Within 4 hours of monitor and evaluate data being received from CICC
	Confirm availability of initial personnel and equipment resources.	Within 5 hours of monitor and evaluate data being received from CICC

Supporting Information

Implementation of Environmental (Scientific) Monitoring is detailed within Part B of the Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP) (Appendix C).

The sampling procedures to assess water and sediment quality, benthic habitats and marine wildlife are described in following Environmental Monitoring Procedures:

- Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037)
- Monitoring Effects of an Oil Spill on Birds (AOHSE-ER-0038)

- Monitoring Effects of an Oil Spill on Marine Mammals and Megafauna (AOHSE-ER-0039)
- Monitoring Effects of an Oil Spill on Benthic Habitats and Benthic Primary Producers (AOHSE-ER-0040)
- Monitoring Effects of an Oil Spill on Marine Reptiles (AOHSE-ER-0043)
- Monitoring Effects of an Oil Spill on Commercial and Recreational Fish Species (AOHSE-ER-0048)
- Monitoring Effects of an Oil Spill on Fishes (AOHSE-ER-0051).

Environmental Performance Standards

Table 6-16 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of Environmental Monitoring response strategy.

Table 6-16: Environmental performance – Environmental monitoring

Environmental Monitoring		
Environmental Performance Outcome	**Implement environment monitoring programs in a timely manner to identify areas potentially exposed to hydrocarbon, assess the effects of hydrocarbon exposure and monitor post-spill recovery of sensitive environmental receptors.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate environmental monitoring, inclusive of the Scientific Monitoring Plans detailed in Table 6-1 of the APPEA Joint Industry Operational and Scientific Monitoring (OSM) Plan Framework, following a Level 2 or Level 3 hydrocarbon spill and in a manner consistent with the initiation criteria detailed within Table 9-2 of the APPEA Joint Industry OSM Plan Framework.	Incident log	CICC Leader
Woodside shall initiate environmental (scientific) monitoring within the timeframes detailed within the OSM Activation Process.	Incident log / communication records	CICC Environment Lead
Woodside shall implement environmental (scientific) monitoring as per Part B of the Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP) (Appendix C).	Incident log	CICC Leader
Woodside shall meet all minimum standards relating to scientific monitoring as per Appendix A of the APPEA Joint Industry OSM Plan Framework.	Incident log	CICC Leader
Environmental monitoring personnel shall be appropriately trained to undertake monitoring operations as per Section 9.1 of the Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP) (Appendix C).	Training records	CICC Environment Lead OSM Service Provider
Environmental monitoring operations shall avoid cultural heritage sensitivities, or where entry is required shall be done in consultation with, and approval of, the Victorian Heritage Council, DELWP and Parks Victoria prior to entry.	Records of IAPs and field reports include review and management of heritage values.	CICC Leader
Woodside shall terminate environmental monitoring, inclusive of the Scientific Monitoring Plans detailed in Table 6-1 of the APPEA Joint Industry OSM Plan Framework, in accordance with the program-specific termination criteria detailed within the response implementation (**Table 6-15**) of this OPEP and in a manner consistent with the termination criteria detailed within Table 9-2 of the of the APPEA Joint Industry OSM Plan Framework.	Sign-off reports	CICC Leader

6.9 Oiled Wildlife Response

Response Implementation

Table 6-17: Response implementation – Oiled wildlife response

Oiled Wildlife	
Response Objective	Protect exposed wildlife by removal and relocation, or treatment and release, during a spill event.
Initiation Criteria	Hydrocarbon spill (Level 2 / 3)
Responsible	CICC Leader (Commonwealth) / DELWP (State)
Controlling Agency	DAWE (Commonwealth) / Vic DoT (State)
Emergency Contact	AMOSC Duty Manager (24/7): 0438 379 328
	Vic DoT State Duty Officer (SDO) 24-hour reporting: Marine pollution incidents that are in, or may impact, state waters as soon as reasonably practicable Mobile: 0409 858 715 Marine Pollution Incident Report Form to email: semdincidentroom@transport.vic.gov.au
Activation Time	Within 2 hours of standing up CICC
Implementation Plan / Guidance Document	Woodside Oiled Wildlife Response Operational Plan Oil Spill Response Strategy – RS11 Oiled Wildlife Response (AOHSE-ER-0061). Victorian Emergency Animal Welfare Plan
Termination Criteria	As directed by the Control Agency, stated within the Victorian Emergency Animal Welfare Plan, or in agreement with the Jurisdictional Authority (DEWLP in State & DAWE in Commonwealth).

First Strike Plan

2 h

- Logistics Coordinator request AMOSC to prepare wildlife recovery & cleaning equipment in Geelong.
- Activate AMOSC Core Group for trained oiled wildlife responders.
- Advise Vic DOT/DEWLP/DAWE oiled wildlife response is necessary, and provide ETA of equipment and personnel.

8 h

- Undertake SIMA & develop IAP (in consultation & agreement with Vic DoT/DEWLP/DAWE).
- Identify protection priorities in agreement with Vic DoT/DEWLP/DAWE (based upon monitoring results).
- Engage Veterinarians in consultation with DEWLP.

16 h

- Confirm receipt of AMOSC equipment.
- Confirm priority protection areas (in agreement with Vic DoT/DEWLP/DAWE).
- Arrange logistics / accomodation for response personnel.

24 - 96 h

- Confirm logistics / accomodation for first-strike response personnel.
- Establish field oiled wildlife facilities at protection priority locations.
- Initiate early triage and field processing under direction of DEWLP.
- Complete daily safety analysis and Operational SIMA for the next 24 h.
- Select primary care facility location in consultation with Vic DoT / DEWLP.

>96 h

- Establish primary care facility and support services in consultation with Vic DoT / DEWLP.
- Complete daily safety analysis and Operational SIMA for the next 24 h.
- Continue as directed by DEWLP / DAWE until end-point criteria met.

Figure 6-10: First strike plan – Oiled wildlife response

Environmental Performance Standards

Table 6-18 provides the environmental performance outcomes, performance standards and measurement criterial for the implementation of Oiled Wildlife Response strategy.

Table 6-18: Environmental performance – Oiled wildlife response

Oiled Wildlife Response (OWR)		
Environmental Performance Outcome	**Implement oiled wildlife response in accordance with the Victorian Emergency Animal Welfare Plan to protect exposed wildlife by removal and relocation, or treatment and release, during a spill event.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate oiled wildlife response following a Level 2 or Level 3 hydrocarbon spill and at the direction of the Jurisdictional Authority.	Incident log	CICC Leader
Woodside shall undertake all oiled wildlife response tasks within the defined timeframes as per the oiled wildlife response first strike plan	Incident log / communication records	CICC Leader / JSCC
Woodside shall undertake oiled wildlife response within State jurisdiction under the direction of DEWLP and in a manner consistent with the Victorian Emergency Animal Welfare Plan.	Incident log / communication records	CICC Leader / JSCC
Woodside shall undertake oiled wildlife response within Commonwealth jurisdiction under the direction of DAWE and in consultation with DEWLP in a manner consistent with the Victorian Emergency Animal Welfare Plan.	Incident log / communication records	CICC Leader / JSCC
Lead oiled wildlife response personnel shall be trained to the satisfaction of DEWLP and experienced for the activities to which they are assigned.	Training records	CICC Leader / JSCC
Support oiled wildlife response personnel shall be trained to the satisfaction of DEWLP prior to undertaking oiled wildlife response operations.	Training records	CICC Leader / JSCC
Oiled wildlife response operations shall avoid cultural heritage sensitivities, or where entry is required shall be done in consultation with, and approval of, the First Peoples State Relations.	Records of IAPs and field reports include review and management of heritage values	CICC Leader / JSCC
Woodside shall terminate oiled wildlife response when end-point criteria have been met as per the Victorian Emergency Animal Welfare Plan and in agreement with the Jurisdictional Authority (DEWLP in State & DAWE in Commonwealth).	Sign-off report	CICC Leader / JSCC

6.10 Forward Operating Base

Response Implementation

Table 6-19: Response implementation – Forward operating base

Forward Operating Base	
Response Objective	Establish a forward command post with Woodside personnel and communications support to enable effective coordination of on-ground resources during an oil spill response.
Initiation Criteria	Hydrocarbon spill (Level 2 / 3)
Responsible	CICC Leader
Controlling Agency	Woodside
Emergency Contact	AMOSC Duty Officer for first instance.
Activation Time	Commence within 2 hours of standing up CICC
Termination Criteria	End of response

First Strike Plan

2 h

- CICC Logistics Coordinator to request establishment of intial Forward Operating Base (FOB) at AMOSC, Geelong.
- CICC Logistics Coordinator to determine what Woodside resources can be mobilised to Geelong.

8 h

- Secure accommodation and rental vehicles.
- Engage Vic DoT regarding alternate FOB locations.
- Engage with Vic DoT regarding co-location at FOBs.

16 h

- Confirm IT connection / communications at Forward Operating Base is available.

>24 h

- Complete daily safety analysis for next 24 h period.
- Carry forward logistics requirements as per IAP.

Figure 6-11: First strike plan – Forward operating base

Supporting Information

AMOSC Geelong: 38-40 Corio Quay Rd, North Geelong VIC 3215, Australia

Environmental Performance Standards

Table 6-20 provides the environmental performance outcomes, performance standards and measurement criteria for the implementation of Forward Operating Base response strategy.

Table 6-20: Environmental performance – Forward operating base

Forward Operating Base		
Environmental Performance Outcome	**Forward operating base will be maintained to facilitate effective and sustained response deployment**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate the establishment of a Forward Operating Base (FOB) following a Level 2 or Level 3 hydrocarbon spill	Incident log	CICC Leader
Woodside shall undertake all forward operating base establishment tasks within the defined timeframes as per the forward operating base first strike plan	Incident log / communication records	CICC Leader
Woodside shall maintain the FOB to coordinate regional response activities for the duration of the oil spill response.	Incident log / communication records	CICC Leader

6.11 Oil Contaminated Waste Management

Response Implementation

Table 6-21: Response implementation – Oil contaminated waste management

Oil Contaminated Waste Management	
Response Objective	Conduct waste management operations in compliance with relevant waste treatment, transport and disposal regulations and in a manner consistent with waste management hierarchy.
Initiation Criteria	Hydrocarbon spill (Level 2 / 3)
Responsible	CICC Leader
Controlling Agency	Woodside
Emergency Contact	Regional Waste Service Provider
Activation Time	Within 24 hours of standing up CICC
Implementation Plan / Guidance Document	APU Waste Management Plan – Oil Spill (AOHSE-E-0014-001). IPIECA Oil spill waste minimisation and management: Good practice guidelines for incident management and emergency response personnel.
Termination Criteria	No further oiled waste is being generated by marine recovery, oiled wildlife, shoreline protection and/or the shoreline clean-up response strategies.

Environmental Performance Standards

Table 6-22 provides the environmental performance outcomes, performance standards and measurement criterial for the implementation of Oil Contaminated Waste Management response strategy.

Table 6-22: Environmental performance – Oil contaminated waste management

Oil Contaminated Waste Management		
Environmental Performance Outcome	**Waste management operations conducted in compliance with relevant waste treatment, transport and disposal regulations and in a manner consistent with waste management hierarchy.**	
Environmental Performance Standard	**Measurement Criteria**	**Responsibility**
Woodside shall initiate waste management operations following a Level 2 or Level 3 hydrocarbon spill.	Incident log	CICC Leader
Woodside shall undertake an Operational SIMA and preliminary IAP and within 24 hours of an incident, to inform mobilisation of site waste management response requirements.	Operational SIMA / IAP / Incident log	CICC Leader
Woodside shall engage the services of a regional Waste Contractor and request the mobilisation of equipment and personnel within 24 hours of notification.	Contract / Communication records	CICC Leader
Woodside shall undertake waste management in accordance with the APU Waste Management Plan – Oil Spill (AOHSE-E-0014-001)	Waste records	CICC Leader
Woodside shall undertake monitoring to determine the ongoing acceptability of the environmental risk associated with waste management methods.	Inspection records	CICC Leader
Woodside shall facilitate the management of oil contaminated waste for the full duration of the spill response until no further oiled waste is being generated by marine recovery, oiled wildlife, shoreline protection and/or the shoreline clean-up response strategies.	Incident log / waste records	CICC Leader

Appendix A – CICC Capability Analysis

Corporate Incident Coordination Centre (CICC) Capability Assessment Report

Document No: AOHSE-ER-0071

REVISION RECORD						
Rev	**Date**	**Description**	**Prepared by**	**Checked by**	**Reviewed by**	**Approved by**
4	30/06/2022	Issued for assessment	Environment Principal Projects	Principal Environment & Regulatory	Head of Drilling & Completions - Australia	Asset Manager

Revision History		
Revision Label	**Revision Date**	**Comments**
A	18/10/2021	Draft Issued for internal review
B	09/12/2021	Internal comments incorporated
0	13/12/2021	Issued for NOPSEMA assessment
1	10/03/2022	Revised to address NOPSEMA RFFWI
2	20/04/2022	Reissued to NOPSEMA
3	22/06/2022	Reissued for internal review post BHP/Woodside merger. Retitled.
4	30/06/2022	Issued to DJPR / Vic DoT / NOPSEMA for assessment

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Acronyms and Glossary

Term	Description
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority (Cwlth)
APPEA	Australian Petroleum Production and Exploration Association
APU	Australian Production Unit
BHP	BHP Petroleum Pty Ltd
BIP	Bridging Implementation Plan
BOD	OPEP: Basis of Design & Field Capability Assessment
BOP	Blow-out preventer
C&R	Containment and recovery
CEM	Crisis & Emergency Management
CICC	Corporate Incident Coordination Centre
CMT	Crisis Management Team
COP	Common operating picture
EMBA	Environment that may be affected
EMT	Emergency Management Team
EOC	Emergency Operations Centre
EP	Environment Plan
EPO	Environmental Performance Outcome
EPS	Environmental Performance Standard
ERP	Emergency Response Plan
ERT	Emergency Response Team
FOB	Forward Operational Base
FPSO	Floating production storage and offloading facility
FRT	Field Response Team
GIS	Geographic information system
HSE	Health, Safety and Environment
IAP	Incident Action Plan
I&CM	Incident and Crisis Management
IC	Incident Command
ICS	Incident Command System
IGN	Industry Guidance Note
IMR	Integrity Management & Response
IMT	Incident Management Team
IOGP	International Oil and Gas Producers
JSCC	Joint Strategic Coordination Committee
LEL	Lower explosive limits
LO	Liaison Officer
LOWC	Loss of well control
m^2	Square metre
MDO	Marine diesel oil
MODU	Mobile offshore drilling unit
MoU	Memorandum of Understanding
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority (Cwlth)
OIM	Offshore Installation Manager
OM	Operational monitoring program
OPEP	Oil Pollution Emergency Plan
OPICC	Offshore petroleum incident coordination committee
OSM	Oil spill monitoring
OSMBIP	Operational and Scientific Monitoring Bridging Implementation Plan
OSMP	Operational and Scientific Monitoring Program
OSRA	Oil Spill Response Agency
OSRL	Oil Spill Response Limited
OSRO	Oil spill response organisation
OSTM	Oil spill trajectory modelling
OWR	Oiled wildlife response
P&D	Protection and deflection
PIC	Person in charge
PS&BR	Property, Security and Business Resilience
ROV	Remotely operated vehicle
SAR	Search and rescue
SCAT	Shoreline clean-up assessment technique
SCS	Source Control Section
SCSC	Source Control Section Chief
SCERP	Source Control Emergency Response Plan
SCME	State Controller Maritime Emergencies (Victoria)
SFRT	Subsea First Response Toolkit
SHP-MEE	State Hazard Plan – Maritime Environmental Emergencies
SIMA	Spill Impact Mitigation Assessment
SIMOPS	Simultaneous operations
SIRT	Subsea Incident Response Toolkit
SMPC	State Marine Pollution Coordinator (Western Australia)
SMV	Surveillance, monitoring and visualisation
SOPEP	Shipboard Oil Pollution Emergency Plan
SPEAR	Safety of Personnel, the Environment, Assets and Reputation
UK	United Kingdom
Vic DoT	Department of Transport (Victoria)
VOC	Volatile organic compound
WA	Western Australia
WA DBCA	Department of Biodiversity, Conservation & Attractions (WA)
WA DoT	Department of Transport (WA)
WCD	Worst-case Discharge
WSD	Well & Seismic Delivery

1 Introduction

BHP Petroleum and Woodside announced their intention to merge in 2021 which was effective on the 1 June 2022. Prior to the merger date BHP Petroleum and Woodside acted as independent companies and planning activities for this decommissioning Environment Plan were conducted independently. The merger consisted of a change of control of BHP Petroleum International Pty Ltd (holding company for BHP global petroleum business) via a share sale to Woodside Petroleum Ltd. All BHP Petroleum entities holding Australian Petroleum titles transferred to Woodside parent company control with this change in ownership.

All BHP Petroleum policies, standards, processes and procedures were included in the merger agreement and remain valid. Harmonisation of processes between BHP Petroleum and Woodside commenced planning upon the completion of the merger and will be conducted in a staged manner. The BHP Petroleum HSE Management system will continue to be used by ‘heritage’ BHP operations until potential changes have been assessed. References to BHP, BHP Petroleum, Australian Production Unit (APU) and Woodside are interchangeable throughout this document.

Since the merger completion on 1 June 2022, BHP Petroleum (Australia) Pty Ltd, BHP Petroleum (Victoria) Pty Ltd, and parent company BHP Petroleum International Pty Ltd are owned 100% by Woodside Energy Group Ltd.

This document has been updated to reflected how BHP Petroleum integrates with the Woodside Incident and Crisis Management (I&CM) Process in relation to a potential oil pollution emergency in either the Pyrenees or Minerva Field, operated by BHP Petroleum (Australia) Pty Ltd and BHP Petroleum (Victoria) Pty Ltd respectively.

2 Purpose

The purpose of this document is to:

- Assess the Corporate Incident Coordination Centre (CICC) capability which would be required to mobilise and maintain the oil spill response field capability for a credible worst-case oil pollution emergency (i.e., a LOWC scenario) within either the Pyrenees or Minerva Fields, during the initial ramp-up period of the response, until the CICC has reached its peak/plateau work output and team size.
- Provide an overview of the CICC capability and linkages to the Woodside I&CM Structure, the Source Control Section (SCS), the Oil Spill Monitoring (OSM) Management Team and linkages to field-based Emergency Response Teams (ERTs), and with mutual aid capabilities including external oil spill response organisations (OSROs).
- Provide Environmental Performance Outcomes (EPOs) and Environmental Performance Standards (EPSs) related to the CICC capability and arrangements for oil spill response (refer Section 5).

3 Incident and Crisis Management (I&CM) Structure

Detailed within the Woodside Incident and Crisis Management Procedure, is the I&CM structure which is established and maintained to enable effective incident control, coordination, and communications at all levels. The structure includes and Emergency Response Team (ERT), Incident Management Team (IMT), the Corporate Incident Coordination Centre (CICC), Functional Support Teams (FST) and a Crisis Management Team (CMT). These teams and the appropriate level of activation are illustrated in Figure 3-1. This structure complements the principles of tiered incident management and measured escalation.

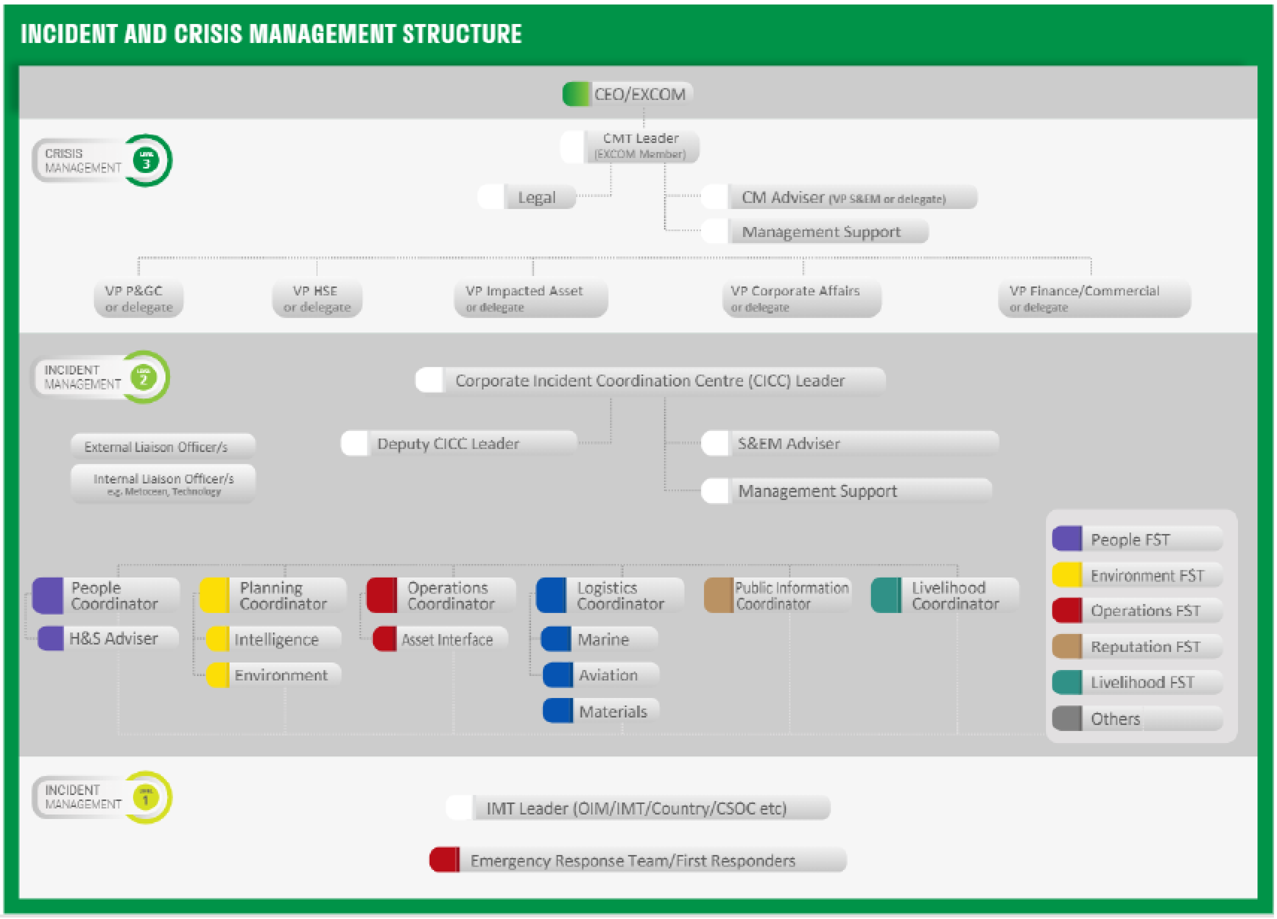

Figure 3-1: Incident and Crisis Management (I&CM) Organisational Structure

Personnel are appointed at appropriate levels throughout the Company to be responsible for maintaining the preparedness of each team. Their responsibilities include, but are not limited to:

- Rostering of team members to ensure availability;
- Maintaining contact directories;
- Identifying and satisfying training needs;
- Maintaining Competency Dashboards; and
- Coordinating the provision of training and confirming competencies through exercises.

The following sections describe the teams listed in Figure 3-1 based on a credible worst-case discharge spill scenario from Woodside operated assets in either the Pyrenees or Minerva Fields i.e., a full loss of well control (LOWC). At the time of writing, the largest potential WCD scenario identified for operated assets is associated with the Pyrenees Phase 4 Infill Drilling Program, as described within the *Pyrenees Infill Drilling Program Environment Plan* (BHPB-04PY-N950-0021). Likewise, this CICC Capability Assessment has been developed to meet the capability needs detailed within the activity-specific Emergency Response Basis of Design and

Field Capability Assessments. Future revisions of this CICC Capability Assessment must be evaluated against the current WCD scenarios for Woodside operated assets at the time of review.

3.1 Emergency Response Team (ERT)

The ERT is responsible for physically controlling incidents in the field or incident scene, where possible, and communicating known facts to the Corporate Incident Communications Centre (CICC). The senior person in charge (PIC) of the facility/site shall be responsible for the overall site emergency response to protect people, the environment, assets and reputation.

For spills within or entering Western Australian State jurisdiction, the Western Australian Department of Transport (WA DoT) is the Controlling Agency. For spills within or entering Victorian State jurisdiction, the Victorian Department of Transport (Vic DoT) is the Controlling Agency. As such, ERTs (Field Units) shall be formed at the direction of either WA DoT or Vic DoT.

The capability analysis for the Field Units is presented within the activity-specific Basis of Design and Field Capability Assessments. At the time of writing, the Pyrenees Phase 4 Basis of Design and Field Capability Assessment (BHPB-04PY-N950-0002) provides a description of the field capability required for the largest potential WCD scenario identified for operated assets within either the Pyrenees or Minerva Fields.

Roles and responsibilities of the offshore ERTs are detailed in Table 3-1, noting multiple ERTs with varying functional objectives may be deployed depending on the nature and scale of the actual emergency oil pollution event. ERTs are supported by the CICC, who in turn are supported by the CMT.

Table 3-1: ERT Roles and Responsibilities

Role	Responsibilities
ERT Leader (On-Scene Commander)	Report potential or actual incidents to the Woodside Communications Centre (WCC), and request escalation of response as required. The On-Scene Commander is responsible for determining the status of the emergency and providing assistance to the CICC Leader, as requested. The ERT Leader is responsible for the safe implementation of site / facility Emergency Response Plans. For MODU-related incidents, this will be the MODU Operator PIC with support from the Woodside Drilling Supervisor. For subsea infrastructure incidents within the Pyrenees Field this will be the Pyrenees FPSO Offshore Installation Manager (OIM). For vessel-related incidents, the Vessel Master assumes responsibility.
Emergency Communications Coordinator	The role of the Emergency Communications Coordinator is to provide a link between all operating responders and to assist them in controlling the incident.
Emergency Coordinator	The Emergency Coordinator provides technical support during the emergency response and communicates with the Emergency Commander.

3.2 The Woodside Communications Centre (WCC)

The Woodside Communications Centre (WCC) is a 24/7, central communication and coordination point for personnel and sites. Initial notification of a potential or actual incident must be made through the WCC. The activation of the CICC/FST/CMT will be actioned by the WCC.

3.3 Corporate Incident Coordination Centre (CICC)

The Woodside Corporate Incident Communication Centre (CICC) is led by empowered decision makers, who can facilitate access to additional resources. The CICC provides operational level incident coordination and/or incident control of response and recovery activities.

During offshore drilling activities (including plug and abandonment), and additional core position of Source Control Section Chief is instated within the CICC structure. CICC members shall always be on standby to respond to an incident during roster period, including the Source Control Section Chief during offshore drilling activities.

Functional Support Teams (FST) shall be activated by the CICC Leader (or delegate) according to the specific requirements of the incident.

Role-specific Corporate Coordination Centre Duty Cards provide guidance on typical duties for each appointment. In addition to typical duties, activity-specific spill response responsibilities for some CICC members are presented in Table 3-2.

Table 3-2: CICC Activity-Specific Responsibilities

Role	Responsibilities
CICC Leader	Initiation and implementation (via delegation) of activity-specific Oil Pollution Emergency Plans (OPEPs) and related spill response procedures. The CICC Leader is responsible for supplying Woodside (or delegate) personnel requested by WA DoT consistent with Appendix 3 of the WA DoT Offshore Petroleum Industry Guidance Note (IGN) – Marine Oil Pollution: Response and Consultation Arrangements (July, 2020) or Victorian DoT consistent with Victorian Joint Industry and State Oil Pollution Responses Guidance Note V2 2020.
Planning Coordinator	Supporting Commonwealth and State agencies, including NOPSEMA, the WA DoT (as the Controlling Agency in WA State jurisdiction) and the Victorian DoT (as the Controlling Agency in Victorian State jurisdiction) to facilitate an effective and timely response to oil pollution emergencies.
Logistics Coordinator	Waste Management (including oil contaminated wastes).
Operations Coordinator	Responsible for oversight of establishment and management of Forward Operating Base and field response staging areas.
Source Control Section Chief (Not presented within I&CM Organisational Structure)	Reports to the CICC Leader and is responsible for the management of all well source control operations. The Source Control Section Chief activates and supervises source control operational elements in accordance with the Incident Action Plan (IAP) and directs its execution. The SCSC also directs the preparation of source control plans necessary to re-establish well control, requests, or releases resources, makes expedient changes to the IAP, as necessary, and reports such to the CICC Leader.
External Liaison Officer	Coordinates Liaison Officer role for WA DoT consistent with WA DoT Offshore Petroleum Industry Guidance Note (IGN) – Marine Oil Pollution: Response and Consultation Arrangements (July, 2020) and Victorian DoT consistent with Victorian Joint Industry and State Oil Pollution Responses Guidance Note (V2 2020).

3.4 Functional Support Teams (FST)

Specialist FSTs can be established to support the CICC with expertise and capacity. FSTs execute tasks assigned by their functional coordinator in the CICC and assist in the collation of specialised information to meet incident management objectives. The composition of FSTs is determined by the nature of the incident, its scale, and its complexity. FSTs will also maintain interdependencies that are determined by the nature of the event.

The *Woodside Guideline: Crisis Management Support - Environment* provides information on the Environment Functional Support Team (Environment FST) structure, responsibilities and processes. The purpose of the guideline is to assist the Environment FST in understanding their responsibilities for providing appropriate resources to the Crisis Management Team (CMT) following notification of an emergency or crisis that has the potential to impact on people, Woodside assets or environment.

Amongst other responsibilities, the Environment FST Leader (or delegate) is responsible for:

- disseminating relevant information from activity-specific EP and OPEP (and associated response documentation) to the CICC to support IAP development and revision in a timely manner;
- support initial notifications to Regulators / Stakeholders;
- completing the initial operational SIMA;
- support the activation of surveillance, monitoring and visualisation (SMV) (i.e., satellite tracker buoys, satellite imagery, etc.);
- support resources at risk / protection priority risk assessment;
- assist Planning Coordinator with development of IAP tasking for SMV and at-sea response strategies;
- activate Oil Spill Monitoring (OSM) Management Team (refer Section 3.1.8).

Amongst other responsibilities, and in consultation with the External Liaison Officer, the Operations FST Leader is responsible for supporting the State Control Agency and:

- Under direction of State Controlling Agency:
    - Agree SCAT data recording processes, systems and tools.
    - Agree available SCAT/shoreline response resources/personnel.
    - Facilitate logistics with specifications of suitable remote response SCAT/shoreline vessels/platforms.
    - Commence early mobilisation of SCAT/shoreline response resources/personnel to FOB in consultation with CICC Logistic Coordinator.
- Under direction of WA DoT / WA DBCA (Western Australia) or Vic DoT / DELWP (Victoria):
    - Assist in coordination of initial oiled wildlife response (OWR) personnel; and
    - Interface with relevant wildlife experts/subject matter experts, to assist in defining OWR priorities and provide input to SIMA processes.

The Aboriginal Heritage Lead is responsible for:

- advising the CICC on appropriate aboriginal engagement and management strategies in the event of potential exposure of Aboriginal heritage sites or lands to hydrocarbon spills, or for the potential access of responders to Aboriginal heritage sites or lands; and
- engaging with relevant statutory agencies in relation to Aboriginal heritage.

3.5 Crisis Management Team (CMT)

The Company's CMT, as led by the accountable ExCom leader, are empowered by the CEO to provide leadership, strategic direction and decision making throughout a crisis.

3.6 CICC Source Control Section (SCS)

In the event of a loss of well control (LOWC) incident the Source Control Section Chief (SCSC) will establish a Source Control Section (SCS).

The SCS implements the activity-specific Source Control Emergency Response Plan (SCERP). The SCS develops and implements strategies and tactics to regain control of the well and stop or contain the discharge of hydrocarbons. These include:

- the coordination of engineering safety and operational activities,
- the development of task-specific plans and procedures,
- the identification of required tools and equipment,
- monitoring progress in achieving well control.

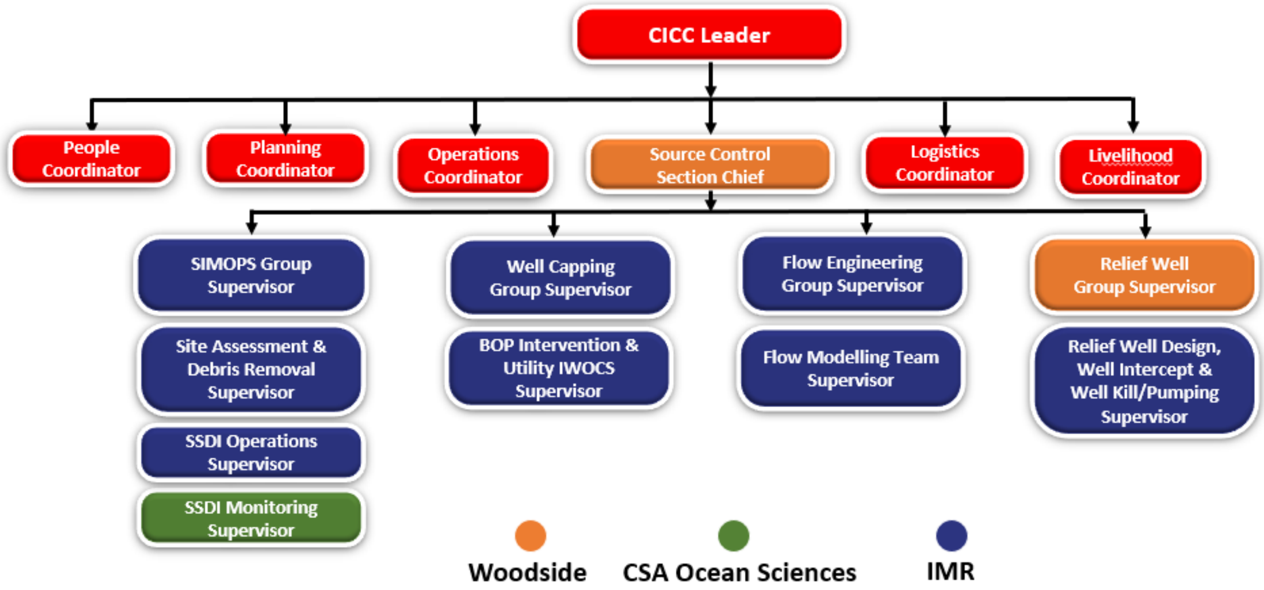

Figure 3-2: Source Control Section organisational chart

Perth-based Well & Seismic Delivery (WSD) representatives will fill the roles of Source Control Section Chief and the Relief Well Group Supervisor. These positions will be supported by Houston-based WSD representatives. Woodside has retained Integrity Management & Response (IMR) to staff SIMOPS Group Supervisor, Well Capping Group Supervisor, and Flow Engineering Group Supervisor roles and associated functions reporting to those roles Table 3-3.

IMR will fulfil these roles remotely from their dedicated Emergency Operations Centre (EOC) in Houston, USA and link into the Perth-based CICC virtually via platforms such as Microsoft Teams or Webex.

Table 3-3: Source Control Section roles, responsibilities and resourcing

Role	Responsibilities	Woodside / OSRO / MoU / Service Provider
SIMOPS Group Supervisor	Ensure safety and effectiveness of source control activities by: • Establishing control of the designated area • Identifying and communicating with resources in and around the designated area, including establishing the common operating picture • Management and coordination for the subsea site assessment, clearing of any debris to allow well access,	**Integrity Management & Response (IMR)**

Role	Responsibilities	Woodside / OSRO / MoU / Service Provider
	and deploying subsea dispersant and water column monitoring equipment	
Well Capping Group Supervisor	Coordinate all well capping operations, including developing incident specific procedures, the preparation and deployment of the capping stack, and management and co-ordination of an intervention on the BOP of the incident well.	**Integrity Management & Response (IMR)**
Flow Engineering Group Supervisor	Develop plan to monitor and conduct flow and production operations for the well including management and coordination of reservoir and flow modelling, estimation of the flow rate, flow assurance, hydrate inhibition requirements, subsea dispersant requirements, well integrity assessment, well kill procedures, and development of soft shut-in procedure including expected pressure response ranges.	**Integrity Management & Response (IMR)**
Relief Well Group Supervisor	Coordinate the planning and execution to drill relief well(s) to re-establish control of the well including development of the drilling plan, drilling procedures, sourcing resources, and managing relief well operations to ensure the relief well successfully reaches its target.	**Woodside (Perth-based)**

3.7 Oil Spill Monitoring (OSM) Team

The CICC will be responsible for coordinating OSM activities, which will be led by the Planning Coordinator, with support from other functions, in particular the Operations Coordinator. The CICC structure is shown in previous Figure 3-1.

For monitoring operations within State jurisdiction, the Controlling Agency will set monitoring priorities that Woodside will implement with oversight from the Controlling Agency i.e., WA DoT or Vic DoT.

Figure 3-3 illustrates the structure of the Oil Spill Monitoring (OSM) Management Team during the response phase. The CICC Leader is ultimately accountable for managing the response operation, which includes this plan. Depending on the scale of the event, individual people may perform multiple roles; similarly, multiple people may share the same role.

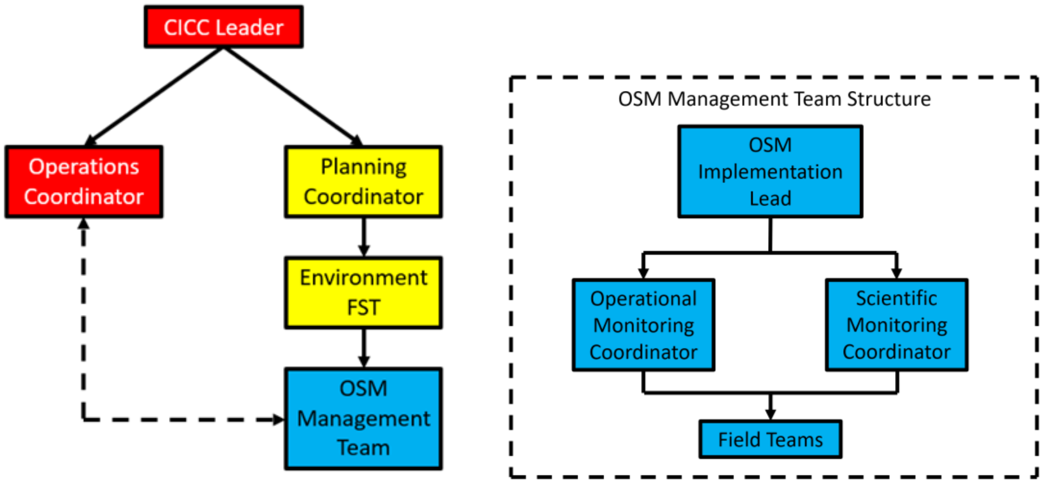

Figure 3-3: Woodside OSM Management Team organisational chart

Table 3-4 outlines the roles held by Woodside and the OSM Service Providers.

During the post-response phase, the Woodside Environment FST Lead and the OSM Service Providers OSM Implementation Lead will continue to be responsible for the coordination and delivery of monitoring plans.

Table 3-4: OSM Roles (Woodside and Service Providers)

Role	Resourcing Strategy
Environment FST Lead	Woodside
OSM Implementation Lead	OSM Service Providers
Operational Monitoring Coordinator and Scientific Monitoring Coordinator	OSM Service Providers
OSM Field Operations Manager	OSM Service Providers
OSM Field Teams	OSM Service Providers

The OSM Implementation Lead reports to the Woodside Environment FST Leader and is responsible for:

- Implementation of the Operational and Scientific Bridging Implementation Plan.
- Notification and activation of OSMP Contractors.
- Evaluation of situational awareness information against OSMP activation triggers to determine relevant operational monitoring programs (OMs) for immediate activation.
- Providing the Logistics Coordinator specifications of suitable OSMP vessels/platforms.

3.8 State Jurisdiction Arrangements

For all incidents, Woodside will use its CICC in Perth, Western Australia.

In Western Australia, the following arrangements apply:

- Western Australian Department of Transport (WA DoT) is the Control Agency for a Level 2 / Level 3 emergency event in State waters resulting from an offshore petroleum activity (in accordance with changes to the State Hazard Plan – Maritime Environmental Emergencies (SHP-MEE)). The WA DoT will only assume the role of Controlling Agency for that portion of the response activity that occurs within State waters as detailed in Appendix 2 (Lead IMT Responsibilities) of the WA DoT Offshore Petroleum Industry Guidance Note (IGN) – Marine Oil Pollution: Response and Consultation Arrangements (July, 2020).

This is regardless of whether the source of the spill is located in Commonwealth or State waters. WA DoT will send a Liaison Officer to the Woodside CICC.

In Victoria, and consistent with the Victorian Joint Industry and State Oil Pollution Responses Guidance Note (V2 2020), the following arrangements apply:

- Where Victorian State waters are impacted by cross-jurisdictional marine pollution incidents, Victorian Department of Transport (Vic DoT) will only assume the role of control agency for response activities occurring in Victorian state waters, in accordance with the MENSAR Plan. In this instance the Woodside will work in collaboration with Vic DoT, sharing response resources and providing qualified personnel to the Vic DoT IMT.
    - In a cross-jurisdictional marine pollution incident, Vic DoT and Woodside will each deploy an Emergency Management Liaison Officer (EMLO) (Woodside CICC to corresponding IMTs for effective communication between Vic DoT and Woodside. The role of the Vic DoT EMLO includes, but is not limited to:
    - Represent Vic DoT and provide the primary contact for the titleholder, inter-agency and/or inter-State coordination.
    - Facilitate effective communications between Vic DoT's State Controller Maritime Emergencies (SCME) and Incident Controller (CICC Leader) and Woodside's appointed Crisis Management Team (CMT) Leader and Incident Controller.
    - Provide enhanced situational awareness to Vic DoT of the incident and the potential impact on state waters.
    - Facilitate the delivery of technical advice from Vic DoT to the titleholder Incident Controller as required.

Vic DoT would anticipate the titleholder EMLO to perform a similar role on behalf of the titleholder, promoting effective communications between Vic DoT and titleholder.

In both WA and Victoria, to facilitate the overarching coordination between the two Controlling Agencies and their respective IMT's, a Joint Strategic Coordination Committee (JSCC) will be established (Figure 3-4). The JSCC will be jointly chaired by the State Marine Pollution Coordinator (SMPC) (in WA) / SCME (Victoria) and the Woodside's nominated senior representative and will comprise of individuals deemed necessary by the chairs to ensure an effective coordinated response across both jurisdictions.

Woodside will continue to undertake response actions for within State waters, until such time that Controlling Agency assumes control. Woodside will subsequently provide resources to facilitate the response in State Jurisdiction.

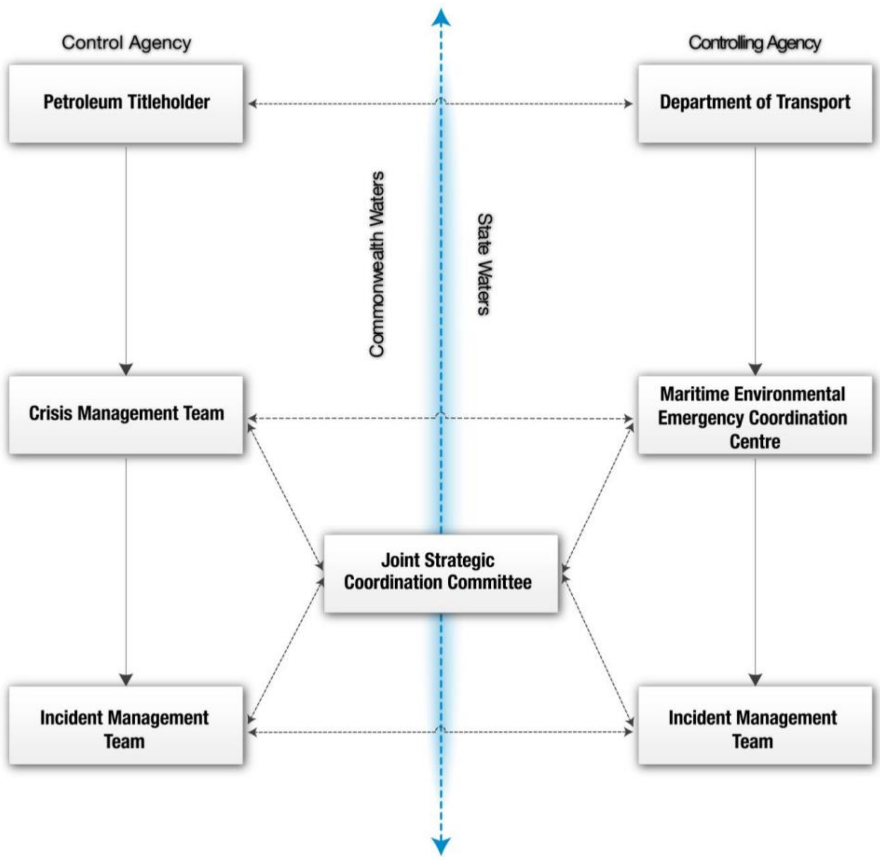

Figure 3-4: Controlling Agency coordination arrangements – Cross jurisdictional (WA DoT, 2020)

3.9 CICC Resourcing Arrangements

This section details the Woodside's resourcing arrangements in place to respond to a potential WCD scenario (i.e., full LOWC) including internal CICC capacity (inclusive of Source Control Section), Oil Spill Response Organisations (OSROs), industry mutual aid agreements, and specialist technical support Service Providers.

Woodside CICC

Woodside maintains a sufficient number of trained and competent personnel to form and maintain the CICC for the full duration of an emergency oil pollution response. Woodside has internal personnel available both within Australia and internationally.

<u>Australia</u>

Woodside maintains a minimum of 72 Perth-based staff (excluding Source Control Section) qualified to fulfil CICC positions. Additional Woodside personnel are trained to fulfil field-based roles and contribute to the AMOSC Core Group.

Woodside currently has a minimum of 6 Perth-based WSD personnel qualified to fulfil core SCS positions. The Woodside Drilling Manager and a Drilling Superintendent would typically fulfil the role of Source Control Section Chief (SCSC) and Deputy SCSC respectively. Other core roles would typically be fulfilled by other Woodside WSD representatives.

Additional Woodside personnel (and contract staff), not on the CICC Roster could be called upon by the CICC due to their specific discipline to provide support to the CICC as required.

Off rostered personnel from the Pyrenees and Macedon facilities could also be available to provide personnel support with facility-specific knowledge if required.

<u>International</u>

Woodside resources could be sourced remotely i.e. Woodside Operations in Trinidad and Tobago, Gulf of Mexico and Houston. These resources can be called upon by the Woodside CMT and CICC.

OSRO Arrangements

Woodside maintains contractual arrangements with oil spill response organisations (OSROs) which include the provision of technical specialists to support the CICC.

<u>Australian Marine Oil Spill Centre (AMOSC)</u>

Woodside maintains an 'associate' membership with AMOSC. This arrangement provides Woodside with access to the AMOSC personnel and equipment and the AMOSC Core-Group, under AMOSPlan.

The AMOSC Core-Group is an Australian industry initiative that was initially crafted in 1992. It is unique within the international context and is noted for being innovative and effective to rapidly expand and surge well trained personnel into a spill response. The AMOSC Core-Group has attended most Australian-based spills and several offshore spills.

The AMOSC Core-Group has around 30-40 IMT personnel and 50-70 field operators.

AMOSC Core Group policy requires all Core-Group personnel to undertake initial training, followed by competency re-validation/training every 2 years.

AMOSC coordinates the routine testing, monitoring and monthly reporting of Core-Group personnel availability.

Oil Spill Response Limited (OSRL)

Woodside is a member of the OSRL group. OSRL have capacity to mobilise additional equipment and personnel to Australia from various global locations. Only nominated Woodside personnel may request the assistance of OSRL via the CICC Leader under OSRL's Service Level Agreement.

The OSRL service level agreement provides for:

- 24/7 call-out arrangements.
- Guaranteed initial response from OSRL of 5 technical support personnel (IMT or field personnel) for 5 days (pending Covid-19 restrictions).
- Surge to a maximum of 18 OSRL personnel, upon request from the CICC.
- Depending on size/complexity, OSRL maintain approximately 80 response team personnel globally, who are potentially able to be provided to support an ongoing Level 3 event, on a best-endeavors basis.

OSRL service level agreement defines the types of services provided by the 18 person surge capability as:

- Advocate / implement Industry “Good Practice"
- Technical advice and incident management coaching within the command centre
- Development of an Incident Management Plan
- Training and Supervision of contractors
- In-country logistics planning and support for inbound equipment
- Environmental Impact Assessments and advice on response strategy selection
- Shoreline and aerial surveillance/quantification surveys
- Tactical Response Planning
- Wildlife planning

Industry Mutual Aid Arrangements

APPEA MoU framework

As a member company, Woodside would seek to engage the services of Perth-based specialist personnel (as required) from other Petroleum Titleholders under the APPEA Industry Memorandum of Understanding (MoU) (2021).

OSRL MoU framework

As a member company, Woodside would seek to engage the services of Perth-based specialist personnel (as required) from other Petroleum Titleholders under the ORSL Memorandum of Understanding (MoU) framework.

Well Control Specialists

Woodside has retained Integrity Management & Response (IMR) to fulfill the function of the SCS. These contracted specialists have the capability to fulfil all core and support roles within the Woodside SCS and cover all aspects of source control operations, including engineering, response coordination, integrity management, and relief well planning and execution.

Additionally, Woodside has contractual agreements in place with established specialist organisations namely:

- The Response Group;
- Wild Well Control; and
- Add Energy.

Technical Support (Environmental Monitoring)

Woodside has arrangements in place with specialist Service Providers to provide environmental monitoring services in support to the emergency response teams. These Service Providers would make available personnel, with environmental science qualifications and environmental monitoring skills, to rotate through field monitoring positions. Service Providers also have staff that could be rotated through specialist avifauna environmental monitoring positions, which could be expanded through access to the Birds Australia network.

Pandemic Readiness

In the first instance, personnel would be sourced locally (both internal Woodside and via external arrangements). Where support services are engaged from international sources, technical specialists have the ability to work remotely via standard communication platforms. Where entry to international responders is required, Woodside shall facilitate in accordance with current government guidelines and in consultation with relevant regulatory bodies.

3.10 CICC Oil Spill Response Objectives

This section describes the CICC oil spill response objectives based upon a worst-case Level 3 oil pollution event i.e., a full LOWC scenario used to inform the CICC Response Capability Analysis in Section 3.11.

Table 3-5: CICC spill response objectives

Operational Period	IMT Spill Response Objectives	Rationale / Justification
0 – 24 Hours	1. Establish/maintain the CICC with appropriate oil spill response trained personnel including mutual aid capabilities for specialist oil spill roles. 2. Implement activity-specific First Strike Plan 3. Gain situational awareness of the safety of MODU crew and operability of MODU and LOWC scenario. 4. Gain situational awareness of spill trajectory, weathering, and potential environmental impact (use of response strategies/tactics including OSTM, visual surveillance, satellite imagery, SCAT surveys, and use of IMT tools including SIMA, resources at risk evaluation, and common operating picture (COP). 5. Conduct regulatory and other stakeholder notifications. 6. Establish cross-jurisdictional IMT coordination & resourcing arrangements with WA DoT/Vic DoT. 7. Commence establishment of Forward Operational Bases (FOBs)/Staging Areas for aviation, shore and marine response strategies 8. Mobilise shoreline assessment/response capabilities including SCAT, OWR, resource protection and shoreline clean-up resources to FOB in anticipation of future deployment. 9. Mobilise/activate at sea response strategies, including: • Activate in-field vessel based dispersant and commence dispersant spraying (WA only) • Mobilise FWAD capability to Learmonth (WA only) • Mobilise C&R capability (WA only) 10. Initiated SCS for implementation of SCERP. 11. Mobilise SSDI spread (WA only) to FOB via AMOSC. 12. Undertake risk assessments and develop Health, Safety and Environment (HSE) plan(s). 13. Activate and mobilise OSROs and mutual aid organisations. 14. Activate and mobilise OSM Team.	1. Establishing and maintaining the CICC is required to ensure that field response activities are undertaken consistent with Woodside’s regulatory obligations (OPEP) and are appropriately scaled to the spill scenario at the time. 2. Activity-specific implementation plan in standardised format based upon nature & scale of WCD and outcomes of strategic SIMA process. 3. Understanding the operability of the MODU influences the Source Control IAP. 4. This is the primary spill response needed for the first 24 – 96 hours, and then acts as a foundation/principle objective for the duration of the spill. It enables all other decisions to be made in regards to field or actions around the spilt hydrocarbon, on the basis of predicted and observed environmental and other impacts, and weathering of the spill. 5. It is important to maintain regulatory and stakeholder relationships & a regulatory requirement. 6. JSCC required for first-strike (and ongoing) response in State jurisdiction as coordinated by Controlling Agency. 7. Establishment of FOBs is required to support the mobilisation/deployment and execution of marine, aviation and shoreline response strategies. 8. The Strategic SIMA and OPEP BOD identified that these strategies may be required to be executed early in the response (depending on the scenario). Noting the long-lead times for deployment of these response strategies, pre-deployment of equipment and personnel to a FOB will reduce timeframes between ‘need identified’ and ‘response strategy deployed’, which is especially important given the geographic isolation of the Exmouth Region (WA). 9. The Strategic SIMA and OPEP BOD determined that these response strategies can (under the right circumstances) be used to reduce the environmental impact of a crude spill. Rapid deployment provides the highest likelihood of successful use of these strategies.

Operational Period	IMT Spill Response Objectives	Rationale / Justification
		10. Source control is primary response strategy for LOWC scenario. 11. SERT / SSDI may be required may be required for subsea spills for debris clearance / VOC reduction / capping stack deployment activities (WA only). Early mobilisation of SERT / SSDI spread ensures this activity is not on 'critical path' for other source control activities. 12. A risk assessment and HSE plan is required to be prepared, in order to assess the particular HSE risks associated with each relevant response strategy for the spill scenario. 13. OSROs and mutual aid organisations provide expertise and additional support into the CICC and field response capability. 14. OSM used to inform IAP.
24 – 72 Hours	1. Maintain and reinforce the CICC with appropriate support functions including oil spill response trained personnel and mutual aid capabilities for specialist oil spill roles. 2. Maintain situational awareness of spill trajectory, weathering, and any potential environmental impacts. 3. Support the mobilisation/deployment of response strategies/field capabilities through FOBs and staging areas. 4. At the direction of Controlling Agency continue the pre-deployment of shoreline assessment/response capabilities including SCAT, OWR, resource protection, and shoreline clean-up resources to FOB in anticipation of future deployment. 5. Mobilise/activate at sea response strategies, including: • continue in-field vessel based dispersant spraying (WA only) • continue mobilisation and/or commence FWAD spraying from a Learmonth Airport (WA only) • continue mobilisation of C&R capability from Exmouth / Dampier port – commence operations in the field if possible (WA only). 6. Mobilise SSDI from FOB to field (WA only). 7. Review hazard assessments and execute HSE plans for operational activities.	1. As above – ongoing. 2. As above – ongoing. 3. The CICC objective has shifted from establishing the FOBs to the operational activity taking place from these locations. 4. As above – ongoing. 5. Ongoing at sea response strategy operations should continue, based on a positive demonstrable environmental outcomes and weather conditions conducive to safe operations. 6. As above – ongoing. 7. The CICC objective now includes the ongoing conduct of risk assessments and preparation of a HSE plans, as well as the execution and ongoing review of the HSE plan for operational response strategies.
72 Hours – onwards	1. Maintain and reinforce the CICC with appropriate support functions including oil spill response trained personnel and mutual aid capabilities for specialist oil spill roles.	1. As above – ongoing. 2. As above – ongoing. 3. The CICC objective has shifted from establishing the FOBs to the

Operational Period	IMT Spill Response Objectives	Rationale / Justification
	2. Maintain situational awareness of spill trajectory, weathering, and potential environmental impacts. 3. Support the mobilisation/deployment of response strategies/field capabilities through FOBs or direct from international (e.g. Singapore). 4. At the direction of Controlling Agency, mobilise shoreline assessment/response capabilities including SCAT, OWR, resource protection and shoreline clean-up resources to Tactical Response Plan locations (or other locations as directed). 5. Mobilise/activate at sea response strategies, including: • continue in-field vessel-based dispersant spraying (WA only). • continue mobilisation and/or commence FWAD spraying from a Learmonth (WA only). • commence/continue with C&R activities in the field (WA only). 6. Maintain SERT / SSDI operations in field (WA only). 7. Review hazard assessments and execute HSE plan for operational activities.	operational activity taking place from these locations. 4. As above – ongoing. 5. The Controlling Agency will determine the timing for actual activation of shoreline assessment and response capabilities from the FOB to the field. 6. As above – ongoing. 7. As above – ongoing.

3.11 CICC Response Capability Analysis

This section presents an evaluation of potential CICC resourcing need for a WCD scenario (i.e., full LOWC) against the CICC Resourcing arrangements presented within Section 3.9. The evaluation accounts for IMT personnel potentially requested by WA DoT consistent with Appendix 3 of the WA DoT Offshore Petroleum Industry Guidance Note (IGN) – Marine Oil Pollution: Response and Consultation Arrangements (July, 2020) or personnel to support the Vic DoT IMT as requested.

The resourcing evaluation presented within this section assumes the full CICC (including FST) is 'stood-up' and is maintained for a minimum of 12 weeks at full capacity. This represents the modelled time to successfully enact a well kill operation in a LOWC scenario within the Minerva Field off the southern coast of Victoria.

This section also details the resourcing needs to establish and maintain the Woodside Source Control Section (SCS) based upon the organisation structure detailed in Section 3.6 and assumes all source control response options detailed within the activity-specific SCERP are implemented in sequence and/or simultaneously where required.

The CICC response capability analysis is based upon the CICC meeting the oil spill response objectives presented in Section 3.10 and meeting capability need at different time steps during the ramp-up of the response until peak capacity.

The analysis determines the number of personnel required within each CICC function.

The IMT capability assessment process is undertaken utilising the following steps:

1. Determine the CICC functions required at defined periods during CICC ramp-up. The periods defined for this capability analysis are:
   - 0 – 12 hours
   - 12 – 72 hours
   - 72 hours – Peak (steady-state)
2. Define the number of personnel required in each CICC function, to manage the response during the defined periods.

This analysis adopted the following assumptions:

- All CICC functions are stood-up over the response;
- 2x 12-hour operational periods per day;
- Some core CICC functions required for 2x 12-hour operational periods per day whilst other support functions would primarily be required for 1x 12 operational period per day;
- Some CICC functions require rotational rosters. Rotations shall be established based upon the nature and scale of a real event, with rosters likely to be 2 week on / 1 week off;
- Following the peak at 12 weeks some CICC functions may be required for extended durations until termination criteria of various response strategies have been met;
- CICC roles may be supported by personnel from OSROs, industry mutual aid agreements, and specialist technical support Service Providers.

The CICC capability analysis is presented in Table 3-6 and details the minimum number of trained and competent personnel for each CICC role.

In summary, the CICC capability analysis concluded a total numbers of personnel required for each defined period is as follows:

- 0 – 12 hours; 33 personnel required.

- 12 – 72 hours; 75 personnel required.
- 72-hours – Peak (steady-state) – 114 personnel required.

With the current CICC resourcing arrangements, all CICC roles can be filled within the defined ramp-up periods and sustained for peak (steady-state) response need including redundancy, rostering, shift coverage, and rotation for personnel to maintain capability for the duration of the response. Further detail is provided within the following section.

The initial 12 hours would be dominated by Woodside personnel and possibly a small contingent of AMOSC personnel (if required). The SCS would be supported via IMR in Houston. As the CICC capability need increases over the coming days/weeks, more internal Woodside, OSRO and contracted technical support can be brought into the CICC. Increased support would be used to facilitate the rotation of acting CICC personnel in and out of the CICC (e.g. commencing two-on one-off rotations).

Figure 3-5 shows an indicative CICC resourcing curve, demonstrating how the Woodside, OSROs and Specialist technical services (other) resources could be utilised to fulfil CICC requirements.

Woodside's response arrangements can be scaled up or down dependent on the nature and scale of the incident and response requirements.

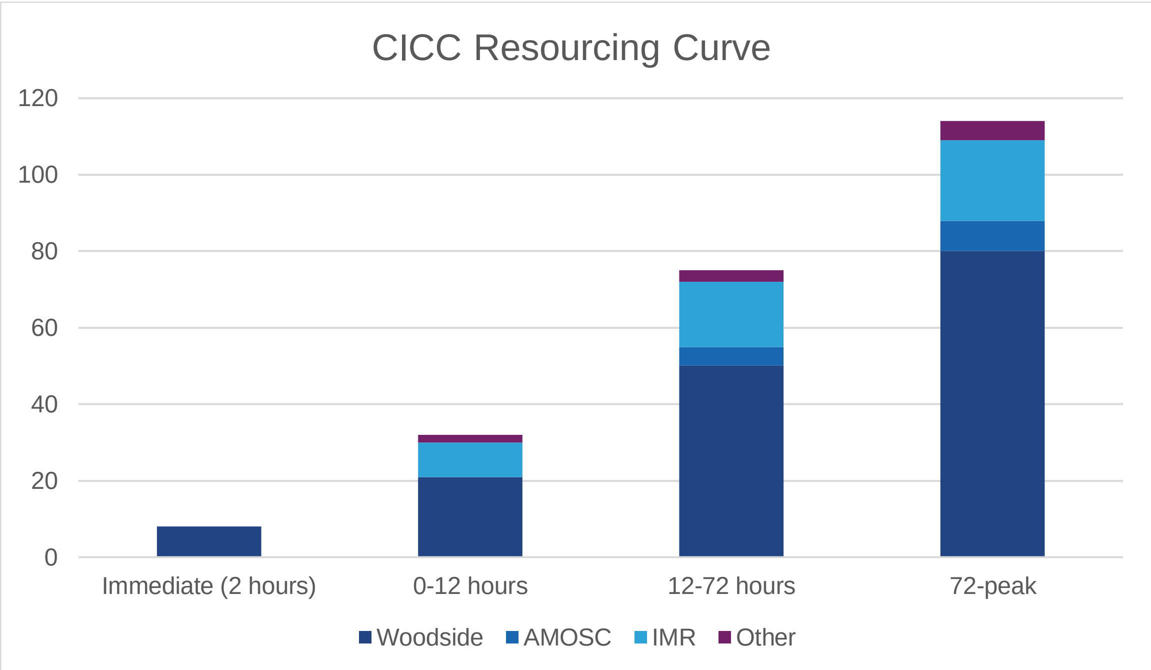

Figure 3-5: Indicative CICC resourcing curve

Table 3-6: CICC potential resourcing needs for WCD scenario

Function / Position	12 hour / 24 hours	0 – 12 hours	12 – 72 hours	72 hours – peak	Rotational Support	Min Trained
CICC and FST						
CICC Leader	24	1	2	2	3	4
S&EM Advisor / CICC Deputy Leader	24	0	2	2	3	4
Management Support	12	2	4	4	6	8
People Coordinator	12	1	1	1	1.5	4
Safety (H&S) Coordinator	12	1	1	1	1.5	4
Planning Coordinator	24	1	2	2	3	8
Intelligence Lead	24	1	2	2	3	4
Environment Lead	12	1	1	1	1.5	4
Operations Coordinator	24	1	2	2	3	4
Asset Interface Lead	24	1	2	2	3	4
Source Control Section Chief (Perth-based – day shift)	12	1	1	1	1.5	2
Source Control Section Chief (Houston-based – night shift)	12	0	1	1	1.5	2
Deputy Source Control Section Chief (Perth-based – day shift)	12	0	1	1	1.5	2
Deputy Source Control Section Chief (Houston-based – night shift)	12	0	1	1	1.5	2
Logistics Coordinator	24	1	2	2	3	4
Marine Lead	12	1	1	1	1.5	4
Aviation Lead	12	1	1	1	1.5	4
Materials Lead	12	1	1	1	1.5	4
Public Information (Reputation) Coordinator	12	1	1	1	1.5	4
External Liaison Officer	12	1	1	1	1.5	2
Internal Liaison Officer	12	1	1	1	1.5	2
Livelihood Coordinator	12	1	1	1	1.5	4
	Total need	19	32	32	48	80
CICC Support						
Shoreline Operations Coordinator	12	1	1	1	1.5	4
GIS Specialist	12	0	1	1	1.5	Personnel sourced within Woodside with existing skills
Finance / Administration	12	0	1	1	1.5	
Staging Area Manager (less in Victoria)	12	0	6	6	9	
Telephone Response Team	12	0	1	2	3	
Legal Officer	12	1	1	2	3	
Aboriginal Heritage	12	1	1	2	3	
	Total need	3	12	15	22.5	

Function / Position	12 hour / 24 hours	0 – 12 hours	12 – 72 hours	72 hours – peak	Rotational Support	Min Trained
Source Control Section						
Well Capping Group Supervisor (WA only)	24	1	2	2	N/A	All roles filled via specialist source control organisation IMR – Houston and supported by internal Woodside WSD personnel
BOP Intervention & Utility IWOCS Supervisor	24	1	2	2	N/A	
SIMOPS Group Supervisor	24	1	2	2	3	
Site Assessment & Debris Removal Supervisor	12	1	1	1	N/A	
SSDI Operations Supervisor (WA only)	24	1	2	2	3	
SSDI Monitoring Supervisor (WA only)	24	0	0	2	3	
Flow Engineering Group Supervisor	24	1	2	2	3	
Flow Modelling Team Supervisor	24	1	2	2	3	
Relief Well Group Supervisor (Perth-based)	24	1	2	2	3	
Relief Well Design, Well Intercept & Well Kill / Pumping Supervisor	24	1	2	2	3	
	Total need	9	17	19	21	
Cross Jurisdictional Controlling Agency IMT Personnel Initial Requirement						
CMT Liaison Officer (covered above)	12	0	1	1	1.5	All roles filled with a combination of CICC trained personnel and AMOSC Core Group Members
Deputy Incident Controller	12	0	1	1	1.5	
Deputy Intelligence Officer	12	0	1	1	1.5	
Environment Support Officer	12	0	1	1	1.5	
Deputy Planning Officer	12	0	1	1	1.5	
Deputy Public Information Coordinator	12	0	1	1	1.5	
Deputy Logistics Officer	12	0	1	1	1.5	
Deputy Finance Officer	12	0	1	1	1.5	
Deputy Operations Officer	12	0	1	1	1.5	
Deputy Waste Management Coordinator	12	0	1	1	1.5	
Deputy Division Commander	12	0	1	1	1.5	
	Total need	0	11	11	17	
OSM Management Team						
OSM Implementation Lead	12	1	1	1	1.5	All roles filled by OSM Service Provider
Operational Monitoring Coordinator and Scientific Monitoring Coordinator	12	0	1	1	1.5	
OSM Field Operations Manager	12	0	1	1	1.5	
	Total need	1	3	3	5	

CICC Response Capability (Immediate 0-2 hours)

CICC Roster (Total need 8 positions)

Woodside maintains a CICC duty roster that is updated weekly with a minimum of 8 qualified CICC personnel to fulfil core CICC positions. A minimum of 4 personnel are rostered ‘on-call’ at any time to immediately fulfil the role of CICC Leader, Operations Coordinator, Planning Coordinator and Logistics Coordinator. During offshore drilling activities (including plug and abandonment), a Well & Seismic Delivery (WSD) representative will be rostered ‘on-call’ to fulfil the role of Source Control Section Chief.

CICC Response Capability (0-12 hours)

CICC & FST (Total need 19 personnel within 12 hours)

Woodside maintains a minimum of 72 Perth-based personnel qualified to fulfil all CICC positions.

CICC Support (Total need 3 personnel within 12 hours)

Woodside maintains a minimum of 4 personnel to fulfil the role of Shoreline Operations Coordinator, that could be rapidly deployed to facilitate site establishment. Woodside has internal Legal Counsel and Aboriginal Heritage Specialists that would be rapidly deployed to support the CICC.

SCS (Total need 9 personnel within 12 hours – LOWC only)

A WSD representative will fulfil the role of the Relief Well Group Supervisor. Woodside would initiate call-off contracts with IMR to establish the remainder of the SCS structure.

OSM Management Team

An FST Environment Leader is available within the first 12-hours to initiate call-off contracts with specialist OSM Service Providers. Service Provider to engage OSM Implementation Lead within 12 hours.

CICC Response Capability (12-72 hours)

CICC & FST (Total need 32 personnel within 12-72 hours)

Woodside maintains a minimum of 72 Perth-based personnel qualified to fulfil all CICC positions.

CICC Support (Total need 12 personnel within 12-72 hours)

All required support personnel with relevant and skills are available within Woodside to provide supporting roles.

Additionally, AMOSC Core Group members or OSRO staff could be call upon to provide support if required.

SCS (Total need 17 personnel within 12-72 hours – LOWC only)

Internal Woodside WSD personnel (both Perth and Houston-based) would fulfil core SCS roles during this period and supply technical support to the SCS Group Supervisors. IMR would support the SCS structure and Woodside would call upon additional technical support via industry MoU framework agreements (as required). Within this timeframe, local technical specialists would be on-boarded into the Woodside SCS within Perth whilst international technical specialists would supply remote support to the SCS.

Cross Jurisdictional Controlling Agency IMT Personnel (Total need 11 personnel within 12-72 hours)

Over this period, and in consultation with either WA DoT or Vic DoT, these 11 positions would likely be sustained and supplemented by AMOSC Core Group personnel in combination with Woodside personnel (or Contractors).

OSM Management Team (Total need 3 personnel within 12-72 hours)

As per the arrangements detailed within Section 3.7, OSM monitoring contracts would be initiated and roles fulfilled via contracted personnel. The FST Environment Leader would remain.

CICC Response Capability (72 hours – peak)

CICC & FST (Total need 32 personnel up to 48 personnel on rotation)

Woodside maintains a minimum of 72 Perth-based personnel qualified to fulfil all CICC positions. Woodside maintain a sufficient number of qualified personnel to supplement acting CICC personnel with rotational staff as required.

CICC Support (Total need 15 personnel up to 22.5 personnel on rotation)

All required support personnel with relevant and skills are available within Woodside to provide supporting roles for the full duration of the response. Woodside has a sufficient number of internal staff to supplement support personnel with rotational staff as required.

Additionally, AMOSC Core Group members or OSRO staff could be call upon to provide support if required.

SCS (Total need 19 personnel up to 21 personnel on rotation – LOWC only)

A rotational roster would be implemented, and internal Woodside personnel would continue to fulfil core SCS roles during this period. Additional SCS support would be rostered by IMR and potentially supported by industry secondees accessed via MoU framework agreements. International technical specialists would supply remote support to the SCS until such time as they could be mobilised to Perth / Melbourne (if required).

Cross Jurisdictional Controlling Agency IMT Personnel (Total need 11 personnel up to 17 on rotation)

In consultation with either WA DoT or Vic DoT, a rotational roster would be implemented to sustain these 11 positions and would likely be supplemented by AMOSC Core Group personnel in combination with Woodside personnel (or Contractors).

OSM Management Team (Total 3 contractor positions up to 5 contractor personnel on rotation)

A rotational roster would be agreed with OSM contractors to sustain all OSM Team positions for the duration of the incident and up to the point where termination criteria of OSM monitoring has been achieved in consultation with regulatory authorities.

4 CICC Competency Assessment

This section provides an analysis of training and competency requirements to ensure Woodside personnel are suitably qualified to fill CICC positions.

4.1 Training Overview

A competency-based training programme and supporting systems is maintained to ensure enough competent personnel are available to manage the activities and demands of an incident or crisis.

Woodside utilises a blend of Nationally recognised units of competency and subject/role specific training programs for the ICC/CMT training and development program. Some courses are conducted using Woodside resources entirely, delivered by company EM Advisers. External providers may be utilised to deliver/co-deliver training modules/presentations as required.

Training and competency requirements are documented in the Woodside *Emergency and Crisis Management Training Guideline*, including a description of training modules and role-specific competency matrix for CICC positions.

Minimum training requirements for CICC roles are maintained within the CICC *Dashboard Role Requirements*.

4.1.1 CICC Personnel Training Requirement

The Woodside CICC is resourced by personnel from the Woodside corporate office in Perth. Table 4-1 summarises the minimum training requirements for each of the CICC Roles.

Table 4-1: CICC Training Requirements

CICC Role	ICLDP	ICC Fundamentals	Oil Spill Response Theory	IMO 2/3	CICC Activation / Exercise / Skills Maintenance (biannual)
CICC Leader					
S&EM Advisor / CICC Deputy Leader					
Management Support					
People Coordinator					
Safety (H&S) Coordinator					
Planning Coordinator					
Intelligence Lead					
Environment Lead					
Operations Coordinator					
Asset Interface Lead					
Source Control Section Chief (Perth-based – day shift)					
Deputy Source Control Section Chief (Perth-based – day shift)					
Logistics Coordinator					
Marine Lead					
Aviation Lead					

Materials Lead					
Public Information (Reputation) Coordinator					
Livelihood Coordinator					

4.1.2 Woodside Oil Spill Response Theory

Woodside provide CICC personnel with oil spill-specific training, inclusive of the content and initiation requirements of activity-specific Oil Pollution Emergency Plans (OPEPs).

In 2021, the APPEA Oil Spill Preparedness and Response Working Group (of which Woodside is a member) developed a new APPEA Guidance Document: Incident Management Teams Knowledge Requirements for Responding to Marine Oil Spills (APPEA, 2021). At the time of preparation of this document, the APPEA (2021) guidance document was in a final draft version. Woodside will revise the Oil Spill Response Theory training course, to align with the APPEA (2021) guidance document once it is finalised.

Each supporting role seconded into the CICC shall undertake onboarding inclusive of Oil Spill Response Theory training.

4.1.3 Well Control Training

The Organisation, Development and Training Standard (DR-STD-PET-DC-0123) defines the well control technical training and competencies required for each discipline within the Well & Seismic Delivery (WSD) team (refer Table 4-2). Each WSD Management, Engineering and Operations Supervisor role must well control training via an accredited training organization (IWCF or IADC WellSharp) to a certification 'Level 4 – Supervisor'. Recertification for Operations roles is required every 2 years, whilst for Engineering and Manager roles it is every 4 years.

4.1.4 Source Control Training and Competency

SCS Command and General Staff members must attain as a minimum ICS 100 and ICS 200 competencies. In addition, the Source Control Section Chief and Deputy complete the Woodside Oil Spill Response Theory Training (refer Table 4-2).

Table 4-2: Source Control Section competencies

IMT Position	ICS100	ICS 200	Oil Spill Response Theory
Source Control Section Chief			
Deputy Source Control Section Chief			
SIMOPS Group Supervisor			
Well Capping Group Supervisor			
Flow Engineering Group Supervisor			
Relief Well Group Supervisor			

It is expected that any secondee into the SCS during a well control incident holds a relevant tertiary qualification, has relevant industry experience and has undertaken well control training via an accredited training organisation comparable with that detailed within the Organisation, Development and Training Standard (DR-STD-PET-DC-0123).

4.1.5 OSM Management Team

Competencies required for key OSM roles will be in accordance with Table 11-1 of the APPEA Joint Industry OSM Plan Framework (refer section 9.1 of the OSM BIP for further information).

In addition, and where practicable, Woodside will engage its most qualified local environment advisors in the initial stages of the monitoring program to help activate and mobilise monitoring teams and support the OSM Services Provider in the finalisation of monitoring designs.

4.1.6 Facility and Vessel ERT Training

Each facility and vessel ERT will maintain its own oil spill response training, commensurate with the risks and responses required. Vessel Masters and the OIM will complete mandatory minimum requirements under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, which includes oil spill response training.

Vessel Masters and OIMs will also ensure facility/vessel ERTs complete drills as scheduled in their relevant Contractor ERP, including Shipboard Oil Pollution Emergency Plan (SOPEP) drills.

5 Environmental Performance

This section provides Environmental Performance Standards related to Woodside oil spill response capability arrangements to ensure Woodside is prepared and ready to respond to oil spill events.

Table 5-1: Environmental Performance Outcomes, Standards and Measurement Criteria for emergency response training, capability and testing

Environmental Performance Outcome	Environmental Performance Standard	Measurement Criteria
Woodside will be prepared and ready to respond to oil spill events.	Woodside shall validate OIM/vessel masters have complete mandatory minimum training requirements under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 which includes oil spill response training.	Records of training
	Woodside shall validate Facility ERTs – conduct routine drills in accordance with the Facility ERPs, including SOPEP drills.	Records of training
	Woodside shall validate contracted Vessel ERTs – conduct routine drills in accordance with the Vessel Contractor ERPs, including SOPEP drills.	Records of training
	Woodside personnel fulfilling CICC roles shall complete all required training and be deemed competent in accordance with the Woodside Emergency and Crisis Management Training Guideline.	Records of training
	Woodside shall maintain a minimum of 72 trained personnel to fulfil CICC roles.	Records of training
	Woodside shall maintain an CICC duty roster and update weekly with a minimum of 8 qualified personnel to fulfil core CICC roles. A minimum of 4 personnel shall be rostered 'on-call' at any time to immediately fulfil the role of CICC Leader, Operations Coordinator, Planning Coordinator & Logistics Coordinator.	CICC Duty Roster records
	For the duration of offshore drilling activities (including plug and abandonment), the CICC duty roster will include an on-call Well & Seismic Delivery (WSD) representative to fulfil the role of Source Control Section Chief.	CICC Duty Roster records
	Internal SCS personnel shall have valid well control certification as described within the Organisation, Development and Training Standard (DR-STD-PET-DC-0123).	Records of training

CICC CAPABILITY ASSESSMENT

Environmental Performance Outcome	Environmental Performance Standard	Measurement Criteria
	For the duration of offshore drilling activities (including plug and abandonment), Woodside shall maintain a minimum of 6 Well & Seismic Delivery (WSD) representatives in Perth trained to fulfil the roles of Source Control Section Chief and Relief Well Group Supervisor.	Records of training
	Woodside shall retain its contractual arrangements with Integrity Management & Response (IMR) to staff SCS roles and associated functions.	Service Level Agreement
	Woodside shall maintain contractual arrangements with established well control specialist organisations to supplement IMRs role in maintaining SCS roles and associated functions.	Service Level Agreement
	Woodside shall validate that well control specialists seconded into the SCS during a well control incident hold relevant tertiary qualifications, have relevant industry experience to fill their designated role and have undertaken well control training via an accredited training organization comparable with that detailed within the Organisation, Development and Training Standard (DR-STD-PET-DC-0123).	Training/induction records
	Woodside shall maintain Service Level Agreement / membership with OSROs (AMOSC / OSRL) enabling the provision of technical specialists to supplement the CICC either directly of via industry mutual aid framework agreements.	Service Level Agreement / Membership
	Woodside shall maintain its contractual arrangements with specialist environmental monitoring companies with suitably qualified staff to enable the formation and ongoing functioning of the OSM Management Team following an emergency oil pollution incident and for the full duration of monitoring until termination criteria have been agreed in consultation with relevant regulatory authorities.	Service Level Agreement
	During any oil spill response, support personnel including mutual aid personnel joining the CICC will be provided an onboarding induction inclusive of CICC role-specific training and Oil Spill Response Theory Training.	Training/induction records

6 Review of this document

This document shall be reviewed on an annual basis or before undertaking a new petroleum activity in either the Pyrenees or Minerva Field in Commonwealth waters. The review shall include:

- An assessment of activity-specific WCD scenario to ensure CICC capability is sufficient; and
- A review of learnings from spill response exercises (as required).

Additionally, this document shall be reviewed following a Level 2 / Level 3 emergency oil pollution emergency event.

7 References

Australian Petroleum Production and Exploration Association. 2021. Guidance Document; Incident Management Teams Knowledge Requirements for Responding to Marine Oil Spills. Prepared by APPEA in consultation with AMOSC. Perth. Australia.

IOGP-IPIECA Report 594: Source Control Emergency Response Planning Guide for Subsea Wells (IOGP-IPIECA, January 2019).

Victorian DoT. 2020. Victorian Joint Industry and State Oil Pollution Responses Guidance Note (V2).

WA DoT. 2021. State Hazard Plan Maritime Environmental Emergencies. Prepared by WA Department of Transport. Approved by State Emergency Management Committee.

WA DoT. 2020. Offshore Petroleum Industry Guidance Note (IGN) – Marine Oil Pollution: Response and Consultation Arrangements.

Appendix B – Minerva Field Emergency Response: Basis of Design and Field Capability Analysis

Minerva Field Emergency Response: Basis of Design and Field Capability Assessment

Document No: 00MC-BHP-N00-0003

REVISION RECORD						
Rev	**Date**	**Description**	**Prepared by**	**Reviewed by**	**Reviewed by**	**Approved by**
0	30/06/2022	Issued for assessment	Environment Principal Projects	Principal Environment & Regulatory	Head of Drilling & Completions - Australia	Asset Manager

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Revision History		
Revision Label	**Revision Date**	**Comments**
A	16/06/22	Draft issued for review
0	30/06/22	Issued to DJPR / Vic DoT / NOPSEMA for assessment

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Acronyms and Glossary

Term	Description
AFEDO	Ayles Fernie Even Drop Out
AIS	Automatic identification system
AHTS	Anchor handling tug supply (vessel)
ALARP	As low as reasonably practicable
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority (Cwlth)
APPEA	Australian Petroleum Production and Exploration Association
APU	Australian Production Unit (Woodside)
ASV	Accommodation support vessel
AUD/year	Australian dollars per year
AT	Air tractor
BAOAC	Bonn Agreement Oil Appearance Code
BIA	Biologically Important Area
BOD/FCA Report	Basis of Design (BOD) and Field Capability Assessment (FCA) Report (this report)
BOD	Basis of Design
C&R	Containment & recovery
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation
CG	Core Group
CICC	Corporate Incident Coordination Centre (Woodside)
DAWE	Department of Agriculture, Water and the Environment (Cwlth)
DBCA	Department of Biodiversity, Conservation and Attractions (Western Australia)
DELWP	Department of Environment, Land, Water and Planning (Victoria)
DIIS	Department of Industry Innovation and Science
DJPR	Department of Jobs, Precincts and Regions (Victoria)
ERR	Earth Resources Regulation (DJPR)
DNP	Director of National Parks
DoEE	Department of Environment and Energy
Vic DoT	Victorian Department of Transport
EEZ	Exclusive Economic Zone
EP	Environment Plan
EPA	Environmental Protection Authority (Victoria)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPO	Environmental Performance Outcome
EPS	Environmental Performance Standard
ERT	Emergency Response Team
ESTB	Electronic surface tracker buoys
FCA	Field Capability Assessment
FOB	Forward operating base
ft	Foot
FWAD	Fixed wing aerial dispersant
g	Gram
GPS	Global positioning system
HSE	Health, Safety and Environment
IAP	Incident Action Plan
IBC	Intermediate bulk container
ICAO	International Civil Aviation Organization
I&CM	Incident and Crisis Management
IMT	Incident Management Team
IOGP	International Association of Oil & Gas Producers
IPIECA	International Petroleum Industry Environmental Conservation Association
IT	Information Technology
km	Kilometre
MDO	Marine diesel oil
mm	Millimetre
MODU	Mobile offshore drilling unit
MSRC	Marine Spill Response Corporation
N/A	Not applicable
SIMA	Net Environmental Benefit Analysis
nm	nautical mile
NatPlan	National Plan for Maritime Environmental Emergencies
NEBA	Net environmental benefit analysis
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority (Cwlth)
NRT	National response team
NWMR	North West Marine Region
OPEP	Oil Pollution Emergency Plan
OPGSS (E) regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Cwlth)
OPGSS regulations	Victorian Offshore Petroleum and Greenhouse Gas Storage Regulations 2021 (State)
OSCA	Oil spill control agent
OSCP	Oil Spill Contingency Plan
OSMBIP	BHP Operational Scientific Monitoring Bridging Implementation Plan
OSM	Operational and scientific monitoring
OSRO	Oil Spill Response Organisation
OSRL	Oil Spill Response Limited
OSTM	oil spill trajectory modelling
OWR	Oiled wildlife response
ppb	Parts per billion
PPE	Personal protective equipment
P&D	Protection and deflection
ROV	Remotely operated vehicle
RS	Response Plan

RTM	Response time model
SAR	Search and rescue
SCAT	Shoreline clean-up assessment technique
SCS	Source Control Section
SCERP	Source Control Emergency Response Plan
SFRT	Subsea first response toolkit
SIMA	Spill Impact Mitigation Assessment
SIRT	Subsea incident response toolkit
SMPEP	Shipboard Marine Pollution Emergency Plan
SMV	Surveillance, monitoring and visualisation
SOPEP	Shipboard Oil Pollution Emergency Plan
SSDI	Sub-sea dispersant injection
µm	Micrometre
Vic	Victoria
VOC	Volatile organic compound
WA	Western Australia
WCD	Worst-case discharge
%	Percent

1 Introduction

1.1 Purpose

Since the merger completion on 1 June 2022, BHP Petroleum (Victoria) Pty Ltd and its parent company BHP Petroleum International Pty Ltd are owned 100% by Woodside Energy Group Ltd. References to APU, BHP, BHP Petroleum and Woodside are interchangeable throughout this document.

This Minerva Field Emergency Response: Basis of Design and Field Capability Assessment provides a detailed evaluation of response need based upon appropriate response strategies for the identified worst-case discharge (WCD) scenarios. It provides:

1. a summary of the Minerva Field Decommissioning activity in the Minerva Field;
2. a summary of the WCD scenarios which could occur as a result of petroleum activities;
3. stochastic and deterministic modelling outputs for selected WCD scenarios to inform the field capability assessment;
4. the Spill Impact Mitigation Assessments (SIMAs) to inform response strategy selection;
5. an environmental impact and risk evaluation for the implementation of each selected response strategy;
6. an evaluation of response need based upon WCD scenarios for each suitable response strategy to inform field response planning and provide the detailed oil spill response field capability analysis;
7. an evaluation of response capability to implement each suitable response strategy (inclusive of source control) in an effective and timely manner, including an assessment of personnel, equipment, procedures both internal to Woodside and from State and National resources and oil spill response organisations (OSROs);
8. detail of response timings for each response strategy including detailed response time models (RTMs) for source control strategies;
9. spill response logistical arrangements;
10. a detailed ALARP evaluation for each response strategy to demonstrate all reasonable and practicable response capability in available to implement a timely response; and
11. Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria for response preparedness.

This process is consistent with the oil spill response planning processes defined in IPIECA-IOGP (2013) *Oil Spill Risk Assessment and Response Planning for Offshore Installations*.

1.2 Scope / Inclusions and Exclusions

This document describes oil spill preparedness arrangements for the effective and timely response to potential WCD scenarios for the Minerva Field Decommissioning activities, inclusive of source control arrangements associated with a potential LOWC scenario.

This document does not include the following:

- a detailed activity description. Refer to activity-specific Environment Plan (EP).
- description and risk assessment of oil spills on environmental values and sensitivities. Refer to activity-specific EP.
- evaluation of controls to prevent oil pollution from the described activity and associated EPOs / EPSs and measurement criteria. Refer to activity-specific EP.
- operational and scientific monitoring programs. Refer to Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (00MC-BHP-N00-0004)
- vessel-based spill response. Refer to vessel-specific Shipboard Marine Pollution Emergency Plan (SMPEP) / Shipboard Oil Pollution Emergency Plan (SOPEP).
- detailed source control planning. Refer to Source Control Emergency Response Plan (SCERP).

2 Minerva Field Decommissioning Overview

Woodside proposes to undertake decommissioning activities within title areas of offshore production license VIC/L22, pipeline licence VIC/PL33 in Commonwealth waters, and VIC/PL33(v) in Victorian State waters within the Otway Basin.

The Minerva gas pipeline is located south-southwest of the township of Port Campbell, Victoria, Australia. The offshore section of the Minerva pipeline (within Pipeline Licence VIC/PL33 & VIC/PL33(v)) is approximately 11 km long extending from the high-water mark out to the Minerva-4 well location in Commonwealth waters. The section of pipeline within Victorian State jurisdiction (within Pipeline Licence VIC/PL33(v)), extends from the high-water mark out to the 3 nautical mile (nm) limit of State waters. The subsea section of pipeline extends from the horizontal direction drill (HDD) exit site located approximately 800 m from shore to the 3 nm limit of Victorian State waters (a total length of approximately 4.756 km) (Figure 2-1). Water depths range from approximately 20 m at the HDD exit to 60 m at the 3 nm limit.

The location coordinates for Minerva subsea infrastructure are provided in Table 2-1.

Table 2-1: Location coordinates for petroleum activity

Infrastructure	Approx. Water Depth (m)	Latitude (South)	Longitude (East)	Production Licence
Minerva-4 well	60 m	38º 43’ 7.37”	142º 57’ 44.02”	VIC/L22
Minerva-3 well	60 m	38° 42 22.718”	142° 57 32.997”	
Minerva-2A well	60 m	38° 42' 58.821"	142° 57' 25.742"	
Minerva-1 well	60 m	38° 42' 06.885"	142° 57' 17.278"	
Pipeline HDD Exit	20 m	38°37'46.97"	142°57'53.52"	VIC/PL33 (v)
Pipeline 3Nm	60 m	38°40'29.11"	142°57'39.42"	

A detailed description of the activity is provided in the activity-specific EP(s)

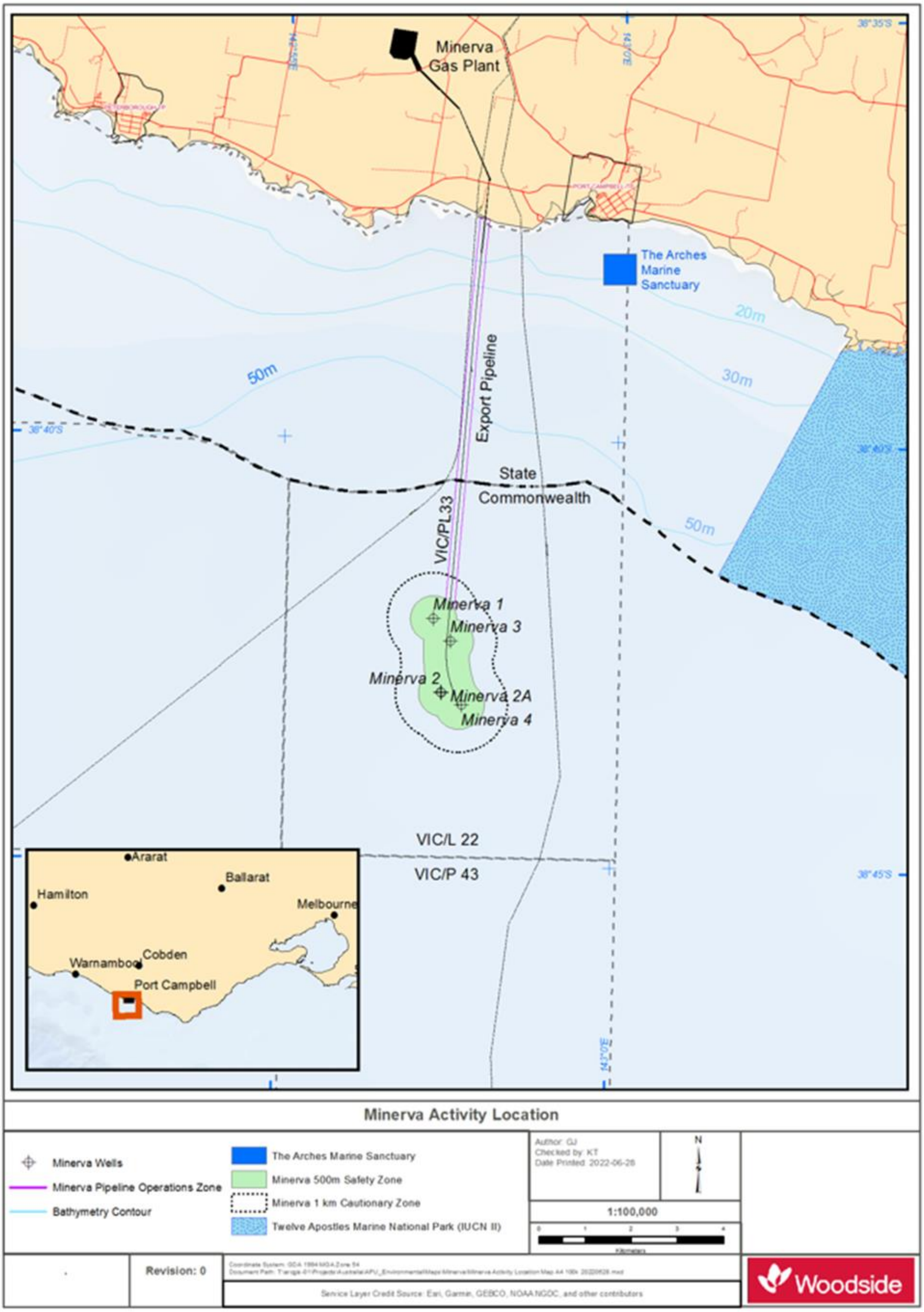

Figure 2-1: The Minerva gas plant, export pipeline & well locations

3 Worst-Case Discharge Scenarios

3.1 Scenario Context

Unplanned events could occur during the decommissioning activities, resulting in the potential for large-scale release of hydrocarbons (i.e., incidents or emergencies). Worst-case discharge (WCD) scenarios were identified through the environmental impact and risk assessment process and a series of workshops. The following scenarios were identified:

- Subsea loss of well control (LOWC) of gas condensate from the Minerva-4 well
- Surface release of marine diesel oil (MDO) from a vessel collision

Table 3-1 presents the worst-case hydrocarbon spill scenarios identified. Each of these scenarios is discussed further in this Section.

Table 3-1: Summary of worst-case hydrocarbon spill scenarios

Scenario	Hydrocarbon Type	Worst-case Maximum Spill Volume	Comment	Oil Spill Modelling?
Subsea Loss of Well Control (LOWC)	Minerva Gas Condensate	Liquid Volume: 52,634 bbl (8,368 m^3) Gas Volume: 15,618 MMscf	Max credible volume over the 81 days	Yes
Surface release of MDO from project vessel onboard tank to a collision within the Minerva Field Operational Area	Marine Diesel Oil (MDO)	A surface spill over a 6-hours resulting in the complete loss of MSO from the vessel's largest tank (330 m^3)	Maximum credible volume based on the largest tank capacity for the project vessels	Yes

3.2 Loss of Containment – Gas Condensate

<u>Loss of Well Control</u>

The calculation of WCD for a LOWC event is consistent with the methodology applied within the *SPE Technical Report; Calculation of Worst-Case Discharge (WCD), Rev 1 2016 (Society of Petroleum Engineers, 2015)*. Reservoir modelling was undertaken for the Minerva Field to determine the WCD for the decommissioning program.

Modelling has demonstrated that a relatively low liquid, gas and water flow is expected from a LOWC scenario from Minerva-4 well due to the low exit velocities expected from the depleted reservoir and well orifice. Based upon the detailed reservoir modelling, the total volume of Minerva gas condensate that may be expected over a 81-day LOWC scenario in the Minerva Field equates to approximately 52,634 bbl of liquid and 15,618 MMscf of gas.

3.3 Loss of Containment – MDO

Vessel Collision

During the activity, the physical presence of the mobile offshore drilling unit (MODU) and anchor handling and tug supply (AHTS) vessels within the operational area presents a vessel-to-vessel and vessel-to-MODU collision risk, consistent with the *Technical guideline for preparing contingency plans for Marine and Coastal Facilities, Commonwealth of Australia 2015.*

The worst-case scenario MDO spill has been based on the release of the full volume of the largest fuel oil tank of an AHTS vessel due to vessel collision and subsequent release to the marine environment. A vessel collision could occur due to poor weather, human error or vessel navigation/equipment failure. Based on a review of the specifications for probable AHTS vessels suitable for supporting the activity, the worst-case maximum credible volume of MDO that could be released to the marine environment is conservatively estimated to be 330 m^3.

4 Spill Modelling Overview

This section presents the details and a summary of outputs of oil spill modelling which has been undertaken to inform Basis of Design for spill response planning presented in Section 45.1. Full details are provided within Minerva Decommissioning Oil Spill Modelling Report (GHD, 2022).

4.1 Probabilistic (Stochastic) Modelling Methodology and Inputs

Spill modelling was carried out using SINTEF's Oil Spill Contingency and Response (OSCAR) System (Version 11.0.1). OSCAR is a system of integrated models that quantitatively assess the fate and transport of hydrocarbons in the marine environment, as well as evaluate the efficacy of response measures (Reed *et al*., 2001; Reed *et al*., 2004).

OSCAR provides an integrated hydrocarbon transport and weathering model that accounts for hydrocarbon advection, dispersion, surface spreading, entrainment, dissolution, biodegradation, emulsification, volatilisation and shoreline interaction.

Three-dimensional (3D) OSCAR modelling was undertaken in stochastic mode with start dates spaced approximately fortnightly over a five-year period. Inputs into the model were sourced from HYCOM (regional ocean currents, temperature and salinity profiles), TPXO7.2 (tidal currents) and NCEP/NCAR (regional winds).

OSCAR enables simulation of a hydrocarbon release scenario in deterministic mode (i.e., a scenario is simulated with one start date with spatial results available at fixed time intervals over the duration of the simulation) or stochastic mode (i.e., a scenario is simulated a number of times with varying start dates, and the results are outputted spatially in a probabilistic manner).

Table 4-1 provides the details on the model input specifications for the modelled scenarios.

Table 4-1: Model input specifications

Parameter	Condensate LOWC	Surface MDO Spill
Location	Latitude 38° 43' 7.37" S Longitude 142° 57' 44.02" E	Latitude 38° 42' 6.89" S Longitude 142° 57' 17.28" E
Depth of spill (m)	48.32 m below MSL	Sea surface
Hydrocarbon type	Minerva 4 Condensate	Marine Diesel Oil
Liquid release volume	52,634 bbl	330 m^3
Gas release volume	15,618 MMScf	-
Release duration	81 days	6 hours
Number of realisations (runs)	200	200
Timing of release risk period	All months (Summer and Winter)	

4.2 Response Strategy Planning Thresholds

Spill model outputs can be utilised to inform spill response strategy planning. Whilst IPIECA-IOGP (2013) does not provide any specific response strategy planning thresholds, several suitable thresholds have been identified and utilised in oil spill planning within the Australian upstream petroleum industry for several years.

The thresholds assist with WCD response strategy planning, by either providing an indication of the minimum timeframe that should be planned for the activation of a certain response strategy, or the size/tier of field capability required for a certain response strategy.

Table 4-2 presents a literature review of various response strategy planning thresholds and discusses how each threshold can be used to inform response strategy planning.

Note, the response planning thresholds presented are not the actual response strategy activation triggers, which would be used in an actual oil spill event by the Woodside Corporate Incident Coordination Centre (CICC). The response strategy planning thresholds are utilised during the development of the Basis of Design (BOD), presented in Table 4-2 and this information is then used to inform the field capability assessments presented in Section 6.6.

Response strategy activation triggers to be utilised as decision-making tools by the CICC during a real spill event are detailed in the activity-specific Oil Pollution Emergency Plan(s) (OPEPs).

The thresholds used to evaluate the environmental risk associated with an oil spill event are defined within the activity-specific EP.

Table 4-2: Response strategy planning thresholds

Response Strategy Planning Threshold	Response Strategy Planning Considerations	Reference/Justification
Max. lineal distance (km) of floating oil >1 g/m^2 (>1 µm)	Used to inform response planning regarding the: • maximum range of surveillance, monitoring and visualisation (SMV) (e.g., aerial surveillance, satellite imagery) (Note, this floating oil threshold and entrained/dissolved thresholds can also be used to inform the potential extent of Operational and Scientific Monitoring programs, however these parameters are not primary consideration for OSMP capability planning).	The Bonn Agreement Oil Appearance Code (BAOAC) is a series of five categories or 'codes' that describe the relationship between the appearances of oil on the sea surface to the thickness of the oil layer. Bonn-Code 1 refers to silver/grey sheens of floating oil and Bonn Code 2 includes rainbow sheen (thickness of 0.0003 mm to 0.005 mm, or 0.3 /m^2 to 5 g/m^2). 1 g/m^2 is therefore at the lower end of Bonn Code 2. Therefore, >1 g/m^2 has been selected as an appropriate minimum thickness to be used during oil spill modelling, to inform the geographic area which may potentially be impacted by oil, causing effects to socio-economic values, and at which water quality within a marine protected area may have been altered (NOPSEMA, 2019). Therefore, during WCD response planning, aerial/satellite surveillance capability/arrangements should be evaluated against this threshold.
Area (km^2) with floating oil >50 g/m^2 (>50 µm)	Used to inform response planning regarding the: • geographic area in which to undertake surface chemical dispersant (aerial/vessel) • geographic area in which to undertake containment & recovery (C&R) (booms and skimmers) • geographic area in which to undertake in-situ burning. • note: emulsification and changes in viscosity are factors potentially limiting the effectiveness of C&R, and more significantly, changes in viscosity and/or emulsification can reduce dispersant effectiveness. Therefore, consideration of these factors may be required during evaluation of modelling outcomes for response planning.	Oil needs to be >100 g/m^2 (>0.1mm, which equates to Bonn Code 4/5) to feasibly corral oil with a boom and achieve any significant level, or operationally efficient level, of oil recovery with skimmers during an offshore C&R operation (O'Brien, 2002; IPIECA-IOGP, 2015a). In addition, as the capture/containment and corralling of oil with booms is required for in-situ burning, this threshold is considered appropriate for that response strategy. IPIECA-IOGP (2015b) and the National Research Council (2005) state that oil slicks need to be >100 g/m^2 (>0.1 mm, which equates to Bonn Code 4/5) to feasibly achieve a successfully dispersant operation. Whilst 100 g/m^2 may be the threshold for on water response strategy effectiveness stated in the literature, when evaluating oil spill modelling outputs, a lower response strategy planning threshold is considered appropriate. The effects of winds, currents etc. cause oil to spread, and it often forms into windrows with a range of oil thicknesses across a given area. During oil spill modelling, the oil thickness within a grid-cell is averaged. Therefore, for a grid-cell reporting an average thickness of 50 g/m^2, there will be range of thicknesses, due to oil behaviour, including patches/windrows/streamers of oil, of which some will be >100 g/m^2. 50 g/m^2 is aligned with the recommendation of NOPSEMA (2019).

Response Strategy Planning Threshold	Response Strategy Planning Considerations	Reference/Justification
	• note: this threshold is not relevant for protection of sensitive resources response strategy. This response strategy typically uses booms to deflect/corral oil, the same as at sea containment and recovery. However, unlike at sea containment and recovery (which requires >100 g/m^2 floating oil thickness for operational efficiency), when conducting protection of sensitive resources, nearshore protection booms can be effective at deflecting low concentrations of floating oil, over a long duration, to prevent long-term accumulation of oil in a sensitive receptor. Therefore, there is no specified response planning threshold defined for the protection of sensitive resources response strategy. • note: whilst this threshold is relevant for surface dispersant application, it is not relevant for subsea dispersant injection (SSDI). Planning for SSDI should be based on consideration of the reservoir oil properties, flow rates, and the effectiveness of selected dispersants on the oil type.	Therefore, during WCD response planning, on water response strategies including C&R, surface dispersant application and in-situ burning capability and arrangements should be evaluated against this threshold.
Longest length (km) or number of segments of shoreline oiled >10 g/m^2	Used to inform response planning regarding the: • number of segments, and tier/size of shoreline clean-up assessment technique (SCAT) teams, including oiled wildlife response (OWR) and protection of sensitive resources assessments.	IPIECA-IOGP (2015c) classifies oil on shorelines based on oil thickness. Stain is classified as <0.1mm (100g/m^2), and film as 'iridescent sheen', i.e., less than stain, with no minimum thickness. If a film were considered an order of magnitude lower than stain, the thickness would be 0.01 mm (10 g/m^2). For comparative purposes, 0.01 mm thickness is equivalent to ~2 teaspoons oil/m^2. Oil is just visible at this thickness on a shoreline and there is potential for some socio-economic impacts at this thickness. Therefore, 0.01mm (10 g/m^2) is considered an appropriate threshold to understand the potential length of shoreline/number of shoreline sectors for which SCAT may be required. This is aligned with the recommendation of NOPSEMA (2019). Therefore, during WCD response planning, SCAT capability and arrangements should be evaluated against this threshold.
Minimum time to shoreline contact for oil >10 g/m^2	Used to inform response planning regarding the: • timeline for mobilisation of SCAT, OWR, and protection & deflection (P&D) assessment teams.	Understanding the shortest possible timeline between the spill event, and oil arriving on a shoreline at >10 g/m^2 provides a metric to consider, for the arrangements required for the mobilisation of a SCAT capability.

Response Strategy Planning Threshold	Response Strategy Planning Considerations	Reference/Justification
Longest length (km) or number of segments of shoreline oiled >100 g/m^2	Used to inform response planning regarding number of segments, and tier/size of: • shoreline clean-up • OWR • protection of sensitive resources (or P&D)	100 g/m^2 is often used as minimum thickness for effective shoreline clean-up (Owens and Sergy, 2000), and French-McCay (2009) conclude that 100 g/m^2 is the minimum oil thickness for effects on marine fauna and invertebrates on a shoreline. This is aligned with the recommendation of NOPSEMA (2019). Therefore, during WCD response planning, shoreline clean-up, P&D and OWR capability and arrangements should be evaluated against this threshold.
Minimum time to shoreline contact for oil >100 g/m^2	Used to inform response planning regarding: • timeline for mobilisation of shoreline clean-up, OWR, P&D and waste management capabilities.	Understanding the shortest possible timeline between the spill event, and oil arriving on a shoreline at >100 g/m^2 provides a metric to consider, for the arrangements required for the mobilisation of a shoreline clean-up/OWR capability, and associated waste management capability that will be required by these response strategies.
Highest peak shoreline loading above moderate threshold (100 g/m^2)	Used to inform response planning regarding the: • volume of waste likely to be generated during P&D, OWR and shoreline clean-up.	100 g/m^2 often used as minimum thickness for effective shoreline clean-up (Owens and Sergy, 2000; French-McCay, 2009) conclude that 100 g/m^2 is the minimum oil thickness for effects on marine fauna and invertebrates on a shoreline, and therefore triggers potential for OWR cleaning operations and associated waste generation. Therefore, during WCD response planning, the volume of oily waste potentially generated during shoreline clean-up, P&D and OWR and the associated waste management capability and arrangements should be evaluated against this threshold.

4.3 Spill Modelling Results and Basis of Design

This section presents the outputs of the WCD modelling runs against the most relevant response planning thresholds described in Table 4-2. The spill model outputs, assessed against response planning thresholds, has been termed the 'Basis of Design' (BOD). The BOD tables are used to inform the Field Capability Assessments presented in Section 6.6.

Stochastic LOWC realisations were selected on the basis of the following criteria for detailed deterministic modelling:

- Highest accumulated shoreline loading of oil on all shorelines above the moderate threshold of 100 g/m^2
- Minimum arrival time of oil to any shoreline above the moderate threshold of 100 g/m^2
- Maximum daily surface oil area (km^2) of surface oil thickness above 50 g/m^2 (>50 µm)

A summary of extant of a worst-case LOWCD subsurface and MDO surface release is presented in Table 4-3 and Table 4-4.

Table 4-3: Summary of worst-case LOWC exposure (GHD, 2022)

Spill Scenario	Potential Extent of Hydrocarbon Exposure
LOWC - subsurface release (81 days)	Highest accumulated shoreline oiling above moderate threshold (100 g/m^2) of **14 tonnes** (Autumn-Winter period)
	Minimum arrival time of oil to any shoreline above the moderate threshold (100 g/m^2) of **0.5 days at Warrnambool Plain (9.6 tonnes)** (Autumn-Winter period).
	Maximum length of oiled shoreline above the moderate threshold (100 g/m^2) of **25.4 km at Warrnambool Plain** (Autumn-Winter period).
	Maximum surface oil contact probability (%) of surface oil thickness >50 g/m^2 of **0%** (No surface oiling predicted for either low, moderate or high threshold models).

Table 4-4: Summary of worst-case MDO exposure (GHD, 2022)

Spill Scenario	Potential Extent of Hydrocarbon Exposure
MDO - surface release (6-hour)	Highest accumulated shoreline oiling above moderate threshold (100 g/m^2) of **186.7 tonnes** (Autumn-Winter period).
	Minimum arrival time of oil to any shoreline above the moderate threshold (100 g/m^2) of **0.2 days at Warrnambool Plain** (both seasons).
	Maximum length of oiled shoreline above the moderate threshold (100 g/m^2) of **29.7 km at Warrnambool Plain** (both seasons)**.**
	Maximum surface oil contact probability (%) of surface oil thickness >50 g/m^2 of **42.3% at Otway** (Spring-Summer period)

*Oil on shorelines is tracked by OSCAR as an accumulated value for the stochastic simulations. The calculation for accumulated oil is the sum of all oil that has arrived at a shoreline cell over the duration of the simulation. In this manner, it does not consider weathering losses due to evaporation or washing of the shoreline by waves. The accumulated value will therefore be a conservative over-estimate of the peak oil mass at a shoreline when compared to the deterministic prediction, which does consider these loss mechanisms.

4.4 Description of Operating Environment

A detailed description of the existing environment, including full EPBC Act Protected Matters Search outputs and literature review of the values and sensitivities potentially impacted by oil spills are contained within the activity-specific EP(s).

To provide context for spill response planning purposes, a high-level summary of the environmental values and sensitivities of the region is provided below.

- Australian Marine Parks
  - Apollo Marine Park
  - Beagle Marine Park
- RAMSAR Wetlands:
  - Western Port
  - Port Phillip Bay
  - Glenelg Estuary and Discovery Bay Wetlands
- Victorian Coastline - threatened ecological communities
  - Subtropical and Temperate Coastal Saltmarsh
  - Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion
  - Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community
  - Natural Damp Grassland of the Victorian Coastal Plains
- Offshore - threatened ecological communities
  - Giant Kelp Marine Forests of South East Australia
- Offshore waters
  - Other oil and gas assets
  - Important migratory pathways for blue, fin, sei, southern right and humpback whales
  - Important foraging areas for seabirds, seals, and sharks
  - Cultural and heritage ship wreck site

5 Spill Modelling Overview

5.1 Field Capability Basis of Assessment

This section presents the relevant information by which to undertake the detailed field capability assessments for each Response Strategy presented in Section 6.6. Supporting information applied to form the basis of the field capability assessment include:

- selection of WCDs for detailed field capability assessment;
- cone of response model;
- oil spill budgets to inform dispersant application; marine recovery; in-situ burning; shoreline protection and clean-up; and oiled wildlife response; and
- summary of tiered preparedness models inclusive of assumed capability need to successfully implement each response strategy.

5.2 Selection of WCD for Field Capability Assessment

In accordance with the processes described in IPIECA-IOGP (2013) Part 2, a single WCD scenario has been selected for detailed Field Capability Assessment, due to nature and scale, and strategic SIMA outcome. Justification for the selected scenario is provided in Table 5-1.

Table 5-1: Selection of WCD for field capability assessment

Worst-Case Discharge	Selected? (Yes/No)	Justification
Subsea release of gas condensate from a loss of containment from the Minerva-4 well.	Yes	This scenario represents the largest release of gas condensate from the Minerva field. The release would be from near the sea floor.
Surface release of MDO from fuel tank rupture on an AHTS vessel.	No	This scenario would have less impact than the loss of well control scenario with fewer response strategies being applicable. Those that are similarly applicable would be to a reduced scale compared with a LOWC event.

5.3 Cone of Response

To maximise the effectiveness of the overall response effort, the most effective and advantageous options should be deployed as close to the source as possible, depending on safety and operational limitations. Supplementary actions should then radiate out from this location. This approach is known as the 'cone of response' model. Optimising the response in this way can help to maximise the removal of oil from the water's surface (IPIECA-IOGP, 2015a).

IPIECA-IOGP (2015b) have developed a similar cone of response model (refer to Figure 5-2); however, this only considered the 'at-sea' response strategies.

Figure 5-1 provides the layout of 'at-sea' response strategies with Zone A for Containment and Recovery (C&R) located closest to the spill source, followed by Zone B for fixed wing aerial dispersant (FWAD) and Zone C for vessel dispersant at increasing distances from the spill source. In contrast, the IPIECA-IOGP (2015b) model (Figure 5-2), shows dispersant operations closest to the spill source and C&R used adjacent to a shoreline sensitivity.

Another 'cone of response' model, which commences from the start of the spill has been developed by AMOSC, provided as Figure 5-3.

These various models have been provided, as an indication of the potential variety of configurations in which the various response strategies can be deployed, to achieve specific response objectives.

The field capability assessment process is used to assess and determine the most suitable capabilities and arrangements for the various response strategies for each of the WCDs. Where relevant, the field capability assessment should take into consideration the various 'cone of response' models available, and different outcomes which can be achieved by varying how and where each response strategy is implemented.

Source control activities such as debris clearance and relief well drilling are summarised within the scope of this document, however detailed source control capabilities and arrangements are provided within the Source Control Emergency Response Plan (SCERP).

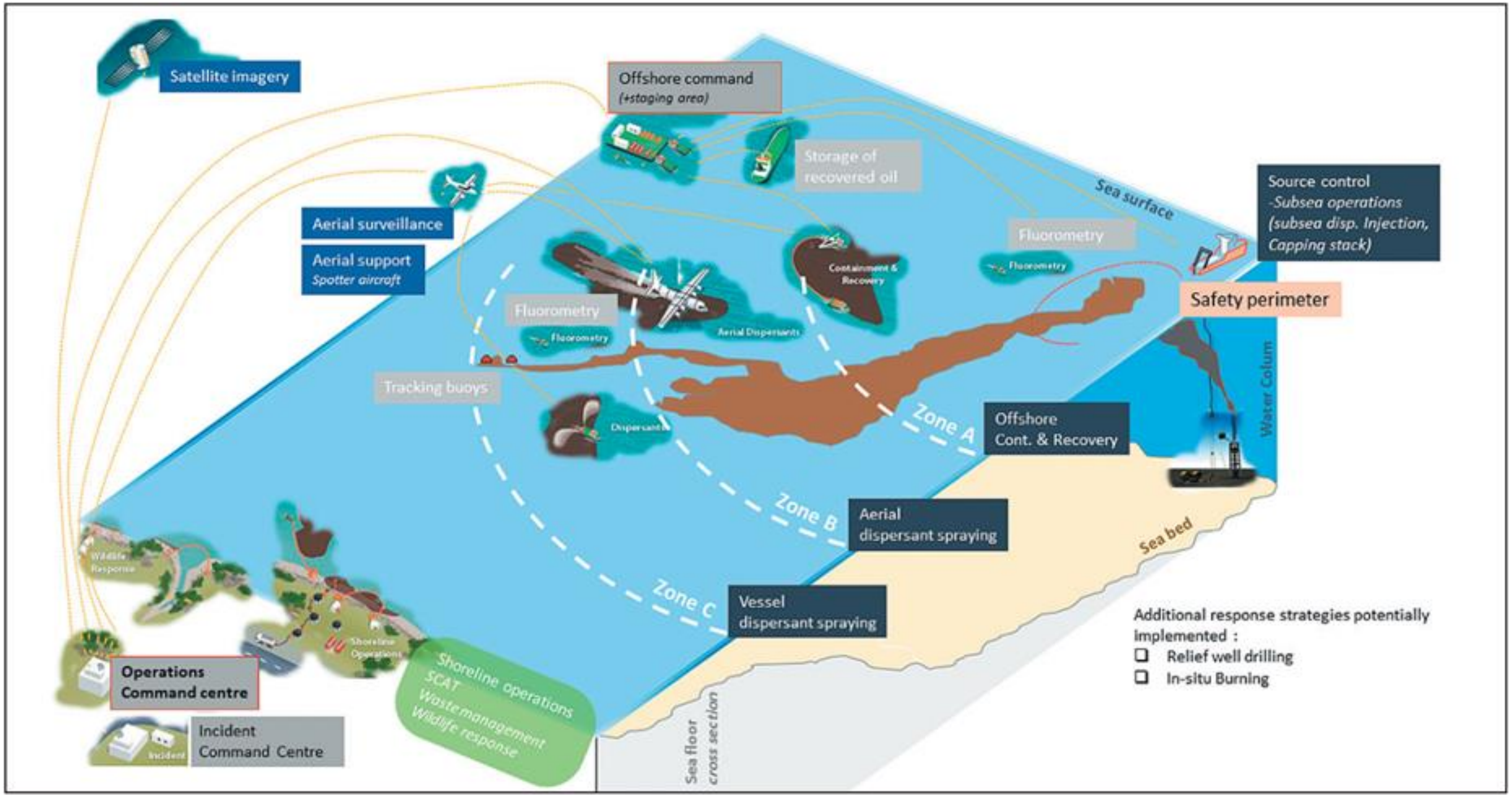

Figure 5-1: Cone of response model (Source: EOSP, 2012)

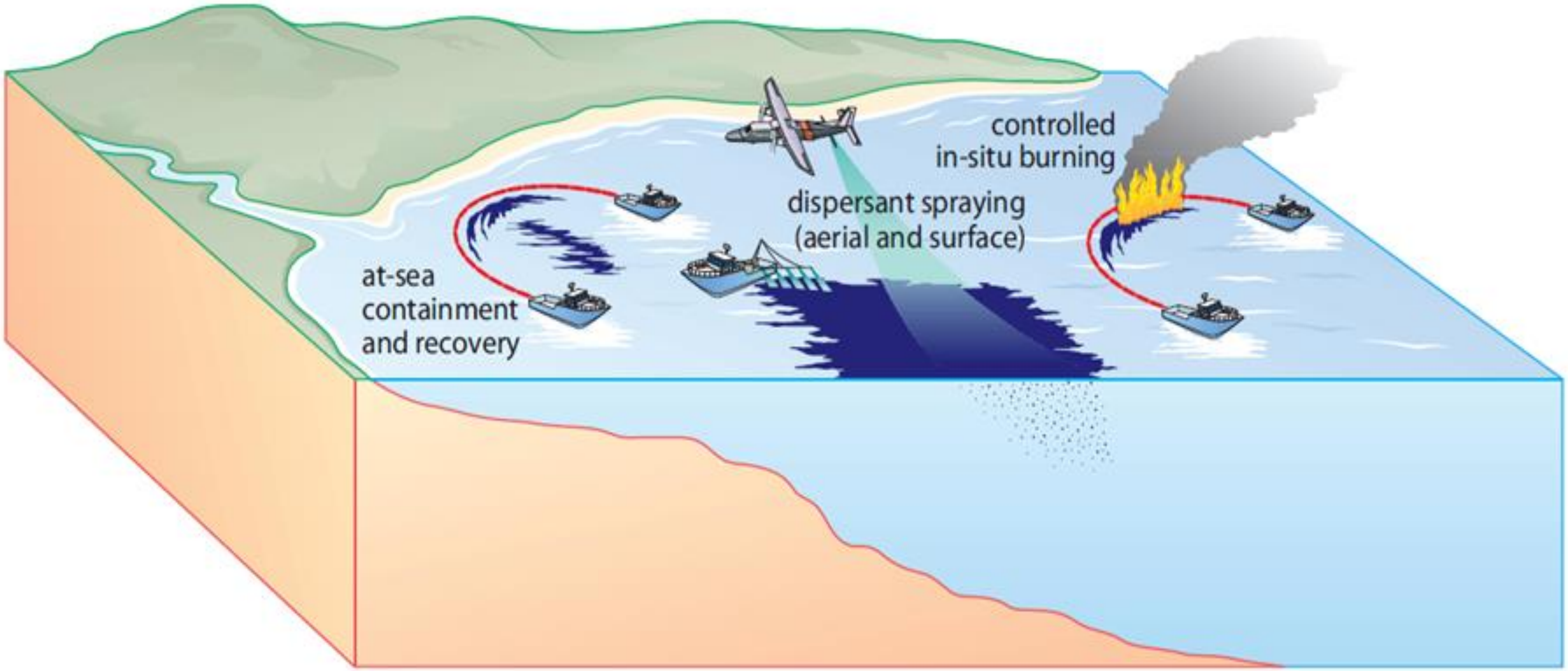

Figure 5-2: At-sea response techniques for responding to a surface spill (Source: IPIECA, 2015b)

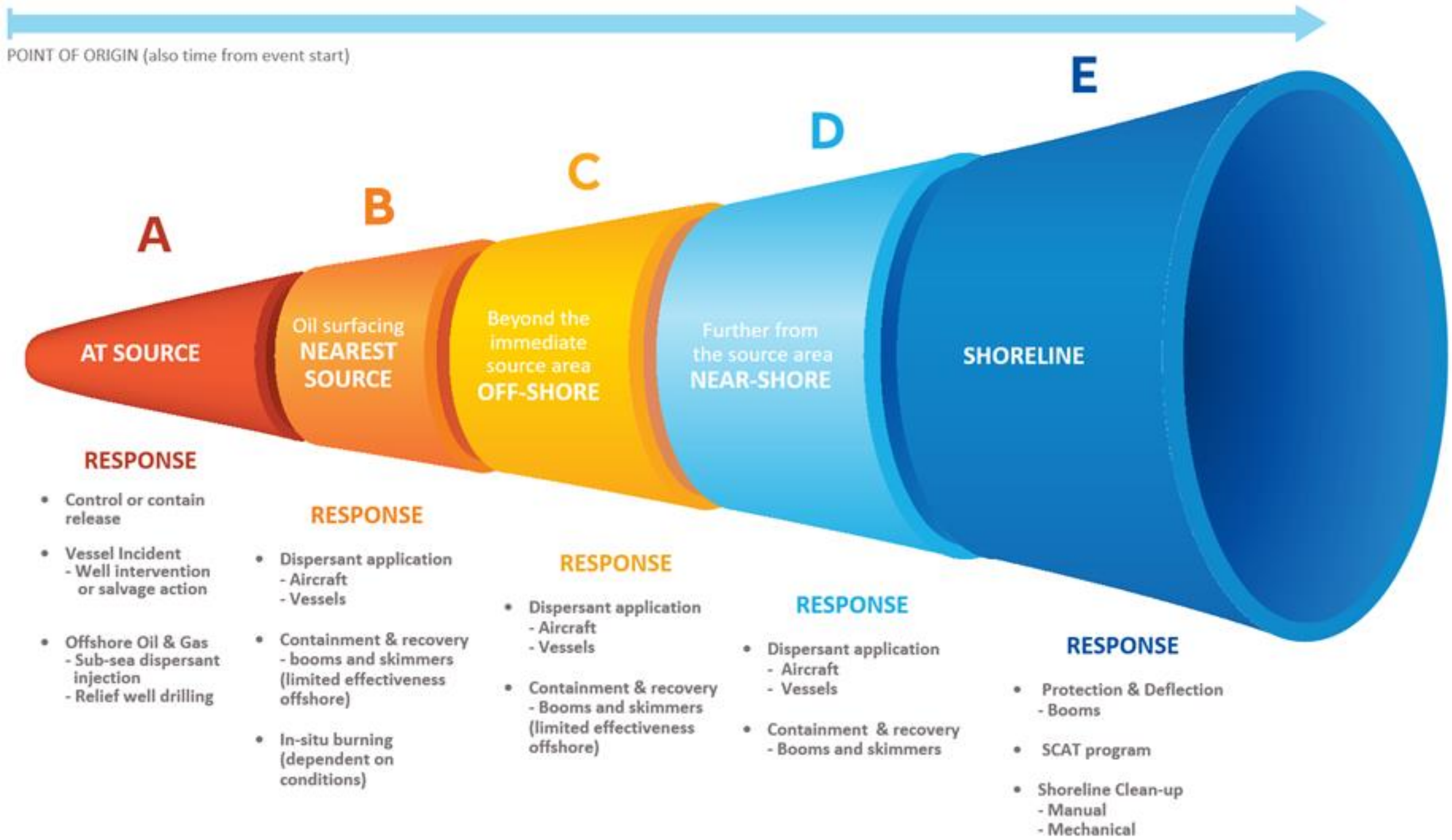

Figure 5-3: Cone of response - AMOSC model

5.4 Oil Spill Budget

An oil spill budget is a process used to assist in the evaluation of the field response capability, based on the volume/thickness of oil within a certain area, weathering, behaviour of the oil over time in the environment, and the effectiveness of the various response strategies.

Oil spill budgets are used as part of the field capability assessments, presented in Section 0.

The below sub-sections describe factors affecting an oil spill budget for the various response strategies.

Generation of an oil spill budget can provide an early indication of several response parameters including:

- potential waste volumes
- scale of response
- duration of response.

5.4.1 Source Control

Source control is the direct or indirect implementation of a control measure to attempt to either mitigate or control the release of hydrocarbons into the marine environment. For a majority of spill scenarios this strategy will be the primary response strategy, and the main option to control the hydrocarbon response. There are several source control tactics that can be used depending on the spill situation (hydrocarbon type, scenario and environment). Source control tactics for a LOWC include: drilling a relief well, top kill, capping stacks, direct well intervention and subsea dispersant applicant. For a vessel spill, the SOPEP will outline clear source control options.

5.4.2 Surface Dispersant Application (SDA)

Dispersant application is designed to transfer oil from the surface of the ocean to the water column and to enhance the natural process of biodegradation. Being able to target oil closest to the source provides the best outcome in terms of efficacy of the dispersant product on the hydrocarbon. This minimises the ongoing impact of pollution in the environment and reduces the overall potential oil spill budget. Dispersants can treat more oil over time typically than other response options due to the versatility of application using both aircraft and vessels. Careful planning for dispersant operations will ensure that any requirement for dispersant application can continue as needed for the duration of a response.

For successful operations, the dispersant must be effective. This can be determined in several ways including:

- jar test (from a sample collected at source or spill) conducted on site
- efficacy testing by a laboratory on known products and hydrocarbons
- visual analysis by trained responders of test spray from aircraft or vessel.

Noting that for heavier oils dispersion can take longer (up to 30 minutes) to occur depending on the dose/concentration applied and wind/wave activity, which will drive mixing of the dispersant into the oil.

Australian stockpiles of dispersant consist of products considered to be effective on a broad range of oils rather than specific to a given type. The application rate may change considerably (high application rates for thicker layers of viscous oil, lower rates for thinner, lighter oils) but no dispersants would be considered effective for either MDO or Minerva Condensate.

Aircraft Application

Aircraft application for an offshore response provides the ability to treat large volumes of oil over a large area, in a rapid timeframe. Aircraft also can transit quickly to respond and to treat slicks separated over large distances.

Aerial operations are restricted to daylight hours and typically require good visibility, minimum cloud ceiling of 1000 ft, and wind speeds below 35 knots to ensure aircraft and pilot safety. Pilots are responsible for aircraft operations and safety at all times.

Defining a single aircraft and support requirements as a strike team, indicative impact on oil budget per strike team can be derived using the following parameters (based on an air-tractor / crop-duster type aircraft):

- total or daily volume of release
- calculated dispersant volume to treat at initial 1:20 – 1:25 dispersant to oil ratio
- one fixed-wing aircraft (FWAD) can deliver 3 m^3 per sortie
- one Hercules aircraft can deliver $10m^3$ per sortie
- one aircraft can typically conduct a maximum of 4 sorties per day, reduced to 3 sorties per day, if conducting operations a significant distance offshore)

Vessel Application

Vessel-based dispersant spray application provides the ability to accurately target oil on the water. However, air support, or the use of drones, allows operators to locate slicks that are difficult to observe from sea level. Smaller amounts of dispersant, or diluted dispersant can be applied based on onsite assessment of efficacy, improving application efficiency.

There are several different systems for vessel-based application and the general considerations for efficient use include:

- mounting of spray arms as far forward as possible to avoid the bow wave moving oil out of the spray path
- nozzles that produce a flat spray of droplets (not mist or fog) that strike the water in a line perpendicular to the direction of vessel movement
- operation of vessel in prevailing wind/weather conditions to avoid overspray onto decks or personnel
- initial (rule of thumb) dispersant-to-oil ratio of 1:20 which can then be adjusted to actual field concentrations based on observed efficacy
- treatment should initially target the outer edges of the thicker portions of any slick rather than through the middle or on thin sheen at surrounding edges.

Defining a single vessel and support requirements as a strike team, indicative capability impact on oil spill budget can be derived using the following parameters:

- total or daily volume of release
- calculated dispersant volume to treat at initial 1:20 dispersant to oil ratio
- calculated vessels required based on 10 m^3 dispersant delivery per 8 hr day per vessel
- number of spray systems per vessel.

5.4.3 Subsea Dispersant Injection (SSDI)

In general terms, subsea dispersant injection (SSDI), conducted close to the source, can have a significant impact on the oil spill budget and can provide advantages over surface dispersant application, including:

- application can be continuous regardless of time of day or weather and sea state
- once set up, injection requires less workforce and assets
- efficacy on fresh oil at source is higher, and with increased dispersant mixing due to the turbulent flow in the oil/gas stream, SSDI requires less dispersant (1:100 dispersant to oil ratio typically used for SSDI) providing the ability to treat large volumes of oil with lower volumes of dispersant compared to surface dispersant application.
- sub-surface injection has been shown to significantly reduce volatile organic carbons (VOCs) at surface (e.g., Macondo/Gulf of Mexico incident), increasing safety of responders on waters adjacent to the source of the release.

An indicative capability impact on oil budget can be derived using the following parameters:

- total or daily volume of oil released
- calculated dispersant volume to treat the oil at an initial 1:100 dispersant to oil ratio (AMOSC, 2016; IPIECA-IOGP,2016a), or
- maximum dispersant flowrate at point of injection.

SSDI is configured in OSCAR by reducing the oil-water interfacial tension parameter, which has the effect of causing the liquid oil to break up into smaller droplets during release. The oil-water interfacial tension was reduced to 2/3 of the default value on the basis of advice provided by SINTEF to simulate SSDI. SSDI is not considered effective for gas condensate.

5.4.4 At Sea Containment and Recovery

At sea containment and recovery is the controlled collection and recovery of floating oil from the water's surface. The response typically involves the deployment of booms and oil skimmers from suitable vessels, as well as the collection, transfer and disposal of oil and oily water recovered during the response.

A traditional U-sweep or J-sweep configuration involved two vessels (or one vessel using a para-vane to hold the boom mouth open). The width of the mouth of the boom is typically one third the boom length, therefore ~120 m wide mouth if 400 m of boom was deployed.

Advanced booming techniques require up to 3 to 5 vessels per strike team with advanced booming equipment such as current-busters and speed-sweep systems. These configurations and equipment can operate at higher speeds (up to 5 knots), however have a narrower swath width, typically only 15 - 22 metres (IPIECA-IOGP, 2015a). Advanced booming techniques are useful in scenarios when the slick has spread and fragmented, however targeted operations will typically require some form of air or drone support due to the difficulty of oil on water observation from vessels. Another issue is that current busters have limited oil storage capacity in the pocket, and therefore booming operations must stop, and switch to skimming when the system becomes full. Therefore, the overall encounter rate/oil recovery rate over an operational period may not vary significantly when compared to traditional techniques.

Effective containment and recovery can reduce the potential risks and impact of a marine pollution event associated with:

- marine fauna
- sensitive shoreline environments
- shoreline response

- waste generation.

However, the overall effectiveness of containment and recovery can be limited by a combination of operational constraints which may include but not limited to:

- slick: thickness and percentage cover on surface (affecting the encounter rate)
- slick: state of weathering (how recoverable the oil is with a skimmer)
- weather: suitable weather/sea state conditions and current strengths.

Oil usually needs to be >100 g/m^2 (>0.1 mm, which equates to Bonn Code 4/5) to feasibly corral oil with a boom and achieve any significant level, or operationally efficient level, of oil recovery with skimmers during an offshore containment and recovery operation (O'Brien, 2002; IPIECA-IOGP, 2015a).

Continuing containment and recovery operations for slicks noted to be in Code 1, Code 2, and Code 3 (silver/grey sheen, rainbow sheen and metallic sheen respectively) would require consideration of potential recovery rates versus the benefits to the environment, as well as operational risk and cost.

The rate at which the spilled oil can be captured within the boom is known as the encounter rate (IPIECA-IOGP, 2015a), and is a product of the:

- swathe width of the boom configuration
- speed at which the boom is being towed
- thickness and continuity of the oil slick that is being encountered, which may vary due to slick spreading and fragmentation.

It is possible to estimate encounter rates and recovery volumes based on the following: oil thickness x boom opening (which is one third length) x efficiency rate (typically around 10% but could be higher depending on oil type – refer below).

Containment and recovery potential calculations provide an indication of the possible impact per strike team on oil spill budget. Calculations can be done on the following basis to indicate a maximum recoverable volume in m^3/hr:

- width of boom collecting oil on water (full span width for advanced boom systems such as a Current Buster, or 30% of boom length for conventional Ro-Boom or similar system)
- thickness of oil on water (typically within BONN Agreement Discontinuous True Colour range of between 50 µm and 200 µm)
- rate of travel over water, which is typically a maximum of 0.75 knots for conventional boom, or up to 4 – 5 knots for advanced booming systems (because excess speed over water will result in oil escaping beneath the boom)
- time of operation per day (daylight hours minus deployment time, skimming time (advancing boom systems) or other HSE requirements/constraints).

Two IPIECA-IOGP worked examples for oil spill budget for at sea containment and recovery are provided below. Note, these examples are based on the strike team encountering contiguous oil of 50 µm (minimum containment potential) and 200 µm (maximum containment potential), across the entire mouth of the boom, for the entire duration of an operational period.

- Current buster strike team
  - Equipment Current Buster 4 (National Plan stockpile standard)
  - Encounter width full span (22 m)

  - BONN agreement Discontinuous True Colour Range, 50 µm and 2 knots speed over water (minimum)
  - BONN agreement Discontinuous True Colour Range, 200 µm and 4 knots speed over water (maximum)
  - Assumed maximum 12 hr operational period per day
  - Minimum containment potential = 33 m^3/day
  - Maximum containment potential = 261 m^3/day
- Traditional Ro-Boom strike team
  - Equipment 2 x 200 m lengths offshore Ro-Boom
  - U or J formation with encounter span 30% of total length = 120 m
  - BONN agreement Discontinuous True Colour Range, 50 µm (minimum) and 200 µm (maximum) oil on water
  - Speed over water 0.75 knots
  - Assumed maximum 12 hr operational period per day
  - Minimum containment potential = 67 m^3/day
  - Maximum containment potential = 267 m^3/day

However, based on the constraints listed above, experience has shown that the efficiency of at-sea containment and recovery operations can vary widely, and recovery is usually limited to between 5% and 20% of the initial spilled volume (IPIECA-IOGP, 2015a).

5.4.5 In-Situ Burning

In-situ burning requires wave heights typically below 1 m and wind speeds below 10 knots (IPIECA-IOGP, 2016b). To implement an effective in-situ burn response, a minimum surface hydrocarbon thickness of 2-5 mm (2000 - 5000 g/m^2) is required to be present. Booms would be required to corral the spill, to generate additional oil thickness. Therefore, in-situ burning could potentially be attempted in the same locations, on the same slicks as at sea containment and recovery.

The efficiency rates can then be calculated based on the same factors as used for at sea containment and recovery, noting that additional time is then required to conduct the burn itself.

5.4.6 Protection of Sensitive Resources

There is no minimum thickness for effective P&D booming (unlike at sea containment and recovery where 100 g/m^2 typical thickness is required for reasonable oil recovery volume). Booming at lower floating oil concentrations can still result in a positive environmental outcome, by preventing accumulation over time.

Oil spill budget factors include:

- location specific tidal ranges and current speeds will need to be taken into consideration, to determine potential nearshore/shoreline booming configurations and their potential effectiveness.
- based on potentially effective booming configurations, it is possible to calculate the required lengths of boom and associated ancillaries for specific receptors/locations.
- an estimate would then need to be made regarding the interception rate and recovery rates for nearshore/shoreline oil.

5.4.7 Shoreline Response

Shoreline response is one of the final areas to impact the oil spill budget. Clear derivation of the impact is complex considering:

- volumetric changes to the oil over time due to weathering
- bulking factors based on marine or shoreline debris (In consultation with Victorian DoT, Woodside have applied a ‘bulking factor’ for the calculation of potential oil contaminated shoreline waste of 10x the volume of the oil stranded on the shoreline)
- bulking factors introduced through cleaning methods or requirements
- waste management and hazardous waste minimisation.

A ‘rule of thumb’ estimate (IPIECA-IOGP, 2015c) of the impact of shoreline clean-up efforts on oil spill budget is that one person can remove 1–2 m^3 per day.

5.4.8 Oiled Wildlife Response

Some elements of potential oiled wildlife capability can be evaluated, based on a range of parameters, including:

- location, density, and abundance (and seasonality) of wildlife population(s) potentially at risk from a WCD
- oil types (including weathering properties) and how the fresh versus weathered oil(s) may affect the various wildlife species
- credible response options/tactics for the various species/populations (e.g., comparison of hazing versus pre-emptive capture and translocation versus collection/rescue, intake, first aid/stabilisation, initial clean and rapid release, or full cleaning, long-term rehabilitation, and release).
- the species protection/priority status, and evaluation of the impact of the loss of individual animals on the overall species/population viability, which informs the justification for full cleaning and rehabilitation, versus other treatment/welfare options.

OWR planning should ensure that capabilities are available for the likely/credible OWR options/tactics, based on the evaluation of the key species at risk.

During oiled wildlife cleaning, it is expected that between 600-1,000 L of fresh water may be required to wash and rinse one wildlife casualty. Additional water is required for rehabilitation pools, general cleaning etc. Therefore, the supply of fresh water, and oily water storage is a key consideration.

An overall space requirement of ~2,400 m^3, a water flow capacity reaching 60,000 L/day and an electrical load of 200 Amps (for heating, air conditioning etc.) are a conservative estimate for a centre dealing with 100 to 500 wildlife casualties at a cleaning/rehabilitation facility at one time (DBCA, 2014).

5.5 Tiered Preparedness

Tiered preparedness is described by the IPIECA-IOGP (2016c) Tiered Preparedness Guideline as:

- Tier 1 capabilities describe the locally held resources used to mitigate spills that are typically operational in nature occurring on or near an operator's own facility.
- Tier 2 capabilities are typically extra resources from regional or national providers, used to increase response capacity or to introduce more specialist technical expertise.
- Tier 3 capabilities are globally available resources that further supplement Tiers 1 and 2. The resources held at the three tiers work to complement and enhance the overall capability by enabling seamless escalation according to the requirements of the incident.

An important concept is the cumulative nature of a tiered response. The elements of a Tier 1 response are supplemented by higher tier capability and not superseded or replaced by it.

The National Plan (AMSA, 2020) identifies three levels of incidents as follows:

- Level 1: Incidents can be resolved through the application of local or initial resources only (e.g., first-strike capacity)
- Level 2: Incidents are more complex in size, duration, resource management and risk and may require deployment of authority resources beyond the initial response
- Level 3: Incidents are characterised by a degree of complexity that requires the Incident Controller to delegate all incident management functions to focus on strategic leadership and response coordination and may be supported by national and international resources.

Combining these two descriptions, for the purposes of Woodside response planning, within an Australian context:

- Tier 1 resources are typically being held 'locally'
- Tier 2 are those held regionally (e.g., West coast versus East coast resources) or a portion of the nationally capability
- Tier 3 being full deployment of the national resources, and/or global capability where required.

Table 5-2 presents an example analysis of the equipment/assets which could be deployed for each field response activity under each tier of response in an Australian context.

This table was initially prepared by the Australian Marine Oil Spill Centre (AMOSC) in 2020, as part of an Australian Petroleum Production and Exploration Association (APPEA) CICC training and capability assessment project and is therefore presented below as an indicative/conceptual model only (i.e., this a conceptual model, not endorsed under the NatPlan or any Victorian Control Agency oil spill contingency plan.

This conceptual model has been developed/presented below, for the purposes of assisting in the consideration of field capability units/strike teams, when conducting the field capability assessment process. Woodside have also included a source control capability overview based upon the Source Control Emergency Response Plan (SCERP).

Section 6.6 presents the specific details of tiered capability in relation to a WCD during Minerva Field Decommissioning activities.

Table 5-2: Tiered preparedness capability overview

Response Strategy	Response Strategy Objective	Capability Requirement Description	Tier 1 Example Criteria	Tier 2 Example Criteria	Tier 3 Example Criteria
Source Control	Well kill via subsea intervention	MODU / vessel with 'work class' ROV Surface controlled subsurface safety valve (SCSSV) – in situ Blow-out preventer (BOP) – when MODU connected to wellhead Emergency Shut-Down System – MODU or FPSO control room Bullheading production bore (well-specific) – operational MODU in field connected to wellhead AMOSC Subsea First Response Toolkit (SFRT) (located in Henderson Western Australia) Oil Spill Response Limited (OSRL) Subsea Incident Response Toolkit (SIRT) package. Wild Well Control Equipment (Singapore - Primary)	1x 'Work Class' ROV Surface controlled subsurface safety valve (SCSSV) Blow-out preventer (BOP) Emergency Shut-Down System Bullheading production bore (well-specific)	AMOSC SFRT	OSRL SIRT package Wild Well Control Equipment
	Enable well kill operations. Debris clearance / subsea dispersant injection (SSDI) via Subsea First Response Toolkit (SFRT)	Dynamic Position (DP2) vessel with active heave compensated 20 - 250t crane (depending on debris weight), 400m^2 deck space. AMOSC SFRT (located in Fremantle/Jandakott Western Australia) OSRL SIRT package. Wild Well Control Equipment (Singapore - Primary)	Nil	AMOSC SFRT Deployment vessel(s)	OSRL SIRT package Wild Well Control Equipment Deployment vessel(s)
	Well kill via relief well	APPEA Memorandum of Understanding: Mutual Aid Alternate MODU plus AHTS vessels Casing and wellhead equipment Consumables Engineering and operational support services	Nil – assumes MODU inoperable	Nil	Alternate MODU – Regional Industry mutual aid resources Alternate MODU – international Specialist well control service providers
Surveillance, monitoring and visualisation (SMV)	To collect spill event/response data from a wide variety of sources, to enable informed and timely CICC decision making during a response.	Oil Spill Trajectory Modelling (OSTM) • OSTM will provide predictions of the trajectory and fate of the oil spill • OSTM can be used to predict effectiveness of dispersant • OSTM outputs can be further interrogated to inform health and safety decisions (such as atmospheric risks etc). The capability requirements for OSTM are provided below. • Validated OSTM computer model/program • Trained personnel, on call, to rapidly activate the OSTM.	1 x OSTM run ordered and received.	2 or more OSTMs ordered and received over a few days to 1 week.	Multiple daily OSTMs ordered and received over long duration response.
		Aerial surveillance aircraft and trained spotters • aerial surveillance will assist with validating the OSTM predictions, through visual confirmation of the location and type of slick. • personnel trained in aerial observation The capability requirements for Aerial Surveillance are provided below. • Suitable aircraft (fixed or rotary wing) • Trained air observer personnel	1 x vessel maintaining surveillance. (Spill is small enough that vessel surveillance is sufficient to replace planned aerial surveillance)	Opportunistic – primary visual surveillance provided by aerial surveillance.	Opportunistic – primary visual surveillance provided by aerial surveillance.
		Vessel surveillance • vessel surveillance will assist with validating the OSTM predictions, through visual confirmation of the location and type of slick. The capability requirements for Aerial Surveillance are provided below. • Suitable vessel • Trained spill observer personnel	1 x vessel maintaining surveillance.	Opportunistic – primary visual surveillance provided by aerial surveillance.	Opportunistic – primary visual surveillance provided by aerial surveillance.

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Response Strategy	Response Strategy Objective	Capability Requirement Description	Tier 1 Example Criteria	Tier 2 Example Criteria	Tier 3 Example Criteria
			(Spill is small enough that vessel surveillance is sufficient to replace planned aerial surveillance)		
		Electronic surface tracker buoys (ESTBs) • ESTBs will assist with validating the OSTM predictions • ESTBs will assist with aerial surveillance flight planning The capability requirements for ESTBs are provided below. • ESTBs • satellite tracking/data reporting platform • suitable deployment platforms (vessels, aircraft etc).	1-3 x Satellite Tracker Buoys deployed near release location during initial release (first 3-6 hours) only.	Additional ESTBs deployed near leading edge of slick or separately identified slicks that develop over time (Sets of 3 buoys depending on slick leading-edge size) at end of daylight operations. 3 - 6 ESTBs deployed.	Routine deployment of clusters of ESTBs deployed near leading edge of slick at end of daylight operations, over multiple days during a long-duration spill event. >6 ESTBs deployed. The need for ongoing deployment of additional ESTBs, or re-deployment of those used previously, would be subject to review based on overall benefit over time.
		Satellite imagery • satellite imagery will assist with validating the OSTM predictions The capability requirements for satellite imagery are: • satellites with suitable spectrum for spill observations • satellite data reporting platform • personnel trained in the interpretation of satellite imagery.	N/A	Single satellite imagery acquisition.	Multiple satellite imagery acquisitions over long duration response, with dedicated imagery interpretation capability also activated.
		Operational Monitoring Programs (part of the OSMP) • provides water quality data and other data to support CICC response decision making The capability requirements for OSMP are: • trained scientific personnel for sampling, data interpretation and reporting • scientific field sampling equipment • logistics platforms (typically small to medium vessels) • laboratories for analysis of samples	Not required if hydrocarbon type known and a sample can be obtained. If spill type is unknown, one or two water quality samples, from in-field vessels if available.	Partial OSMP activation (e.g., water quality sampling only).	Full suite of Operational Monitoring activation (exact program details will be scenario specific, depending on activation triggers).
At sea containment and recovery (C&R)	To reduce the volume of oil on the sea surface, resulting in a reduction in the likelihood and/or consequence of impacts associated with floating oil on the sea surface and on potentially impacted shorelines.	The capability requirements for C&R based on key elements of IPIECA-IOGP (2015a) are: • Offshore Contain and Recovery (C&R) basic strike team • 200-400 m offshore boom and skimmer • single large vessel with a rolled stern for boom deployment, and with boom-vane (single vessel operation), or an additional small support vessel for two vessel operations for U-sweep or J-sweep operation • offshore waste storage/transport resources for transport of recovered oil to shore Offshore C&R – Advanced Strike Team • 600 m – 1,000 m offshore boom and skimmer • advanced booming equipment such as current-buster or speed-sweep • U-sweep or J-sweep configuration, or funnel booming arrangements • 3-5 vessel configuration • aerial surveillance (aircraft or drones) to provide information to vessel to enhance encounter rate C&R trained personnel • basic and Advanced booming requires experienced/trained C&R personnel, such as AMOSC Core Group operations team, who can lead/supervise a contain and recover team	1-2 x C&R strike teams (single or two vessel configurations), using locally based C&R equipment and resources.	3 – 5 x C&R strike teams (single or two vessel configurations) 1 – 2 x advanced booming configuration Additional C&R equipment and resources sourced from AMOSC/AMSA stockpiles located in the same region.	6 or more basic C&R strike teams (single or two vessel configurations) 3 or more advanced C&R strike teams Additional C&R equipment and resources sourced from AMOSC/AMSA stockpiles from around Australia. International C&R equipment mobilised through National Plan and Global Response Network (through AMOSC/AMSA) (e.g., Oil Spill Response Limited (OSRL) equipment).

Response Strategy	Response Strategy Objective	Capability Requirement Description	Tier 1 Example Criteria	Tier 2 Example Criteria	Tier 3 Example Criteria
		• vessel deck crews can receive on the job training from appropriately trained C&R team leads • typically, a minimum of 5 deck personnel required for a single basic strike-team; additional teams required for advanced booming configurations			
Surface dispersant application (SDA) - vessels	To reduce the volume of oil on the sea surface, by dispersing it into the water column, resulting in a reduction in the likelihood and/or consequence of impacts associated with floating oil on the sea surface and on potentially impacted shorelines.	The capability requirements for vessel dispersant are provided below, based on key elements of IPIECA-IOGP (2015b). Offshore vessel dispersant strike team • Typical minimum vessel specs for offshore vessel dispersant would include: • single vessel (minimum 15-20 m length – depending on operating environment and expected sea conditions) • deck space for IBCs or single 10 m^3 ISO-tank • dispersant spray systems, such as fixed booms or AFEDO units Dispersant application trained personnel • personnel trained in vessel -based dispersant application • minimum 2 x trained operator + 2 deck crew	Single vessel dispersant spraying strike team using locally based dispersant equipment & local dispersant stockpile.	2 – 4 vessel dispersant spraying strike teams on station. Some dispersant equipment/stocks shifted to site from AMOSC/AMSA stockpiles located in the same region.	5 or more vessel dispersant spraying strike teams on station. Large scale dispersant equipment/stocks shifted to site from AMOSC/AMSA stockpiles around Australia. Equipment/dispersant stocks sourced and imported from overseas third-party suppliers. Possible activation of Global Dispersant Stockpile – Singapore, Americas, Middle East & Europe. Just in time dispersant manufacture considered /actioned (Nalco/Chemetell/Dasic/Total Fluids)
Surface Dispersant - Fixed wing aerial dispersant (FWAD)	To reduce the volume of oil on the sea surface, by dispersing it into the water column, resulting in a reduction in the likelihood and/or consequence of impacts associated with floating oil on the sea surface and on potentially impacted shorelines.	The capability requirements for aerial dispersant using air-tractors (AT) are based on the AMOSC Fixed Wing Aerial Dispersant Operations Plan (FWAD Ops Plan) (AMOSC, 2020) which contains the overarching national fixed wing arrangements, as well as AMOSC regional Aerial Operations plans specific to each state/region. A FWAD air-tractor offshore strike team would consist of: • Air tractor(s) – single pilot • Air Attack Supervisor Platform (helicopter preferred over fixed wing aircraft), trained Air Attack Supervisor, and Aircraft Loading Officer. • Search and Rescue platform (vessel or aircraft) The FWAD airbase support requirements outlined in the FWAD Ops Plan consists of all the elements required to effectively manage airbase operations in support of Aerial Dispersant Application including: Suitable runway/airstrip with: • operations/coordination room • office facilities – internet, fax, telephone • catering facilities / Amenities – toilets, kitchen, eating room • access arrangements – 24/7 • security arrangements – equipment, operations room, airfield • availability of bulk water • vehicle access – truck, 4wd, car, bus • storage for equipment Additional details confirmed through the Airport Operations Manager or Aerodrome Reporting Officer including: • refuelling facilities and arrangements – bulk, drums, truck • identification of fuel requirements of aircraft – JET A1/AVGAS • identification of availability and transfer arrangements for refuelling • emergency service arrangements – fire, ambulance, rescue, hospital • transport arrangements for airbase personnel – distance from town Dispersant stockpiles would be mobilised to meet aircraft at the appropriate location. Timeframes are: • third-party trucking provided within 4 hrs of activation	1 x Air Tractor (AT) aircraft on station; 1-3 sorties from FWAD. Delivery of up to 10 m^3/day.	2 – 6 AT aircraft on station; multiple sorties (4 – 24 sorties/day). Delivery of up to 77 m^3/day.	>6 AT aircraft,>24 sorties/day. Potential for activation of Global Response Network internationally available aircraft – 727, 737 & L-382 aircraft (OSRL and other providers). Delivery of >77 m^3/day. Equipment/dispersant stocks sourced and imported from overseas third-party suppliers. Potential for activation of Global Dispersant Stockpile – Singapore, Americas, Middle East & Europe. Potential for activation of agreed 'just in time' dispersant manufacture considered / actioned (Nalco/Chemetell/Dasic/Total Fluids)

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Response Strategy	Response Strategy Objective	Capability Requirement Description	Tier 1 Example Criteria	Tier 2 Example Criteria	Tier 3 Example Criteria
		• estimated vehicle loadout = 90 mins per vehicle			
Offshore subsea dispersant injection (SSDI)	To reduce the volume of oil floating up to the sea surface, by dispersing it at the seabed, resulting in a reduction in the likelihood and/or consequence of impacts associated with floating oil on the sea surface and on potentially impacted shorelines.	The capability requirements for subsea chemical dispersant injection are provided below. In conjunction with AMOSC the Australian offshore oil and gas industry has established the Sub-Sea First Response Toolkit (SFRT) which as capable of clearing the wellhead as well as allowing sub-sea dispersant injection. The equipment is housed and maintained in Fremantle by Oceaneering and requires the following to assist in mobilisation and deployment: • large support vessel with 750 m^2 deck space, tote tank storage capacity, active heavy compensated 20t (min) crane, and work-class remote operated vehicle (ROV): Min (2) Medium Work Class with capability to reach mud line at incident well centre and survey 50 m radius around well centre Carrying Capacity:100 kg Included in the SFRT or available once deployment has been arranged are: • dispersant injection wands and associated dispersant injection equipment including pumping manifolds and downlines • access to the AMOSC Fremantle based 500 m^3 SSDI dispersant stockpile plus additional industry stockpiles Secondary additional resources available from OSRL (SWIS subsea dispersant system)	nil	AMOSC SSDI equipment including 500 m^3 dispersant stockpile and injection equipment mobilised (as part of the AMOSC Subsea First Response Toolkit). OSRL (SWIS subsea dispersant system) including ancillary equipment Equipment/dispersant stocks sourced and imported from overseas third-party suppliers. Potential for activation of Global Dispersant Stockpile – Singapore, Americas, Middle East & Europe. Potential for activation of agreed 'just in time' dispersant manufacture considered/actioned (Nalco/Chemetell/Dasic/Total Fluids)	
SSDI Monitoring https://www.oilspillprevention.org/-/media/Oil-Spill-Prevention/spillprevention/r-and-d/dispersants/api-1152-e1-industry-recommended-subsea.pdf	Operational efficacy monitoring to inform IAP	Small support vessel with ROV capability for operational monitoring – water quality, including towed fluorometer, including trained water quality scientists. Real-time VOC monitoring equipment (e.g., photoionization detector, colorimetric tubes, etc.) and trained users will be stationed on vessels located near the well site. Air sampling for specific hydrocarbon constituents, including BTEX, PAHs, and other hydrocarbons, by integrated air sampling with multi-sorbent thermal desorption tubes or worker badges, followed by gas chromatography mass spectrometer (GC-MS) analysis (via NIOSH Method 2549 or equivalent method) Laboratory analysis ROV with video cameras for plume analysis Aerial surveillance - helicopters, fixed-wing systems, unmanned aerial systems (UAS), satellites, and tethered balloons.	nil	SLA with OSRL including access to Subsea Intervention Response Toolkit (SIRT) & dedicated monitoring equipment. CSA Ocean Sciences monitoring services via OSRL framework agreement.	
Controlled in-situ burning	To reduce the volume of oil on the sea surface, resulting in a reduction in the likelihood and/or consequence of impacts associated with floating oil on the sea surface and on potentially impacted shorelines.	The capability requirements for in-situ burning, based on key elements of IPIECA (2016b) are: • appropriate support vessels for deployment and management of fire rated containment boom • smaller vessels to facilitate ignition, recovery of burn residue, standby fire safety, and transport of personnel and equipment • fire-retardant booms (from international stockpiles) • incendiary devices • trained personnel from Global Response Network (e.g., Marine Spill Response Corporation (MSRC), OSRL)	nil	nil	Overseas provision of fire boom and trained responders from overseas providers. (OSRL, MSRC and others.)
Protection and deflection (P&D) of sensitive resources	To prevent/reduce the volume of oil on entering a sensitive habitat, resulting in a reduction in the likelihood and/or consequence of impacts associated with floating oil on the values and sensitivities of the habitat.	The capability requirements for a single protection of sensitive resources/protect & deflect (P&D) strike team include: • 100 m – 200 m shore-seal boom (4 to 8 x 25 m, +50 kg lengths) • 200 m – 400 m nearshore boom and associated ancillaries (shoreline and nearshore anchor kits, sandbags etc) (8 to 16 x 25 m, +50 kg lengths) • 1 - 2 x small, typically shallow draft support vessel • 1 – 4 x Light vehicle(s)/Utility Task Vehicle (side by side UTV)	1 – 2 shoreline-based sensitivities protected (shoreline/nearshore booming) 1 – 2 P&D strike teams (establish booming and monitor)	5 – 16 shoreline-based sensitivities protected 3 – 8 P&D strike teams (establish booming and monitor) Regional equipment stockpiles mobilised.	>16 sensitivities protected >8 shoreline protection strike teams National stockpiles of equipment mobilised.

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Response Strategy	Response Strategy Objective	Capability Requirement Description	Tier 1 Example Criteria	Tier 2 Example Criteria	Tier 3 Example Criteria
		• 1 x skimmers / oil recovery devices suited for nearshore/shoreline environment • 4 – 8 x nearshore anchor kits • (optional) 1,000 – 4,000 sandbags • onshore solid and liquid waste management resources • trained responders (2 minimum) • general labour personnel (8 minimum) Once P&D boom is deployed and in place it will require monitoring and potential adjustment over changes in tide and weather/wind/sea state. This can be achieved with a reduced number of personnel, the remainder of which can be redeployed to alternative activities.		1-2 x remote P&D operations. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or marine FOB). Responders required to camp / stay overnight on a support vessel.	>2 remote P&D operations. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or marine FOB). Responders required to camp / stay overnight on a support vessel.
				*Note: 'Remoteness' and 'isolation' are triggers for an escalation in tier. This is based on (1) the time frames for operators to execute this tactic and (2) to reflect the complexity of these operations with resources drawn from outside the immediate region.	
Shoreline clean-up assessment technique (SCAT) (SCAT – including oiled wildlife reconnaissance).	To systematically collect data about the location, nature, and degree of shoreline oiling, (including at risk/impacted wildlife), to inform shoreline treatment and oiled wildlife response planning.	The capability requirements for an individual SCAT team are provided below, based on key elements of IPIECA (2015c). A single SCAT team will typically consist of: • 1 or 2 x trained SCAT specialist • 1 x trained oiled wildlife expert/advisor • 1 x indigenous heritage advisor/ranger and/or 1 x local government ranger • 4x4 vehicle or utility task vehicle (side by side UTV) • SCAT data recording platform/tools • potential for 1 x drone and drone-operator for locations with restricted access Trained SCAT and wildlife personnel are available from industry/AMOSC as well as individual states via National Response Team (NRT) arrangements. Indigenous SMEs and local knowledge specialists are available through the states.	1 SCAT team <10 km shoreline to survey	2 – 10 SCAT teams >10 – 100km shoreline to survey, OR, Complex shorelines (Environmental Sensitivity Index (ESI) 1 or 2, ESI 6 – 10) AMOSC Core Group (CG), Government Control Agency staff NRT members from other jurisdictions Expanded multi-agency response including multiple state gov agencies. 1-2 x remote SCAT operations. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or Marine FOB). Responders required to camp / stay overnight on a support vessel.	>10 SCAT teams >100km of shoreline to survey OR, Complex shorelines (ESI 1 or 2, ESI 6 – 10), and/or, Full deployment of industry / AMOSC and NRT resources Potential for mobilisation of Global Response Network personnel to SCAT teams from OSRL and other third parties. >2 remote SCAT operations. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or Marine FOB). Responders required to camp / stay overnight on a support vessel.
Shoreline clean-up	To reduce the volume of oil on shoreline, to reduce the likelihood/consequence of impacts on the values and sensitivities of the shoreline and promote/increase the speed of the natural recovery of the shoreline to its pre-oiled state.	The capability requirements for the Shoreline Clean-up element of the Shoreline Response Program below are based on key elements of IPIECA Shoreline Response Programme Guidance (IPIECA-IOGP, 2020) and are for one individual shoreline response clean-up team. • 1 x Trained Responder (as shoreline clean-up Team Lead) • 7 - 10 x labour hire personnel (on the job training) • manual clean-up tools (rakes, shovels, hand trowels, etc) • oily waste storage containers (Heavy duty plastic bags) • potentially 1 x small machinery (e.g., rubber tracked bobcat) or tray back all-terrain vehicle to transport recovered oily waste to centralised temporary hazardous waste storage • ablutions and welfare facilities for personnel	Day 0 – day four Immediate deployment and mobilisation with the aim of having team/s on the ground within 96 hrs. 1-2 x shoreline clean-up teams	Day four – day seven 3 – 10 shoreline clean up teams 30 – 100 m^3 oily waste recovered per day	Week three onwards >30 shoreline clean up teams >300 m^3 oily waste recovered per day Potential inclusion of advanced clean-up techniques including high volume / low pressure flushing, surf washing, mechanical equipment.

Response Strategy	Response Strategy Objective	Capability Requirement Description	Tier 1 Example Criteria	Tier 2 Example Criteria	Tier 3 Example Criteria
		• decontamination resources (additional personnel and equipment)	10 – 20 m^3 oily waste recovered per day Resources from local area.	Potential inclusion of advanced clean-up techniques including high volume / low pressure flushing, surf washing, mechanical equipment. Resources and equipment from within the region from industry, AMOSC/CG, labour contracting entities and other mutual aid, NRT.	Potential for resources from non-spill sector (Defence, volunteer groups) with just-in-time training and provisioning National Plan resources and equipment from industry, AMOSC/CG, labour contracting entities and other mutual aid and NRT. Potential for mobilisation of Global Response Network equipment and resources.
				1-2 x shoreline clean-up teams operating at a single remote/isolated shoreline. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or Marine FOB) or air. Responders required to camp / stay overnight on a support vessel.	>2 x shoreline clean-up teams operating at multiple remote/isolated shorelines. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or Marine FOB) or air. Responders required to camp / stay overnight on a support vessel.
		Escalation of shoreline clean-up response will require utilisation of forward operating base (FOB) for the purpose of coordination and support.	Level 1 • single marquee • 1 x FOB team leader or Sector Command • 1 x medic (also providing admin support).	Level 2 • larger FOB base set-up • FOB Manager • 1-2 x shoreline division commanders • 1-2 admin assistants • 4 – 8 Sector Commanders • 1 x health & safety rep • 1 x medic • 1 x logistics/catering coordinator • 1 x waste management coordinator	Level 3 • very large FOB set-up • FOB Manager • 3+ x shoreline division commander • 3+ x deputy commanders • 3+ x admin assistants • 8+ x sector commanders • 3+ HSE reps • 2+ medics • 2+ logistics/catering • 1-2 waste management coordinators • 1-2 Information Technology (IT)/communications specialists

Response Strategy	Response Strategy Objective	Capability Requirement Description	Tier 1 Example Criteria	Tier 2 Example Criteria	Tier 3 Example Criteria
Oiled wildlife response (OWR)	To minimize the impact of an oil spill on wildlife by both prevention of oiling where possible and mitigating the effects on individuals when oiling has taken place (IPIECA-IOGP, 2014).	The capability requirements for an individual OWR collection & transport team are provided below: • 2-4 x trained OWR personnel • 1 x OWR collection kit (for capture and transport of oiled wildlife) • 1 x vehicle The capability requirements for an individual wildlife cleaning/rehabilitation team are provided below: • Wildlife treatment/rehabilitation team would typically consist of: • 1 x OWR container • 5 x trained OWR personnel • 10 x labour hire personnel • 2 x trades persons (electrician, plumber etc., to set-up of OWR container) • liquid and bio-hazard oily waste storage The capability requirement for wildlife hazing typically includes: • vessel air-horns, vessel water cannons etc. • acoustic deterrents/bird scaring devices, deployed onshore or from a vessel • visual deterrents • physical barriers/structures. **N.B.** in the case of a marine pollution emergency affecting wildlife occurring within Victoria, DELWP is responsible, pursuant to the Emergency Management Manual Victoria, for mounting and co-ordinating the response. When wildlife are impacted by a marine pollution emergency, DELWP will establish and coordinate a wildlife response under the DOT Incident Management Team (IMT). DELWP has an agreement with Phillip Island Nature Parks (PINP) with regard to the provision of trained staff and volunteers and treatment and rehabilitation of oiled seabirds. Under this arrangement DELWP may request the involvement of PINP depending on the level and type of wildlife impact.	As per State Plan - level one and two state response Localised resources (Operator + government + AMOSC)	State plan levels three and four Localised +State + National Mutual aid	Level five and six (and multiples of) + international + complexity of animal oiling
				1-2 x OWR collection/transport team operating at a single remote/isolated shoreline. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or Marine FOB) or air. Responders required to camp / stay overnight on a support vessel.	>2 x OWR collection/transport teams operating at multiple remote/isolated shorelines. Isolated island or remote operations required – access only via vessel (>2 hours travel from port or Marine FOB) or air. Responders required to camp / stay overnight on a support vessel.
Oil contaminated waste management	To limit the environmental impacts including secondary contamination associated with the transport and disposal of the collected oily waste products (liquids, solids, biohazard, etc.).	The capability requirements for tertiary waste collection are provided below, based on the key elements of IPIECA-IOGP (2016d) Oil Spill Waste Management and Minimisation. • waste management planning (aims, objectives, processes, and procedures) • waste collection and storage • waste transportation including licensed hazardous waste transport trucks (vacuum trucks, solid contaminated waste transport trucks etc.) • pre-treatment, treatment, and final disposal, (e.g., licenced onshore tertiary waste treatment facilities (landfill, soil remediation, incineration facilities etc.)	<20 m^3/day of solid/liquid/biohazard oily waste, transported to licenced tertiary waste treatment/disposal facility.	20 – 100 m^3/day of solid/liquid/biohazard oily waste, transported to licenced tertiary waste treatment/disposal facility.	>300 m^3/day of solid/liquid/biohazard oily waste, transported to licenced tertiary waste treatment/disposal facility.

IPIECA-IOGP (2016c), encourages contingency planning to be undertaken in a manner which not only examines the tiers of capabilities through single distinct levels (e.g., as represented in Section 0), but also, to evaluate and illustrate where the resources could/should be sourced from to fulfil risk mitigation aims. The identification of individual/discrete capabilities that may be required for oil spill response enables a much more specific and tailored representation of response capability matched to each operation/risk.

Thus, the response capability required is unique to all operations and locations, with each situation being shaped by both setting and operational factors which not only affect the risk profile but also influence how resources will be provided. Each response strategy/capability can be considered independently, and the planning process can consider at least the following four determining factors:

- inherent operational-specific risks (e.g., the oil type, inventory, and related release scenarios)
- location-specific risk (e.g., the proximity of oil-sensitive environmental receptors)
- relative proximity and access to supporting resources and their logistical requirements, and
- applicable legislative requirements or stipulated regulatory conditions.

Each of these factors may influence the provision of response resources/capabilities across the range of response strategies, which can then be presented in the form of a unique pictogram (or tiered preparedness wheel) for any operation.

Once completed, the model/tiered preparedness wheel provides a simple visual representation of the response capabilities that are available and how they can be combined to provide the capacity required to mitigate the risk identified for each operation or location. A non-specific example of this model is provided in Figure 5-4.

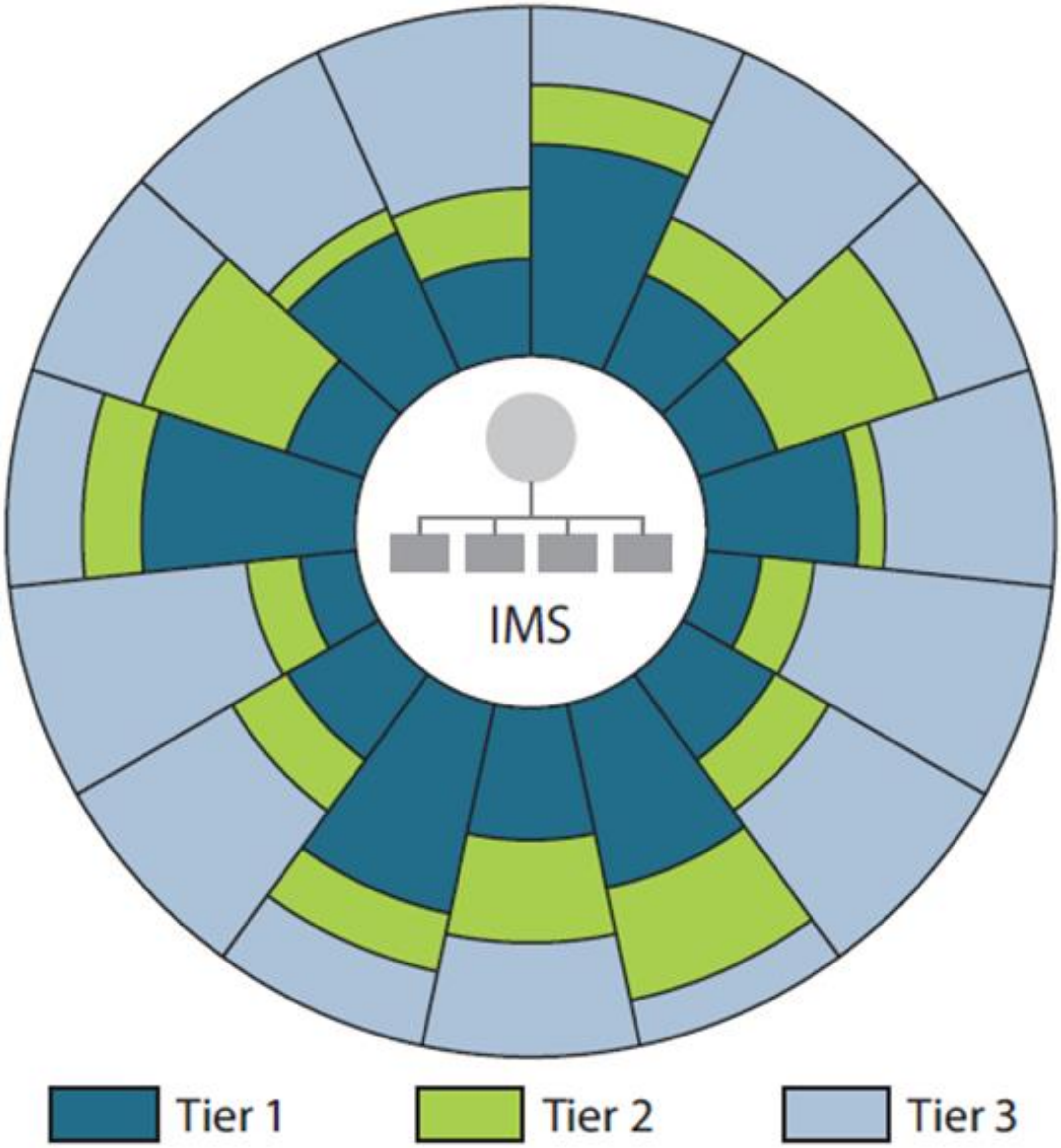

Figure 5-4: Example tiered preparedness wheel (IPIECA-IOGP, 2016c)

The IPIECA-IOGP (2016c) tiered preparedness evaluation process described above is considered appropriate, not only for individual petroleum titleholder operations, but also for regional response planning. Within a region/hydrocarbon exploration/production basin, there are inherent similarities in the four determining factors described by IPIECA-IOGP (2016c). For example, consistency in oil types and release scenarios, similar location specific risks and environmental sensitivities, similar logistical challenges and all are operating within the Australian NatPlan and OPGGS (E) regulatory environment.

Using the tiered preparedness wheel concept, an OPEP-specific tiered capability overview is provided in Table 5-3. This table defines the Tier, (1, 2 or 3), the target operational timeframe within which the capability should be able to be mobilised, to achieve the response strategy objective, and the geographic location in which the capability should be located, to enable the mobilisation of the response capability within the target timeframe.

Table 5-3: OPEP tiered capability overview

Tier	General Description	Target operational timeframe	OPEP capabilities and locations
Tier 1	Area / region specific resources, typically able to be activated quickly, mobilised (enroute to site) and/or on location and operationally within 12 – 48 hours.	<48 hours	Woodside contracted offshore facilities and vessels • logistics assets (vessels/aircraft) Geelong • AMOSC Tier 1 stockpile (Geelong) • Logistical assets (vessels) Waarnambool • Forward Operating Base (option) • Logistical assets (aircraft)
Tier 2	Regional resources require air or land movements to FOB, deployed and infield operationally within 48-96 hours (operationally active during days three to four).	48 – 96 hours	AMOSC (Geelong) & AMSA (Melbourne) based equipment stockpiles (including SFRT - Fremantle). Geelong/Melbourne/Waarnambool logistics assets (vessels/aircraft). AMOSC Core Group within Vic Vic Control Agency personnel
Tier 3	National or international resources, operational in the field from day four onwards.	>96 hours	Australian west-cost and international (Woodside / OSRL / WWC) based equipment stockpiles, logistics assets and personnel (including SIRT) APPEA MoU: Mutual Aid resources Internationally sourced MODU / vessels on open market

6 Field Capability Arrangements and Environmental Risk Assessment of Response Strategies

This section provides:

- Details of standing oil spill response arrangements Woodside may access during an oil pollution emergency event; and
- Detailed field capability assessments for selected response strategies based upon response planning thresholds (Table 4-2), oil spill modelling results (Section 4.3), and basis of assessment information detailed within Section 5.1.

6.1 Standing Oil Spill Response Arrangements

This section provides an overview of general resourcing arrangements in place to undertake and emergency oil pollution response. In line with Woodside Incident and Crisis Management (I&CM) arrangements, Woodside has established formalised third-party contracts and agreements with defined performance standards/criteria for the provision of resources, services or equipment in support of emergency response activities. These resources will be activated, dispatched and deactivated prior to and during an emergency.

Activation protocols to initiate each of these arrangements is presented within the activity-specific OPEP.

Capability to initiate and resource the Woodside CICC and Vic DoT CICC is presented within the *Corporate Incident Coordination Centre (CICC) Capability Assessment Report* (AOHSE-ER-0071).

6.2 OSRO Arrangements

Woodside maintains contracts with a number of Oil Spill Response Organisations (OSROs). Whilst these OSROs have capability to provide technical specialists to supplement the Woodside CICC, OSRO resources also include trained personnel to lead Field Response Teams and provide access to industry response equipment. The main relationships are detailed in the sub-sections.

6.2.1 Australian Marine Oil Spill Centre (AMOSC)

The Australian Marine Oil Spill Centre (AMOSC) is an industry funded oil spill response facility based in Geelong, Victoria. AMOSC resources include:

- AMOSC spill response equipment stored at AMOSC and at other locations;
- Oil company equipment based at various locations; and
- Trained industry response (“Core Group”) personnel.

Woodside is a full member of AMOSC and as such has access to industry equipment and personnel via the APPEA Memorandum of Understanding: Mutual Aid and National Plan equipment held as part of the contingency plans of the Australian Oil Industry and the Australian Government. AMOSC require confirmation from mobilisation authorities to access equipment listed under the National Plan.

All National Plan, AMOSC and those industry equipment resources that are registered with AMOSC, which are potentially available for response to an incident, are listed in the Marine Oil Spill Equipment System (MOSES) database. The MOSES database is a computer database that lists the type, quantity, location, status and availability of pollution control equipment. It is also used to manage audits, maintenance and repair of AMSA-owned equipment.

Normal requests for assistance are directed to AMOSC in Geelong to coordinate, but equipment may also be accessed through the MOSES database, or AMSA – Marine Environmental Protection Services (MEPS).

AMOSC (and AMOSC Core Group members) form part of Woodside’s First Strike and primary response strategy to a spill. Only nominated Woodside personnel can request the assistance of AMOSC.

Table 6-1: AMOSC advice levels

AMOSC Advice Level	Status	AMOSC Requirements
Level 1	Forward Notice	Advise a potential problem. Provide or update data on oil spill. Update information on spill and advise 4 hourly.
Level 2	Standby	AMOSC resources may be required. Assessment of resources and destination to be made. Update information on spill and advise 2 hourly.
Level 3	Callout	AMOSC resources are required. Detail required resources and destination.

The AMOSC Core Group is an Australian industry initiative that was initially crafted in 1992. It is unique within the international context and is noted for being innovative and effective to rapidly expand and surge well trained personnel into a spill response. The AMOSC Core Group has attended most Australian-based spills and also several offshore spills.

The AMOSC Core Group has around 30-40 CICC personnel and 50-70 field operators.

AMOSC Core Group policy requires all Core Group personnel to undertake initial training, followed by competency re-validation/training every 2 years.

Typically, AMOSC manage the Core Group re-validation/training by conducting 3 x 1 week Core Group training/workshops per year.

AMOSC coordinates the routine testing, monitoring and monthly reporting of Core Group personnel availability.

The AMOSPlan will be activated by Woodside when the response to an oil spill incident is regarded by Woodside as requiring resources beyond those of the company itself.

In the event that the oil spill response requires the call out of AMOSC's own resources, the call out request is made directly to AMOSC by the Woodside Corporate Incident Coordination Centre (CICC).

Should the response require mutual aid from equipment owned and personnel employed by another company, the request for assistance is made directly company to company via each company's nominated Mutual Aid Contact.

Current AMOSC equipment stock listing is detailed within Appendix A.

6.2.2 Wild Well Control (WWC)

Woodside has a commercial agreement in place with Wild Well Control (WWC) to provide well containment services.

6.2.3 Oil Spill Response Limited (OSRL)

Woodside is a member of the OSRL group. OSRL have capacity to mobilise additional equipment and personnel to APU from their Singapore location. Only nominated Woodside personnel may request the assistance of OSRL via the CICC Leader under OSRL's Service Level Agreement (SLA).

The OSRL service level statements provides for:

- 24/7 call-out arrangements.
- Guaranteed initial response from OSRL of five technical support personnel (CICC or field personnel) for 5 days.
- Surge to 18 OSRL personnel, upon request from the Woodside CICC.

- Depending on size/complexity, OSRL maintain 80 response team personnel globally, who are potentially able to be provided to support an ongoing Level 3 event, on a best-endeavours basis.

OSRL service level statement defines the types of services provided by the 18-person surge capability as:

- Technical advice and incident management coaching within the command centre.
- Development of an Incident Management Plan.
- Tier 1 / 2 equipment readiness and training of contractors.
- In-country logistics planning and support for inbound equipment.
- Impact assessment and advice on response strategy selection.
- SCAT and aerial surveillance / quantification surveys.
- Tactical response planning.

Updates on the availability of OSRL's equipment availability is provided via a weekly Equipment Stockpile Status Report from OSRL's website at:

http://www.oilspillresponse.com/activate-us/equipment-stockpile-status-report

The Equipment Stockpile Status Report provides a quick and timely overview of the availability of OSRL's equipment stockpile globally and is especially useful in assuring OSRL's readiness. It also provides a vital overview of the resources that Woodside would be able to access in the event of a spill. Under OSRL's Service Level Agreement (SLA), the first member who initiates mobilisation of OSRL will be entitled to a maximum 50% of the stockpile, while the second member is entitled to a maximum 50% of the remaining stockpile (and so on).

In addition to the Equipment Stockpile Status Report, OSRL provides a response equipment list that provides an overview of the size, type and ancillaries required for the equipment that is available at their bases. To ensure efficient and timely response capability, OSRL also have also pre-packaged some of the equipment into loads ready for dispatch, that are suitable for general spill situations and operating environments.

The equipment list can be accessed via the link below:

http://www.oilspillresponse.com/files/OSRL_Equipment_List.pdf

In addition to providing response equipment, OSRL also supply a selection of ground staff who have the practical skill and experience to assist and support Woodside in a spill response and are trained in using Incident Management Systems. Response teams will comprise:

- Team Manager;
- Operations Manager; and
- Senior technicians/ technicians.

OSRL can be called upon to provide immediate technical advice and begin to mobilise personnel if required. OSRL would be called on to lead small specialist teams and/or provide supplementary labour and equipment if ongoing response is required. Only nominated Woodside personnel may request the assistance of OSRL via the CICC Leader.

Actual mobilisation of OSRL will be dependent on any international travel restrictions at the time of the incident.

6.3 Technical Support (Environmental Monitoring)

Woodside maintains a list of pre-approved vendors (OSM Service Providers) who can be called upon at short notice to provide environmental monitoring services in the event of an oil spill.

Woodside has a Service Level Agreement (SLA) with OSRL under which a framework agreement enables CSA Ocean Sciences to provide in-field SSDI monitoring services.

6.4 General Support

Woodside has arrangements in place and access to providers to supply personnel as required to populate response teams. Woodside has tested these arrangements and considers that personnel for shoreline response operations can be sourced to and maintained for the full duration of response to worst-case spill scenario including redundancy, rostering, shift coverage, and rotation for maintaining field capability for the duration of the response.

Woodside will mobilise shoreline crews at the direction of Vic DoT, and where possible prior to the predicted arrival of hydrocarbons. These crews will focus on pre-cleaning beach areas (e.g., removing debris such as seaweed to areas above the high tide mark) and establishing staging areas to enable a more efficient response when hydrocarbons are arriving ashore.

This level of personnel required will be dependent on the location of the oil, the situation and the constraints and will be determined by the Vic DoT. Peak personnel levels shall be maintained to account for rotational support and potential workforce attrition and/or absentees.

During the first strike response phase, Woodside will rely on the skilled personnel (i.e., AMOSC Core Group, OSRL) to supervise response crews. In addition, personnel from the National Response Team (NRT), Aerial Operation staff from Aerotech 1st response will be mobilised. OSRL may also supply a selection of ground staff who have the practical skills and experience to assist and support Woodside during a spill response.

All labour-hire or internal personnel not trained in oil spill response would receive role-specific on-the-job training prior to undertaking response operations. Training would be ongoing throughout the response operation.

Woodside has standing contracts with labour-hire companies to enable access to a work force that have experience and understanding of HSEQ requirements. Woodside would prioritise the engagement of local labour hire personnel within Victoria.

6.5 Spill Response Logistics

A response to a worst-case discharge event will require equipment and personnel to be deployed and potentially accommodated in multiple locations. Coordination of these aspects of the response will be the responsibility of the Logistics Coordinator in the CICC.

AMOSC facilities in Geelong can be supplemented by regional resources within appropriate timeframes for the response. Regional locations such as Geelong, Waarnambool and Portland are equipped to manage the logistical arrangements for construction, mining and petroleum projects, which are similar in scale to a large-scale spill response. These resources involve the movement of personnel, freight and equipment over large distances.

Woodside has internal resources (Supply Team) and utilises third-party logistics providers for movements of freight from overseas locations by air or sea. The Supply team, along with the specialist contractors, are highly experienced in procurement and supply chain management for large scale projects and ongoing offshore operational activities. These skills are directly transferable to a spill response.

Road transportation of personnel will be by hire cars (for team leaders, SCAT teams, small teams) and by charter buses for large movements of teams such as shoreline responders. Regional providers can supplement the resources and logistical requirements. Freight logistics by road will utilise existing local contracts and other local operators supplemented by larger regional providers.

Accommodation for responders can be arranged via local providers in locations such as Melbourne, Geelong, Waarnambool. All locations are common tourist destinations and can an array of existing accommodation options that can be available when required.

Spill modelling indicates that a spill may result in inaccessible shorelines may be exposed to hydrocarbons. equipment. Small commercial vessels/utility vessels can be used to access these shorelines if safe and directed by the CICC Leader.

6.5.1 Aerial Support

A contract arrangement is in place through AMSA via National Plan, to make fire attack aircraft available for dispersant spraying. The contract with Aerotech 1st Response or Dunn Aviation ensures aircraft are available within four hours of mobilisation. Mobilisation of this service is through the AMSA Environment Protection Response Duty Officer via AusSAR. The AMOSC Duty Officer should also be notified to enable AMOSC to assist in smooth mobilisation.

AMOSC's FWAD contract provides for 'wheels up' of 6 aircraft around Australia within 4 hours of activation.

There are a significant number of additional air tractors around Australia which do not form part of the FWADC contract (40 – 50 aircraft) that can be made available within relatively short timeframes (noting timeframes vary based on time of year and current operations, e.g., fire-fighting and crop-dusting operations).

When triggered, the FWADC contract provides the following: Air Tractor AT802, pilot, Aerotech First Response Liaison Officer, an Air Attack Supervisor, an Aircraft Loading Officer, and transportation for all personnel to the nominated location.

The Air Attack Supervisor is typically identified as a key critical path role. AMOSC maintain an Air Attack Supervisor as part of the Aerotech First Response FWADC contract. Other personnel are available via AMSA and the National Response Team (traditionally from bushfire services).

An Air Attack Supervisor platform (helicopter or fixed wing) will need to be supplied by Woodside, in the event Woodside is the Control Agency for the spill. Aerotech First Response also have the capability to source this capability, if required. Woodside would typically utilise a crew-change helicopter as the Air Attack Supervisor platform.

Woodside will establish a contract with to provide helicopters for crew change, 24/7 Medevac, and Search and Rescue coverage. These helicopters can be used for aerial surveillance in event of an oil spill.

Additional aerial support could be engaged through the Global Response Network via either AMOSC or OSRL to access internationally available aircraft.

6.5.2 Vessel Support

Woodside maintains a Contractor Management System to monitor regionally available offshore support vessels (OSV).

Woodside maintains oversight of availability of larger vessels that would be required to undertake a response via subscription to live vessel feeds via MarineBase. Whilst vessel availability and locations are dependent on levels of activity, data derived via vessel monitoring would inform vessel contracting during an oil spill response.

Woodside have access to Clarkson's Sea/response software platform through their OSRL membership. The software uses its patented technology to identify emergency vessels and equipment most suitable for source control operations and those that are closest to the incident location. Sea/response vessel tracking has been set up to search vessels on pre-identified mission requirements covering Capping, Containment and Offset Installation Equipment (OIE). Vessels that already have an approved Safety Case for working in Australia are tracked.

Port facilities at Melbourne, Geelong, and Warrnambool are likely to be used throughout the response. A logistics plan will be developed by the Woodside CICC Logistics Coordinator with a look ahead to replace or supplement vessels during the response operations to maintain the operational capability.

There may be circumstances where additional support vessels may be required to assist with spill response, e.g., deployment of equipment for an inshore response or transportation of equipment and people to offshore installations. Requests for offshore vessel support can be made by AMSA.

6.5.3 State and National Resources

In accordance with the Victorian State Emergency Management Plan (SEMP) Maritime Emergencies (non-search and rescue) Sub-Plan (MENSAR) (edition 2) (2021), and following consultation with the Vic DoT, additional personnel to assist with labour intensive aspects of a response (if required) will be sourced through the State Combat Committee (Executive Advisory Group). Depending on the level of response required, sources of labour may include the local shire, the Department of Environment, Land, Water and Planning (DEWLP) and AMSA.

Under the National Plan, a National Response Team (NRT), comprising experienced personnel from operator to senior spill response manager level from Commonwealth/State/NT agencies, industry and other organisations, has been developed.

The services of the NRT will be obtained through the Environment Protection Group (EPG) and AMSA, which has made arrangements with the respective government and industry agencies, for the release of designated personnel for oil spill response activities. These services will be activated when it is assessed that an oil spill incident exceeds the resource availability at the state level.

During a National Plan incident, the Woodside CICC Leader or the Marine Pollution Controller appointed by a Control Agency may submit a request to AMSA for personnel from other States to become part of the Incident Management Team or the incident response team.

A request should be made initially through the Environment Protection Duty Officer via the **Emergency Response Centre on 1800 641 792 or 02 6230 6811**. This request must be followed by written confirmation within three (3) hours of the verbal request.

The following information will be provided when making such a request:

- Roles or skills required (e.g., Planning Officer, Aerial Observer);
- Number of personnel required to fill each role;
- Contact name, address, and time of where personnel are to initially report; and
- Brief overview of the work to be undertaken.

Suitable personnel will then be selected by AMSA from the National Response Team or the National Response Support Team (NRST) unless special circumstances exist.

6.6 Field Capability for Selected Response Strategies

This section provides a detailed field capability assessment (consistent with the principles of IPIECA-IOGP (2013 and 2016c)) for each of the response strategies selected via the SIMA process, including:

- A summary of each response strategy including basis of assessment considerations (where relevant) and response tier level (refer Section 5.1);
- An overview of potential environmental impacts and risks relevant for each response strategy (with further detail provided in Section 7);
- Presents an evaluation of relevant oil spill budget considerations for the response strategy;
- Response arrangements in place to meet response capability requirements presented in Section 5.5 and associated operational considerations;
- A description of response timing for the implementation of each strategy (including relevant assumptions);
- A summary of legislative and other considerations relevant to the response strategy;
- A detailed ALARP evaluation as per the process described within activity-specific EP(s) and ALARP supporting information (if additional context required);
- Response preparedness performance standards to maintain sufficient field capability for the timely implementation of the response strategy;
- A demonstration of acceptability of preparedness arrangements for each response strategy; and.
- The environmental performance requirements to maintain field capability readiness for each of the selected response strategies presented in the form of Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria.

The EPOs and EPSs related to the CICC capability/arrangements are contained in the *Corporate Incident Coordination Centre (CICC) Capability Assessment Report* (AOHSE-ER-0071).

The EPOs and EPSs relating to the management of potential environmental impacts and risks associated with the implementation of response strategies are presented within the activity-specific OPEP / EERM (State).

Consultation was conducted with the Victorian Department of Transport (Vic DoT) as Controlling Agency in State Jurisdiction and the Wildlife Response Agency (DEWLP) to inform the capability requirements and response timeframes for shoreline and nearshore response strategies, namely: shoreline clean-up & assessment technique (SCAT), shoreline protection & deflection, shoreline clean-up, and oiled wildlife response (OWR).

6.6.1 Source Control

6.6.1.1 Vessel-based

Summary of Activity – Vessel-based control (Tier 1 -2)

The basis of assessment for vessel-based source control relates to the potential surface release of MDO from fuel tank rupture on an offshore vessel as per Table 3-1. The assessment assumes a fixed volume of hydrocarbon release within an offshore environment.

Vessel-based source control methods are implemented as the primary response strategy for responding to single point releases from transfer operations, hull leakage and spills in the event of a vessel collision. Source control will be activated immediately by persons onboard, under the direction of the Vessel Master, to reduce or control the discharge and conducted according to the vessel-specific MARPOL-compliant SOPEP for vessels, as required under *International Convention for Protection of the Sea (Prevention of Pollution from Ships) Act 1983*; AMSA Marine Orders – Part 91 and Part 94; and MARPOL Annexes I and III. Vessel-based source control activities will always include consideration of human health and safety applying the principles of Safety of Life at Sea (SOLAS).

Vessel-based source control activities will be dependent on the type of incident but may include:

- Closing valves, isolating pipework and shutting down pumps.
- The use of temporary patches or bungs/ plugs to seal holes to prevent further releases, until more permanent measures can be made.
- The transfer of product between tanks on the vessel or between vessels - in the event of a leaking tank or tank rupture from a vessel collision.
- The use of spill response equipment located around the vessel, including small booms, absorbent pads, spill absorbent litter, spill recovery containers, permissible cleaning agents and other materials available onboard to clean-up spilled material on deck. Remaining oily spill residues on decks or other surfaces may be washed into drains leading to the oil-water separator system to treat the effluent prior to discharge.

Potential Environmental Impact and Risks – Source Control (Vessel-based)

There are no additional environmental impacts and risks associated with a vessel-based source control response in offshore waters to those already described within the activity-specific EP(s).

Response Arrangements – Source Control (Vessel-based)

AMSA is the Controlling Agency for vessel-related incidents within Commonwealth waters. Under the National Plan AMSA may call upon a National Response Team or the National Response Support Team (NRST) and national stockpile resources.

Response Timing – Source Control (Vessel-based)

Controls implemented aboard the stricken vessel under the direction of the Vessel Master are assumed to be implemented immediately upon identification of a spill scenario.

When a stricken vessel requires support from a third-party, (under the direction of AMSA) the response may take a number of days to implement.

Legislative and Other Considerations – Source Control (Vessel-based)

MARPOL-compliant SOPEP / SMPEP (suitable to class) for vessels, as required under *International Convention for Protection of the Sea (Prevention of Pollution from Ships) Act 1983.*

ALARP Evaluation – Source Control (Vessel-based)

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H): Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from the execution of this response strategy.	No source control from vessel.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. Halting the release of MDO or chemicals is essential.	The do-nothing option is not considered acceptable.	**Reject:** Source control is a recognised strategy for the mitigation of oil spill impacts.
Substitute	Leaking vessel inoperable / unable to implement source control	Source control from alternate vessel within region	Administered by AMSA	As per NatPlan	-	1-2 days (assumed)	Minor	H	H	H	H	H	Limit release volume	Availability of response vessel Location of stricken vessel Weather and sea state	**Accept:** Control to form component of response strategy
Engineer	Spill control equipment unavailable	Spill control equipment available aboard AHTS vessels as per SOPEP / SMPEP	Control is based on MARPOL Annex I (Prevention of Pollution by Oil).	As per SOPEP / SMPEP	-	Immediate	N/A	H	H	H	H	H	Limit release volume	Location of stricken vessel Weather and sea state	**Accept:** Control to form component of response strategy
Separate	Source of spill remains active	Isolate source of spill (tank / hose) as per SOPEP / SMPEP	Control is based on MARPOL Annex I (Prevention of Pollution by Oil).	As per SOPEP / SMPEP	-	Immediate	N/A	M	H	H	H	H	Limit release volume	Location of stricken vessel Weather and sea state	**Accept:** Control to form component of response strategy
Administrate	No MARPOL-compliant SOPEP or SMPEP.	Vessel-specific MARPOL-compliant SOPEP or SMPEP.	Control is based on MARPOL Annex I (Prevention of Pollution by Oil).	As per SOPEP / SMPEP	-	Immediate	N/A	H	H	H	H	H	Implements response plan to deal with unplanned hydrocarbon spills quickly and efficiently in order to reduce impacts to the marine environment.	Controls have high effectiveness; are available, functional and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications for the operation.	**Accept**: Controls based on legislative requirements must be accepted. Controls are practicable and the cost sacrifice is not disproportionate to the environmental benefit gained.

6.6.1.2 Subsea Intervention

Summary of Activity – Subsea Intervention (Tier 1 – Tier 2)

The basis of assessment for subsea intervention source control relates to the potential subsea release of condensate from a loss of containment from the Minerva-4 well as per Table 3-1.

Subsea intervention methods are implemented for a subsea release. Source control via subsea intervention is a primary response strategy for responding to subsea LOWC (Level 3 spill).

When possible, subsea intervention will be activated immediately by the MODU Offshore Installation Manager (OIM). Source control actions will always include consideration of human health and safety.

Subsea intervention activities will be dependent on the nature of the release.

In the event of a LOWC scenario, subsea intervention is to be implemented concurrently with other response strategies (see below).

Potential Environmental Impact and Risks – Subsea Intervention

There are no additional environmental impacts and risks associated with a subsea intervention response in offshore waters to those already described within the activity-specific EP(s).

Response Arrangements – Subsea Intervention

The MODU has a subsurface blowout preventer (BOP), enabling attachment to the wellhead and providing primary well control barrier during P&A activities. In accordance with Woodside standards, and consistent with APIS53, the BOP is required to contain at least one annular sealing element and one blind-shear ram capable of shearing and then sealing the wellbore; and contain at least four rams, one of which shall have shear capability.

The MODU is equipped with a 'Work-Class' remotely operated vehicle (ROV). Additionally, Offshore Support Vessels (OSVs) with 'Work-Class' ROVs are readily available on the open market and available within the region.

BOP intervention equipment is available within the AMOSC SFRT and OSRL SIRT, subsea accumulator kit, spreader bar and mud skirts, BOP intervention skid, dual BOP interface manifold, deployment rack for flying leads, and a 250 m flying lead as detailed within the Source Control Emergency Response Plan (SCERP).

Response Timing – Subsea Intervention

BOP activation can be initiated immediately (<1 hour) from the MODU assuming the MODU is operable. Manual override via ROV aboard the MODU is dependent on deployment timeframes but would likely be implemented in <1 hour.

Should an alternate OSV with ROV capability be deployed, steam time to field and ROV deployment may take 6-12 hours.

Bullheading production bore with MODU operable would likely take 6 hours.

BOP intervention via SFRT is anticipated to take 4 days including equipment mobilisation to site.

Legislative and Other Considerations – Subsea Intervention

There are no additional legislative requirements or alternate considerations to implement subsea intervention, as this response is considered within existing in-force approvals.

ALARP Evaluation – Subsea Intervention

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from not adopting source control.	No source control via subsea intervention.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. Halting the release of hydrocarbons is essential.	The do-nothing option is not considered acceptable.	Reject: Source control is a recognised strategy for the mitigation of oil spill impacts.
Substitute	Subsea intervention ineffective to control loss of containment	Concurrent implementation of capping stack deployment and relief well	Creates redundancy in response options and provides greater degree of well containment assurance	Multiple	-	Strategy dependent	High	H	H	H	H	H	High cost, however potential benefit of building redundancy into response strategies has potential expedite control of well and subsequently reduce environmental harm.	Practicable to implement concurrent response strategies. Source Control Section structure enables concurrent response activities.	Accept: Source control strategies can be implemented concurrently to increase likelihood of successful well kill.
Engineer	Engineering controls inadequate to contain release	BOP – activated from MODU	BOP actuation is a primary control	MODU emergency shut-down BOP	1	<1-hr	Low	H	H	H	H	H	Significant environmental benefit gained by rapid closure of BOP limiting release rate / volume of hydrocarbons.	BOP MODU operable. System tested. Training. BOP monitoring in place. BOP redundancy / deadman. Emergency shut-down sequencing.	**Accept:** BOP actuation is a primary control.
	BOP unable to be activated via MODU	BOP and subsea tree (SST) controls - activated via manual ROV override	BOP actuation is a primary control – ROV aboard MODU has specific interface with MODU BOP.	ROV aboard MODU	1-2	<1-hr	Low	H	H	H	H	H	Significant environmental benefit gained by rapid closure of BOP limiting release rate / volume of hydrocarbons.	ROV (high output) pump designed to close BOP rams within specific timeframes according to API specifications. Response potentially limited by sea state up to 3-4 m.	**Accept:** BOP actuation is a primary control supported by ROV if required.
		Well kill from MODU (by bullheading production bore)	Well kill	Operable MODU	1	<6 hrs	Low	H	H	H	L	H	Significant benefit by implementing well kill.	Scenario driven. If low volume release this response may be valid. If full LOWC, emergency shut-down initiated and MODU evacuated.	**Accept:** Primary response strategy – scenario dependent.
	MODU (and MODU ROV) inoperable	The activation of the BOP and SST controls via manual ROV override from AHTS vessel with Work Class ROV capability.	AHTS vessels in field with ability to initiate rapid response	In-field vessel with ROV capability	1	3 hrs (ROV available)		H	H	H	H	H	Significant environmental benefit gained by rapid closure of BOP limiting release rate / volume of hydrocarbons	Feasible with in-field vessel with ROV capability.	**Accept:** Control to form component of response strategy.
	In-field AHTS vessel incapable to implement source control	Alternate ROV support vessel to activate BOP and SST controls as above	Contract rather than specific vessels	Alternate third-party vessel with ROV capability	1	6-12 hours		H	H	H	H	H	Significant environmental benefit gained by closure of BOP limiting release rate / volume of hydrocarbons.	Feasible with regionally available vessels with ROV capability.	**Accept:** Control to form component of response strategy.

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation												
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Separate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Administrate	No source control contingency pre-planning increasing overall time and risk associated with well kill operations	Source Control Plan Emergency Response Plan (SCERP)	Consistent with industry good practice, corporate requirements, IOGP Report 594 and APPEA Guidelines for source control	Multiple concurrent response strategies included	N/A	Immediate (upon initiation of Source Control Section)	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**Accept:** Control to form component of response strategy.
		Monitor response vessel availability	Monitor available vessels with technical capability to initiate well control via ROV	N/A	N/A	Ongoing	Low	H	H	H	H	H	Benefit gained by rapid identification of alternate vessel(s) to implement response.	Feasible with multiple OSV available.	**Accept:** Control to form component of response strategy
	Equipment unavailable to undertake subsea intervention activities	Woodside signatory to APPEA MoU: Mutual Assistance	Enables access to regional industry equipment & personnel	MoU in place	1	Immediate (upon initiation of Source Control Section)	Low	H	H	H	H	H	Enabling subsea intervention provides net benefit.	APPEA MoU in place.	**Accept:** Control to form component of response strategy.

6.6.1.3 Relief Well

Summary of Activity – Relief Well (Tier 3)

The basis of assessment for relief well drilling source control relates to the potential subsea release of gas condensate oil from a worst-case loss of well control (LOWC) from the Minerva-4 well as per Table 3-1.

The primary response document for the implementation of well kill operations via a relief well in the event of a LOWC is the *Source Control Emergency Response Plan (SCERP)*. The particulars of the relief well location, design and dynamic kill plan will be detailed in the SCERP.

The relief well response strategy will be implemented for Level 3 spills only. A relief well is the initial and highest priority response strategy for responding a LOWC and is a necessity to intercept the uncontrolled hydrocarbon zones from the well and to stop or limit further pollution, in this case, gas condensate, into the marine environment. The relief well is designed to be drilled via a MODU at a location at a safe distance from the flowing well.

A conservative approach has been adopted for the assessment of a LOWC by modelling the worst-case release scenario of 52,634 bbl condensate over 81 days.

Source Control – Relief Well activities include:

- Establishment of the Source Control Section (SCS): Relief Well Group embedded within the Woodside CICC;
- Implementation of the *Source Control Emergency Response Plan (SCERP)* inclusive of a Relief Well Plan;
- Activation of the APPEA Memorandum of Understanding: Mutual Aid to source and mobilise a MODU and AHTS vessels within the region or source a suitable MODU from international waters (if required); and
- Mobilisation of resources (including Woodside, third-party responder and Contractor Drilling personnel) to oversee relief well drilling operations.

Potential Environmental Impact and Risks – Relief Well

There are no additional environmental impacts and risks associated with a vessel-based response in offshore waters to those already described within the *Minerva Plug and Abandonment and Field Maintenance EP* (00MC-BHP-N00-0001) as summarised within the section covering ‘Offshore Response Operations’.

Response Arrangements – Relief Well

Procedure

Source Control Emergency Response Plan (SCERP)

Execution plans for a relief well will be similar to a standard well. A relief well is typically drilled as a vertical hole down to a planned deviation (“kick-off”) point, where it is turned toward the target well using directional drilling technology and tools. Dynamic kill well control commences after the target well is intersected, by pumping drilling fluid down the relief well into the incident well to kill the flow. Cement may follow to seal the original well bore.

Casing and wellhead inventories will be maintained to ensure there is always equipment readily available to drill a relief well.

Woodside has Master Service Agreements in place for specialist assistance to help with engineering and operational support for relief well planning and execution.

MODU Specifications

An alternate moored semi-submersible MODU must be capable of operating within 50-100 m water depth, have a BOP meeting or exceeding APIS53 requirements and have a minimum of eight-point mooring system.

MODU Availability / Tracking

In the event that the primary MODU undertaking the activity is non-operable, Woodside would seek an alternate MODU located regionally in the first instance. The MODU would be sourced under the arrangements of the APPEA Memorandum of Understanding: Mutual Aid agreement. Over the period of the proposed drilling activity, Woodside anticipate there would be multiple alternate MODUs located within Australian waters capable of undertaking relief well drilling operations in the Minerva field. The status of these MODUs along with AHTS vessels is monitored by Woodside on a monthly basis during the activity.

In the event that a suitable MODU is unavailable within the region at the time of the activity, an alternate MODU would be sought from Australia or South East Asia to undertake the relief well drilling operation. Woodside actively monitors current MODU market availability through an independent market analyst and MODU broker service.

Response Timing – Relief Well

The APPEA Memorandum of Understanding: Mutual Aid allows for ‘best endeavours’ for a MODU to be made available. It is anticipated a regionally available MODU could be secured and mobilised to site within 2 weeks.

Sourcing an alternate MODU from international waters represents a worst-case scenario and has been used to inform the WCD oil spill trajectory modelling and the overall preparedness needs analysis for Woodside to gain control of the well.

It is estimated that it could take approximately 45 days to drill and dynamically kill the incident well, assuming a MODU is available regionally. For a MODU mobilised outside of Australia, this could add an additional 35 days, depending on location and environmental conditions. The general tasks and approximate timings to engage and mobilise a MODU to field is and drill a relief well is 81 days.

Legislative and Other Considerations – Relief Well

The MODU and AHTS vessels contracted to undertaken relief well drilling operations will require an Australian Safety Case (accepted by NOPSEMA) and Safety Case Revision.

In the event that an alternate MODU / AHTS vessels are required, pending technical capability review, Woodside shall prioritise engaging a locally / regionally available MODU and vessels with existing Safety Case with best endeavours arrangements under the APPEA Memorandum of Understanding: Mutual Aid. The in-force Woodside Safety Case Revision would be leveraged to expedite the development of a MODU-specific Safety Case Revision for the relief well drilling operation. In this scenario, Woodside consider a Scope of Validation is suitable to undertake relief well drilling operations.

Should a MODU be required from an international location, in addition to availability and technical capability review, priority shall be given to a MODU that has previously operated in Australian Jurisdiction where a historical Safety Case (and Scope of Validation) may form the basis of a regulatory submission to NOPSEMA.

Where a MODU is engaged that has neither a current / historical Safety Case and scope of validation, these documents shall be developed in consultation with both the MODU Operator and NOPSEMA immediately following contractual engagement and simultaneously with mobilisation to field.

Whilst the revision and acceptance timeframes for Safety Cases / Safety Case Revisions / Scope of Validations is subject to a number of variables, Woodside shall engage suitably qualified HSE professionals with relevant petroleum industry experience to facilitate and assist in approval development, revision and submission on a 24 hour / 7 days a week basis following MODU engagement until all required approvals are in-force.

ALARP Evaluation – Relief Well

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from not adopting source control.	No source control.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. Halting the release of hydrocarbons and spill clean-up activities are essential.	The do-nothing option is not considered acceptable.	**Reject:** Source control is a recognised strategy for the mitigation of oil spill impacts.
Substitute	Failure to intersect wellbore to affect well kill in a timely manner	Concurrent implementation of: Subsea Intervention; & Well Containment	Concurrent implementation of alternate source control strategies with relief well as primary.	N/A	N/A	4 days to kill well	High	H	H	H	H	H	Provides back-up for well securement	Field SIMOPS	**Accept:** Source control strategies can be implemented concurrently to increase likelihood of successful well kill.
Engineer	No MODU available to implement well kill via relief well	Alternate MODU on standby within field to immediately implement relief well.	Expedite commencement of relief well drilling	N/A	MODU	~35 days to kill well	High $1.4M+ / d (2x MODUs) ~$84M additional cost + $20-30M to mob from outer region	M	H	H	H	H	Well kill potentially 2 weeks sooner that seeking alternate MODU via APPEA MoU.	The availability of multiple MODUs within region not assured. Prohibitively expensive to engage multiple MODUs for single well campaign. Likely contracting & scheduling restrictions.	**Reject:** Cost of strategy grossly disproportionate given alternate MODUs readily available for mobilisation.
		Alternate & technically capable MODU engaged via APPEA MoU	Initiate relief well drilling in a timely manner with technically capable & regionally available MODU (inclusive of Aust. Safety Case)	Multiple	MODU	~45 days to kill well	High $700k+ / d	H	H	H	H	H	Well kill potentially 3 weeks sooner than seeking alternate MODU from South East Asia via open market.	Location of alternate MODU.	**Accept:** Primary strategy to engage MODU via APPEA MoU. Benefit outweighs cost.
	Alternate & technically capable MODU unavailable via APPEA MoU	Alternate MODU sourced from South East Asia (Singapore) with increased technical capability	Initiate relief well drilling in a timely manner with available MODU (Safety Case required)	Multiple	MODU	~81 days to kill well	High $700k+ / d + $20-30m to mob from outer region	H	H	H	H	H	Overall potential benefit in controlling well release. Extended period to implement well kill when compared with in-region MODU.	MODUs readily available from South East Asia on open market. Potentially time constrained by procurement, quarantine readiness, mobilisation, COVID readiness & lack of Australian Safety Case.	**Accept:** Secondary strategy to engage MODU via open market. Benefit outweighs cost.
	Required hardware and consumables not available in a timely manner to implement relief well drilling	Maintain casing and wellhead inventories to implement relief well as per design	Equipment availability	As per well design	N/A	N/A	Moderate	H	H	H	H	H	Ready access to equipment	No identified constraints.	**Accept:** Benefit outweighs cost.
		Pre-drill top hole of relief well	Potential reduction in overall time to drill relief well.			14 days to drill Approx. time saved compared with relief well = 4 days	High $25-30M+ X2 wells = $50-$60m	L	H	H	H	H	~4 days (possible) of hydrocarbon release	Pre-drill 2x top holes (2 relief well locations) Time required to mobilise MODU to pre-drilled relief well. Multiple mooring operations increased	**Reject:** limited benefit gained given mobilisation of MODU required to intercept well bore. Cost grossly disproportionate to

Controls				ALARP Evaluation											
						Implementation Time		Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	(Days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
														risk (dropped objects on existing infrastructure)	limited benefit gained.
Separate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Administrative	Delay in sourcing required hardware & consumables	Confirm open-market availability of required hardware and consumables to implement relief well as per design	Validate readiness to respond to LOWC prior to activity.	Hardware & consumables		Pre-drill	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by validating control readiness.	No identified constraints.	**Accept:** Control to form component of response strategy.
		Source Control Plan Emergency Response Plan (SCERP) including Relief Well Plan	Consistent with industry good practice, BHP corporate requirements, IOGP Report 594 and APPEA Guidelines for source control	Multiple concurrent response strategies included	1	Immediate	Moderate	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response through pre-planning.	No identified constraints.	**Accept:** Control to form component of response strategy.
	Alternate MODU unavailable to undertake relief well activities	APPEA MoU: Mutual Assistance	Enables best endeavours access to suitable MODUs and support vessels to implement relief well drilling.	Multiple	1	Immediate	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response through pre-planning.	MODU availability and readiness. MoU best endeavours only with no binding commitment / obligation.	**Accept:** Control to form component of response strategy.
		Ongoing tracking for suitable alternate MODUs on a regular basis prior to and during drilling activity	Ongoing validation of technically capable & available MODUs	Multiple	1	Pre-drill	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by validating control readiness.	No identified constraints.	**Accept:** Control to form component of response strategy.
	Non-competent personnel increasing risk of unsuccessful well kill.	Well Control Training	Supervisory-level certificate from a well control accredited program (IWCF or IADC WellSharp).	Multiple personnel		Immediate – upon formation of SCS	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by trained personnel	No identified constraints.	**Accept:** Control to form component of response strategy.
		Remote working - Technical support	SCS functions can be fulfilled remotely to increase local / regional capacity.	Multiple personnel		Immediate – upon formation of SCS	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by trained personnel	No identified constraints.	**Accept:** Control to form component of response strategy.
	Alternate MODU unauthorised to undertake petroleum activities within Australian Cth Waters.	MODU tracking includes: • MODU availability • MODU safety case status & scope	Validation of MODU preparedness	MODU(s) of opportunity validation	1	30 days prior to spud	Low	H	H	H	H	H	Potential increased timeliness in pre-identifying alternate MODU ready to undertake response.	No identified constraints.	**Accept:** Control to form component of response strategy.

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation												
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
	No Safety Case in place for alternate MODU	Only seek alternate MODU with pre-existing NOPSEMA-accepted Safety Case in place	No delay in obtaining Aust Safety Case.	N/A	N/A	-	-	H	H	H	H	H	Safe management systems pre-validated leading to earlier implementation of response.	Alternate MODU without Aust Safety Case may have increased technical capability and be more suited to task.	**Reject:** Primary strategy involves alternate MODU with Australian Safety Case, but alternate would not be excluded if available and technically capable.
		Support the development of Safety Case for potential international MODU	If Safety Case required	N/A	N/A	Prior to spud	Low - Admin	H	H	H	H	H	Safe operations essential	Support development concurrently with MODU mobilisation. Time to develop and have accepted.	**Accept:** Only if required. Secondary strategy if no alternate MODU available.
	Woodside CICC / SCS / third-party responders unfamiliar with relief well planning and increasing overall time and risk associated with relief well implementation	Emergency exercise testing arrangements in place for relief well operations	Readiness review	All	-	Pre-drill	Low - Admin	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by validating control readiness.	Desktop validation only. No deployment of alternate MODU, equipment or consumables.	**Accept:** Control to form component of response strategy.

6.6.1.4 Subsea First Response Toolkit (SFRT / SIRT)

Summary of Activity – SFRT / SIRT (Tier 2)

The basis of assessment for subsea first response toolkit source control relates to the potential subsea release of gas condensate from a loss of containment from the Minerva well as per Table 3-1.

The Source Control – Subsea First Response Toolkit (SFRT) / Subsea incident Response Toolkit (SIRT) response strategy will be implemented for Level 3 spills only. The SFRT / SIRT is a subsea dispersant and debris clearance toolkit allowing debris to be cleared around the area of the wellhead, to enable intervention and prepare relief well drilling and safe installation of the well capping or containment device.

The Source Control – SFRT / SIRT response strategy will require support from OSVs for the duration of the response activities.

Source Control – SFRT activities will include:

- Establishment of the Source Control Section (SCS): SIMOPS Group embedded within the Woodside CICC;
- Implementation of the *Source Control Emergency Response Plan* inclusive of a Subsea Intervention Plan;
- Notification of incident to AMOSC, to request mobilisation of SFRT from Fremantle, and OSRL to requests SIRT from Norway (if required);
- Activation of agreements to mobilise OSVs;
- Mobilisation of resources (including Woodside Drilling personnel) to oversee subsea operations; and
- Implementation of the SCERP.

Potential Environmental Impact and Risks – SFRT / SIRT

There are no additional environmental impacts and risks associated with a vessel-based response in offshore waters to those already described within the *Minerva Plug and Abandonment and Field Maintenance EP* (00MC-BHP-N00-0001) and summarised in Section 7.1 for 'Offshore Response Operations'.

Response Arrangements – SFRT / SIRT

AMOSC Equipment (SFRT)

As a member company, Woodside has access to the Subsea First Response Toolkit (SFRT) including debris clearance and SSDI equipment and dispersant stockpiles located in Fremantle, Western Australia and maintained by Oceaneering. Oceaneering maintain support staff to facilitate the mobilisation, deployment, and operation of the SFRT.

OSRL Equipment (SIRT)

Woodside's subscription to the OSRL SWIS Supplementary Agreements provides Woodside with access to 2x Subsea Incident Response Toolkits (SIRT), with the approval to mobilise one per incident, which are each an integral part of capping operations. OSRL support staff are available to facilitate the mobilisation, deployment, and operation of the SIRT.

Each SIRT provides equipment that can be used for Debris Clearance, BOP Emergency Intervention and the Subsea Dispersant Injection kit for application of any selected hydrocarbon dispersants directly at the wellhead/BOP/CS.

The primary OSRL package for Woodside would be the SIRT located at Oil Spill Response (SWIS) Norway AS facilities in Tanager, Norway.

Deployment Vessel

The SFRT / SIRT can be deployed from a routinely available dynamically positioned (DP) offshore support vessel (OSV) with 'Work-Class' ROV capability. Woodside has standing contracts in place to access such vessels.

Minimum Vessel Specification

Minimum specifications for the SFRT / SIRT deployment vessel are:

- DP2 capability
- Min (2) Medium Work Class ROVs with capability to reach mud line at incident well centre and survey 50 m radius around well centre with carrying capacity:100 kg
- Active heave compensated crane with minimum 20t mud line capacity
- Minimum 750 m^2 deck space
- Deck tote tanks can be used, but below deck bulk storage is preferred for dispersant storage.

Response Timing – SFRT

Woodside have determined the SFRT can be mobilised to the Minerva Field within 4 days.

Legislative and Other Considerations – SFRT / SIRT

There are no additional legislative requirements or alternate considerations to implement subsea intervention, as this response is considered within existing in-force approvals, and subsea dispersant application is not considered a viable strategy

ALARP Evaluation – SFRT / SIRT

Controls				ALARP Evaluation												
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from the execution of this response strategy.	No SFRT / SIRT used	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environmental benefit would be gained from this option. Enabling the deployment of subsea response equipment is essential.	The do-nothing option is not considered acceptable unless there is not damage or debris encountered that would prevent other response strategies.	**Reject:** Source control is a recognised strategy for the mitigation of oil spill impacts.
Substitute	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Engineer	Deployment of CSS not feasible due to physical / mechanical obstruction	SFRT Debris Clearance	Enable the installation of CSS / Containment equipment Designed for first intervention for well Cutting tools ROV pressure washing tools SSDI equipment	SFRT AMOSC SIRT (OSRL)	2+	SFRT 4 days (AMOSC Fremantle)	Moderate	H	H	H	H	H	Enabling installation of CSS provides net benefit.	Equipment readily available and deployable	**Accept:** Control to form component of response strategy.
Separate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Administrate	Insufficient information / planning to mobilise & deploy debris clearance subsequently hamper vessel intervention operations.	SCERP including subsea intervention Plan	Pre-planning enables ready mobilisation and deployment.	SCERP in place prior to undertaking activity	1	Immediate (upon initiation of Woodside Source Control Section)	Low	H	H	H	H	H	Enabling clear site to impment source control operations	SCERP aligned with IOGP / APPEA guidance ready for immediate implementation. Common language enables ease of implementation.	**Accept:** Control to form component of response strategy.

6.6.2 Source Control Preparedness Performance Standards

Spill Response Preparedness – Source Control			
Environmental Performance Outcome	**Woodside prepared to implement source control in an effective and timely manner**		
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**	**Responsibility**
SOPEP / SMPEP	All vessels contracted to Woodside shall have a MARPOL-compliant SOPEP / SMPEP (suitable to class)	Completed Vessel Assurance Questionnaire for each response vessel prior to entering field demonstrating compliance with MARPOL Annex I (Prevention of Pollution by Oil)	Logistics Coordinator
APPEA Memorandum of Understanding: Mutual Aid	Woodside shall be a signatory to the APPEA Memorandum of Understanding: Mutual Aid to enable access to industry resources.	APPEA MoU: Mutual Aid signed by Woodside	APU Operations Manager
MODU equipment	Consistent with APIS53, the BOP aboard the MODU shall contain at least one annular sealing element and one blind-shear ram capable of shearing and then sealing the wellbore; and contain at least four rams, one of which shall have shear capability, and a 'hot-stab' connection enabling activation via ROV.	MODU specifications	Head of Drilling & Completions - Australia
	The contracted MODU is fitted with a 'Work – Class' ROV	MODU specifications	Head of Drilling & Completions - Australia
Source Control Plan Emergency Response Plan (SCERP) including subsea intervention plan	Woodside shall develop a SCERP consistent with IOGP Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (2019) and APPEA Australian Offshore Titleholder's Source Control Guideline (June 2021). The SCERP shall include: • A subsea intervention plan; and • A relief well plan.	Documented SCERP consistent with the International Oil and Gas Producers (IOGP) Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (2019) and APPEA Australian Offshore Titleholder's Source Control Guideline (June 2021)	Head of Drilling & Completions - Australia
Monitoring of vessel availability & status	Woodside shall actively monitor current heavy lift vessel (HLV) market availability through Clarkson's Sea/response software platform via OSRL to identify emergency vessels and equipment most suitable for source control operations, and those that are closest to the incident location. Considerations for engagement of a HLV to include: • location & availability / readiness to respond • technical specifications / capability to undertake scope of response • Australian Safety Case status & Scope of Validation • Pathway to having Safety Case / Scope of Validation (if required)	Clarkson's report	Head of Drilling & Completions - Australia
	Woodside shall monitor regionally available OSV with 'Work-Class' ROV capability and availability shall be verified prior to undertaking P&A activities.	Vessel monitoring records	Logistics Coordinator
Monitoring of MODU availability & status	Woodside shall monitor the status of alternate MODU along with AHTS vessels located regionally on a monthly basis during the activity.	Monthly MODU status reports	Head of Drilling & Completions - Australia
	Woodside shall actively monitor current MODU market availability through an independent market analyst and MODU broker assistant service. Considerations for engagement of alternate MODU include: • location & availability / readiness to respond • technical specifications / capability to undertake scope of response • Australian Safety Case status & Scope of Validation • Pathway to having Safety Case / Scope of Validation (if required)	MODU Broker reports	Head of Drilling & Completions - Australia
Personnel	Woodside shall maintain HSE / Technical capability internally to support the development of Safety Case for potential international MODU as required	Internal staffing records	APU Operations Manager
Relief well equipment	Woodside shall maintain casing and wellhead inventories to ensure there is always equipment readily available to drill a relief well.	Documented inventory of available casing and wellhead equipment	Head of Drilling & Completions - Australia
Specialist Service Providers	Woodside shall maintain contractual arrangements with specialist assistance for engineering and operational support for relief well planning and execution.	Contract records	Head of Drilling & Completions - Australia
OSRO Service Contract	Woodside shall have a contract in place with OSRO to enable access to industry response equipment.	Service contract with OSRL and/or WWC AMOSC membership	APU Operations Manager

Spill Response Preparedness – Source Control			
Environmental Performance Outcome	**Woodside prepared to implement source control in an effective and timely manner**		
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**	**Responsibility**
Well Control Training	Woodside Drilling Staff shall hold supervisory-level certificate from a well control accredited program (IWCF or IADC WellSharp).	WSD training records	Head of Drilling & Completions - Australia
Relief Well Planning and Blowout Dynamic Kill Simulation	Woodside shall develop a Relief Well Planning and Blowout Dynamic Kill Simulation, consistent with OGUK guidance, details the planning of the relief well for subsea blowout scenarios on the Crosby and Stickle development wells to enable a relief well to be implemented in the shortest timeframe practicable. The simulation shall determine the kill mud weights, pump rates and power requirements for potential kill scenarios and if the drilling of one single relief well is sufficient for the well kill operations. Plan inclusive of: • Detailed relief well modelling; • Reservoir parameters; • Analysis of shallow hazards; • Relief well surface location and design (including casing requirements); and • Dynamic kill modelling via seawater and/or kill weigh drill fluid	Document Relief Well Planning and Blowout Dynamic Kill Simulation, consistent with OGUK guidance	Head of Drilling & Completions - Australia
Relief Well Proposed Mooring Pattern	Prior to initiating relief well operations with an alternate MODU, Woodside shall develop a detailed mooring plan including consideration of: • 8- or 12-point mooring system required; • Results of shallow hazards assessment; • Existing Pyrenees field infrastructure; • Proposed anchor and mooring line locations; and • Mooring equipment tensioning requirements	Mooring Plan document	Head of Drilling & Completions - Australia
Testing / Exercising	Woodside shall undertake a desk-top exercise against the spill response testing objectives detailed within the *Minerva Plug and Abandonment and Field Maintenance EP* (00MC-BHP-N00-0001) prior to undertaking the activity including validation of source control response readiness.	Exercise records	Lead Principal HSE
Response Timing	Woodside shall maintain arrangements to enable best endeavours drilling of a relief well within 45 days of a LOWC event (pending regionally available MODU) to 81 days should an international MODU be required.	Exercise records confirm arrangement in place to enable best endeavours relief well operations within modelled timeframes	Head of Drilling & Completions - Australia
	Woodside shall maintain arrangements to enable best endeavours mobilisation of the SFRT within 4 days of a LOWC or pipeline rupture event.	Exercise records confirm arrangement in place to enable best endeavours SFRT mobilisation within modelled timeframes	Head of Drilling & Completions - Australia

Demonstration of Acceptability – Source Control

- Contracted vessel having a vessel specific SOPEP / SMPEP meets MARPOL Annex I (Prevention of Pollution by Oil);
- Woodside minimum standards for BOP design and functionality are consistent with API Standard 53: Well Control Systems for Drilling Wells;
- Source control planning arrangements are consistent with industry good practice, namely International Oil and Gas Producers (IOGP) Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (2019) and APPEA Australian Offshore Titleholder's Source Control Guideline (June 2021);
- The APPEA Memorandum of Understanding: Mutual Aid is an Australian Petroleum Industry recognised mechanism to access regionally available response equipment including an alternate MODU on a best endeavours basis;
- A detailed ALARP evaluation has been undertaken including an assessment of alternate and improved options and BHP has adopted an approach to implement source control in the shortest reasonably practical timeframes; and
- Given the multiple spill response preparedness measures detailed within this section, Woodside consider the Environmental Performance Outcome of 'Woodside prepared to implement source control in an effective and timely manner' can be achieved.

6.6.3 Monitor and Evaluate

Summary of Activity – Monitor and Evaluate (Tier 1 – Tier 2)

The Monitor and Evaluate response strategy is applicable for Level 2–3 spills and is mandatory for real-time decision-making during a large spill event. This includes an assessment of the location, weather and sea state conditions, volume of oil released, oil weathering state, and trajectory of the spill. Monitoring results inform the operational SIMA process for selecting alternate strategies for responding to and managing a spill event, such as the chemical dispersant application.

Monitoring and evaluation requires access to aircraft, vessels, and personnel. In the event of a Level 2 / Level 3 spill, the following monitoring and evaluation methods will typically be implemented, dependent on the nature and actual or potential volume of the spill:

- Aerial surveillance;
- Vessel surveillance;
- Oil spill tracking buoys;
- Spill trajectory modelling; and
- Satellite imagery.

Aerial Surveillance

Aerial surveillance is activated by the Woodside CICC Leader or by a designated officer of the nominated Control Agency. Aerial surveillance will be by helicopter and/or fixed-wing plane. In addition to the aircrew, trained aerial surveillance observers will be aboard flights to confirm spill location, size and thickness. Information will be relayed to CICC for processing. A schedule of flights will be developed, to ensure sufficient timely information is available for fate modelling. Aerial observations will only be undertaken during daylight hours. The aerial surveillance will include digital imagery of the spill, the GPS coordinates of the spill extremities, an estimate of the spill thickness and the time of the observations.

Vessel Surveillance

Direct observations from the contracted MODU, AHTS vessels and/or ROV can be used to assess the location and visible extent of any immediate oil spill. Additional vessels used 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 a safety risks.

Oil Spill Tracking Buoys

Once deployed in field, Self-Locating Datum Marker Buoys (SLDMB) or Oil Spill Tracking Buoys (OSTBs) monitor the movement of hydrocarbons via satellite. Can be deployed via MODU, vessel or helicopter.

Oil Spill Trajectory Modelling

CICC to engage RPS-APASA via a call-off contract maintained by AMOSC to initiate trajectory modelling and correlate it with real data received from aerial and vessel surveillance, OSTBs and/ or sea gliders. From these sources, RPS-APASA will develop an initial oil spill trajectory model for the next 5 days, which will allow the CICC to direct resources for the next phase of the response. Alternative oil spill modelling agencies may be selected dependent on operational requirements.

Satellite Imagery

Satellite imagery provides a supplementary source of information that can improve awareness of the extent, trajectory, and thickness of a slick. Suitable imagery is available via satellite imagery suppliers 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 (SAR) and visible imagery may both be of value.

Potential Environmental Impacts and Risks – Monitor and Evaluate

There are no additional environmental impacts and risks associated with a monitoring and evaluation response in offshore waters to those already described within the activity-specific EP.

Potential environmental impacts and risks associated with nearshore monitoring and evaluation and mitigative control measures are summarised in Section 7.2 for 'Nearshore Response Operations'.

Response Arrangements – Monitor and Evaluate

Procedure(s)

Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan (00MC-BHP-N00-0004) - refer Table 8-2: Indicative Resources Required for Implementation of Operational Monitoring Plans.

APU Oil Spill Response Strategy – Monitor and Evaluate (AOHSE-ER-0053)

APU Procedure – Operational Response Guideline 1: Aerial Surveillance. Confirmation, Quantification and Monitoring of Oil Spills (AOHSE-ER-0041)

APU Procedure – Operational Response Guideline 3: Oil Spill Trajectory Modelling. Initiation, Data Collection and Progression (AOHSE-ER-0044)

APU Procedure – Operational Response Guideline 4: Oil Spill Tracking Buoy – Deployment / Tracking (AOHSE-ER-0033)

Aircraft

Woodside will have a contract with service provider to provide helicopters crew change, 24/7 Medevac, and Search and Rescue coverage. The service providers helicopters can be used for aerial surveillance in event of an oil spill. See 'Aerial Support' Section 6.5.1 for additional information.

Trained Aerial Observers

Crew aboard the Minerva Field MODU can be deployed to undertake aerial observations.

Additional trained aerial observers are available to Woodside from AMOSC. Additional trained aerial observers are available via OSRL in the event of a large/longer duration response.

Oil Spill Tracking Buoys

At least one OSTB will be location in-field on the MODU, during the Minerva P&A Program.

Response Timing – Monitor and Evaluate

<u>Aerial surveillance</u> – activate within 2 hours of forming Woodside CICC.

Contracted crew change helicopter(s) could be diverted to the spill location immediately if safe to do so, providing it is not required for emergency evacuation related tasks from the MODU. Trained aerial observers are available to Woodside from AMOSC. These personnel can be mobilised within 48 hours. Additional trained aerial observers are available via OSRL in the event of a large/longer duration response.

<u>Vessel surveillance</u> – activate within 2 hrs of forming Woodside CICC.

Contracted AHTS vessels could be diverted from routine operations to undertake monitoring operations if safe to do so.

<u>Oil spill tracking buoy</u> – activate within 2 hours of spill (direct deployment from vessel / MODU).

<u>Oil spill trajectory modelling</u> – activate via AMOSC within 2 hours of forming Woodside CICC.

ALARP Evaluation – Monitor and Evaluate

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H): Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from the execution of this response strategy.	No situational awareness.	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. Developing a monitoring and evaluate response strategy is a necessary contingency to have in place prior to and during operations and cannot be eliminated. Monitoring and evaluation is integral to the management and verification of spill response strategies for all spill scenarios.	The do-nothing option is not considered acceptable.	**Reject:** The monitor and evaluate strategy is a mandatory response strategy to have in place and cannot be eliminated.
Substitute	None identified	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Engineering	No available fixed wing aircraft	Dedicated monitoring aircraft on standby	Immediate response deployment via dedicated aircraft	N/A	N/A	<2 hours	High approx. $100,000 per month	N/A	N/A	N/A	N/A	N/A	Rapid mobilisation of aerial to provide situational awareness information back to the CICC for planning purposes to protect sensitive receptors.	The cost to maintain dedicated fixed wing aircraft would be approx. $100,000 per month, per aircraft. The cost to maintain a single, or multiple dedicated fixed wing aircraft is not considered reasonable, as Woodside's current arrangements enable aerial surveillance (daylight only).	**Reject:** aircraft under contract and available.
Separate	None identified	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Administrate	Response strategy executed ado with no real planning.	Monitor and evaluate operations to be reviewed and managed by CICC through Incident Action Plan (IAP) process.	Within the first 24 hours, Woodside CICC will enact the first strike plan in conjunction with development of an IAP.	N/A	N/A	<24 hours	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective monitor and evaluate response activities to track the spill trajectory and to feed into real-time decision-making for further strategies for responding to and managing spill event. The review/evaluation of monitor and evaluate options will be implemented immediately for all levels of spills.	Controls have High effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications for the operation.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Spill trajectory not known in early stages of the response.	Spill fate modelling initiated within 2 hours of CICC forming to support Operational SIMA.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable evaluation of which sensitive receptors require priority protection.	A	N/A	<2 hours from CICC forming	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will enable real-time evaluation of which sensitive receptors require priority protection.		

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Administrate	Aerial surveillance resources not available.	Contract in place with a primary helicopter provider and backup by secondary provider	Contract in place for the provision of aerial surveillance mobilising from Waarnambool (or alternatively from Barwon Heads/Colac in the event of a hydrocarbon spill.	N/A	2	<2 hours	Minor	H	H	H	H	H	Positive environmental benefit gained from having aircraft/ vessels already on contract or readily obtained through MOUs for spill surveillance activities. Dependent on the size of the spill, vessel/ aerial surveillance would be initiated immediately.	The response capacity is small, but the effectiveness is generally High (vessel operations are only possible during daylight hours). The cost of using all available marine vessels, those available through Mutual Aid and on the local spot-charter market in Melbourne/Geelong has minor cost implications. Cost during activation would be moderate.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Marine based resources (vessels) not available to respond when required.	Access to support vessels (Woodside, mutual aid, local charter).	Woodside contracted vessel(s), Mutual aid MOU's and vessels of opportunity available on the local spot charter market in Melbourne / Geelong. Vessels already on contract or readily obtained through MOU's, no additional standby cost.	N/A	1-4	0-1 days	Moderate	H	H	H	H	H			
	Spill modelling resources not available.	Contract in place with AMOSC who maintains call-off contract with RPS-APASA* to provide spill modelling in the event of a hydrocarbon spill.	Real-time monitoring and evaluation of the spill is a mandatory primary response strategy implemented for Level 2 – 3 spills required for real-time decision-making during a spill event. Woodside has agreements and contracts in place to expedite implementation of monitor and evaluate activities.	N/A	N/A	<24 hours	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. Oil spill trajectory modelling will be conducted to predict the extent of impacts to offshore habitat, for any physical disturbance that may impact shoreline, nearshore areas, or areas protected for the purpose of conservation. The CICC will engage RPS-APASA* via a call-off contract maintained by AMOSC to start modelling the spill and correlate it with real data received from aerial surveillance, OSTB and/ or sea gliders.	Control has High effectiveness; it is available, functional, and reliable and in general it is reliable and compatible with other control measures. Control has minor cost implications for operations.	
	Spill modelling not available within the needed timeframe and to the expected standard.	Ensure spill modelling capability meets and exceeds the industry standards for oil spill modelling.											From these sources, RPS-APASA will develop an oil spill trajectory model for the next 5 days, which will allow the CICC to direct resources for the next phase of the response. Alternative oil spill modelling agencies may be selected dependent on operational requirements.	Control has High effectiveness; it is available, functional, and reliable and in general it is reliable and compatible with other control measures. Control has minor cost implications for operations.	
	Tracker buoys not immediately available for deployment.	OSTB located on MODU deployed within 2 hours of spill incident.	Access to OSTB's located on the MODU	N/A	1	<2 hours deployment from MODU	Moderate	H	H	H	H	H	Positive environment benefit by in-field tracking capability. Immediate tracking of currants and associated hydrocarbons for effective decision-making	The response capacity is small for vessel operations, but the control effectiveness is	

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
														generally High (vessel operations are only possible during daylight hours). The cost of using all available vessels is minor. Cost during activation would be moderate.	
	Real time monitoring arrangements not in place as part of response preparedness.	Woodside has agreement in place with OSRL/ third party for the provision of satellite imagery.	Real-time monitoring and evaluation of the spill is a mandatory primary response strategy implemented for Level 2 – 3 spills required for real-time decision-making during a spill event. Woodside has agreements in place to expedite acquisition of satellite imagery in the event of a spill.	N/A	N/A	< 24 hours for acquisition of first satellite image.	H	H	H	H	H	H	Positive environmental benefit by having access to monitor and evaluate resources obtained via contractual arrangements and service agreements with OSRL and other third-party vendors ensures activation of response strategy activities are expedited in the event of a spill.	The response capacity is minor, but the control effectiveness is generally High The cost of having agreements/contracts in place is minor. Cost during activation would be moderate.	
Administrate	Aerial surveillance resources not available.	Access to aerial surveillance and trained observers from AMOSC Core Group or OSRL.	Woodside has agreements in place to expedite resourcing additional aerial surveillance and trained observers in the event of a spill.	N/A	Multiple	24-48 hours	Moderate	H	H	H	H	H	Positive environment benefit gained from implementation of this control measure Woodside has agreements in place to expedite resourcing additional aerial surveillance and trained observers in the event of a spill.	Contracts in place.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Marine based resources (vessels) not available to respond when required.	Dedicated oil spill response vessel on standby.	On standby 24/7 during operations to expedite monitoring	N/A	1	0-1	Moderate $35K/day x 120 days = ~$4.2M	H	H	L	H	H	Positive environment benefit gained by having dedicated aircraft/ vessels on standby to immediately monitor the spill.	Dedicated standby vessels have substantial costs, that do not provide a measurable advantage over utilising assets already in the field during the activity.	**Reject**: This control has high costs that are disproportionate to any environmental benefit that might be gained. This takes into consideration additional fuel required for having vessels on standby at site.

Spill Response Preparedness – Monitor and Evaluate			
Environmental Performance Outcome	**Woodside prepared to undertake monitoring and evaluation in an effective and timely manner**		
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**	**Responsibility**
APPEA Memorandum of Understanding: Mutual Aid	Woodside shall be a signatory to the APPEA Memorandum of Understanding: Mutual Aid to enable access to industry resource.	APPEA MoU: Mutual Aid signed by Woodside	APU Operations Manager
Service Contract	Woodside shall maintain a service agreement for a crew-change helicopter to support the Minerva P&A Program.	Service agreement with aircraft operator	APU Operations Manager
	Woodside shall have a contract in place with OSROs to facilitate access to: • Fixed-wing aircraft • Oil Spill tracking buoys • Trained aerial observers • Oil spill trajectory modelling • Oil spill observation satellite imagery	Service contract with OSRL AMOSC membership	APU Operations Manager
Monitoring of vessel availability & status	Woodside shall monitor regionally available OSV with 'Work-Class' ROV capability and availability shall be verified prior to undertaking P&A activities.	Vessel monitoring records	Logistics Coordinator
OSTB	Woodside shall maintain a minimum of 1 OSTB on the MODU, during the Minerva P&A Program. The OSTB shall be function tested prior to undertaking the activity.	Inspection records	Head of Drilling & Completions - Australia
Testing / Exercising	Woodside shall undertake a desk-top exercise against the spill response testing objectives detailed within the Minerva P&A and Field Maintenance EP (00MC-BHP-N00-0001) prior to undertaking the activity including validation of monitoring and evaluation response readiness.	Exercise records	Lead Principal HSE
Response Timing	Woodside shall maintain arrangements to facilitate the mobilisation of monitoring and evaluation operations in accordance with the following timeframes: • Aerial surveillance within 4 hours of forming CICC (via existing contracts) • Vessel surveillance within 2 hours of forming CICC (via in-field vessels) • Oil spill tracking buoys deployed within 2 hours of spill event • Spill Trajectory Modelling initiated within 24 hours of forming CICC • Satellite imagery initiated within 2 hours of forming CICC	Exercise records	APU Operations Manager

Demonstration of Acceptability – Monitor and Evaluate

- A detailed ALARP evaluation has been undertaken including an assessment of alternate and improved options and Woodside has adopted an approach to undertake monitoring and evaluation in the shortest reasonably practical timeframes; and
- Given the multiple spill response preparedness measures detailed within this section, Woodside consider the Environmental Performance Outcome of 'Woodside prepared to undertake monitoring and evaluation in an effective and timely manner' can be achieved.

6.6.4 Shoreline Protection

Summary of Activity – Shoreline Protection (Tier 2)

The basis of assessment for shoreline protection relates highest accumulated shoreline loading above moderate threshold (100 g/m^2) and the longest length (km) of shoreline oiled >100 g/m^2 (Table 4-2). For an LOWC event, shoreline loading has been modelled up to 14 tonnes across all shorelines (Table 4-3).

A consideration for shoreline protection operations is the minimum arrival time above a moderate threshold (100 g/m^2). Spill modelling indicates for a LOWC scenario, a minimum arrival time of 0.5 days at Warrnambool Plains (Autumn-winter period) and 1.8 days at Otway Plain (Spring-Summer period) with arrival at other receptors occurring after 2.8 days and for an MDO release a minimum arrival time of 0.2 days at Warrnambool Plains. Whilst minimum arrival times may be less than 24 hours at some locations, potential shoreline exposure is cumulative rather than instantaneous, therefore shoreline protection measures would be designed to avoid potential peak loading rather than full prevention of shoreline contact.

Shoreline protection will be carried out as directed by the Victorian Department of Transport (Vic DoT), as the Controlling Agency in State waters.

Shoreline protection involves the deployment of protection and deflection booms which assist in minimising the amount of oil contacting shorelines. At the direction of Vic DoT, protective and deflective booms may be deployed to deflect a slick away from an identified sensitivity towards an area where collection can be more effective without impacting high value habitat areas. Alternatively, slicks can be deflected to shorelines of lower environmental value where the oil can be collected, or if appropriate, identification of nearby suitable sacrificial habitat.

This response strategy involves the deployment of vessels, equipment and personnel and is dependent on favourable weather and sea state conditions.

Potential Environmental Impacts and Risks – Shoreline Protection

Potential environmental impacts and risks associated with shoreline clean-up and mitigative control measures are summarised in Section 7.2 'Nearshore Response Operations', and Section 7.4 for 'Shoreline Response Operations'.

The installation of booms and associated equipment could result in damage to sensitive habitats and disturbance of fauna (e.g. trampling of sensitive shorelines and nesting grounds, damage to rocky platforms, and estuary and river inlets by vessels used to deploy nearshore booms and anchoring impacts), entanglement of marine fauna within booms, accidental corralling fauna into surface oil, accidental deflection of surface oil to sensitive shorelines and environmental receptors, and damage to Aboriginal registered sites of cultural significance from shoreline accumulation and deployment of protection and deflection booms.

The environmental sensitivity of shorelines that may be impacted by hydrocarbon exposure is a key consideration in determining priorities for shoreline response (refer Section 7.4 for further detail). The sensitivity of shorelines may vary depending on the time of year, as some shorelines in the region are used as turtle and bird nesting areas.

Physical presence and movement of personnel across shorebird nesting beaches could potentially cause damage to buried eggs, reducing nesting success. Incorrect management of personnel and equipment on nesting beaches could result in a minor impact on a small proportion of a seabird and shorebird nesting population.

Sensitive receptor protection (intertidal booms and skimming) and shoreline clean-up responses (see Section 6.6.5) may generate a significant quantity of hydrocarbon contaminated solid and liquid waste. Contaminated solids would include PPE, spill clean-up equipment (shovels, rakes, etc.) and the oil contaminated sediments collected from shorelines (IPIECA, 2015) and oil-coated booms, skimmers etc. and the oily contaminated liquids and sediments collected during the nearshore booming/skimming activities. Inappropriate management of oil contaminated waste could result in localised secondary contamination of the nearshore marine environment shoreline sediments and harm to individuals of protected species.

Oil Spill Budget – Shoreline Protection

As detailed in Section 5.4.6 ‘Protection of Sensitive Resources’ there is no defined minimum thickness for effective protection and deflection operations and booming at low surface thresholds may still result in a positive environmental outcome, by preventing accumulation over time.

Response Arrangements – Shoreline Protection

As directed by Vic DoT, Woodside will arrange for the call-up of the necessary personnel and logistics associated with maintaining response crews at the impact location, which includes the support arrangements to ensure the health, safety, and welfare of the shoreline crews. This includes availability of PPE, sun shelter, first aid supplies, catering, drinking water, ablutions, decontamination facilities, accommodation, transport, and communications to support the number of personnel expected to be required at the impact location.

Procedures / Guidelines
APU Oil Spill Response Strategy – RS5 Shoreline Protection (AOHSE-ER-0057)

Tactical Response Plans:

- Aire River
- Curdies Inlet
- Gellibrand River
- Warrnambool

Personnel

As described in Section 6.4 ‘General Support’, Woodside would initiate the deployment of labour-hire personnel to staff shoreline protection crews in addition to Woodside personnel. Woodside commits to initially engaging a minimum of 40x labour-hire personnel for the deployment of 10x personnel to implement Tactical Response Plans (TRPs) detailed above, and engage additional personnel as required at the direction of Vic DoT. In addition to skilled personnel from the DoT, skilled personnel would initially be sourced from the AMOSC Core Group, OSRL and the National Response Team (NRT) to supervise response crews. All unskilled personnel would receive relevant on-the-job training prior to undertaking shoreline protection operations with some labour-hire personnel potentially upskilled to support supervisory roles during the course of the response.

Equipment

Woodside commits to deploying regionally available industry protection and deflection equipment to the identified sensitive receptor locations in the first instance, at the direction of Vic DoT.

As a member company, Woodside has access to industry equipment maintained by AMOSC.

Under an existing Service Level Agreement, Woodside has access to OSRL equipment.

Woodside would also source regionally available equipment such as PPE, shelter, accommodation units, vehicles, and machinery.

Response Timing – Shoreline Protection

Woodside commits to:

- mobilise initial (first strike) crews (including AMOSC Core Group members) to priority protection areas (as determined by Vic DoT) within 48 hours of a spill event with the potential to impact State waters and lands.

- initiating the deployment of regionally available industry shoreline protection and deflection equipment within 24 hours of a spill event with the potential to impact State waters and lands; and

- making sufficient resources available and establishing a forward operating base at priority protection areas in the south region of Victoria (as determined by the Vic DoT) within 96 hours of a Level 2 / Level 3 spill event occurring.

Supplementary resources (personnel and equipment) will continue to be deployed by Woodside under the direction of the Vic DoT until peak capacity is reached as deemed appropriate by Vic DoT.

Woodside shall maintain resourcing at levels determined by the Vic DoT until termination of the response strategy.

Legislative and Other Considerations – Shoreline Protection

Shoreline protection operations are administered by Vic DoT as the Controlling Agency within State jurisdiction.

Woodside via the Joint Strategic Coordination Committee (JSCC) would engage with other relevant Victorian State Departments such as the Victorian Police Force, Department of Environment, Water, Land and Planning and other relevant agencies in relation to emergency response arrangements in State jurisdiction.

For nearshore vessel operations: Marine Order 91 (Pollution Prevention – Oil), Marine Order 94 (Pollution Prevention – Packaged Harmful Substances), Marine Order 95 (Pollution Prevention – Garbage) and Marine Order 96 (Pollution Prevention – Sewage) and EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with Cetaceans.

Logistical Constraints

Access to areas requiring shoreline protection:

Access to some areas identified as protection priorities, and potential areas of shoreline exposure to hydrocarbon may be difficult. The CICC should obtain situational information to inform the response of safety concerns, access, and logistical constraints prior to mobilising shoreline protection responders to site.

Locations amenable to shoreline protection:
Some shorelines may not be suited to shoreline protection given:

- The reliability of deployment effectiveness of shoreline protection equipment at the locations exposed directly to the ocean currents;
- The exposed coastline may not be suitable for shoreline protection methods.
- During the response, SCAT teams and specialists will continue to monitor opportunities to deploy additional shoreline protection strategies.

ALARP Evaluation – Shoreline Protection

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	**Risk**	**Control Measure**	**Rationale**	**Response Capacity**	**Units**	**Implementation Time (days)**	**Cost**	**Availability**	**Functionality**	**Reliability**	**Survivability**	**Independence / Compatibility**	**Environmental Benefit Gained**	**Practicability / Constraints**	**ALARP Summary**
Eliminate	Negative environmental impact from the execution of this response strategy.	No shoreline response.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option; experience from past oil spills suggests that environmental sensitivities can be protected effectively when shoreline protection operations are activated.	There may be occasions when shoreline protection is not implemented, e.g., during poor weather, or when operations are temporarily ceased such as, for example, due to the presence of migratory EPBC Act listed species occurring within the area of operations, but in general, the 'do nothing' option is not considered within the external context (e.g., stakeholder views) to be a viable option.	**Reject**: Shoreline protection using booms is a recognised strategy for the mitigation of oil spill impacts.
Separate	Response executed when EPBC Act listed migratory are in the area.	Operational control to prevent impacts on EPBC Act Listed migratory species.	If EPBC Act Listed migratory species such as whales or birds are observed in the immediate vicinity of shoreline protection operations as determined from situational awareness reports from the 'monitor and evaluate' response strategy and/or from the vessel platforms, shoreline protection operations would cease until the animal has moved out of the area and has not been sighted for 30 minutes.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environment benefit gained by reducing the potential impacts, e.g., entrapment, entanglement, associated with implementing shoreline protection operations in areas where EPBC Act Listed threatened/migratory species have been observed, as determined from situational awareness reports. Operations would cease until the animal has moved out of the area and has not been sighted for 30 minutes to reduce the potential of interaction with booms.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response use during periods of important windows of ecological sensitivity, such as migratory shorebirds arriving /departing the region and during migrations of EPBC Act Listed species.	Temporal / seasonal windows of ecological sensitivity to be considered in Operational SIMA.	Shoreline protection is a key response strategy to facilitate the protection of sensitive shorelines and adjacent shallow water habitats. However, shoreline protection during periods of important windows of ecological sensitivity, e.g.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environment benefit gained by reducing the potential impacts associated with shoreline protection operations during windows of important ecological sensitivity.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
			during migrations of EPBC Act Listed species such as whales and birds will be a key component of the Operational SIMA and will be subject to operational constraints.												
	Response strategy not executed effectively through planning or fast enough to prevent impact highly sensitive areas impacted.	Pre-deployment of shoreline protection boom at identified sensitivities along the coast during operations.	Pre-deployment of shoreline protection boom at identified sensitivities along coast would reduce the time to deployment following the loss of hydrocarbons thereby increasing the potential for protection of environmental sensitivities.	N/A	N/A	N/A	Major; 2 people $1,000 / day x 120 days = $120K	H	H	H	Low	H	Positive environment benefit gained by pre-deploying shoreline protection boom such as beach guardian at identified sensitivities along the coastline during operations.	This control would have low survivability and major costs associated with standby rates for the field crew to monitor the condition of the boom.	**Reject**: Pre-deployment of shoreline boom has high costs that are disproportionate to the potential environmental benefit that might be gained particularly taking into consideration that sufficient booms are located in Geelong and mobilisation timeframes are considered to be acceptable for rapid deployment.
Administrate	Response strategy not executed effectively through planning or fast enough to prevent impact highly sensitive areas impacted.	Shoreline protection operations to be reviewed and managed by CICC through Incident Action Plan (IAP) process.	Within the first 24 hours, the Woodside CICC will develop IAPs in consultation with Vic DoT.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/evaluation of shoreline protection operations will take place almost immediately in the event of a Level 3 spill. The shoreline protection operations would be adapted based on real-time information regarding the spill incident: determine if sea state and weather conditions are conducive to operations and applicability with other response strategies.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational SIMA.	Operational SIMA to include evaluation of requirement for implementation of shoreline protection operations.	The shoreline protection response strategy will be activated if Operational SIMA indicates the implementation would provide a net environmental benefit to prevent environmental impacts to sensitive environmental receptors.	N/A	N/A	<2 hours from CICC forming	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational SIMA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather and sea state conditions etc.) to confirm the appropriate response strategies to adopt for protection of priority locations and sensitive receptors. Shoreline protection will be activated if the Operational SIMA indicates the potential harm of implementation is less than leaving the oil untreated on the surface; and if the implementation of the response strategy would provide a net environmental benefit to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors.		
	Predictive spill trajectory unknown when undertaking Operational SIMA.	Oil spill modelling contract in place to provide predictions of oil trajectory to be undertaken to support the Operational SIMA and activated within 2 hours of notification.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable direction of daily shoreline protection operations.	N/A	N/A	<2 hours from CICC forming	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will assist in the effective deployment of shoreline protection boom to areas where sensitive receptors require priority protection.		
	Incompetent personnel utilised during response operations.	Trained operators to supervise boom deployment and shoreline protection operations.	Use of skilled personnel to supervise boom deployment and shoreline protection operations will increase efficiency of oil spill protection efforts.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by using skilled personnel to supervise boom deployment and shoreline protection operations to increase efficiency of response efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.		
	Shoreline response delayed due to poor understanding of impact area and specific operational response.	Deployment of boom and any laydown areas will follow pre-designated plans for establishing a works area to protect environmental sensitivities and including areas of cultural sensitivity.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental and cultural sensitivity.	N/A	N/A	N/A	Minor	H	H	H	H	H			

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation												
								Effectiveness (L/M/H)								
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
	Vessel selection limits the ability to deploy boom.	Vessels used to deploy boom will be flat-bottomed (where safe and practicable) and no anchoring of vessels or booms will occur on emergent reefs or other fragile / sensitive benthic habitats.	Increases the potential that impacts to sensitive receptors will be prevented by using plant and equipment that is fit-for-purpose.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by using small marine craft that are fit for purpose in working in shallow water and not anchoring on sensitive benthic habitats.		
	Response impact (positive or negative) is not known or measured.	Environmental monitoring	Environmental monitoring to evaluate the concentration of hydrocarbons; the effectiveness of shoreline protection; and the impact of hydrocarbons on marine and shoreline habitats.	N/A	N/A	Immediately and on-going	Minor	H	H	H	H	H	Positive environmental benefit gained from adopting this control measure. Allows evaluation of the effectiveness of shoreline protection techniques.		
	Response continues with no end point or is removed early.	Response strategy activities continued until termination criteria met.	Ensures that the shoreline response strategy continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the shoreline protection response strategy continues until the performance outcome has been achieved.		
Administrate	Response resources not available.	Access to shoreline protection equipment, e.g., beach guardian, fence boom, deployment kits, owned by AMOSC (Fremantle and Geelong).	Mobilisation of AMOSC owned shoreline protection equipment from Fremantle / Geelong).	Small	AMOSC	0-1	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of shoreline protection is to separate the oil from shoreline sensitivities.	The response capacity is small, but the control effectiveness is generally high. Woodside has access to this capability through contractual arrangements with AMOSC / OSRL. Control has minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Shoreline response delayed due to poor understanding of impact area and specific operational response.	Shoreline tactical response plans for key sensitivities.	These plans outline the equipment and resources requirements for pre impact and post impact response.	N/A	N/A	0-1	Minor	H	H	H	H	H			
	Response resources not available.	Access to shoreline protection equipment.	Mobilisation of OSRL shoreline protection equipment from Singapore and other countries.	Small	OSRL	< 24 hours to mobilise; onsite > 7 days	Minor	Low (due to time to mobilise)	H	H	H	H	These plans outline the equipment and resources requirements for pre impact and post impact response. Reduces time for response personnel to determine site requirements.	This control has high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Control has minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
	Response resources not available.	Access to small support vessels (AMOSC, local charter).	Mobilisation of AMOSC owned small craft from Geelong and / or vessels of opportunity available on the local spot charter market in Melbourne/Geelong/ Warrnambool).	Small	4	7	Minor	H	H	H	H	H	The environmental benefit associated with shoreline protection is potentially significant, which has the potential to reduce the severity of environmental impact.	The response capacity is small for vessel operations, but the control effectiveness is generally high (vessel operations are only possible during daylight hours) and the cost of using marine vessels available through AMOSC and on the local spot-charter market has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
Administrate	Response resources not available.	Support vessels (Australia).	Acquisition of more support vessels via charter on the spot-market from around Australia.	Small	As required	3-8	Moderate	H	H	H	H	H	The environmental benefit associated with shoreline protection is considered to be significant, which has the potential to reduce the severity of environmental impact.	The response capacity is small, but the control effectiveness is generally high and the cost of acquiring small marine vessels and more equipment as required through the spot-charter market around Australia has minor cost implications. Cost during activation would be moderate.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Response resources not available.	Additional marine shoreline protection equipment.	Acquisition of more shoreline protection equipment to be on standby.	Small	As required	< 24 hours to mobilise; onsite > 7 days	Minor	Low (due to time to mobilise)	H	H	H	H	Scalable options involve accessing more vessels and equipment from around Australia and the broader region including SE Asia.	Stockpiles of boom are sufficient to meets the needs of the initial areas at risk and current stockpiles held by AMOSC, AMSA, Mutual Aid and supplemented by OSRL international stocks can be mobilised prior to the need for areas that may be impacted in weeks 3 onwards where SCAT teams identify that these locations are amenable to protection.	

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
	Response resources not available.	Dedicated shoreline protection vessel with boom deployment equipment on standby at Warrnambool / Geelong base.	On standby 24/7 during operations to expedite initiation of shoreline protection operations.	Small	1	0-1	Major $35K/day x 14 days = $500K	H	H	L	H	H	The environmental benefit associated with shoreline protection is considered to be significant, which has the potential to reduce the severity of environmental impact.	Dedicated standby vessels have substantial costs, in the order of $500K during operations.	**Reject**: These controls have high costs that are disproportionate to the potential environmental benefit that might be gained particularly taking into consideration the small increment of oil volume that would be recovered prior to activation of the CICC response, which would occur on a time scale of 1-3 days.
	Response resources not available	Pre-deployment of shoreline protection boom equipment during operations.	On standby 24/7 during operations to expedite initiation of shoreline protection operations.	Small	1	0-1	Moderate, includes standby crew	H	H	L	L	H	The environmental benefit associated with the pre-deployment of shoreline protection boom during operations to reduce the amount of time lost prior to the first contact of hydrocarbons on the shoreline is considered significant. This has the potential to reduce the severity of environmental impact.	The response capacity is small, but the control effectiveness is moderate as the control would have a low survivability. Cost during activation would be high.	**Reject:** These controls have high costs that are disproportionate to the potential environmental benefit that might be gained. This control would have a low survivability (i.e., boom integrity may decrease with time in the period when no hydrocarbon is in the near-shore zone), and hence no potential increase in any environmental benefit. Sufficient equipment are available in Geelong, which is the closest oil spill equipment storage location.

Response Preparedness Performance Standards – Shoreline Protection

Spill Response Preparedness – Shoreline Protection			
Environmental Performance Outcome	**Woodside prepared to respond to a potential WCD scenario in an effective and timely manner**		
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**	**Responsibility**
APPEA Memorandum of Understanding: Mutual Aid	Woodside shall be a signatory to the APPEA Memorandum of Understanding: Mutual Aid to enable access to industry resource.	APPEA MoU	APU Operations Manager
Service Contract	Woodside shall have a contract in place with OSROs (AMOSC and OSRL) to facilitate access to industry shoreline protection equipment and trained response personnel.	Service Level Agreement	APU Operations Manager
	Woodside shall maintain a contract with a labour-hire company to enable the initial engagement of a minimum of 40 in-field (active) personnel within 48 hours of a Level 2 / Level 3 spill event to implement primary TRPs.	Service Level Agreement	APU Operations Manager
	Woodside shall maintain contractual arrangements with logistics service providers to enable the deployment of industry equipment to priority protection areas.	Service Level Agreement	APU Operations Manager
Monitoring of vessel availability & status	Woodside shall monitor regionally available OSV on a monthly basis during the activity.	Vessel monitoring / availability records	APU Operations Manager
Response Timing	Woodside shall maintain arrangements to facilitate: • the mobilisation of initial (first strike) response crews to priority protection areas (as determined by and at the direction of Vic DoT) within 24 hours of a spill event with the potential to impact State waters and lands; • the initial deployment of a minimum of 1x trained and 10x unskilled shoreline protection response personnel to 4x priority protection areas to priority protection areas (as determined by and at the direction of Vic DoT) within 96 hours of a Level 2 / Level 3 spill event occurring; and • the deployment of additional response personnel to peak workforce capacity at the direction of Vic DoT until the response is terminated.	Vessel monitoring / availability records	APU Operations Manager

Demonstration of Acceptability – Shoreline Protection

- The strategy is consistent with the Victoria's State Emergency Management Plan (SEMP),and the associated SEMP Maritime Emergencies (non-search and rescue (NSR)) Sub-plan ('MENSAR'). Shoreline protection does not contravene any relevant Plan of Management for a World Heritage place, National Heritage place or Ramsar wetland identified within the EMBA;
- Woodside has undertaken a detailed ALARP evaluation to consider additional or improved response arrangements with adopted controls presented within the activity-specific OPEP / EERM (State);
- Woodside has undertaken engagement with Vic DoT (as Controlling Agency in Victorian State Jurisdiction) in a manner consistent with the Victorian Joint Industry and State Oil Pollution Responses Guidance Note V2 2020;
- Relevant listed species recovery plans, conservation advice and threat abatement plans have been considered within the environmental impact and risk evaluation detailed in Section 7.4 (Shoreline Response Options) and have been used to inform the development of mitigative control measures;
- Response arrangements (personnel and equipment) detailed for the implementation of shoreline protection are commensurate with the nature and scale of a potential worst-case spill event within State jurisdiction;
- Woodside has further committed to supplying additional response personnel and equipment at the direction of the Vic DoT based upon an evaluation of response need post-spill;
- Given the spill response preparedness measures detailed within this section, Woodside consider the Environmental Performance Outcome of 'Woodside prepared to respond to a potential WCD scenario in an effective and timely manner' will be achieved.

6.6.5 Shoreline Clean-Up

Summary of Activity – Shoreline Clean-up (Tier 2)

The basis of assessment for shoreline clean-up relates highest accumulated shoreline loading above moderate threshold (100 g/m^2) and the longest length (km) of shoreline oiled >100 g/m^2. Spill modelling indicates and MDO release would likely result in higher shoreline loading than a gas condensate LOWC event. For an MDO spill event, shoreline loading has been modelled up to 186.7 tonnes (Autumn and Winter period) across all shorelines (Table 4-3). Spill modelling indicates the Warrnambool Plain is potentially exposed to moderate levels of shoreline loading after 0.2 days of the release. Maximum length of oiled shoreline above the moderate threshold (100 g/m2) of 29.7 km at Warrnambool Plain.

By applying a bulking factor of 10x the volume of the oil stranded on the shoreline (as described in Section 5.4.7) it is anticipated a total volume of up to 1,870 tonnes of oil contaminated waste material may require clean-up across the coastline. This is a highly conservative calculation, given the bulking factor assumes oil is stranded on a sandy beach and the potentially impacted region consists of predominantly rocky shorelines.

Shoreline clean-up will be carried out as directed by the Victorian Department of Transport (Vic DoT), as the Controlling Agency in State waters.

Shoreline clean-up will be required where actionable thresholds of shoreline oiling are identified and when the Operational SIMA demonstrates a potential net environmental benefit. Shoreline clean-up is logistically and labour intensive, requiring multiple vessels, equipment, clean-up crews and waste management. Shoreline clean-up involves the physical removal of stranded oil from shorelines via a range of techniques including:

- Natural recovery;
- Sediment relocation;
- Mechanical clean-up using heavy machinery;
- Debris removal via manual bagging;
- Absorbents;
- Pumps and vacuums;
- Low-pressure flushing; and
- High-pressure flushing.

At the direction of Vic DoT, Woodside will use the information gained from implementation of the Monitor and Evaluate response strategy (Section 6.6.3) to predict shorelines with potential to be impacted to inform shoreline clean-up activities. Through information gathered and assessed by the CICC and Vic DoT, the trajectory of the spill towards the specific coast will be confirmed and the shoreline clean-up strategy will be implemented.

Shoreline clean-up strategies consider the following factors:

- Shoreline characteristics (substratum type, beach type, shoreline exposure, biological/ social/ heritage/ economic values; characteristics of the oil (i.e., degree of weathering); amount of oil present, distribution of the oil on the shoreline; shoreline sediment type);
- Logistic considerations (availability of access – personnel, equipment; waste removal); availability of equipment and labour; availability of waste storage areas);
- Operational risk assessment of potential shoreline clean-up methods will be captured leading to the development of Operational SIMAs;
- Damage to Aboriginal registered sites of cultural significance from shoreline clean-up activities; and
- The requirement for other Operators to enact their OPEP / EERM arrangement for sensitive receptors at their location of operations.

An Operational SIMA will also be carried out for shoreline protection and clean-up in consultation with the Vic DoT to inform the IAP. The specific clean-up techniques will be risk assessed and refined during development of the IAP to suit the circumstances of the incident response. The sensitivity of shorelines may vary depending on the time of year, such as shorelines and beaches used by birds for nesting. This will be considered during the Operation SIMA process.

Based on the IAP, Shoreline Clean-up and Assessment Technique (SCAT) teams shall be deployed for assessment of the shoreline and developing recommended clean-up strategies for the CICC planning and operations group. SCAT team members will include members trained in oil spill response measures and environmental and coastal sensitivities of the region. Ideally, each SCAT team will include a representative from the appropriate State agency.

The SCAT teams will undertake systematic surveys of the shoreline that will be segmented into sections. The SCAT teams will then provide sketches and reports which will include recommendations for the most appropriate clean up strategy for the shoreline segment. This information will feed back to the CICC who will then prioritise areas for clean-up and allocate resources.

The SCAT teams will utilise techniques to determine appropriate termination end points for response in consultation with both Vic DoT and DEWLP. The endpoints can be determined by either:

- Qualitative field observations – to describe the presence or absence of stranded oil and/or the character of such oil;
- Quantitative field measurement methods – based on visual measurements and observations of the quantity of oil;
- Analytical measurement methods – typically require the collection of representative field samples and subsequent laboratory analysis; or
- Interpretive impact assessment methods – based on an evaluation of system impacts (i.e., SIMA).

Potential Environmental Impacts and Risks – Shoreline Clean-up

Potential environmental impacts and risks associated with shoreline clean up and mitigative control measures are summarised in Section 7.2 ‘Nearshore Response Operations’, and Section 7.4 for ‘Shoreline Response Operations’.

In summary, the physical clean-up activities associated with shoreline response strategy could result in trampling of shoreline habitats by response clean-up crew, heavy machinery and vessel anchoring damaging shoreline habitats and Aboriginal registered sites of cultural significance; flushing and pressure washing procedures damaging habitats and alteration of beach profiles by removal/ relocation of sediment. The use of equipment, machinery, and clean-up personnel in some coastal environments, e.g., bird nesting beaches could potentially cause more damage than the stranded hydrocarbons themselves, thereby reducing the recovery and net environmental benefit of the clean-up strategy. Shoreline clean-up activities also present a risk of cross-contamination between oiled and non-oiled areas or further spreading of hydrocarbons. The movement of equipment and personnel and lighting onto bird nesting beaches has the potential to disturb nests and nesting activities.

Oil Spill Budget – Shoreline Clean-up

As detailed in Section 5.4.7 ‘Shoreline Response’, a ‘rule of thumb’ estimate (IPIECA-IOGP, 2015c) of the impact of shoreline clean-up efforts on oil spill budget is that one person can remove 1–2 m^3 per day.

The following assumptions have been applied to determine possible response need for shoreline clean-up operations:

- a worst-case total volume of up to 1,870 tonnes of oil contaminated waste material that may require clean-up across the impacted coastline;
- greater than 100 g/m^2 loading for clean-up;

- all waste is removed by hand (although where practicable machinery may be deployed);
- 1 m^3 of contaminated sand / debris weighs between 1.6 – 2 tonne (depending on dry / wet condition); and
- due to the remote location and climatic conditions of the coastline, assumes one-person can clean up 1m^3 of waste per day.

Based upon the above, 1,870 tonnes equates to approximately 1,163 m^3 of oil contaminated waste.

Response Arrangements – Shoreline Clean-up

As directed by Vic DoT, Woodside will arrange for the call-up of the necessary personnel and logistics associated with maintaining those crews at the impact location, which includes the support arrangements to ensure the health, safety, and welfare of the shoreline crews. This includes availability of PPE, sun shelter, first aid supplies, catering, drinking water, ablutions, decontamination facilities, accommodation, transport, and communications to support the number of personnel expected to be required at the impact location.

Procedures / Guidelines

NP–GUI–025: National Plan response, assessment, and termination of cleaning for oil contaminated foreshores available from: https://www.amsa.gov.au/marine-environment/national-plan-maritime-environmental-emergencies/np-gui-025-national-plan

Personnel

Assuming the sample criteria for a tier 1 response (Table 5-2) is implemented, 4x shoreline clean-up teams (consisting of 1x trained and 10x unskilled personnel per team) would require 44x personnel (4x skilled and 40x unskilled). It may take 29 days for 4 active response teams to clear all oil contaminated waste from the impacted shorelines, although this estimate is highly conservative given it is based on the worst-case shoreline loading outcome and assumes all waste is cleared by hand. As described above, not all shoreline types are amenable, or accessible, to clean-up techniques.

Active (in-field) personnel would be supplemented on a rotational basis throughout the clean-up phase. To accelerate clean-up operations additional unskilled personnel would be sought from labour-hire contractors.

In addition to skilled personnel from the Vic DoT, skilled personnel would initially be sourced from the AMOSC Core Group, OSRL and the National Response Team (NRT) to supervise response crews. Shoreline clean-up personnel may be sourced from existing shoreline protection teams provided sufficient numbers of personnel are in place to maintain protection and deflection equipment during the response as directed by Vic DoT. All unskilled personnel would receive relevant on-the-job training prior to undertaking shoreline clean-up operations with some labour-hire personnel potentially upskilled to support supervisory roles during the course of the response, thus ensuring a suitable ratio of skilled to unskilled personnel per active response team throughout the clean-up operation.

Equipment

AMOSC have shoreline clean-up and decontamination kits that can be utilised in the first strike capability. As a member company, Woodside has access to industry equipment maintained by AMOSC.

Under an existing Service Level Agreement, Woodside has access to OSRL equipment.

Equipment required to perform clean-up operations can be sought through existing supplier and logistical arrangements. Additional clean-up equipment can be readily obtained from hardware/industrial suppliers and delivered to Warrnambool or Geelong to meet the arrival time of responders.

Response Timing – Shoreline Clean-up

Woodside commits to mobilising response resources (up to 40x personnel and 4x clean-up kits) to priority protection sites (as determined by Vic DoT) within 96 hours from the spill event.

Supplementary resources (personnel and equipment) will continue to be deployed by Woodside under the direction of the Vic DoT until peak capacity is reached as deemed appropriate by Vic DoT.

Woodside shall maintain resourcing at levels determined by the Vic DoT until termination of the response strategy.

Legislative and Other Considerations – Shoreline Clean-up

Shoreline clean-up operations are administered by Vic DoT as the Controlling Agency within State jurisdiction. Vic DoT would engage with other relevant Victorian State Departments such as the Victorian Police Force, Department of Environment, Water, Land and Planning and other relevant agencies in relation to emergency response arrangements in State jurisdiction.

Logistical Constraints

Movement of personnel: Movement of personnel from their accommodation or transit point to the clean-up location can impact the effectiveness of the response. If the clean-up location requires a long commute the amount of effectiveness from the shoreline crews diminishes as the amount of time spent in the actual operation is reduced.

Weather: Storms may impede actual operations on the day or access to certain locations due to flooding. Shoreline crews will need to work around tidal movements on the beaches. Clean-up activities will be arranged around tidal cycles.

Access to areas requiring shoreline clean-up:

Access to some areas identified as protection priorities, and potential areas of shoreline exposure to hydrocarbon may be difficult. The CICC should obtain situational information to inform the response of safety concerns, access, and logistical constraints prior to mobilising shoreline protection responders to site.

Locations amenable to shoreline clean-up:
Some shorelines may not be suited to shoreline protection given:

- The reliability of deployment effectiveness of shoreline protection equipment at the locations exposed directly to the ocean currents;
- The exposed coastline may not be suitable for shoreline protection methods.
- During the response, SCAT teams and specialists will continue to monitor opportunities to deploy additional shoreline protection strategies.

ALARP Evaluation – Shoreline Clean-up

Controls				ALARP Evaluation												
								Effectiveness (L/M/H)								
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from the execution of this response strategy	No shoreline clean-up	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option; experience from past oil spills suggests that environmental sensitivities can be protected effectively when shoreline clean-up operations are activated.	There may be occasions when shoreline clean-up is not implemented, e.g., during poor weather, but in general, the do-nothing option is not considered within the external context (e.g., stakeholder views) to be a viable option.	**Reject:** Shoreline clean-up is a recognised strategy for the mitigation of oil spill impacts.
Separate	Sensitive vegetation impacted by machinery	No machinery to be used in mangroves. No machinery to be used within 20 m of an identified nest.	Separate the potential of impacts due to machinery on sensitive receptors.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by separating the potential of impacts due to machinery on sensitive receptors.	Control has high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Control has no cost implications.	**Accept**: Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
Personnel	Insufficient response personnel leads to protracted clean-up of bulk oily waste and potential re-mobilisation of stranded oil.	Mobilise and maintain a minimum of unskilled personnel and skilled (supervisors) personnel in-field to actively undertake bulk oil/waste clean-up operations within 96 hours as directed by Vic DoT.	Rapid clean-up response to protection priority areas as directed by Vic DoT.	Woodside / AMOSC / industry / labour-hire	N/A	Within 96 hours	Moderate	H	H	H	H	H	Rapid response to identified priority protection areas limits environmental impacts to known sensitivities.	No constraints identified. Woodside consider this measure to be practicable based upon available resources.	**Accept**: Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		Engage additional personnel as required at the direction of Vic DoT.	Further accelerate clean-up operations.	Labour hire	As required / directed by Vic DoT	As directed by Vic DoT	Major	H	H	H	H	H	Additional personnel may accelerate cleaning operations. There is potential negative effects by deploying excessive numbers of responders to sensitive habitats, thereby increasing potential for inadvertent / indirect impacts. However, overall benefit to be determined by Vic DoT and facilitated by Woodside as requested.	Potential constraints associated with accommodation and logistics depending on areas of shoreline exposure. Additional personnel mobilised in consultation with Vic DoT and when constraints resolved.	**Accept**: Control is practicable (pending logistical constraints in remote response locations), and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response personnel not suitably supervised or insufficient numbers of skilled / trained responders	Maintain a suitable ratio of skilled to unskilled personnel per active response team throughout the clean-up	Correct levels of supervision maintained for each response team to ensure response activities are undertaken in	Labour-hire (upskilled)	Min 1 per team of 10	As required / on-going to response termination	Minor	H	H	H	H	H	Appropriately trained and / or supervised teams limiting potential secondary impacts to particular values and sensitivities. Operations undertaken in a more effective and timely manner whilst under appropriate supervision.	No limit or constraints or upskilling labour-hire personnel for promotion to supervisory roles over the duration of the response.	**Accept**: Control is practicable, and the cost sacrifice is not disproportionate to the

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
		operation by upskilling (training) personnel throughout the response.	a planned and responsible manner to the satisfaction of the Controlling Agency.												environmental benefit gained.
Administrate	Response strategy executed adhoc with no real planning	Shoreline clean-up operations reviewed and managed by CICC through Incident Action Plan (IAP) process.	Within the first 24 hours, the Woodside CICC will develop IAPs in consultation with Vic DoT.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/evaluation of shoreline clean-up operations will take place almost immediately in the event of a Level 2 / 3 spill. The shoreline clean-up operations would be adapted based on real-time information regarding the spill incident: determine if sea state and weather conditions are conducive to operations and applicability with other response strategies.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational SIMA.	Operational SIMA to include evaluation of requirement for implementation of shoreline clean-up operations.	The shoreline clean-up response strategy will be activated if Operational SIMA indicates the implementation would provide a net environmental benefit to prevent environmental impacts to sensitive environmental receptors.	N/A	N/A	<2 hours from CICC forming	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational SIMA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather, and sea state conditions etc.) to confirm the appropriate response strategies to adopt for protection of priority locations and sensitive receptors.		
	Poor situational awareness and understanding of oil spill trajectory prior to response execution (i.e., oil could be heading out to sea).	Modelling predictions of oil trajectory to be undertaken to support the Operational SIMA.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable direction of daily shoreline clean-up operations.	N/A	N/A	<2 hours from CICC forming	Minor	H	H	H	H	H	Shoreline clean-up will be activated if the Operational SIMA indicates the potential harm of implementation is less than leaving the oil untreated on the shoreline; and if the implementation of the response strategy would provide a net environmental benefit to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors.		
	Response strategy not executed effectively through planning or fast enough to prevent impact highly sensitive areas impacted	Implement shoreline clean-up response strategy in accordance with optional shoreline protection methods for different coastal types	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental sensitivity.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by using established shoreline protection plans to increase efficiency of response efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.		

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
	Deployment of resources ineffective due to poor understanding of impact area	Conduct observations/ surveys prior to deployment of equipment and personnel to develop a deployment/ operations plan, which includes avoidance of impacts to wildlife, organisation of ground disturbance, protection of sensitive areas, and consultation with DEWLP and local stakeholders.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental sensitivity.	N/A	N/A	N/A	Minor	H	H	H	H	H	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental sensitivity.		
	Poor shorelines clean up practices with remobilisation of oil in the marine environment	Prevent further surface water contamination by conducting all flushing clean-up activities to a contained area.	Ensures that shoreline accumulated oil is contained and that impacts are not spread across a wider area.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by ensuring that shoreline accumulated oil is contained and that impacts are not spread across a wider area.		
	Poor understanding of the effectiveness of shoreline clean up and its impact on the environment	Implement environmental monitoring to determine the ongoing acceptability of the environmental risk associated with the application of shoreline clean-up methods.	Water, sediment, and benthic infauna quality monitoring to evaluate the effectiveness of shoreline clean-up techniques.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by understanding the effectiveness of shoreline clean-up techniques.		
	Shoreline activities impacting areas of cultural significance	Shoreline clean-up operations will avoid cultural heritage sensitivities.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas of known cultural significance.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by taking into consideration any advice from State government agencies and spatial information to avoid impacts to sensitive cultural heritage sensitivities.		
	Response continues with no end point or is removed early	Response strategy activities continued until termination criteria met as determined by Vic DoT.	Ensures that the shoreline response strategy continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the shoreline clean-up response strategy continues until the performance outcome has been achieved.		

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Administrate	Response resources not available	Access to shoreline clean-up equipment owned by AMOSC (in Geelong and Fremantle).	Mobilisation of AMOSC owned shoreline clean-up equipment from Geelong/Fremantle	Small	AMOSC	1-2	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of shoreline clean-up is to remove the oil from shoreline sensitivities.	The response capacity is small, but the control effectiveness is generally high. Woodside has access to this capability through contractual arrangements with AMOSC / OSRL. Control has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Response resources not available	Access to shoreline clean-up equipment owned by OSRL	Mobilisation of OSRL shoreline clean-up equipment from Singapore and other countries.	Small	OSRL	< 24 hours to mobilise; onsite > 7 days	Minor	Low (due to time to mobilise)	H	H	H	H			
	Response resources not available	Access to small support vessels (AMOSC, local charter)	Mobilisation of AMOSC owned small craft from Geelong and / or vessels of opportunity available on the local spot charter market in region	Small	4	7	Minor	H	H	H	H	H	The environmental benefit associated with shoreline clean-up is potentially significant, which has the potential to reduce the environmental severity.	The response capacity is small for vessel operations, but the control effectiveness is generally high (vessel operations are only possible during daylight hours) and the cost of using marine vessels available through AMOSC and on the local spot-charter market in Melbourne/Geelong/ Warrnambool has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Mobilisation of response personnel to impact location delayed	Mobilise First Strike Team within 24 hours following notification by CICC.	Mobilisation of BHP personnel from Perth to provide first-hand situational awareness to the CICC.	Small	Woodside	0-1	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective is to provide first-hand situational awareness to the CICC.		
	No arrangement with third-party services leading to insufficient resourcing during response	AMOSC and OSRL contracts and other third-party agreements for provision of resources for shoreline clean-up in place during operations.	Mobilisation of AMOSC / OSR: personnel to provide situational awareness and expert advice to the CICC on clean-up protection priorities.	Small	AMOSC / OSRL	0-4	Minor	H	H	H	H	H	Positive environmental benefit gained from mobilisation of AMOSC / OSRL personnel to provide situational awareness and expert advice to the CICC on clean-up protection priorities.		
Administrate	Response resources not available	Support vessels Geelong / Australia).	Acquisition of more support vessels via charter on the spot-market from Geelong and around Australia.	Small	As required	3	Moderate	H	H	H	H	H	The environmental benefit associated with shoreline protection is considered to be significant, which has the potential to reduce the environmental severity.	The response capacity is small, but the control effectiveness is generally high and the cost of acquiring small marine vessels and more equipment as required through the spot-charter market around Australia and SE Asia has minor cost implications. Cost during activation would be moderate.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.

Spill Response Preparedness – Shoreline Clean-up			
Environmental Performance Outcome	**Woodside prepared to respond to a potential WCD scenario in an effective and timely manner**		
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**	**Responsibility**
APPEA Memorandum of Understanding: Mutual Aid	Woodside shall be a signatory to the APPEA Memorandum of Understanding: Mutual Aid to enable access to industry resource.	APPEA MoU	APU Operations Manager
Service Contract	Woodside shall have a contract in place with OSROs (AMOSC and OSRL) to facilitate access to industry shoreline clean-up equipment and trained response personnel.	Service Level Agreement	APU Operations Manager
	Woodside shall maintain a contract with a labour-hire company to enable the engagement of a minimum of in-field (active) personnel within 48 hours of a Level 2 / Level 3 spill event and a minimum of an additional in-field (active) personnel within 3 weeks of a Level 2 / Level 3 spill event.	Service Level Agreement	APU Operations Manager
	Woodside shall maintain contractual arrangements with logistics service providers to enable the deployment of industry equipment to priority protection areas.	Service Level Agreement	APU Operations Manager
Equipment	Woodside shall purchase equipment as required throughout the response to ensure sufficient equipment is available to responders.	Response records	CICC Leader
	Woodside shall make available light or heavy machinery (and trained Operators) to undertake shoreline clean-up operations at the direction of Vic DoT.	Response records	CICC Leader
Response Timing	Woodside shall maintain arrangements to facilitate: • the mobilisation of initial (first strike) response crews to priority protection areas (as determined by and at the direction of Vic DoT) within 24 hours of a spill event with the potential to impact State waters and lands; • the deployment and maintenance of skilled and unskilled in-field (active) shoreline clean-up response personnel to priority protection areas (as determined by and at the direction of Vic DoT) within 96 hours of a Level 2 / Level 3 spill event occurring; • the deployment of additional response personnel to peak workforce capacity at the direction of Vic DoT until the response is terminated; and • supply shoreline clean-up kits within 96 hours of a Level 2 / Level 3 spill event occurring.	Exercise records	APU Operations Manager
Supervisor Training	Woodside shall maintain a suitable ratio of skilled to unskilled personnel (1 to 10) per active response team throughout the clean-up operation by upskilling (training) in-field response personnel to fulfil supervisory roles to the satisfaction and agreement of the Vic DoT.	Training records	CICC Leader

Demonstration of Acceptability – Shoreline Clean-up

- The strategy is consistent with the Victoria's State Emergency Management Plan (SEMP),and the associated SEMP Maritime Emergencies (non-search and rescue (NSR)) Sub-plan ('MENSAR'). Shoreline protection does not contravene any relevant Plan of Management for a World Heritage place, National Heritage place or Ramsar wetland identified within the EMBA;
- Woodside has undertaken a detailed ALARP evaluation to consider additional or improved response arrangements with adopted controls presented within the activity-specific OPEP / EERM (State);
- Woodside has undertaken engagement with Vic DoT (as Controlling Agency in Victorian State Jurisdiction) in a manner consistent with the Victorian Joint Industry and State Oil Pollution Responses Guidance Note V2 2020;
- Relevant listed species recovery plans, conservation advice and threat abatement plans have been considered within the environmental impact and risk evaluation detailed in Section 7.4 (Shoreline Response Options) and have been used to inform the development of mitigative control measures;
- Response arrangements (personnel and equipment) detailed for the implementation of shoreline protection are commensurate with the nature and scale of a potential worst-case spill event within State jurisdiction;
- Woodside has further committed to supplying additional response personnel and equipment at the direction of the Vic DoT based upon an evaluation of response need post-spill;
- Given the spill response preparedness measures detailed within this section, Woodside consider the Environmental Performance Outcome of 'Woodside prepared to respond to a potential WCD scenario in an effective and timely manner' will be achieved.

6.6.6 Natural Recovery

Summary of Activity

Natural recovery, as the title suggests, makes use of the natural degradation and weathering processes to breakdown, and remove surface oil and stranded hydrocarbons. Effectively this response strategy means that no direct action is taken other than to monitor and evaluate the oil spill trajectory, the rate of dispersion of the diesel or gas condensate, and the rate of habitat/community recovery. As such, no additional risks or impacts will occur, other than those already described previously.

6.6.7 Environmental Monitoring

Summary of Activity – Environmental Monitoring (Tier 2 – Tier 3)

Part A of the *Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan* (00MC-BHP-N00-0004) provides a detailed description of Woodside preparedness to implement monitoring operations so environmental monitoring arrangements are not discussed further within this document.

Potential Environmental Impacts and Risks – Environmental Monitoring

There are no additional environmental impacts and risks associated with an environmental monitoring in offshore waters to those already described within the activity-specific OPEP / EERM (State) and summarised in Section 7.1 for 'Offshore Response Operations'.

Potential environmental impacts and risks associated with nearshore environmental monitoring and mitigative control measures are summarised in Section 7.2 for 'Nearshore Response Operations'.

Potential environmental impacts and risks associated with shoreline environmental monitoring and mitigative control measures are summarised in Section 7.4 for 'Shoreline Response Operations'.

Response Arrangements – Environmental Monitoring

Refer to the *Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan* (00MC-BHP-N00-0004)

6.6.8 Oiled Wildlife Response

Summary of Activity – Oiled Wildlife Response (Tier 2)

Basis of Assessment for oiled wildlife response relates to the following response planning thresholds (refer Table 4-2):

- Longest length (km) or number of segments of shoreline oiled >10 g/m^2
- Minimum time to shoreline contact for oil >10 g/m^2
- Longest length (km) or number of segments of shoreline oiled >100 g/m^2
- Minimum time to shoreline contact for oil >100 g/m^2
- Highest accumulated shoreline loading above moderate threshold (100 g/m^2)

The overall aim of the Oiled Wildlife Response Strategy is to mitigate the effects of oil on wildlife. Specifically, the response strategy seeks to define a system that addresses the overall aim focussing on the following key objectives:

- Respond safely and efficiently to oiled wildlife;
- Protect the health and welfare of wildlife threatened or impacted by oil;
- Co-ordinate field reconnaissance of at risk or impacted wildlife;
- Prevent or minimise exposure of wildlife to oil where possible;

- Recover oiled wildlife in a safe and effective manner;
- Prioritise the treatment of species of conservation value when resources are limited;
- Establish an effective system for the treatment and rehabilitation of oiled wildlife;
- Release wildlife back into the wild as healthy, contributing members of a population; and
- Identify and remove dead oiled wildlife from the coastal environment.

In the case of a marine pollution emergency affecting wildlife occurring within Victoria, DELWP is responsible, pursuant to the Emergency Management Manual Victoria, for mounting and co-ordinating the response.

When wildlife are impacted by a marine pollution emergency, DELWP will establish and coordinate a wildlife response under the DOT Incident Management Team (IMT). DELWP has an agreement with Phillip Island Nature Parks (PINP) with regard to the provision of trained staff and volunteers and treatment and rehabilitation of oiled seabirds. Under this arrangement DELWP may request the involvement of PINP depending on the level and type of wildlife impact.

Oiled wildlife response includes pre-oiling activities such as the installation of onshore exclusion barriers (e.g. fencing) to stop shorebirds and terrestrial fauna gaining access to shoreline areas affected by the hydrocarbon spill; hazing techniques, either on the water or on shorelines and may involve a combination of visual and auditory devices to shepherd fauna away from oil slicks or oiled shorelines; and pre-emptive capture and removal of fauna that may otherwise come into contact with oil if they were to stay in the area.

Post-oiling activities will include the collection and rehabilitation to treat oiled fauna at dedicated Oiled Wildlife Response Centres and once treated, to return them to similar suitable habitat.

Potential Environmental Impacts and Risks – Oiled Wildlife Response

The potential risks associated with fauna handling / interaction are detailed in Section 7.1 for ‘Offshore Response Operations’, Section 7.2 for ‘Nearshore Response Operations’, Section 7.4 for ‘Shoreline Response Operations’ and can be summarised as:

- Non-oiled fauna may be accidentally driven into surface oil slicks or impacted shorelines during hazing and pre-emptive capture activities resulting in increased numbers of oiled wildlife;
- During hazing and pre-emptive capture activities, oiled fauna may be accidentally driven into surface oil slicks or impacted shorelines rather than away from oil during hazing activities;
- Inappropriate equipment and capture techniques resulting in distress, fatigue, injury and/ or the separation of faunal groups (adult/juvenile pairs);
- Inadequate/ inappropriate cleaning and husbandry techniques/ conditions resulting in distress, disease and/ or injury; and
- Release of captured wildlife to inappropriate relocation areas.

Response Arrangements – Oiled Wildlife Response

Arrangements for OWR in Victoria are detailed within the Victorian Emergency Animal Welfare Plan.

AMOSC manages a database of trained / qualified OW Responders from industry that could be called upon to support a response.

AMOSC maintains 3x oiled wildlife (washing) containers.

OWR associated with a WCD from the Minerva Field would require the establishment of multiple ‘field oiled wildlife facility’ with each supported by at trained oiled wildlife responders, inclusive of a Veterinarian.

In addition to the field facilities, a larger ‘primary care’ facility may be established. The purpose of the Primary Care Facility is stabilisation, cleaning, and rehabilitation.

Response Timing – Oiled Wildlife Response

First-strike response priority would be to establish a ‘field oiled wildlife facility’ (within approx. 24-48 hours).

The establishment of a Primary Care Facility would require significant planning and a large amount of support infrastructure. Mobilisation of washing containers would be part of developing the Primary Care Facility. It is anticipated the establishment of a functional Primary Care Facility would take between 1-2 weeks to be operational.

Legislative and Other Considerations – Oiled Wildlife Response

Specific wildlife permits are now required from the DEWLP for activities involving the protection and treatment of wildlife during an Oiled Wildlife Response, including those listed below:

- Hazing: deterring wildlife from entering oiled sites;
- Pre-emptive capture: capturing and holding (or translocating) wildlife;
- Recovery of oiled wildlife from the environment;
- Treatment and rehabilitation of oil impacted wildlife;
- Release of rehabilitated wildlife;
- The humane euthanasia of oiled animals as necessary (under veterinary direction); and
- The retrieval of dead oiled wildlife from the marine and coastal environment.

ALARP Evaluation – Oiled Wildlife Response

Controls				ALARP Evaluation												
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence /	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from the execution of this response strategy	No oiled wildlife response	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option.	This control is practicable and not implementing it would not be satisfactory from a stakeholder perspective.	**Reject**: Oiled wildlife response is a recognised strategy for preventing impacts of an oil spill on environmental sensitivities.
Administrate	Response strategy executed adhoc with no real planning leading to ineffective response.	Oiled wildlife response operations will be reviewed and managed by CICC through Incident Action Plan (IAP) process.	Within the first 24 hours, the Woodside CICC will develop IAPs in consultation with Vic DoT.	N/A	N/A	0-1	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/evaluation of oiled wildlife operations will take place almost immediately in the event of a Level 3 spill. The oiled wildlife operations would be adapted based on real-time information (situational awareness / OSTM) regarding the spill incident to inform collection of wildlife.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational SIMA.	Operational SIMA to include evaluation of requirement for implementation of oiled wildlife response.	The oiled wildlife response strategy will be activated if Operational SIMA indicates the implementation would provide a net environmental benefit in preventing impacts to sensitive receptors.	N/A	N/A	0-1	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational SIMA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather, and sea state conditions etc.) to confirm the appropriate response strategies to adopt for protection of priority locations and sensitive receptors. Oiled wildlife response will be activated by the Operational SIMA to prevent impacts to sensitive receptors.		
	Unsuitably qualified personnel.	Lead response personnel are trained and experienced for the activities to which they are assigned.	Use of skilled personnel to implement oiled wildlife response will increase efficiency of oil spill protection efforts.	N/A	N/A	5	Minor	H	H	H	H	H	Positive environmental benefit gained by using skilled personnel to implement oiled wildlife response following Industry and Vic State Government drafted guidelines, which will increase efficiency of response efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.		
	Response strategy executed adhoc with no real planning leading to ineffective response.	Activation and implementation of oiled wildlife response will follow pre-designated plans for establishing works areas, as described Victorian Emergency Animal Welfare Plan.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental sensitivity.	N/A	N/A	5	Minor	H	H	H	H	H			
	Response activities impacting areas of cultural significance.	Oiled wildlife response operations will avoid cultural heritage sensitivities.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by taking into consideration any advice from State government agencies and spatial information to avoid impacts to sensitive cultural heritage sensitivities.		

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (days)	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence /	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
			of known cultural significance.												
	Response continues with no end point or is removed early.	Response strategy activities continued until termination criteria met.	Ensures that the oiled wildlife response strategy continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the oiled wildlife response strategy continues until the performance outcome has been achieved.		
Administrate	No access to suitable specialised equipment in reasonable timeframes.	Access to containerised oiled wildlife wash facility (via AMOSC contract) and trained responders, mobilisation within 24 h of notification by Incident Commander with establishment of Primary Facility in 1-2 weeks.	Contract with AMOSC for mobilisation to site and access to resources and equipment.	N/A	N/A	1-2 weeks	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of oiled wildlife response is to prevent effects of an oil spill on environmental sensitivities.	The response capacity is small, but the control effectiveness is generally high. Woodside has access to this capability through contractual arrangements with AMOSC. Control has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
Administrate	Insufficient specialised personnel available – resourcing.	Access to more oiled wildlife responders.	Mobilise more oiled wildlife responders from around Australia and SE Asia.	N/A	N/A	14-21	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of oiled wildlife response strategy is to prevent effects of an oil spill on environmental sensitivities.	The response capacity is small, but the control effectiveness is generally high. Woodside has access to this capability through contractual arrangements with AMOSC. Control has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	No access to suitable specialised equipment in reasonable timeframes.	Pre-deployment of oiled wildlife container on standby at Warrnambool during operations.	On standby 24/7 during operations to expedite initiation of environmental monitoring operations.	Small	1	0-1	Moderate	H	H	Low	H	H	The environmental benefit associated with oiled wildlife response strategy is considered to be significant, which has the potential to reduce the environmental severity from a spill. Scalable options for oiled wildlife response involve a pre-deployment and establishment of the oiled wildlife facility to be on standby, fully functional, and capable of receiving oiled wildlife on Day 1 of an incident.	Dedicated standby oiled wildlife crews have substantial cost.	**Reject**: This control has moderate costs that are disproportionate to the potential environmental benefit that might be gained particularly taking into consideration the availability and mobility of the containerised oiled wildlife wash facility operated by AMOSC and available in Geelong.

Response Preparedness Performance Standards – Oiled Wildlife Response

Spill Response Preparedness – Oiled Wildlife Response			
Environmental Performance Outcome	**Woodside prepared to respond to a potential WCD scenario in an effective and timely manner**		
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**	**Responsibility**
APPEA Memorandum of Understanding: Mutual Aid	Woodside shall be a signatory to the APPEA Memorandum of Understanding: Mutual Aid to enable access to industry resource.	APPEA MoU	APU Operations Manager
Service Contract	Woodside shall have a contract in place with AMOSC to facilitate access to industry oiled wildlife equipment and trained response personnel.	Service Level Agreement	APU Operations Manager
	Woodside shall maintain contractual arrangements with logistics service providers to enable the deployment of industry equipment to stage areas determined by Vic DELWP.	Service Level Agreement	APU Operations Manager
Response Timing	Woodside shall maintain arrangements to facilitate: • the mobilisation of initial (first strike) response crews and establish one or multiple 'field oiled wildlife facility' (as determined by and at the direction of Vic DELWP) within 48 hours of a spill event with the potential to impact State waters and lands; • the establishment of a 'Primary Care Facility' (as determined by and at the direction of Vic DELWP) within 2 weeks.	Exercise records	APU Operations Manager

Demonstration of Acceptability – Oiled Wildlife Response

- The strategy is consistent with the Victorian Emergency Animal Welfare Plan. OWR does not contravene any relevant Plan of Management for a World Heritage place, National Heritage place or Ramsar wetland identified within the EMBA;
- Woodside has undertaken a detailed ALARP evaluation to consider additional or improved response arrangements;
- Woodside has undertaken engagement with Vic DoT (as Controlling Agency in Victorian State Jurisdiction) in a manner consistent with the Victorian Joint Industry and State Oil Pollution Responses Guidance Note V2 2020 and DEWLP in relation to OWR arrangements and relevant advice has been adopted by Woodside;
- Response arrangements (personnel and equipment) detailed for the implementation of OWR have been agreed with the Vic DoT and DEWLP and are commensurate with the nature and scale of a potential worst-case spill event within State jurisdiction;
- DELWP is responsible, pursuant to the Emergency Management Manual Victoria, for mounting and co-ordinating the response;
- Given the spill response preparedness measures detailed within this section, Woodside consider the Environmental Performance Outcome of 'Woodside prepared to respond to a potential WCD scenario in an effective and timely manner' will be achieved.

6.6.9 Forward Operating Base

Summary of Activity – Forward Operating Base (Tier 2)

Constant monitoring and evaluation by people on-location is a mandatory strategy required for real-time decision-making during a spill event. The objective of this response strategy is to assist the CICC in planning the oil spill response activities in the spill zone by assisting in the development of incident action plans, oversee field operations, manage rosters, and provide situational briefings/debriefings. Personnel within the forward command post will also maintain liaison with local emergency service organisations, industry, and other government departments active in the spill zone. The forward operating base will be established in Geelong (AMOSC), or another appropriate building.

Potential Environmental Impacts and Risks – Forward Operating Base

There are no relevant environmental risks and impacts associated with mobilising Woodside employees and third-party contractors to Geelong or Warrnambool to establish a Forward Operating Base outside of standard HSE requirements.

Response Arrangements – Forward Operating Base

Woodside is a member company with AMOSC who will assist in the arrangements of identifying a Forward Operating Base, and in the first instance allow the Geelong Office to act as a Forward Operating Base until a suitable one is established.

6.6.10 Oil Contaminated Waste Management

Summary of Activity (Tier 2)

During an oil spill clean-up, the disposal of waste material must not pose any threat to the health and safety of people or the environment and must be carried out in accordance with relevant State legislation. The type and amount of waste generated will depend on the spill itself and its location. It is important to note that the volumes of oily waste recovered from shorelines may be significantly greater than the volume of oil spilled. Typical waste volumes generated will be influenced by a bulking factor of:

- For offshore recovery there is a 1:10 increase in waste volume generation due to water being collected with the oil and emulsification occurring; and
- For shoreline clean-up there is a 1:10 increase of waste volume generation due to collection of sand and detritus from the high-water mark and surrounding environment.

Table 6-2 identifies the types of waste likely to be generated from a spill from the operations.

Table 6-2: Response strategies and their effect on waste generation

Response Strategy	Effect on Waste Stream	Type of Waste Generated
At Sea Response Operations (including protection)	Recovery operations will potentially give rise to a large quantity of waste oil and water for treatment. The volume of the storage systems available must be consistent with the recovery capacity of the skimmers. The type of oil spilled will have an effect on the resultant waste; viscous and waxy oils in particular will entrain debris and can create large volumes of waste. They can also present severe handling difficulties.	• Oiled equipment/vessels • Oiled PPE and workforce • Recovered oil • Oily water • Oiled vegetation • Oiled sorbent materials • Oiled flotsam and jetsam • Animal carcasses
Shoreline Clean-up	The type of spilled oil will often have a profound effect on the amount of oily waste generated. Waste segregation and minimisation techniques are critical to ensure an efficient operation. These	• Oiled equipment/vessels • Oiled PPE and workforce • Recovered oil

Response Strategy	Effect on Waste Stream	Type of Waste Generated
	should be established at the initial recovery site and maintained right through to the final disposal site otherwise waste volumes will spiral out of control. Waste sites should be managed in such a way as to prevent secondary pollution.	• Oiled vegetation • Oily water • Oiled sorbent materials • Oiled beach material, sand • Oiled flotsam and jetsam • Animal carcasses • Oiled transport

For any spill likely to produce significant amounts of waste, a Waste Management Plan will be developed to ensure that:

- Oily waste is properly handled and stored;
- Oil and oily debris is adequately segregated, treated, and stored at the point of collection;
- Oil and oily debris is rapidly collected and taken to designated sites for storage, treatment, or disposal; and
- Treatment or disposal practices ensure that the waste poses no future threat to the environment.

In addition, the Waste Management Plan will identify how waste volumes will be minimised (Table 6-3).

Table 6-3: Waste management hierarchy

Waste Management Hierarchy	
Reduction	Efficient response strategies selected for oil spill clean-up to ensure that the minimum material is used and/or contaminated during the process.
Reuse	This is the reuse of an item for its original purpose, i.e., clean-up equipment should be cleaned and reused in place of disposable items. An example might be the cleaning of PPE so that it can be reused.
Recovery	This is the production of marketable product for waste, e.g., taking waste oil to a refinery for conversion into other useable products. This will be directly affected by the quality of the recovered product, i.e., highly contaminated material is less likely to be suitable for recycling.
Refuse	Refuse is the final and least desirable option. If none of the above methods can be carried out for whatever reasons the waste must be disposed of effectively though some means. This may be the case for highly mixed wastes of oils, plastics, organic debris, water, sediments etc. which cannot be separated.

The basis for such a Waste Management Plan will include a demonstration of:

- Temporary on-site waste storage:
  - Care will be taken in the selecting a location for a temporary waste handling base to allow for waste separation. Local authorities and waste management contractors will be consulted regarding the selection of suitable disposal routes, local regulations and may provide local facilities.
- Segregation of waste:
  - Wherever possible, wastes will be segregated in accordance with the preferred segregation. It may be required to separate oil from associated water, sediment, and debris, in order to minimise volumes. It is preferable that this is not attempted on the spill site.
- Onsite handling:
  - Attention will be given to the prevention of leaching or spillage of oil from vehicles or containers. Onsite handling equipment is available via Vic DoT OSRC, AMOSC or AMSA.
- Offsite transport and storage:

    - Only State licensed waste contractors will be used. Care will be taken that all vessels, vehicles, or containers used for the transport of oily wastes are effectively sealed and leak-proof.
- Waste treatment and disposal options:
    - The disposal method most appropriate in an incident will depend on several factors, including the nature and consistency of the waste, the availability of suitable sites and facilities, the costs involved, as well as regulatory restrictions.
- Waste separation:
    - Waste separation is usually undertaken offsite at a designated waste processing area.
- Disposal:
    - Waste must be disposed of in accordance with Vic regulations.
- Establishing a field decontamination facility:
    - The size and complexity of field decontamination facilities required will depend on the character of the oil and on the scale and nature of the clean-up being implemented.

Monitoring and Reporting of Waste

The Logistics Coordinator will be responsible for maintaining a Waste Management Register for all waste generated from the shoreline response strategy. The designated Waste Contractor will monitor measure and record all waste streams that are disposed of onshore.

Measurement as required by Waste Contractor Conditions, including without limitation:

- Types of waste collected (e.g., liquid oily waste);
- Quantities of types of wastes collected (e.g., tonnes, litre);
- Destination of waste collated (named authorised disposal facility);
- Method of waste disposal (e.g., landfill, recycling); and
- Quantity of recyclable waste by type.

The Materials and Logistics Supervisor shall ensure that adequate waste disposal records are being maintained by the Waste Contractor, and that the Waste Reference Number for all waste is communicated to the Onshore Materials Logistics Coordinator for updating the Waste Management Register once waste is disposed.

Potential Environmental Impacts and Risks – Oil Contaminated Waste Management

Potential impacts from oil contaminated waste include secondary oiling of fauna, ground and water contamination.

Response Arrangements – Oil Contaminated Waste Management

In the event that shoreline contact was made and as part of Shoreline Clean-up, BHP will use a service provider who are capable of collection, transport, treatment, and disposal of oil wastes generated by a large-scale emergency response situation.

Response Timing – Oil Contaminated Waste Management

Waste Management arrangements will be timed to ensure oil contaminated waste from marine recovery and / or shoreline clean-up operations can be appropriately handled, stored, and transported.

Legislative and Other Considerations – Oil Contaminated Waste Management

Waste management reporting will comply with the following reporting requirements:

- Victorian *Environment Protection Act 2017*;

- Woodside internal requirements;
- National Pollutant Inventory annual reporting of emissions and discharges relating to resource consumption e.g., waste effluent.

ALARP Evaluation – Oil Contaminated Waste Management

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Eliminate	Negative environmental impact from the execution of this response strategy.	No waste management	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environmental benefit would be gained from this option; experience from past oil spills suggests that environmental sensitivities can be protected effectively when waste management operations are activated.	Waste management is practicable, and the do-nothing option is not considered within the external context (e.g., stakeholder views) to be a viable option.	**Reject**: Waste management is a recognised strategy for the mitigation of oil spill impacts.
Administrate	Response strategy executed adhoc with no real planning leading to ineffective response.	Waste management operations reviewed and managed by CICC through Incident Action Plan (IAP) process.	Within the first 24 hours, the Woodside CICC will develop IAPs in consultation with Vic DoT and EPA.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/evaluation of waste management operations will take place almost immediately in the event of a Level 3 spill. The waste management operations would be adapted based on real-time information regarding the spill incident.	Controls have effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational SIMA.	Operational SIMA to include evaluation of requirement for implementation of waste management operations.	The waste management response strategy will be activated to prevent environmental impacts to sensitive environmental receptors.	N/A	N/A	0-2 hours	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational SIMA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather, and sea state conditions etc.) to confirm the		

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time	Cost	Effectiveness (L/M/H) Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
													appropriate response strategies to adopt for protection of priority locations and sensitive receptors. Waste management will be activated to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors.		
	No access to suitable specialised equipment in reasonable timeframes.	Mobilisation of equipment and personnel to conduct waste management response within 24 hours of notification by CICC following outcomes of first IAP and maintained regularly in IAP outcomes.	Timely implementation of waste management plan and contractor.	N/A	N/A	Within 24 hours of formation of CICC	Minor	H	H	H	H	H	Positive environmental benefit gained from rapid response of waste management plant, equipment, and resources from Geelong/Melbourne.		
	Recovered waste is not handled or managed effectively or efficiently further impacting the environment.	Oil waste retrieved to be managed in accordance with the Waste Management Plan.	Ensures waste management policies and procedures are being followed.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from rapid response of waste management plant, equipment, and resources from Geelong/Melbourne.		
	Poor understanding of the effectiveness of waste management and its impact on the environment.	Implement environmental monitoring to determine the ongoing acceptability of the environmental risk associated with waste management methods.	Environmental monitoring will be used to determine the effectiveness of waste management controls and techniques for removing waste oil from site.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from environmental monitoring in understanding the effectiveness of waste management controls and techniques for removing waste oil from site. Outcomes of environmental monitoring will be used to inform waste management response strategy through the IAP's.		
	Response activities impacting areas of cultural significance.	Waste management operations will avoid cultural	Increases the potential that impacts to sensitive receptors will be	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by taking into consideration any		

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
		heritage sensitivities.	prevented by avoiding areas of known cultural heritage significance.										advice from State government agencies and spatial information to avoid impacts to cultural heritage sensitivities.		
	Response continues with no end point or is removed early.	Response strategy activities continued until termination criteria met.	The waste management response strategy will continue to prevent environmental impacts to sensitive environmental receptors until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the waste management response strategy continues until the performance outcome has been achieved.		
Administrate	No access to suitable specialised equipment in reasonable timeframes.	Access to waste management plant and equipment in place during operations.	Enables rapid response of waste management resources from Geelong/ Melbourne.	Large	N/a	N/A	Moderate	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of waste management is to prevent impacts to sensitive receptors by the removal of oiled waste from site.	Control has High effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications for operations but moderate to major costs if implemented.	**Accept**: Control is practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
Administrate	No access to suitable specialised equipment in reasonable timeframes.	Access to more waste management plant and equipment.	Acquisition of more waste management plant and equipment from Melbourne and around Australia.	Small	As required	10	Moderate	H	H	H	H	H	The environmental benefit associated with waste management is considered to be significant, which has the potential to reduce the environmental severity Scalable options involve accessing more plant and equipment from Melbourne and if needed around Australia.	This control is effective and the cost of acquiring more plant equipment from Melbourne and around Australia would potentially have moderate cost implications. Cost during activation would be major.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Response strategy executed adhoc with no real planning leading to ineffective response.	Pre-position temporary waste storage locations along most likely area for oil to come ashore	Build temporary waste storage locations along the coast to enable rapid collection of oil following shoreline contact.	Large	N/A	Up to 35 days	Moderate	H	L	L	H	H	The environment benefit gained with temporary storage is once oily waste is collected it allows effective waste management to continue and not hinder recovery	Temporary storage disposal locations will vary depending on the concentrations of contaminates and location ashore. The control has High availability. Woodside has equipment/resources in place for	**Reject:** Construction of temporary storage area prior to spill event is not a recognised strategy for the mitigation of oil spill impacts. Worst

MINERVA FIELD EMERGENCY RESPONSE BASIS OF DESIGN AND FIELD CAPABILITY ASSESSMENT

Controls				ALARP Evaluation											
								Effectiveness (L/M/H)							
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time	Cost	Availability	Functionality	Reliability	Survivability	Independence / Compatibility	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
													operations because the necessary permits/approvals are in place for temporary storage, treatment, and disposal of oily waste. The only limitation is logistics such as traffic, waste collection and processing time associated with temporary storage/treatment and final disposal options. Cost to build and operate would be Moderate to Major.	project managing the selection, construction and operation temporary storage sites, however, significant resource requirements are required for the following activities to be complete: - Temporary storage site suitability assessment. - Select most suitable sites. - Obtain site owner approval and necessary licensing requirements and permits. - Construct site with engineer contractor and waste contractor - Select storage options, implement traffic management, set up waste reception area; - Establish system to track types, quantities and movements of waste into and out of temporary storage site including volumes recovered and type, segregation streams, storage locations, transport and disposal. - Create bunded areas for waste lay down and method to control capacity of the bunds (pumps, valves) - Construct truck transfer designated area (hard stand or bunded area) - Implement appropriate decontamination procedures for personnel and equipment before leaving work area. The control has low functionality and low reliability; implementation of the control measure does not greatly reduce the risk/impact of oil on shore, and the control has not been tried and tested in Australian waters for another oil and gas project. The control has High survivability and High independence/compatibility; implementation has a High operating timeframe and will not need to be replaced regularly; the control can be implemented in unison with accepted Administrative Control Measures.	possible volumes ashore and associated waste volumes can be managed with existing infrastructure and arrangements.

Response Preparedness Performance Standards – Oil Contaminated Waste Management

Spill Response Preparedness – Oil Contaminated Waste Management			
Environmental Performance Outcome	**Woodside prepared to respond to a potential WCD scenario in an effective and timely manner**		
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**	**Responsibility**
Service Contract	Woodside shall engage a licenced Waste Management Contractor with regional capacity to manage oil contaminated wastes.	Service Level Agreement	APU Operations Manager

Demonstration of Acceptability – Oil Contaminated Waste Management

- A detailed ALARP evaluation has been undertaken including an assessment of alternate and improved options and Woodside has adopted an approach to undertake waste management in the shortest reasonably practical timeframes; and
- Given the preparedness measures detailed within this section, Woodside consider the Environmental Performance Outcome of 'Woodside prepared to respond to a potential WCD scenario in an effective and timely manner' will be achieved.

6.7 Tiered Preparedness Wheel (LOWC – Minerva Condensate)

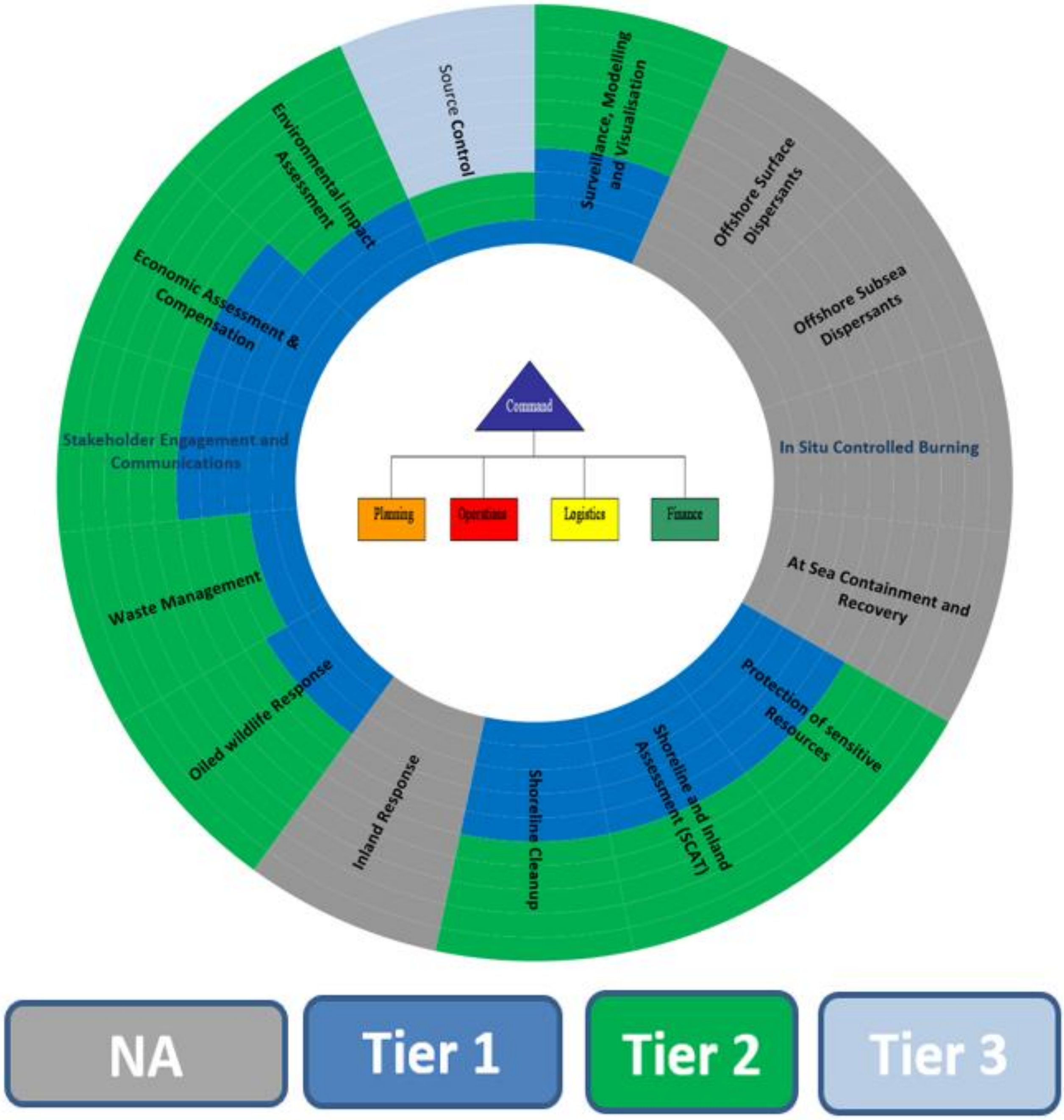

Figure 6-1: Tiered preparedness wheel – Minerva LOWC (condensate)

7 Environmental Impact and Risk Assessment

The purpose of this section is to address the requirements of Regulations 13(5) and 13(6) in relation to the evaluation of all the identified impacts and risks associated with the implementation of response strategies and the mitigative control measures that will be applied to reduce the potential environmental impacts and risks to ALARP and an acceptable level.

While spill response activities are intended to reduce the potential environmental consequences of a hydrocarbon spill, they can introduce new impacts and risks. In the event of a hydrocarbon spill, response strategies will be implemented where possible to reduce environmental impacts and risks to ALARP. The response strategies deemed appropriate based on the predicted nature and scale of the worst-case spill scenarios identified for the Minerva Field Decommissioning have been identified (via the preliminary SIMA) (refer to previous Section **Error! Reference source not found.**).

7.1 Offshore Response Operations

Offshore response strategies that occur in offshore locations via either vessel or MODU (with the exception of chemical dispersant application) are undertaken in a manner consistent with routine operations described within the *Minerva Plug and Abandonment and Field Maintenance EP* (00MC-BHP-N00-0001). As such, the environmental aspects, impacts and risks that may arise from conducting spill response activities in offshore locations are similar to those already described in Sections 7 and 8 of the EP. Table 7-1 provides a summary of these potential impacts and risks and the control measures and corresponding Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria (MC) that apply whilst undertaking spill response operations in offshore waters.

Potential environmental impacts and risks and mitigative control measures associated with specific response strategies undertaken nearshore and shoreline response strategies are presented within subsequent sections.

Table 7-1: Summary of general impacts and risks associated with offshore operations

Summary of potential impacts associated with offshore response strategies as per Minerva P&A and Field Maintenance EP									Relevant Section of Minerva P&A and Field Maintenance EP	
Aspect	Source of Risk	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability	Applicable Control Measures	Applicable EPOs / EPSs / MC
Physical presence	Presence of the MODU and AHTS vessels and timing of the activity.	Interference with or displacement of other marine users (e.g., commercial shipping, commercial fishing and/ or other third-party vessels).	10	N/A	-	Type A Low Order Impact	Tolerable	Table 7-2	Table 9-1
Benthic habitat disturbance	Anchor placement within 2 km of well centre.	Benthic habitat and biota disturbance	10	N/A	-	Type A Low Order Impact	Tolerable	Table 7-3	Table 9-2
Light emissions	Artificial light on-board	Light emissions (light spill/ glow) from	10	N/A	-	Type A	Tolerable	Table 7-4	N/A

Summary of potential impacts associated with offshore response strategies as per Minerva P&A and Field Maintenance EP								Relevant Section of Minerva P&A and Field Maintenance EP	
Aspect	**Source of Risk**	**Potential Impact**	**Severity Factor**	**Likelihood Factor**	**Residual Risk**	**Decision Context**	**Acceptability**	**Applicable Control Measures**	**Applicable EPOs / EPSs / MC**
	MODU and AHTS vessels	external lighting causing behavioural alterations in protected species including displacement from foraging areas.				Low Order Impact			
Noise emissions	Generation of underwater noise from the MODU and AHTS vessels during routine operations.	Underwater sound emitted to the marine environment causing interference to marine mammals.	10	N/A	-	Type A Low Order Impact	Tolerable	Table 7-8	Table 9-3
	Generation of noise from helicopter operations.	Sound emitted to the marine environment causing interference to marine mammals.							
Atmospheric emissions	Exhaust emissions of particulates and volatile organic compounds (VOCs) from MODU & AHTS vessels engines and generators & AHTS vessel incinerators.	Localised and temporary reduction in ambient air quality resulting in harm avian fauna.	10	N/A	-	Type A Low Order Impact	Tolerable	Table 7-11	Table 9-4
Routine MODU & AHTS vessel discharges within operational area	Routine planned discharge of sewage, grey water, putrescible (food), desalination brine, cooling water, and deck and bilge water to the marine environment from the MODU & AHTS vessels.	Localised and temporary reduction in water quality adjacent to the discharge point associated with minor increases in nutrients, salinity, temperature, and oily water/ chemical residues.	10	N/A	-	Type A Low Order Impact	Tolerable	Table 7-13	Table 9-5

Summary of potential impacts associated with offshore response strategies as per Minerva P&A and Field Maintenance EP									Relevant Section of Minerva P&A and Field Maintenance EP	
Aspect	**Source of Risk**	**Potential Impact**	**Severity Factor**	**Likelihood Factor**	**Residual Risk**	**Decision Context**	**Acceptability**		**Applicable Control Measures**	**Applicable EPOs / EPSs / MC**
	Discharge of BOP control fluids or other chemicals such as hydraulic fluids and greases (and well kill brine as contingency).	Localised and temporary reduction in water quality adjacent to the discharge point associated with hydrocarbon and chemical contaminants causing adverse toxicity effects.	10	N/A	-		Tolerable			
*Discharge of drill cuttings**	WBM cuttings discharged overboard or to seabed.	Localised changes in turbidity, altered physical characteristics of sediment.	10	N/A	-	Type A Low Order Impact	Tolerable			
	Cuttings contamination with reservoir hydrocarbon.	Localised, short-term changes in water quality and toxicity at the surface due to cuttings discharge.	10	NA	-		Tolerable			
*Discharge of water-based drill fluids**	WBM fluid discharged overboard into water column.	Localised and temporary reduction in water quality adjacent to the discharge point associated with minor increases in turbidity.	10	N/A	-	Type A Low Order Impact	Tolerable			
		Potential acute/chronic toxicity to marine biota, accumulation of heavy metals in sediments.	10	N/A	-		Tolerable			
Discharge of cement during activities	Cement residue from flushing of pipework and cement unit/ tank after each cement job.	Localised, short-term changes in water quality and toxicity at the surface due to cement discharge.	10	N/A	-	Type A Low Order Impact	Tolerable			
	Mixed cement and/ or cement additives mixed for use but not subsequently used discharged overboard.	Localised loss of biota from smothering.	10	NA	-		Tolerable			

Summary of potential impacts associated with offshore response strategies as per Minerva P&A and Field Maintenance EP									Relevant Section of Minerva P&A and Field Maintenance EP	
Aspect	Source of Risk	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability	Applicable Control Measures	Applicable EPOs / EPSs / MC
Waste management	Waste (hazardous and non-hazardous) generated during activities.	Increase waste to landfill. Additional usage of onshore waste reception facilities.	10	N/A	-	Type A Low Order Impact	Tolerable	Table 7-14	Table 9-6
Interaction with marine fauna	Accidental collision between AHTS vessel and marine fauna.	Potential lethal impact or injury to protected marine species.	10	Highly Unlikely (0.03)	0.3	Type A Lower Order Risk	Tolerable	Table 8-25	Table 9-12
Introduced marine species	Movement of vessel and immersible equipment from known high invasive marine species risk areas.	Introduction of invasive marine species to area leading to major impact to native species.	100	Highly Unlikely (0.03)	3	Type A Low Order Risk	Tolerable	Table 8-28	Table 9-13
Fauna handling / interaction	Oiled Wildlife Response – unintended impacts associated with poorly implemented hazing, capture, clean & rehabilitation. Poor animal welfare / husbandry practices.	Secondary disturbance causing behavioural alterations in protected species including displacement from foraging and nursing areas. Inadvertent oiling or re-oiling of individuals. Individuals may become unnecessarily stressed and disease may be introduced into wild populations.	30	Unlikely (0.1)	3	Type A Low Order Risk	Tolerable	RS-CM-06	Refer OPEP

* Not specifically covered within the Minerva Plug and Abandonment and Field Maintenance EP (00MC-BHP-N00-0001), as impacts and risks related to response activities, specifically relief well drilling activities.

7.2 Nearshore Response Operations

Table 7-2 provides a summary of potential impacts and risks relate to response strategies undertaken in nearshore environments via vessel or light aircraft.

Table 7-2: Summary of potential impacts and risks associated with nearshore response

Aspect	Source of Risk	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability	Mitigative Control Measure
Physical presence	Presence of response vessels in nearshore location.	Interference with or displacement of other marine users in nearshore locations (e.g., recreational fishers).	10	N/A	-	Type A Low Order Impact	Tolerable	RS-CM-01
	Accidental collision between response vessel and marine fauna.	Potential lethal impact or injury to protected marine species.	10	Highly Unlikely (0.03)	0.3	Type A Lower Order Risk	Tolerable	RS-CM-03
Benthic habitat disturbance	Mooring of response vessels in nearshore environments.	Benthic habitat and biota disturbance.	10	N/A	-	Type A Low Order Impact	Tolerable	RS-CM-02
Light emissions	Artificial light on-board response vessels.	Light emissions (light spill/ glow) from external lighting causing behavioural alterations in protected species including displacement from foraging, nursing, and nesting areas.	10	N/A	-	Type A Low Order Impact	Tolerable	RS-CM-03
Noise Emissions	Generation of underwater noise response vessels in nearshore environments.	Underwater sound emitted to the marine environment causing interference to marine mammals.	10	N/A	-	Type A Low Order Impact	Tolerable	RS-CM-03
	Noise from helicopter and aircraft operations in nearshore environments.	Sound emitted to the marine environment causing behavioural alterations in protected species including displacement from foraging, nursing, and nesting areas.						RS-CM-04
Vessel discharges	Discharge of sewage, grey water, putrescible (food) from response vessels	Reduced water quality impacting listed species.	10	Unlikely (0.1)	1	Type A	Tolerable	RS-CM-03

Aspect	Source of Risk	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability	Mitigative Control Measure
	in nearshore environments.					Low Order Risk		
Accidental release of solid objects overboard	Loss of solid waste or equipment overboard due to improper waste management or handling error.	Impacts to marine fauna (e.g., ingestion, entanglement) and seabed disturbance if object heavy enough to sink to the seabed.	10	Unlikely (0.1)	1	Type A Lower Order Risk	Tolerable	RS-CM-03
Introduced marine species	Response vessels mobilised from species risk areas / ballast water discharges.	Introduction of invasive marine species to area leading to major impact to native species in shallow benthic environments.	100	Highly Unlikely (0.03)	3	Type A Low Order Risk	Tolerable	RS-CM-03 RS-CM-05
Fauna handling / interaction	Oiled Wildlife Response – unintended impacts associated with poorly implemented hazing, capture, clean & rehabilitation. Poor animal welfare / husbandry practices.	Secondary disturbance causing behavioural alterations in protected species including displacement from foraging, nursing, and nesting areas. Inadvertent oiling or re-oiling of individuals. Individuals may become unnecessarily stressed and disease may be introduced into wild populations.	30	Unlikely (0.1)	3	Type A Low Order Risk	Tolerable	RS-CM-06.1

7.3 Mitigative Control Measures for Nearshore Response

Table 7-3 details the mitigative control measures applied to nearshore response operations. Refer to OPEP for corresponding Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria.

Table 7-3: Control measures for nearshore operations

Control Measure Reference	Mitigative Control Measure
RS-CM-01	Stakeholder engagement with potentially affected marine users prior to and during the implementation of response strategies.
RS-CM-02	Contracting of shallow-bottom response vessels for near-shore operations (where practicable).
RS-CM-03	Project induction for Vessel Masters covering: • EPBC Regulations 2000 – Part 8 Division 8.1 Interacting with cetaceans; • Hazards to nearshore benthic environments due to mooring activities;

	• Hazards associated with artificial lighting and overview of National Light Pollution Guidelines (DoEE, 2020) and light reduction measures for night-time operations; • Speed limitations in nearshore environments to reduce engine noise; • Overview of Marine Order 91 (Pollution Prevention – Oil), Marine Order 94 (Pollution Prevention – Packaged Harmful Substances), Marine Order 95 (Pollution Prevention – Garbage) and Marine Order 96 (Pollution Prevention – Sewage); • Waste containment measures for small vessels and onshore waste disposal options; • An overview of Australian Ballast Water Management Requirements (Rev 8); and • Hazards associated with the introduction of invasive species to offshore island habitats.
RS-CM-04	Aircraft operators informed of potential impacts to nearshore environments and 'no fly' zones if established.
RS-CM-05	All response vessels subject to Introduced Marine Species Risk Assessment and Approval Procedure (AOHSE-E-0018-001).
RS-CM-06.1	Oiled Wildlife Response undertaken in manner consistent with the Victorian Oiled Wildlife Response Plan (2014) and under the direction of Department of Environment, Water, Land and Planning (DEWLP) in State jurisdiction and the NatPlan in Commonwealth waters under the direction of Department of Agriculture, Water, and the Environment (DAWE) in Commonwealth jurisdiction.

7.4 Shoreline Response Operations

Table 7-4 provides a summary of potential impacts and risks relate to response strategies undertaken on shorelines.

Table 7-4: Summary of potential impacts and risks associated with shoreline response

Aspect	Source of Risk	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability	Mitigative Control Measure
Physical presence	Presence of response personnel and equipment on shorelines.	Displacement of people / communities from shoreline locations (e.g., amenity beaches).	10	N/A	-	Type A Low Order Impact	Tolerable	RS-CM-07 RS-CM-09
		Disturbance to shoreline habitat and biota (e.g., EPBC Act listed, migratory, threatened species). Potential to disturb birds nest and nesting activities.	10	Unlikely (0.1)	1	Type A Low Order Risk	Tolerable	RS-CM-08 RS-CM-09
		Disturbance / damage to site Aboriginal heritage sites.	100	Highly Unlikely (0.03)	3	Type A Low Order Risk	Tolerable	RS-CM-16 RS-CM-09
Light emissions	Artificial light from forward operating bases.	Light emissions (light spill/ glow) from external lighting causing behavioural alterations in protected species including displacement from foraging, nursing, and nesting areas.	10	Unlikely (0.1)	1	Type A Low Order Risk	Tolerable	RS-CM-11 RS-CM-12
Noise emissions	Noise from shoreline clean-up equipment / machinery.	Noise causing behavioural alterations in protected species including displacement from foraging, nursing, and nesting areas.	10	Unlikely (0.1)	1	Type A Low Order Risk	Tolerable	RS-CM-11
Waste Management	Incorrect management of hydrocarbon-contaminated wastes.	Additional contamination of the shoreline not directly exposed to original hazard.	10	Unlikely (0.1)	1	Type A Low Order Risk	Tolerable	RS-CM-11 RS-CM-12 RS-CM-13
Introduced terrestrial species	Response vessels, personnel and equipment	Introduction of invasive species (namely rodents) to offshore islands leading	100	Highly Unlikely (0.03)	3	Type A	Tolerable	RS-CM-05 RS-CM-14

Aspect	Source of Risk	Potential Impact	Severity Factor	Likelihood Factor	Residual Risk	Decision Context	Acceptability	Mitigative Control Measure
	landing on shorelines	to major impact to native species.				Low Order Risk		
Fauna handling / interaction	Oiled Wildlife Response – unintended impacts associated with poorly implemented hazing, capture, clean & rehabilitation. Poor animal welfare / husbandry practices.	Secondary disturbance causing behavioural alterations in protected species including displacement from foraging, nursing, and nesting areas. Inadvertent oiling or re-oiling of individuals. Individuals may become unnecessarily stressed and disease may be introduced into wild populations.	30	Unlikely (0.1)	3	Type A Low Order Risk	Tolerable	RS-CM-06.1

7.4.1 Identification of environmentally sensitive shoreline types

Environmentally sensitive shorelines, cultural heritage sites and shoreline receptors that may be impacted by a potential oil spill is a key consideration in determining priorities for shoreline response and clean-up activities. Whilst the Vic DoT is ultimately responsible for determining protection priorities, this section outlines considerations to inform the identification of shore-based oil spill response and clean-up priorities in the event of spill incidents. Table 7-5 identifies protection and clean-up options. Table 7-6 outlines the sensitivity of coastal features, and appropriate protection and clean-up options given the sensitivities and features. Table 7-7 provides an environmental risk assessment of the identified protective measures and preferred clean-up methods. The outcomes from Table 7-7, in consultation with the Vic DoT, may be used to inform the Operational SIMA and subsequent IAP.

Table 7-5: Protection and clean-up options

1. Containment and recovery using booms	8. Manual clean-up of oil, or movement of substratum
2. Divert to less sensitive shore	9. Low pressure seawater flushing
3. Man-made sorbent methods	10. High pressure flushing
4. Earth barriers	11. Hot water steam cleaning
5. Chemical dispersant	12. Low pressure warm seawater wash
6. Skimmers, vacuums	13. Mechanical clean-up of oil, removal, or movement of substrate
7. Natural recovery, allow to weather naturally	14. Bioremediation

Table 7-6: Coastal features classification: sensitivity, protection and clean-up methods

Coastal Feature	Sensitivity *	Comments	Protective Measure	Clean-up Method		
				Preferred	Possible	Avoid
Sites of Cultural Significance	S1	Potential damage to Aboriginal registered sites of cultural significance from shoreline clean-up activities and shoreline response operations.	2, 3	1, 7	6, 14	5, 8, 9, 10, 11, 12,13
Mangroves & Tidal Flats	S1	Extremely low energy areas. Oils may penetrate muddy substrate rapidly and deeply and can persist for years. Associated tidal flats are very important for wading birds. These areas should receive top protection and clean-up priority.	2, 3	1, 7	3, 6, 14	5, 8, 9, 10, 11, 12,13
Intertidal Limestone Reef & Corals	S2	Unless tide is low, most corals will not be directly exposed to floating oil. However, turbulent mixing from waves can result in contact and adhesion of oil to reef areas.	1, 2, 3, 4	1, 3, 7	8	5, 6, 9, 10, 14
Sandy Beaches	S3 S1*	Sand beaches are relatively low in ecological diversity except during times of turtle and bird nesting. Higher clean-up priority should be given to turtle nesting and amenity beaches. High potential for oil penetration.	1, 3	1, 3, 6, 7, 8, 13	9, 14	5, 10, 11
Sheltered Rock Shores	S3	Landed oil will weather quickly and may accumulate in pools and cracks.	1, 3	7	3, 8, 9	5,10,11
Shingle, Rock and Sand Mixed Beaches	S4	High potential for oil penetration and persistence.	1, 3	7, 9	8, 14	5, 10, 11, 12
Exposed Rock Shores and Cliffs	S4	Wave reflection may keep oil offshore. Moderate diversity and organisation quickly. Oil will accumulate in tidal pools and cracks.		7	1, 3, 9, 12	5, 10, 11
Marina, Jetties, Piers	S4	Very low likelihood of marina or pier areas being affected. To be cleaned as circumstances dictate.	1, 3	1, 3, 6, 9, 10	11, 12	5

Sensitivity Codes:

S1: Extreme Sensitivity: High Protection and clean-up priority
S2: High Sensitivity: Protection and clean-up priority as resource use & circumstances dictate
S3: Moderate Sensitivity: Protection and clean-up priority as resource use and circumstances dictate
S4: Low Sensitivity Low protection and clean-up priority
*Sandy beaches have an extreme sensitivity during turtle and bird nesting, which occurs at a number of sandy beaches in the region.

Table 7-7: Environmental risks of shoreline protective and preferred clean-up method

Protection and Clean-up Options Method Reference	Method	Environmental Risks	Likelihood Factor	Severity Factor	Residual Risk	Acceptability
2	Diversion to a less sensitive shoreline	• Contamination and accumulation of oil on the less sensitive shore; and • Wildlife entrainment, disturbance, injury and entanglement during deployment and use of equipment.	Highly Likely (3)	10	30	Tolerable
3 **6**	Man-made sorbents Skimmers and vacuums	• Contamination of ground or surface water resulting from management of waste; and • Wildlife entrainment, disturbance injury and entanglement during deployment and use of equipment and personnel.	Unlikely (0.1)	10	1	Tolerable
4 **8**	Earth barriers Manual clean-up and/or movement of substratum	• Ground and vegetation disturbance and/or compaction to sensitive coastal landforms through use of machinery and earth moving, resulting in erosion and potential sedimentation of surface water; • Wildlife entrainment, disturbance, injury and entanglement during deployment and use of equipment and personnel; and • Contamination of ground or surface water resulting from management of waste.	Likely (1)	30	30	Tolerable
7	Natural recovery, allow to weather naturally	• Prolonged and ongoing contamination and visible oil on both the shore and in the marine sediments and water column.	Highly Likely (3)	100	300	ALARP
9 **10**	Low pressure flushing High pressure flushing	• Contamination of surface water with oily water; • Drive oil deeper into substratum; • Erosion of substratum; and • Damage and/or death to sensitive shoreline flora and fauna via action of water, and deployment of equipment and personnel.	Likely (1)	30	30	Tolerable
13	Mechanical clean- up of oil, removal or movement of substrata	• Vegetation clearing and damage, soil compaction; • Hydrocarbon leaks from equipment; • Drive oil deeper into substratum; • Erosion of substratum; • Damage and/or death to sensitive shoreline flora and fauna via action of water, and	Likely (1)	30	30	Tolerable

Protection and Clean-up Options Method Reference	Method	Environmental Risks	Likelihood Factor	Severity Factor	Residual Risk	Acceptability
		deployment of equipment and personnel.				

7.4.2 Mitigative Control Measures for Shoreline Response

Table 7-8 details the mitigative control measures that apply to shoreline response operations. Refer to OPEP for corresponding Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria.

Table 7-8: Control measure for shoreline response

Control Measure Reference	Mitigative Control Measure
RS-CM-06.2	Oiled Wildlife Response undertaken in a manner consistent with the Victorian Oiled Wildlife Response Plan under the direction of Department of Environment, Water, Land and Planning.
RS-CM-07	Stakeholder engagement with potentially affected shoreline amenity users prior to and during the implementation of response strategies
RS-CM-08	SCAT implemented to identify vulnerable receptors potentially exposed to shoreline response operations.
RS-CM-09	Demarcation of identified values and sensitivities to mitigate potential impacts from response personnel and equipment.
RS-CM-10	Type and size of shoreline clean-up equipment appropriate for nature and scale of response operation and objective of IAP.
RS-CM-11	Project induction for shoreline responders covering: • Activity-specific controls; • Overview of EPBC listed / threatened / migratory species and fauna handling requirements and reporting protocols; • Hazards to shoreline environments due to response operations; • Hazards associated with artificial lighting and overview of National Light Pollution Guidelines (DoEE, 2020) and light reduction measures for night-time operations; • Oil contaminated waste containment and equipment cleaning measures; and • Hazards associated with the introduction of invasive species to offshore island habitats.
RS-CM-12	Forward Operating Bases located in coastal areas to consider lighting management in design / layout to limit light spill / glow.
RS-CM-13	Waste Management Plan prepared and implemented in consultation with AMOSC and Vic DoT inclusive of dedicated oil contaminated equipment cleaning areas.
RS-CM-14	Visual inspections for exotic terrestrial species (pests) of vessels, helicopters, equipment, and personnel mobilising to offshore islands as part of any shoreline response activity.
RS-CM-15	Operational SIMA undertaken in consultation with AMOSC and in agreement with Vic DoT prior to development of shoreline response IAPs and implementation of response strategies in State jurisdiction. At a minimum, IAPs to consider: • Responder HSE requirements; • Suitability of shoreline response strategies in relation to coastal features and potential environmental risks; • Management of personnel and equipment on turtle nesting beaches; • Potential impacts from night-time operations (light spill / glow) on listed species; • Potential disturbance to intertidal habitats from response operations;

Control Measure Reference	Mitigative Control Measure
	• Potential for introduction and establishment of invasive species
RS-CM-16	Identification and protection of registered Aboriginal heritage sites in consultation with the relevant Victorian state agency.

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Appendix A – Industry Response Equipment

Industry Mutual Aid Equipment Register Updated 10/05/2021

Company	Equipment	Type	Units	Location
BHP BILLITON as 13/05/2021				
BHP Billiton	Dispersant, Spray Systems	Auspray Dispersant system ASDS	1	Pyrenees FPSO
BHP Billiton	Dispersant, Spray Systems	Auspray Dispersant system ASDS	1	Dampier
BHP Billiton	Dispersant	Corexit 9527	1.2 m3	Pyrenees FPSO
Ampol as of 10/05/2021				
Ampol	Absorbent, Boom	Rubberiser Boom	200 m	Lytton Refinery
Ampol	Boom, Nearshore	GP 800 Fence Boom	180 m	Lytton Refinery
Ampol	Shoreline Cleanup equipment	Oil Spill shed	1 unit	Lytton Refinery
Ampol	Vessel	4.75 mtr Aluminium Runner about "Jabiru"	1 unit	Lytton Refinery
Ampol	Vessel	5.7 litre multicruiser "Mimi"	1 unit	Lytton Refinery
Ampol	Vessel	135hp Honda "Ocean Cruiser"	1 unit	Lytton Refinery
Ampol	Skimmer, Multi Head	Versatech Multi Skimmer, Brush, drum, disc with all hydraulic hoses, oil transfer hose and diesel Hydraulic power pack deliver FIS	1 Unit	Lytton Refinery
Ampol	Boom, Nearshore	Zoom Boom	150m	Lytton Refinery
Ampol	Vessel	Seamac (Punt)	1 units	Lytton Refinery
Ampol	Boom, OnShore	Beach guardian	7 units	Lytton Refinery
Ampol	Boom, OnShore	Anchor Kits	15 units	Lytton Refinery
CHEVRON as of 23/11/2020				
Chevron	Boom, OnShore	AirBlower	2	BWI
Chevron	Temporary Storage	Canflex Open Top, Floating Collar Tank	1	BWI
Chevron	Boom, Nearshore	Current Buster 2 (plus air blower)	1	BWI
Chevron	Boom, Nearshore	Current buster 6 with boom vane (plus 2 x air blowers)	1	BWI
Chevron	Power Pack	Desmi Skimmer Power Pack/ Skimmer Hose Reel	3	BWI
Chevron	Shoreline Cleanup equipment	Diesel Powered Water pump for low pressure flushing system	2	BWI
Chevron	Boom, OnShore	Ex WA Oil Shore Guardian	3	BWI
Chevron	Boom, Nearshore	Ex WA Oil Zoom boom	2	BWI
Chevron	Temporary Storage	Fastank 2000	4	BWI
Chevron	Tracking Buoys	iSphere tracking buoy	1	BWI
Chevron	Skimmer, Weir	Mini-Max Weir Skimmer Set	2	BWI
Chevron	Boom, Nearshore	NOFI Solid Floatation Boom Bags 350 EP	2	BWI
Chevron	Boom, Nearshore	NOFI towable boom bag	2	BWI
Chevron	Boom, Nearshore	Self Inflating Zooom Boom	8	BWI
Chevron	Boom, Nearshore	Self Inflating Zooom Boom	10	BWI
Chevron	Power Pack	Spate pump	2	BWI
Chevron	Skimmer, Brush	Terminator Skimmer	3	BWI
Chevron	Boom, Nearshore	Tidal Boom 500 (Shore sealing boom)	9	BWI
Chevron	Temporary Storage	Towable bladder canflex	2	BWI

Chevron	Dispersant, Spray Systems	AFEDO nozzles spray system	1	Ashbuton North
Chevron	Dispersant	Slickgone EW dispersant	5	Ashbuton North
Chevron	Power Pack	Spate pump	2	Ashbuton North
Chevron	Tracking Buoys	iSphere tracking buoy	1	Ashbuton North
Chevron	Temporary Storage	Towable bladder (Canflex Series 1 'Sea Slug')	1	Ashbuton North
Chevron	Temporary Storage	Fastank 2000	1	Ashbuton North
Chevron	Boom, Nearshore	Self Inflating Zooom Boom	6	Ashbuton North
Chevron	Boom, Nearshore	Current Buster 2 in 10ft container	1	Ashbuton North
Chevron	Skimmer, Brush	Terminator in 10ft container	1	Ashbuton North
Chevron	Skimmer, Vacumm	Manta Ray skimmer	2	Ashbuton North
Chevron	Temporary Storage	Fastank 2000	15	Ashbuton North
Chevron	Boom, Nearshore	NOFI Boom Bag 350EP	1	Ashbuton North
Chevron	Boom, Nearshore	Self Inflating Boom in container (Canadyne)	2	Ashbuton North
Chevron	Temporary Storage	Fastank 10000	4	Ashbuton North
Chevron	Skimmer, Brush	Terminator	125tph	Karratha
Chevron	Boom, Offshore	Norlense NO-1000-R	300	BWI
Chevron	Boom, Offshore	Norlense NO-1000-R	300	BWI
Chevron	Dispersant, Spray Systems	AFEDO nozzles spray system	1	Karratha
Chevron	Dispersant	Slickgone EW dispersant	5	Karratha
Chevron	Boom, Nearshore	Current buster 4 with boom vane	1	Karratha
CONOCO PHILLIPS as of 10/05/2020				
Conoco Phillips	Tracking Buoys	Pathfinder Tracking Buoy	2 units	FSO Liberdade- Timor Sea
Conoco Phillips	Absorbent, Boom	Absorbent, Boom	400m	Darwin LNG Facility
ESSO as of 02/06/2021				
Esso	Temporary Storage	Aluminium Skips (3m x 2m x 600mm High)	12 unit	LIP
Esso	Vessel	Sperm Whale for nearshore response. (F.Y.I. to transport this vessel a tilt tray or Semi would be required & is potentially oversized load due to width of vessel and cradle)	1	BBMT
Esso	Dispersant	AFEDO dispersant spray systems	2	BBMT
Esso	Dispersant	Corexit 9500	30 m3	BBMT
Esso	Boom, Nearshore	Expandi 3000 Harbour Boom	300m	BBMT
Esso	Boom, Nearshore	Sea Sentinel (Can be used Offshore, ASTM connectors)	2000m	LIP
Esso	Trailer	Beach/shoreline cleanup trailers	x4	LIP x 2, BBMT x 1, Sale x 1
Esso	Trailer	Decontamination Trailer	x1	LIP
Esso	Dispersant, Spray Systems	Vikospray Dispersant System, Boat Spray Booms (pressure wands) & pump	X1	LIP
Esso	Boom, Nearshore	Shoreboom	750m	LIP
Inpex as of 11/05/2021				
INPEX	Boom, Nearshore	400m zoom-boom in deployment trailer, plus ancillaries, (towing bridles, ship hull magnets, 6 x anchor kits etc)	1	Bhagwan Darwin Marine Logistics Base – East Arm (Darwin Harbour)
INPEX	Skimmer, Weir	Desmi Termite Weir Skimmer (with brush skimmer adaptor)	1	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Skimmer, Weir	(Skimmer) Action Hydraulics Power Pack and ancillaries (hydraulic hoses etc)	1	ASCO Marine Supply Base – East Arm (Darwin Harbour)

INPEX	Temporary Storage	25m3 towable oil storage bladder	2	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Oil Transfer Equipment	Desmi DOP 200 Offloading Pump	1	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Oil Transfer Equipment	20m oil transfer hoses on reel	1	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Dispersant	IsoTank 8000Lt Dasic Slick Gone NS Dispersant (MSDS attached)	2	Ichthys Venturer FPSO – Ichthys Field
INPEX	Dispersant, Spray Systems	AFEDO Spray System	1	Ichthys Venturer FPSO – Ichthys Field
INPEX	Tracking Buoys	RPS MetOcean Drifter (ARGOS satellite system)	10	Darwin (INPEX Offshore Logistics Base) Broome (INPEX Drilling Logistics Base) Ichthys Field (CPF, FPSO and various vessels)
Jadestone current as of 18/05/2021				
Jadestone	Boom, Offshore	Offshore Boom	2	Darwin
Jadestone	Skimmer, Brush	Brush Skimmer	2	Darwin
Jadestone	Temporary Storage	11 Te. Collapsible Storage Tank	4	Darwin
Jadestone	Temporary Storage	50 Te. Deck Tank	2	Darwin
Jadestone	Dispersant	Dasic Slickgone NS Dispersant (1000lt IBC)	8	Darwin
Jadestone	Dispersant, Spray System	AFEDO 100D Dispersant Spray System	1	Darwin
Jadestone	Tracking Buoy	iSphere Tracking Buoy	1	Darwin
Jadestone	Dispersant, Spray System	Dispersant Spray System (Type)	2	Darwin
Jadestone	Skimmer, Wier	Lamor LWS500 Wier Skimmer	1	Darwin
Jadestone	Dispersant, Transfer Pump	Dispersant Transfer Pump Spate 75c	1	Darwin
Jadestone	Dispersant	Dasic Slickgone NS Dispersant (1000lt IBC)	5	Darwin
SANTOS WA 10/05/2021				
Santos WA	Absorbent, Boom	Boom, 3metre x 180mm	120 metres	WA, Exmouth
Santos WA	Absorbent, Boom	Boom, 3metre x 180mm	144 metres	WA, Varanus Island
Santos WA	Absorbent, Roll	Roll,40mx1.1m	280 metres	WA, Varanus Island
Santos WA	Boom, Nearshore	Zoom Boom	400 metre	WA, Varanus Island
Santos WA	Boom, Nearshore	Harbo T-Fence Boom	200 metre	WA, Varanus Island
Santos WA	Boom, Offshore	Expandi self-inflating boom – 2 x 200 m vertical bundles	400 metre	WA, Dampier
Santos WA	Boom, Offshore	Power pack for Expandi Self-inflating Boom	1 unit	WA, Dampier
Santos WA	Boom, Offshore	Roto Cassette Retrieval Reel for Expandi Self-inflating Boom	1 unit	WA, Dampier
Santos WA	Boom, Offshore	Power Pack for Expandi Sea Curtain Boom	Out of Service	WA, Exmouth
Santos WA	Boom, Offshore	Sea Curtain Boom (Kepner – self inflation) – 2 x reels	Out of Service	WA, Exmouth
Santos WA	Boom, Offshore	Expandi self-inflating boom – 4 x 200 m vertical bundles	800 metre	WA, Varanus Island
Santos WA	Boom, Offshore	Power pack for Expandi self-inflating boom	1 Unit	WA, Varanus Island
Santos WA	Boom, Offshore	Roto Cassette Retrieval Reel for Expandi Self-inflating Boom	1 Unit	WA, Varanus Island
Santos WA	Boom, OnShore	Beach Guardian Boom	200 metre	WA, Varanus Island
Santos WA	Boom, OnShore	Beach Guardian, Deployment Kit	2 unit	WA, Varanus Island
Santos WA	Dispersant, Spray Systems	Double AFEDO Head Spray System	1 unit	WA, Dampier
Santos WA	Dispersant, Spray Systems	Double Arm Spray System	1 unit	WA, Dampier
Santos WA	Dispersant, Spray Systems	Single Arm Spray System	1 unit	WA, Exmouth
Santos WA	Dispersant, Spray Systems	4 x Lance Head Spray System	1 unit	WA, Exmouth
Santos WA	Dispersant, Spray Systems	Double Arm Spray System	1 unit	WA, Exmouth

Santos WA	Shoreline Clean-up Container	40ft Container (W/barrows,Shovels,Brooms,Squeegy, sorbents)	1 unit	WA, Varanus Island
Santos WA	Skimmer, Oleophilic/Brush	Skimmer, Disc and brush, Desmi DBD 16, incl. hoses and power	1 unit	WA, Dampier
Santos WA	Skimmer, Oleophilic/Brush	Skimmer, Disc and brush, Desmi DBD 16, incl. hoses and power	1 unit	WA, Varanus Island
Santos WA	Temporary Storage	CORT Bladder Tank	3 unit	WA, Varanus Island
Santos WA	Tracking Buoys	Fastwave	6 unit	WA, Dampier
Santos WA	Tracking Buoys	i-Sphere	2 unit	WA, Exmouth
Santos WA	Tracking Buoys	Fastwave	2 unit	WA, Ningaloo Vision
Santos WA	Tracking Buoys	Fastwave	4 unit	WA, Varanus Island
Santos WA	Vessel	28'Aluminium Response Vessel "Monte Belle"	1 unit	WA, Varanus Island
SANTOS East as at - 24/11/2020				
Santos East	Vessel	8 mtr Shark Cat "TREGALANA" with spray equipment	1 unit	Port Bonython Shark-Cat is current out of survey and requires minor repairs – vessel is currently out of service accordingly. PB team working on rectification to reinstate to "available" condition – timing TBC.
Santos East	Vessel	6 Mtr Stabi Craft with 135 HP Outboard	1 unit	Port Bonython Vessel is in water and ready to be deployed when required.
Santos East	Vessel	3.66 Mtr Clark Open Boat Aluminium Dinghy with 9hp Outboard	1 unit	Port Bonython Available – however not registered and only used for ballast pond operations, not for sea use.
Santos East	Vessel	4.08 Mtr Alocraft Sprint, Aluminium Open Boat 20hp Outboard	1 unit	Port Bonython
Santos East	Dispersant, Spray Systems	Afedo Dispersant Spray System 100TS	1 unit	Port Bonython
Santos East	Boom, Nearshore	Vikoma Shoreline (blowers x3 and water pumps x2 for deployment)	1000m	Port Bonython Available and ready for use – 3 x blowers and 2 x water pumps
Santos East	Dispersant	Slickgone NS	4 m3	Port Bonython And Corexit 9527 X 5m3
VIVA as at 10/05/2021				
Viva	Boom, OnShore	Beach Guardian, 25 metre	150m	Victoria, Geelong
Viva	Boom, Nearshore	Zoom Boom, 25 metre	200m	Victoria, Geelong
Viva	Boom, Nearshore	Fence Boom, 500mm, 20 metre	Nil	Victoria, Geelong
Viva	Boom, Nearshore	Fence Boom, 600mm, 20 metre	160m	Victoria, Geelong
Viva	Temporary Storage	10,000 Fastank	2 units	Victoria, Geelong
Viva	Skimmer, Oleophilic	Disc, 12k Komara	1 unit	Victoria, Geelong
Viva	Skimmer, Vacumm	Manta Ray Head	1 unit	Victoria, Geelong
Viva	Boom, OnShore	Beach Guardian, Deployment Kit	1 unit	Victoria, Geelong
WOODSIDE as 10/05/2021				
Woodside	Boom, Onshore	Fence Boom	150m	WA, Dampier

Woodside	Boom, Onshore	Lamor Shore Seal	200m	WA, Dampier
Woodside	Boom, Onshore	Shore Guardian, 20 metre	160m	WA, Dampier
Woodside	Boom, (Curtin on reel)	Curtain Boom, 30 metre lengths	300m	WA, Dampier
Woodside	Boom, Nearshore	Zoom Boom, 25 metre	175m	WA, Dampier
Woodside	Boom, Nearshore	Zoom Boom, 50 metre	200m	WA, Dampier
Woodside	Boom, Nearshore	Lamor inflatable Boom	250m	WA, Dampier
Woodside	Boom, Offshore	Offshore Boom on reel 200m per reel	400m	WA, Dampier
Woodside	Skimmer, Vacuum	Delta Ray Head	2 units	WA, Dampier
Woodside	Skimmer, Weir	Dragon Fly Weir Skimmer	1 unit	WA, Dampier
Woodside	Skimmer, Weir	Global 30m3/hr Weir Skimmer	1 unit	WA, Dampier
Woodside	Skimmer	Lamor 12 - Multi Skimmer	1 unit	WA, Dampier
Woodside	Boom, Nearshore	Anchoring Systems	21 units	WA, Dampier
Woodside	Shoreline Clean-up	Spades, Rakes, Some PPE etc.	multiple units	WA, Dampier
Woodside	Shoreline Clean-up	Decontamination Kit	2 unit	WA, Dampier
Woodside	Temporary Storage	Lamor storage tanks (like fast tanks) 7000L	2 units	WA, Dampier
Woodside	Dispersant	Slickgone NS	1 m3 on each vessel (2x OSV's)	WA, Dampier/ Exmouth, Supply Vessels
Woodside	Dispersant	Slickgone NS	5 m3	WA, Dampier
Woodside	Dispersant, Spray Systems	Alfedo Set	1 unit	WA, Exmouth
Woodside	Dispersant, Spray Systems	Alfedo Set	1 unit	WA, Dampier
Woodside	Gas monitors	Auto Rea	x6	KBSF

Product Totals by Location Report

Friday, 4 June 2021
8:30:46 AM

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
Broome						
2	2		G-033	Afedo Spray System 200-TS	Dispersant Spray Equipment	Supply Base 3
1	1		G-041	Lamor Hydraulic Power Pack	Power Packs, Pumps & Accessories	Supply Base 3
1	1		G-052	Minimax Brush Skimmer	Skimmer	Supply Base 3
2	2	400	G-092	200m HDB 1300 Boom on Hyd Reel	Boom	Supply Base 3
4	4	100	G-110	Beach Guardian Boom	Boom	Supply Base 3
8	8	200	G-111	Zoom Boom	Boom	Supply Base 3
1	1		G-130	Beach Guardian Deployment Kit	Boom Accessories	Supply Base 3
4	4		G-133	Zoom Boom Anchor Kit	Boom Accessories	Supply Base 3
1	1		G-141	Vikotank 13000 litres	Waste Storage	Supply Base 3
16	16		G-150	Sorbent Boom	Sorbents	Supply Base 3
3	3		G-151	Sorbent Squares	Sorbents	Supply Base 3
3	3		G-184	Shipping Container	General	Supply Base 3
1	1		G-330	Oiled fauna kit	Decontamination	Supply Base 3
1	1		G-331	Decontamination Kit	Decontamination	Supply Base 3
1	1		G-400	Boom Cage	Misc	Supply Base 3
1	1		G-401	Boom Cage	Misc	Supply Base 3
1	1		G-500	Response tool box	General	Supply Base 3
14	14		G-607	Ardrox 6120	Dispersant	DG Shed
Exmouth						
1	1		G-030	Vikospray Spray Unit	Dispersant Spray Equipment	Harold Holt
1	1		G-031	Simplex Helicopter Bucket	Dispersant Spray Equipment	Harold Holt
1	1		G-032	Dispersant Transfer Pump	Dispersant Spray Equipment	Harold Holt
1	1		G-033	AFEDO Ecospray 80W	Dispersant Spray Equipment	Harold Holt
1	1		G-040	Ro-Boom Power Pack	Power Packs, Pumps & Accessories	Harold Holt
1	1		G-051	Komara 12K Skimmer	Skimmer	Harold Holt
1	1		G-052	Minimax Brush Skimmer	Skimmer	Harold Holt
1	1		G-054	Passive Weir Skimmer Kit	Skimmer	Harold Holt
1	1		G-070	Ro-Vac	Skimmer	Harold Holt
1	1		G-079	GT 185 Weir Skimmer	Skimmer	Harold Holt

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
2	2		G-090	Hydraulic Powered reel Winder	Boom Accessories	Harold Holt
2	2	400	G-091	Ro-Boom	Boom	Harold Holt
20	20	500	G-110	Beach Guardian Boom	Boom	Harold Holt
20	20	500	G-111	Zoom Boom	Boom	Harold Holt
3	3		G-130	Beach Guardian Deployment Kit	Boom Accessories	Harold Holt
1	1		G-132	Shoreline Boom Anchoring kit	Boom Accessories	Harold Holt
10	10		G-133	Zoom Boom Anchor Kit	Boom Accessories	Harold Holt
2	2		G-140	Fastank Temporary Storage	Waste Storage	Harold Holt
1	1		G-160	Rope Mop 240 Oil Skimming Machine	Skimmer	Harold Holt
1	1		G-181	General Support Trailer	Trailer	Harold Holt
2	2		G-184	Shipping Container	General	Harold Holt
10	10		G-186	Wheelbarrow	General	Harold Holt
1	1		G-260	15kva Generator	Trailer	Harold Holt
1	1		G-330	Oiled fauna kit	Decontamination	Harold Holt
1	1		G-335	Decontamination Kit (PPE)	Decontamination	Harold Holt
1	1		G-336	Decontamination Kit Locker	Decontamination	Harold Holt
1	1		G-337	Shoreline Accessories Cage	General	Harold Holt
3	3		G-400	Boom Cage	Misc	Harold Holt
5	5		G-401	Boom Cage	Misc	Harold Holt
30	30		G-604	Slickgone NS	Dispersant	Harold Holt
45	45		G-605	Slickgone NS	Dispersant	Harold Holt
1	1		G-610	Dispersant Agitator	General	Harold Holt

Fremantle

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
1	1		G-029	Boom Vane Dispersant Spray System	Dispersant Spray Equipment	Outside Warehouse
1	1		G-030	Vikospray Spray Unit	Dispersant Spray Equipment	
5	5		G-033	AFEDO Spray System	Dispersant Spray Equipment	Outside Warehouse
1	1		G-034	Global Dispersant Spray System	Dispersant Spray Equipment	Outside Warehouse
1	1		G-035	GTA 30 Oil Transfer Pump	Power Packs, Pumps & Accessories	2D
4	4		G-037	GX-160 Honda Water Pump	Power Packs, Pumps & Accessories	Outside Warehouse
9	9		G-039	2 Stroke Air Blower	General	Outside Warehouse
1	1		G-040	Ro-Boom Power Pack	Power Packs, Pumps & Accessories	4B
3	3		G-042	Hydraulic Power Pack LPP 36	Power Packs, Pumps & Accessories	12, 13, 14
1	1		G-043	Hydraulic Power Pack LPP7	Power Packs, Pumps & Accessories	

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
1	1		G-044	Spare Control Stand for LPP36	Power Packs, Pumps & Accessories	2A
3	3		G-045	Hydraulic Air Blower	General	12, 13, 14
1	1		G-051	Komara 12K Skimmer	Skimmer	3B, 3E
2	2		G-052	Minimax Brush Skimmer	Skimmer	2C, 2F, 2B, 2E
1	1		G-053	Komara 20K Skimmer	Skimmer	3C, 3F
1	1		G-054	Passive Weir Skimmer Kit	Skimmer	4C, 4F
2	2		G-060	Lamor Rock Cleaner	General	1C, 1F, 1B, 1E
3	3		G-081	LWS500 Weir Skimmer	Skimmer	12, 13, 14
6	6		G-090	Hydraulic Powered reel Winder	Boom Accessories	14, 13, 12
6	6	1200	G-091	Ro-Boom	Boom	14, 13, 12
23	23	575	G-110	Beach Guardian Boom	Boom	Outside Warehouse
30	30	750	G-111	Zoom Boom	Boom	4 A/D, Outside Warehouse
18	18	540	G-112	450mm Curtain Boom	Boom	Outside Warehouse
1	1		G-113	Current Buster 2	Boom	
2	2		G-130	Beach Guardian Deployment Kit	Boom Accessories	4E
3	3		G-131	Ro-Boom Anchoring System	Boom Accessories	12, 13, 14
28	28		G-133	Zoom Boom Anchor Kit	Boom Accessories	Outside Warehouse
2	2		G-140	Fastank Temporary Storage	Waste Storage	Outside Warehouse
2	2		G-142	25000lt Lancer Storage Barge	Waste Storage	Outside Warehouse
3	3		G-143	25 Cube Deck Storage Tanks	Waste Storage	Outside Warehouse
4	4		G-144	LCT 11.4 Collapsable Storage Tank	Waste Storage	Outside Warehouse
1	1		G-161	Rope Mop 260 Oil Skimming Machine	Skimmer	Warehouse 2
1	1		G-172	Heli 7 Tonne Forklift	Vehicle	Warehouse
1	1		G-180	Mobile Workshop Trailer	Trailer	Warehouse 3
2	2		G-181	Galvanised Tandem Trailer	Trailer	Outside Warehouse
5	5		G-183	Aluminium Container	General	Outside Warehouse
9	9		G-184	Shipping Container	General	Outside Warehouse
5	5		G-188	I SPHERE Satellite Drift Buoys	Communications	1A
2	2		G-189	Spot Gen 3	Communications	Head Office
6	6		G-195	Communications Radio	Communications	Warehouse Office
1	1		G-199	Bird Scarer	Wildlife Support	1D
1	1		G-200	Zodiac Pro 500	Vessel	Warehouse
2	2		G-259	Portable Generator	General	Warehouse, Wildlife Container

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
1	1		G-262	Vehicle Washdown Trailer	Trailer	Warehouse 2
1	1		G-325	Fauna Hazing & Exclusion Kit	Wildlife Support	
3	3		G-326	Fauna hazing & capture kits	Wildlife Support	Warehouse
1	1		G-332	Wildlife washdown container	Wildlife Support	Outside Warehouse
1	1		G-333	Shoreline Support Kit	General	3A
1	1		G-334	Shoreline Flushing Kit	Power Packs, Pumps & Accessories	3D
1	1		G-336	Decontamination Kit Locker	Decontamination	7 C/F
1	1		G-400	Boom Cage	Misc	4 A/D
8	8		G-605	Slickgone NS	Dispersant	Outside Warehouse, Dispersant Area
27	27		G-606	Corexit 9500	Dispersant	Outside Warehouse, Dispersant Area
1	1		G-610	Dispersant Agitator	General	Warehouse
1	1		G-700	Phantom 4 Drone	General	Head Office
1	1		G-750	Aerial Surveillance Kit	General	Head Office
1	1		G-770	Shoreline Surveillance Kit	Misc	
2	2		G-808	Gas Alert Monitor (Microclip)	General	Head Office
1	1		G-809	Air Quality Monitoring System	Misc	Head Office
4	4		G-850	Ancilliaries box 1	General	Outside Warehouse
4	4		G-851	Ancilliaries Box 2	General	Outside Warehouse
2	2		G-889	Oil sampling kit	General	Outside Warehouse
1	1		G-950	AMOSC Vehicle	Vehicle	Warehouse
1	1		G-960	CF Moto u550	Vehicle	Warehouse
Nth Geelong						
1	1		G-029	Boom Vane Dispersant Spray System	Dispersant Spray Equipment	Outside Warehouse
2	2		G-030	Vikospray Spray Unit	Dispersant Spray Equipment	Bay D
1	1		G-031	Simplex Helicopter Bucket	Dispersant Spray Equipment	Bay D
1	1		G-032	Dispersant Transfer Pump	Dispersant Spray Equipment	Bay D
3	3		G-033	Afedo Spray System 200 DFWE	Dispersant Spray Equipment	Outside Warehouse
1	1		G-035	GTA 30 Oil Transfer Pump	Power Packs, Pumps & Accessories	Bay P
2	2		G-039	2 Stroke Air Blower	General	Warehouse
1	1		G-040	Ro-Boom Power Pack	Power Packs, Pumps & Accessories	Bay A
3	3		G-042	Hydraulic Power Pack LPP 36	Power Packs, Pumps & Accessories	Bay A
1	1		G-044	Spare Control Stand for LPP36	Power Packs, Pumps & Accessories	Bay K
3	3		G-045	Hydraulic Air Blower	General	Bay A

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
2	2		G-050	Komara 30K Skimmer	Skimmer	Bay J
2	2		G-051	Komara 12K Skimmer	Skimmer	Bay J
1	1		G-052	Minimax Brush Skimmer	Skimmer	Bay K
1	1		G-054	Passive Weir Skimmer Kit	Skimmer	Bay K
2	2		G-060	Lamor Rock Cleaner	General	Bay O
3	3		G-070	Ro-Vac	Skimmer	Bay P
1	1		G-079	GT 185 Weir Skimmer	Skimmer	Bay C
1	1		G-080	Desmi 250 Weir Skimmer	Skimmer	Outside Warehouse
3	3		G-081	LWS500 Weir Skimmer	Skimmer	Bay A
2	2		G-082	Ro-Skim Weir Boom System	Skimmer	Outside Warehouse
1	1		G-083	Canadyne Multi Head Skimmer	Skimmer	Bay K
1	1		G-084	Versatech Multi Head Skimmer	Skimmer	Bay C
8	8		G-090	Hydraulic Powered reel Winder	Boom Accessories	Bay A
7	7	1400	G-091	Ro-Boom	Boom	Bay A
1	1	36	G-093	36m Ro-Boom	Boom	Bay A
51	51	1275	G-110	Beach Guardian Boom	Boom	Bay L, Training Trailer
135	135	3375	G-111	Zoom Boom	Boom	Bay L, Training Trailer, Outside Warehouse
40	40	1200	G-112	450mm Curtain Boom	Boom	Outside Warehouse, Bay L, Training Trailer
1	1		G-114	Speed Sweep	Boom	Bay E
3	3		G-120	General Purpose Pump	Power Packs, Pumps & Accessories	Bay P
1	1		G-121	DOP 250 Pump	Power Packs, Pumps & Accessories	Bay P
8	8		G-130	Beach Guardian Deployment Kit	Boom Accessories	Training Trailer, Bay M
3	3		G-131	Ro-Boom Anchoring System	Boom Accessories	Bay A
4	4		G-132	Shoreline Boom Anchoring kit	Boom Accessories	Bay M
22	22		G-133	Zoom Boom Anchor Kit	Boom Accessories	Training Trailer, Bay K
2	2		G-135	Dual Hull magnet - 1000Kg	Boom Accessories	Charging Station Area
4	4		G-140	Fastank Temporary Storage	Waste Storage	Training Trailer, Bay M
1	1		G-141	Vikotank 13000 litres	Waste Storage	Bay M
2	2		G-142	25000lt Lancer Storage Barge	Waste Storage	Bay F
3	3		G-143	Deck Bladder	Waste Storage	Bay G
65	65		G-150	Sorbent Boom	Sorbents	Bay N
40	40		G-151	Sorbent Squares	Sorbents	Bay N
96	96		G-152	Viscous Oil Snares	Sorbents	Bay N

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
11	11		G-153	Sorbent Roll	Sorbents	Bay N
31	31		G-154	Spare Rope Mops	Sorbents	Trailer Bay
1	1		G-160	Rope Mop 240 Oil Skimming Machine	Skimmer	Trailer Bay
1	1		G-161	Rope Mop 260 Oil Skimming Machine	Skimmer	Trailer Bay
1	1		G-162	Egmopol Barge	Skimmer	Warehouse
2	2		G-172	Hyster 2 Tonne forklift	Vehicle	Warehouse
1	1		G-180	Decon Support Trailer	Trailer	Trailer Bay
3	3		G-181	General Support Trailer	Trailer	Trailer Bay
1	1		G-182	Egmopol Trailer	Trailer	Warehouse
1	1		G-183	Aluminium Container	General	
11	11		G-184	Shipping Container	General	Outside Warehouse, Dispersant Area
13	13		G-185	IBC	Waste Storage	North Wall
1	1		G-188	I SPHERE Satellite Drift Buoys	Communications	Charging Station Area
5	5		G-189	Spot Gen 3	Communications	Head Office
1	1		G-190	VHF/UHF Base station	Communications	R17T
18	18		G-195	Communications Radio	Communications	Bay 9, Warehouse Office
1	1		G-201	9m Aluminium Catamaran	Vessel	Warehouse
3	3		G-259	Portable Generator	General	Bay, Wildlife Container
1	1		G-260	Trailer/Generator/Karcher Pressure Washer Unit	Trailer	Trailer Bay
1	1		G-261	4in shore line flushing kit	General	Bay O
1	1		G-262	Vehicle Washdown Trailer	Trailer	Trailer Bay
2	2		G-263	Diesel Pressure Washer	Power Packs, Pumps & Accessories	Bay O
1	1		G-325	Fauna Hazing & Exclusion Kit	Wildlife Support	
2	2		G-330	Oiled fauna kit	Decontamination	Bay H
1	1		G-332	Wildlife washdown container	Wildlife Support	Outside Warehouse
1	1		G-334	3 in Shoreline Flushing Kit	Power Packs, Pumps & Accessories	Bay O
1	1		G-335	Decontamination PPE Kit (First Strike Support)	Decontamination	Bay I
1	1		G-336	Decontamination Kit Locker	Decontamination	Bay I
1	1		G-338	Shoreline Impact Lance Kit	Power Packs, Pumps & Accessories	Bay O
24	24		G-400	Boom Cage	Misc	Bay 12, Bay L
13	13		G-401	Boom Cage	Misc	Bay L, Bay K
1	1		G-500	Response tool box	General	Warehouse Store
8	8		G-604	Slickgone NS	Dispersant	Bay 0

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
67	67		G-605	Slickgone NS	Dispersant	Bay 0
62	62		G-606	Corexit 9500	Dispersant	Bay 0, Outside Warehouse
1	1		G-610	Dispersant Agitator	General	Dispersant
2	2		G-700	DJI Spark	General	Head Office
1	1		G-750	Aerial Surveillance Kit	General	Head Office
1	1		G-760	Dispersant Effectiveness Field Test Kit	Dispersant	Head Office
6	6		G-808	Gas Alert Monitor (Microclip)	General	Head Office
1	1		G-889	Oil sampling kit	General	Outside warehouse
3	3		G-950	AMOSC Vehicle	Vehicle	Warehouse, Head Office
1	1		G-960	CF Moto u550	Vehicle	Warehouse

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Appendix C – Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan

Minerva Field: Operational and Scientific Monitoring Bridging Implementation Plan

Document No: 00MC-BHP-N00-0004

REVISION RECORD						
Rev	**Date**	**Description**	**Prepared by**	**Checked by**	**Reviewed by**	**Approved by**
0	30/06/2022	Issued for assessment	Environment Principal Projects	Principal Environment & Regulatory	Regional HSE Lead Australia	Asset Manager

Revision History		
Revision Label	**Revision Date**	**Comments**
A	15/06/2022	Draft issued for internal review
0	30/06/2022	Issued to DJPR / Vic DoT / NOPSEMA for assessment

Contents

List of Tables

List of Figures

Definitions and Acronyms

TERMS/ACRONYM	DEFINITION/EXPANSION
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
API	American Petroleum Institute
APPEA	Australian Petroleum Production and Exploration Association
APU	Australian Production Unit
AUV	Autonomous Underwater Vehicle
BACI	Before After Control Impact
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene are hydrocarbons and commonly found in Condensate oil
BHP	BHP Petroleum (Victoria) Pty Ltd
BIA	Biologically Important Area
CICC	Corporate Incident Coordination Centre (Woodside)
DAWE	Department of Agriculture, Water and the Environment
DELWP	Department of Environment, Land, Water and Planning (Victoria)
DFR	Daily Field Report
DJPR	Department of Jobs, Precincts and Regions (Victoria)
DJPR ERR	Earth Resourecs Regulation (DJPR)
DNP	Director of National Parks
DoEE	Department of Environment and Energy
DoT	Department of Transport (Victoria)
EBPC act	Environmental Biodiversity and Biodiversity Conservation Act 1999
EERM	Environmental Emergency Response Manual
EP	Environment Plan
EPA	Environmental Protection Agency (Victoria)
EMBA	Environment that May Be Affected
EMT	Emergency Management Team
EPO	Environmental Performance Outcome
EPS	Environmental Performance Standard
ESC	Environmental Scientific Coordinator
FPSO	Floating Production Storage and Offloading
FST	Functional Support Team
GHD	GHD Pty Ltd
GIS	Geographic Information Systems
GPS	
HSE	Health, Safety and Environment
IAP	Incident Action Plan
IBRA	Interim Biogeorgraphic Regonalisation of Australia
I&CM	Incident and Crisis Management
IFU	Issued for use
IMCRA	Integrated Marine and Coastal Regionalisation of Australia
IMT	Incident Management Team
KSAT	Kongsberg Satellite Services
LOWC	Loss of well control
MDO	Marine diesel oil
MENSAR	State Maritime Emergencies (non-search and rescue) Plan
MNP	Marine National Park (State)
MS	Marine Sanctuary (State)
NATA	National Association of Testing Authorities
NEBA	Net Environmental Benefit Analysis
NOAA	(United States) National Oceanic and Atmospheric Administration

NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
OM	Operational Monitoring
OMP	Operational Monitoring Plan
OPEP	Oil Pollution Emergency Plan
OSM	Operational and Scientific Monitoring
OSMBIP	Operational and Scientific Monitoring Bridging Implementation Plan
OSMP	Operational and Scientific Monitoring Plan
OSRA	
OSRL	Oil Spill Response Limited
OSTB	Oil Spill Tracker Buoys
OSTM	Oil Spill Trajectory Modelling
OWR	Oiled Wildlife Response
PAH	
ppb	Parts per billion
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
ROV	Remotely Operated Vehicle
SCAT	Shoreline clean-up assessment technique
SCC	State Control Centre (Victoria)
SCERP	Source Control Emergency Response Plan
SCME	State Controller Maritime Emergencies (Victoria)
SDO	State Duty Officer (Victoria)
SEMR	South East Marine Region
SIMA	Spill Impact Mitigation Assessment
SM	Scientific Monitoring
SMP	Scientific Monitoring Plan
SSDI	Subsea Dispersant Injection
Tas	Tasmania
TPH	Total Petroleum Hydrocarbon
TSV	Transport Safety Victoria
UAV	Unmanned Aerial Vehicle
US EPA	United States Environmental Protection Agency
Vic	Victoria
VEAWP	Victorian Emergency Animal Welfare Plan
VFA	Victoria Fisheries Authority
WCD	Worst-case discharge
Woodside	Woodside Energy (BHP Petroleum Pty Ltd / BHP Petroleum (Victoria) Pty Ltd)

1 Introduction

This document fulfils the requirements for an Operational and Scientific Monitoring Plan (OSMP) under Regulation 14(8AA) and 14(8D) of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 and (in part) Subregulations 17(1)&(2) of the Victorian OPGGSR 2021 (collectively referred to as the Environment Regulations).

1.1 Purpose

Oil spills are an inherent risk associated with offshore petroleum activities including but not limited to drilling, exploration, and vessel activities (including those associated with field decommissioning activities). These events are unlikely to occur, however they pose a threat to the marine environment and the values that it supports (NOPSEMA).

The OSMP is a key part of the offshore petroleum approval process. The OSMP is the principle tool for determining the effect, severity, and persistence of environmental impacts from an oil spill (NOPSEMA, 2016). An OSMP allows Titleholders to determine whether their Environment Plans are sufficient and meeting their goals. The OSMP can also be used to test how effective the oil spill response is regarding environmental impact and protection (NOPSEMA, 2016). The OSMP can also be used to improve predictive and response capacity for future oil spills.

To create consistency across industry and strengthen responses to oil spills around Australia, the creation of an OSMP Framework through Australian Petroleum Production and Exploration Association (APPEA) was proposed. Woodside has elected to use the Joint Industry Operational and Scientific Monitoring (OSM) Framework and supporting Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs) as the foundation of its operational and scientific monitoring approach within the Otway Basin. The Joint Industry OSM Framework is available on the APPEA Environment Publications Webpage. Use of the Joint Industry OSM Framework requires each Titleholder to develop a Bridging Implementation Plan (this Plan) which fully describes how the Framework interfaces with Titleholders own activities, spill risks and internal management systems.

This document is consistent with the APPEA Operational and Scientific Monitoring Bridging Implementation Plan Template (Rev A, March 2021) (APPEA, 2021a) and acts as a Bridging Implementation Plan to the Joint Industry OSMP Framework for petroleum activities undertaken by BHP Petroleum (Victoria) Pty Ltd during Minerva Field decommissioning activities off the southern coast of Victoria.

Since the merger completion on 1 June 2022, BHP Petroleum (Victoria) Pty Ltd and its parent company BHP Petroleum International Pty Ltd are owned 100% by Woodside Energy Group Ltd. References to APU, BHP, BHP Petroleum and Woodside are interchangeable throughout this document.

This document (hence forth referred to as the Operational and Scientific Monitoring Bridging Implementation Plan (OSMBIP)) is a component of the environmental management framework, and should be read in conjunction with the activity-specific Environment Plan (EP) and Oil Pollution Emergency Plan (OPEP).

This plan is presented in two parts. Part A outlines the relationship between BHP Petroleum (Victoria) Pty Ltd's Spill Response Document Framework and the Joint Industry Operational and Scientific Monitoring Plan (OSMP) Framework (APPEA, 2021b). Part B provides operationally focused guidance for Woodside personnel and OSM Service Providers to coordinate the implementation of monitoring plans.

1.1.1 Petroleum Activities

This OSMP is relevant to petroleum activities undertaken by Woodside within Australian Commonwealth and State waters associated with Minerva Field decommissioning in the Otway Basin.

1.1.2 Hydrocarbon Properties

Hydrocarbon types associated with Level 2 or Level 3 hydrocarbon spill scenarios within the Minerva Field include:

- Gas condensate; and
- Marine diesel oil (MDO).

Error! Reference source not found. provides and overview of condensate oil properties associated with the Minerva Field and marine diesel oil.

Table 1-1: Hydrocarbon Properties

Parameter	Minerva 4 Condensate [1]	Marine Diesel Oil [2]
API Gravity	**49.9**	**0.843**
Specific Gravity	**0.7802**	**36.4**
Viscosity (@ 20ºC)	**1.204 cSt**	**3.9 cP**
Pour Point (ºC)	**-36**	**-36**
Wax Content (%)	**<0.1**	**0.05**
Asphaltene (%)	**-**	**0.05**

Note 1: Data from ITS (2003)
Note 2: Data from SINTEF's Marine Diesel IKU

1.1.3 Spill Scenarios

This OSMP is applicable to all Level 2 or Level 3 hydrocarbon spills as described within the activity-specific EPs / OPEPs.

1.2 Spill Response Document Framework

The inter-relationship of this document to other spill response documentation is presented in Table 1-2 and shown in

Figure 1-1.

Table 1-2: Spill Response Document Framework

Document Title	Document Number	Purpose
Woodside Incident and Crisis Management Procedure (I&CMP)		The I&CMP describes the process requirements intended to ensure the Company remains prepared to manage incidents and crises effectively and details the prevention, preparedness, response and recovery aspects of incident and crisis management, which are relevant to all sites and activities operated or managed by the Company.
Activity-Specific Environment Plan	Varies	The EP contains the following: • detailed activity description;

Document Title	Document Number	Purpose
		• detailed description of the environment that may be affected (EMBA) by a credible worst-case discharge (WCD) scenario; • description and risk assessment of oil spills on environmental values and sensitivities; and • evaluation of controls to prevent oil pollution from the described activity and associated Environmental Performance Outcomes (EPOs) / Environmental Performance Standards (EPSs) and Measurement Criteria
Minerva Field Emergency Response Basis of Design & Field Capability Assessment Report	00MC-BHP-N00-0003	The Basis of Design (BOD) and Field Capability Assessment (FCA) presents an overview of the petroleum activity and associated oil spill risks. It includes an evaluation of modelling outcomes from the identified WCD scenarios. It includes a strategic Spill Impact Mitigation Assessment (SIMA) for the identified WCD scenarios associated with the activity. It also provides a detailed evaluation of response needs based upon WCD scenarios and presents an oil spill response field capability analysis inclusive of EPOs, EPSs and Measurement Criteria for response preparedness.
Corporate Incident Coordination Centre (CICC) Capability Assessment	AOHSE-ER-0071	The CICC Capability Assessment evaluates the size and structure of the Woodside CICC (inclusive of Source Control Branch) necessary to mobilise and maintain the field capability for a protracted worst-case oil pollution emergency i.e., a LOWC scenario. It provides a detailed evaluation of CICC capability and competency to enable the implementation of response strategies for the full duration of the oil pollution emergency inclusive of EPOs, EPSs and Measurement Criteria for maintenance of CICC capability and competency.
Activity-specific Oil Pollution Emergency Plan / Environmental Emergency Response Manual (EERM) - State	Varies	The OPEP / EERM is the tool which would be utilised by the Woodside IMT during any impending/actual oil spill event to implement the detailed Response Strategies. The OPEP / EERM provides a detailed framework for spill response implementation inclusive of EPOs, EPSs and Measurement Criteria for the effectiveness of response strategy implementation.
Source Control Emergency Response Plan	Varies	The Source Control Emergency Response Plan (SCERP) is consistent with the requirements of the Critical Control Performance Standards: Source Control (PET-GDC20-DR-PRD-00063), the Source Control Framework detailed within the International Oil and Gas Producers (IOGP) Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (IOGP, 2019) and the APPEA Australian Offshore Titleholder's Source Control Guideline (June 2021). The SCERP includes: • Subsea First Response Toolkit Plan; and • Relief Well Plan. Refer directly to SCERP for the implementation of all source control operations.
Operational and Scientific Monitoring Bridging Implementation Plan - this Plan	00MC-BHP-N00-0004	This Plan (the OSMBIP) is consistent with the APPEA Operational and Scientific Monitoring Bridging Implementation Plan Template (APPEA, 2021a) and acts as a Bridging Implementation Plan to the Joint Industry OSMP Framework for petroleum activities undertaken by Woodside in the Minerva gas field off the Southern coast of Victoria.

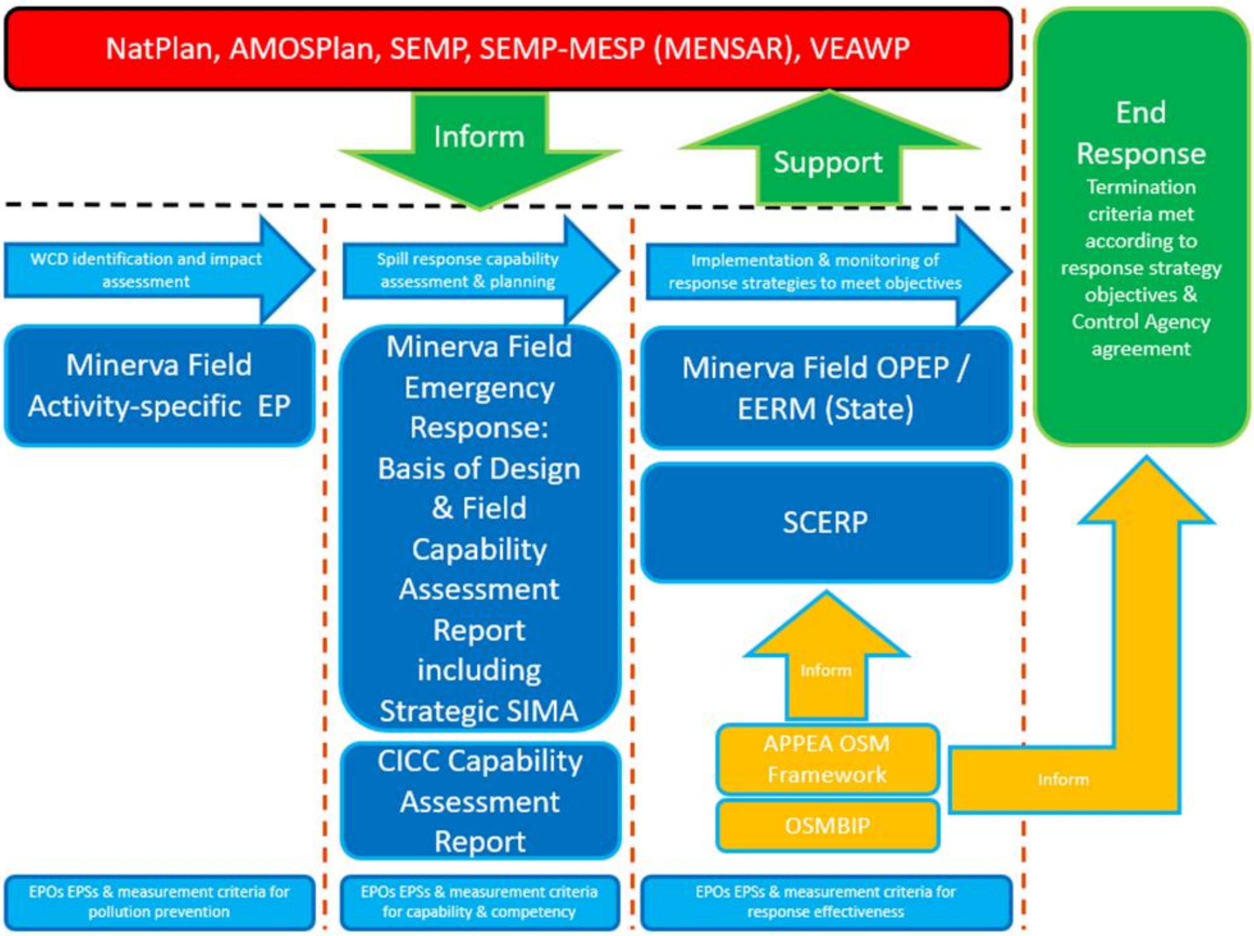

Figure 1-1: Spill Response Document Framework for Minerva Field

Part A – Preparedness

2 Environment that May Be Affected and Monitoring Priorities

2.1 Environment that May Be Affected

The oil exposure values used to define the EMBA within activity-specific EPs was guided by NOPSEMA's Environment Bulletin – Oil Spill Modelling Guideline (NOPSEMA, 2019) as detailed in Table 2-1. The EMBA represents the combined stochastic modelling outputs for an identified worst-case discharge (WCD) oil spill, based on multiple (200) individual spill realisations for each modelled spill scenario. By overlaying all of the realisations onto a single figure, the stochastic modelling shows all the potential areas that could be contacted by hydrocarbons in the event of a spill. The outer geographical extent of the EMBA is determined using the conservative low (contact) exposure values and does not represent the area of actual ecological impact in the event of a spill.

Table 2-1: Hydrocarbon Exposure Values

Hydrocarbon Phase	Exposure Value		
	Low	Moderate	High
Surface (floating) oil	1 g/m^2	10 g/m^2	50 g/m^2
Shoreline (accumulated) oil	10 g/m^2	100 g/m^2	1,000 g/m
Total submerged oil in the water column (a combination of entrained and dissolved oil components)	10 ppb	-	100 ppb
Dissolved oil in the water column	10 ppb	50 ppb	400 ppb

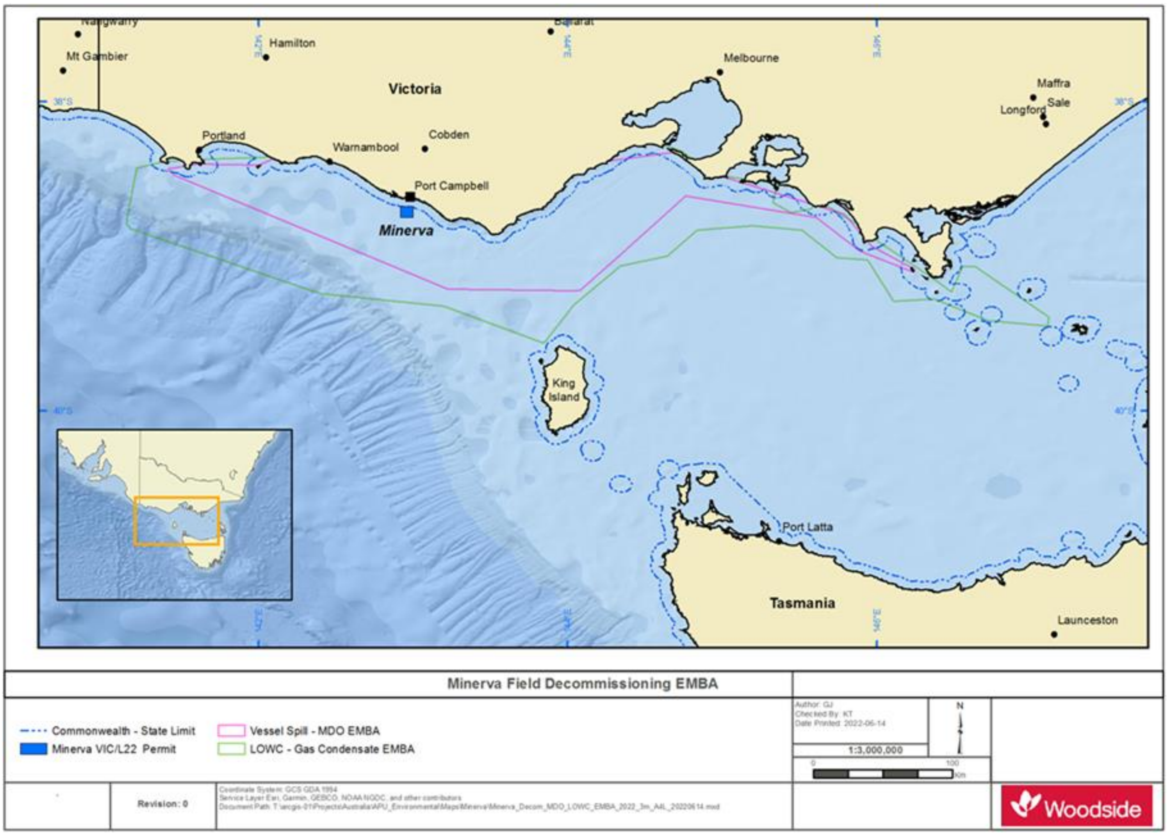

Figure 2-1: EMBA for Minerva Field Decommissioning Program

2.2 Monitoring Priorities

Table 2-2 provides a summary of the environmental receptors that would be monitored in the event of a spill incident on the basis of their sensitivity. It also provides the corresponding monitoring procedure that would be provided to the external consultant undertaking the work, noting that the same company may not necessarily be contracted for all monitoring scopes.

Monitoring priorities have been identified through analysis of hydrocarbon spill modelling results against the location of key sensitive receptors with high conservation value; including habitat, species (e.g. State/Commonwealth protected areas, protected species), the sensitivity and/or recoverability of receptors to hydrocarbon impacts, and important socio-economic/heritage values.

Detailed information on the spill risks, modelling analysis of scenarios and protection priorities is provided in the activity-specific EP and OPEP. The following tables provide a summary of the locations, key receptors and spill modelling results for the worst-case scenarios associated with Minerva decommissioning activities.

Using spill trajectory modelling to help prioritise resources to implement monitoring programs, (including the collection of baseline data) can be useful. For example, sensitive locations with a high probability of rapid contact from an oil spill should be the priority of a monitoring program, compared to similar locations with a lower probability and longer time for contact following a spill, where time may permit the collection of reactive (post-spill but pre-contact) baseline data.

In addition to these locations, there are receptors that are transient (i.e. cetaceans, seabirds) and others that are broadscale, such as managed fisheries with large spatial extents, Key Ecological Features (KEFs) and Biologically Important Areas (BIAs). These receptors are described in detail in the activity-specific EP.

The relationship between hydrocarbon exposure levels and degree of impact/risk should be considered when finalising the monitoring design. It should be noted that the monitoring priority locations provided in Table 2-3 to
Table 2-5 are listed for planning purposes. Woodside will work with its OSM Service Providers and key

stakeholders in the initial stages of the spill regarding priority receptors and to assist in the finalisation of the monitoring design. This process is outlined in Section 13.

Table 2-2: Summary of Environmental Receptors, Description of Monitoring and Applicable Monitoring Procedure

Receptor	Sensitivity Ranking	Impact Monitoring	Monitoring Procedure*
Water Quality	High	Reactive post-spill pre-impact	*Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna* (AOHSE-ER-0037)
Shoreline Sediment Quality (*incorporates Rocky Shorelines*)	High	Reactive post-spill pre-impact	*Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna* (AOHSE-ER-0037)
Benthic Infauna (*incorporates Migratory Shorebird Habitat, Sandy Beaches, Intertidal Zone, Mixed Beaches*)	High	Reactive post-spill pre-impact	*Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna* (AOHSE-ER-0037)
Avifauna	High	Post-spill	*Incident Action Plan –Seabirds and Migratory Shorebirds* (AOHSE-ER-0038)
Marine Mammals (e.g. whales, dolphins, dugongs) and Megafauna (whales)	High	Post-spill	*Incident Action Plan – Marine mammals and Megafauna* (AOHSE-ER-0039)
Benthic Habitats and Benthic Primary Producers (Mangroves, Corals, Macroalgae, Sponge Communities and Seagrass)	High	Post-spill	*Incident Action Plan –Benthic Habitats and Benthic Primary Producers* (AOHSE-ER-0040)
Marine Reptiles	High	Post-spill	*Incident Action Plan – Marine Reptiles* (AOHSE-ER-0043)
Commercial and Recreational Fish Species	High	Post-spill	*Incident Action Plan – Commercial and Recreational Fish Species* (AOHSE-ER-0048)
Fishes	High	Post-spill	*Incident Action Plan – Effects of an Oil Spill on Fishes* (AOHSE-ER-0051)
Aboriginal Cultural Heritage	High	Post-spill	Woodside Aboriginal Heritage Procedures activated by Woodside Heritage Team.

** Equivalent Woodside Energy Monitoring Procedures may be adopted during implementation*

Within the *Minerva Decommissioning Oil Spill Modelling Report* (GHD, 2022) the receptor regions used for reporting shoreline loading outcomes were sourced from the Interim Biogeographic Regionalisation of Australia (IBRA). Modifications were made to the IBRA regions to extend their shoreline boundaries offshore to the state waters (coastal waters) limit, which is 3 nautical miles (~5.5 km) offshore. In this manner, modelling results reported for the IBRA regions for in- and on-water components (dissolved hydrocarbons, total submerged hydrocarbons and surface oil) also represent contact within the state water limit. The priority monitoring locations are based upon the categorisation of environmental receptors displayed in Figure 2-2 to Figure 2-6.

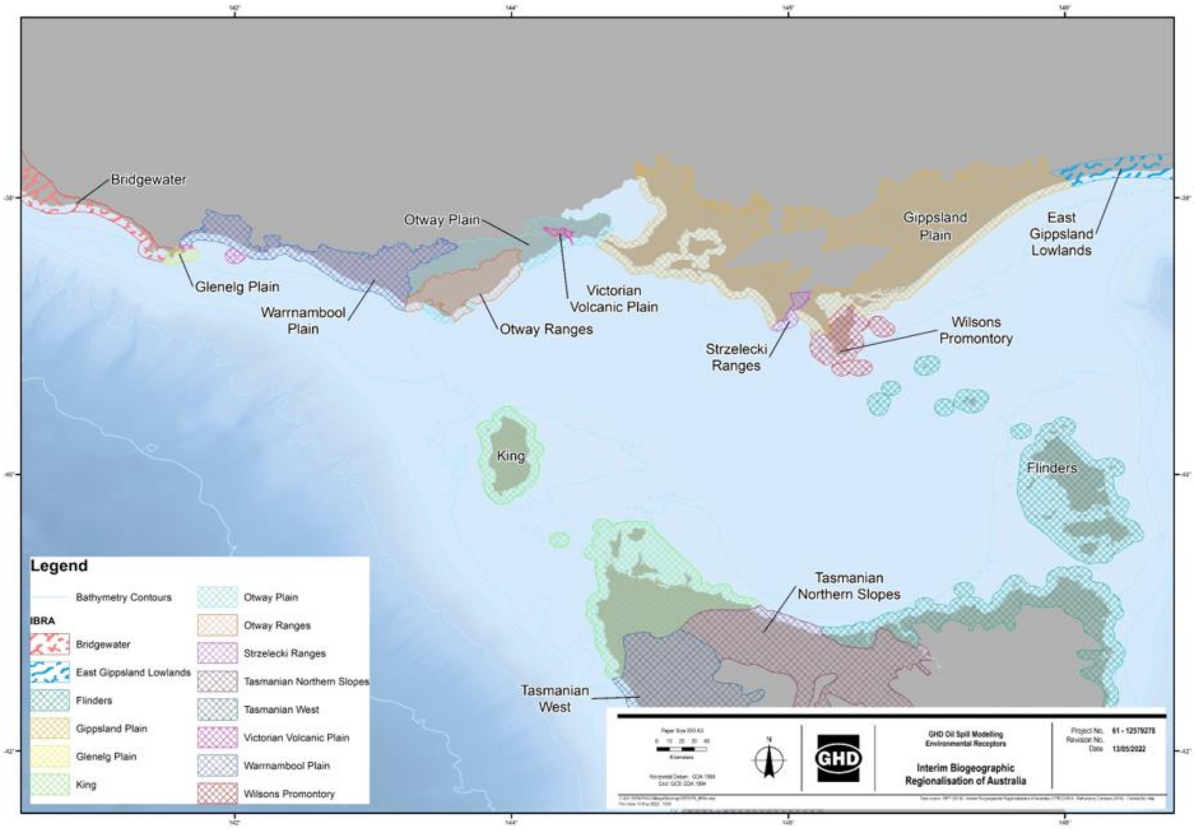

Figure 2-2: Interim Biogeographical Regionalisation of Australia

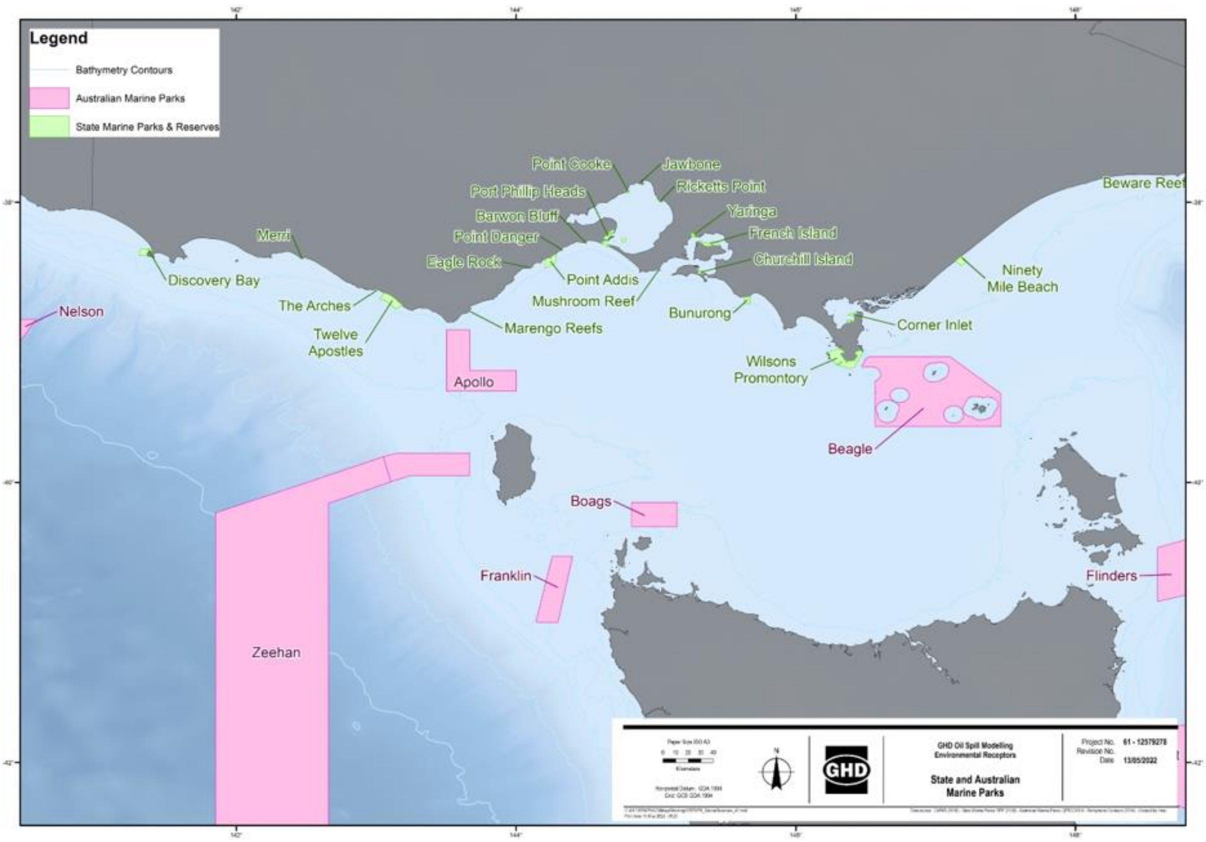

Figure 2-3: State and Australian Marine Parks

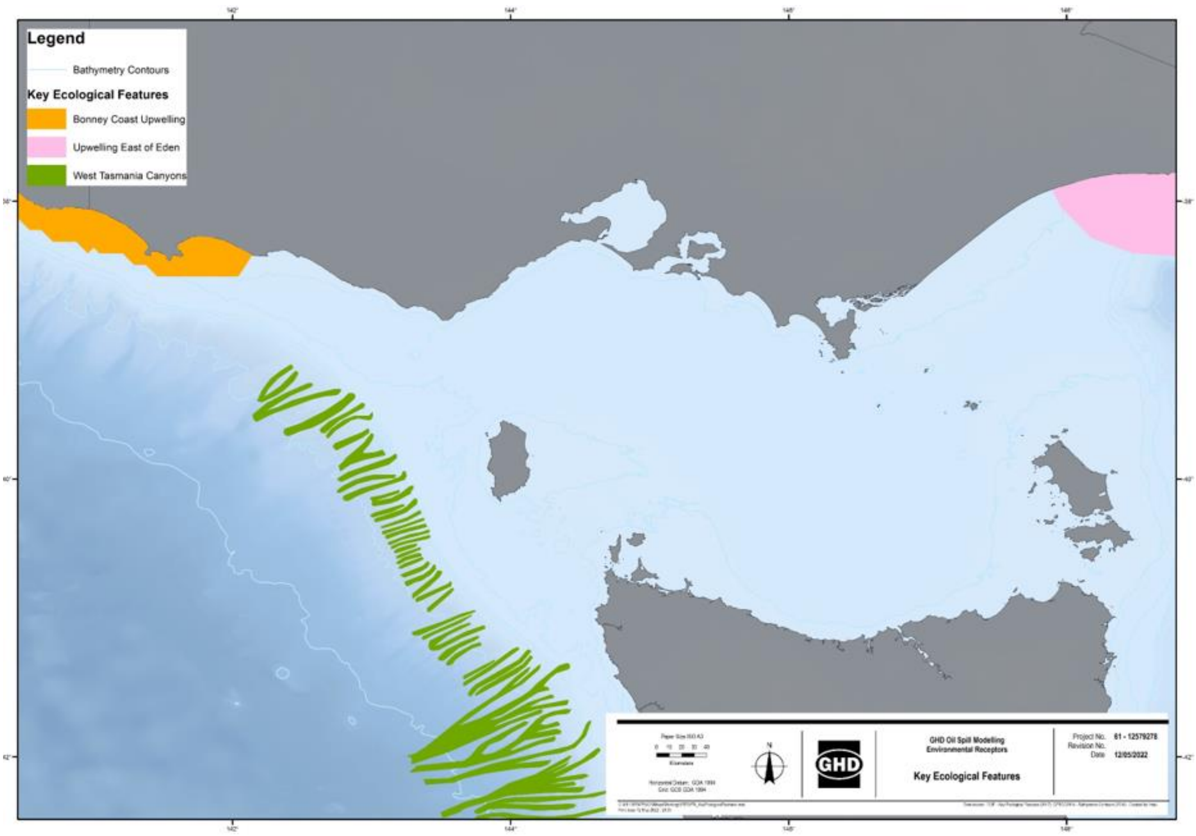

Figure 2-4: Key Ecological Features

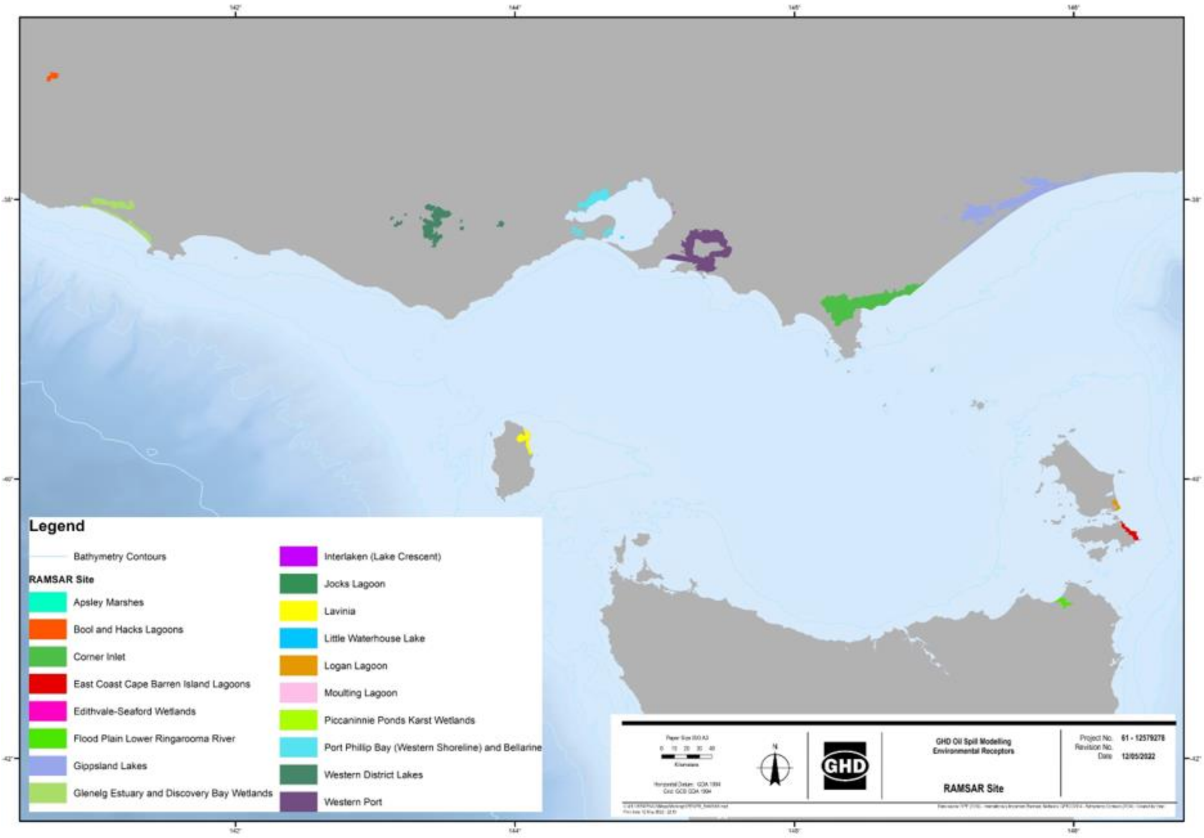

Figure 2-5: RAMSAR Sites

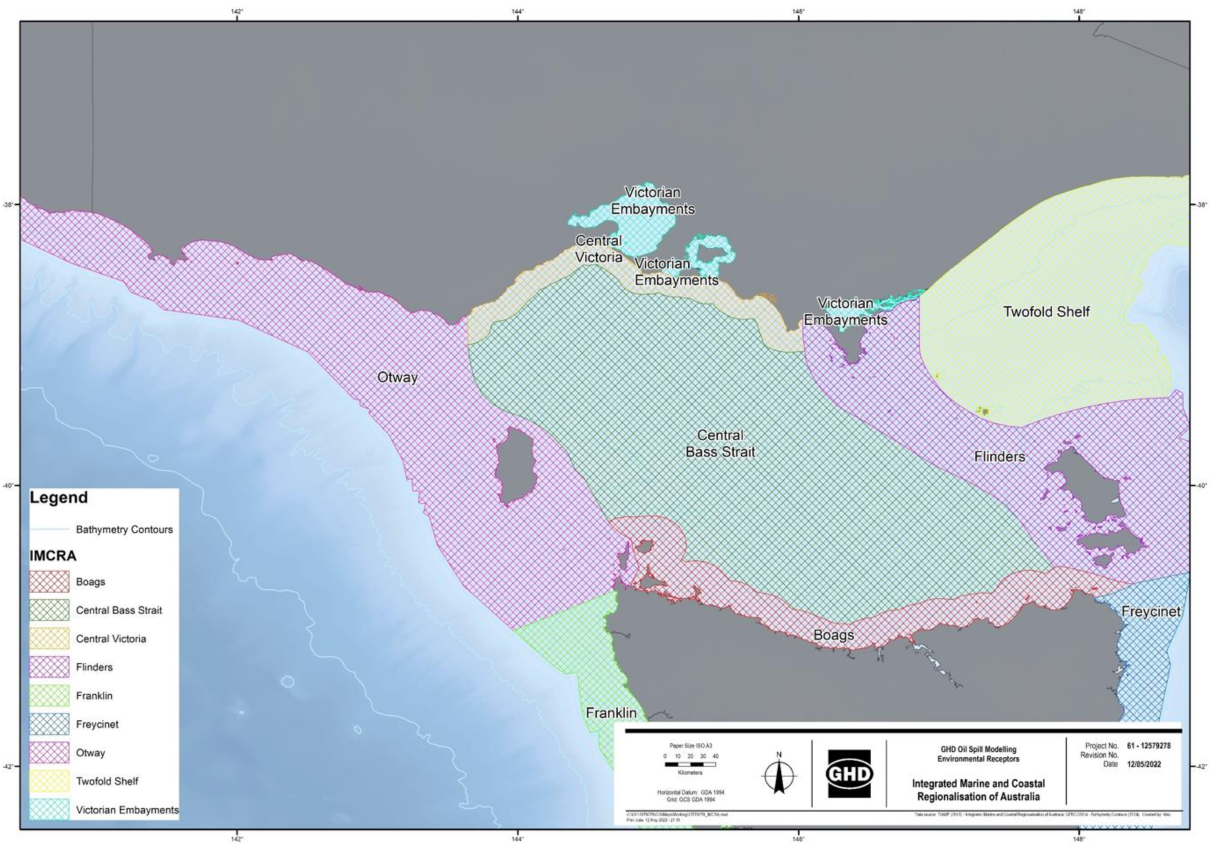

Figure 2-6: Integrated Marine and Coastal Regionalisation of Australia

Based upon proximity to the Minerva Field, the potential arrival time of hydrocarbons, the probability of contact from a Level 2 / Level 3 spill scenario, the potential extent of exposure to hydrocarbons, and the receptor types at risk, the locations detailed in the following tables would be prioritised for monitoring (Table 2-3, Table 2-4, Table 2-5, and Table 2-6).

Table 2-3: Summary of Priority Monitoring Locations (Surface Hydrocarbons)

Location (Marine Parks)	Receptor Types	Potential Exposure from LOWC (Condensate)		Potential Exposure from Vessel Collision (MDO)	
		Probability of Contact % @ ≥1 g/m² (Autumn-Winter/ Spring-Summer)	Minimum Time to Contact (days) @ ≥1 g/m² (Autumn-Winter/ Spring-Summer)	Probability of Contact % @ ≥1 g/m² (Autumn-Winter/ Spring-Summer)	Minimum Time to Contact (days) @ ≥1 g/m² (Autumn-Winter/ Spring-Summer)
Summary of receptors impacted by surface hydrocarbons oil spill modelling (GHD, 2022)*					
Otway Plain	IBRA	-	-	0.5 / -	1.0 / -
Warrnambool Plain	IBRA	-	-	44.6 / 57.1	0.1 / 0.2
Otway Ranges	IBRA	-	-	1.0 / -	0.7 / -
The Arches	State Marine Park	-	-	1.5 / 2.6	0.7 / 0.3
Twelve Apostles	State Marine Park	-	-	18.6 / 17.3	0.2 / 0.2
Otway	IMCRA	-	-	100 / 100	0.1 / 0.1
Summary of identified priority monitoring locations that may be impacted by surface hydrocarbons					
Australian Marine Park	Water Quality. Shoreline Sediment Quality. Benthic Infauna. Marine Mammals. Benthic Habitats & Benthic Primary Producers. Avifauna. Marine Reptiles. Commercial & Recreational Fish Species. Fishes.	Considered relevant based upon location			
Apollo AMP					
Beagle AMP					
State Marine National Parks (MNP) and Marine Sanctuaries (MS)					
Bunurong MNP					
Churchill MNP					
Discovery Bay MNP					
Point Addis MNP					
Port Phillip Heads MNP					
Twelve Apostles MNP					
Wilsons Promotory MNP					
Marengo Reefs MS					
Barwon Bluff MS					
Eagle Rock MS					
Merri MS					
Mushroom Reef MS					
Point Danger MS					

** No surface hydrocarbons at low, moderate or high thresholds were detected for LOWC condensate spill scenario*

Table 2-4: Summary of Priority Monitoring (Shoreline Accumulated Hydrocarbons)

Location	Receptor Types	Potential Exposure from LOWC (Condensate)		Potential Exposure from Vessel Collision (MDO)	
		Probability of Contact % @ ≥10 g/m^2 (Autumn-Winter/ Spring-Summer)	Minimum time to Contact (Days) @ ≥10 g/m^2 (Autumn-Winter/ Spring-Summer)	Probability of Contact % @ ≥10 g/m^2 (Autumn-Winter/ Spring-Summer)	Minimum Time to Contact (Days) @ ≥10 g/m^2 (Autumn-Winter/ Spring-Summer)
Summary of receptors impacted by shoreline hydrocarbons from the oil spill modelling (GHD, 2022)					
Flinders	IMCRA	1.0 / -	95.0 /	-	-
Wilsons Promontory (Tas)	IBRA	1.9 / 1.0	29.9 / 97.9	-	-
Glenelg Plain	IBRA	- / 5.2	- / 16.3	- / 1.5	- / 6.9
Wilsons Promontory (Vic)	IBRA	1.9 / -	64.4 / -	0.5 / -	23.5 / -
Gisspland Plain	IBRA	27.2 / 8.2	17.8 / 42.7	0.5 / -	7.5 / -
Otway Plain	IBRA	100 / 88.7	1.8 / 1.8	73.0 / 33.7	1.0 / 1.4
Warrnambool Plain	IBRA	100 / 100	0.5 / 0.6	79.9 / 89.8	0.2 / 0.2
Otway Ranges	IBRA	97.1 / 82.5	3.8 / 2.8	57.8 / 35.7	0.7 / 1.2
Victorian Volcanic Plain	IBRA	1.9 / 13.4	49.2 / 6.8	- / 1.5	- /4.7
Strzelecki Ranges	IBRA	1.0 / 1.0	63.5 / 90.5	-	-
Summary of identified priority monitoring locations for shoreline accumulated hydrocarbons					
Western Port (RAMSAR)	Shoreline Sediment Quality. Benthic Infauna. Benthic Habitats & Benthic Primary Producers. Avifauna. Marine Reptiles. Aboriginal Cultural Heritage.	Considered relevant based upon location			
Port Phillip Bay (RAMSAR)					
Glenelg Estuary & Discovery Bay Wetlands (within 10 km of RAMSAR)					
Western Port					
Swan Bay and Swan Island					
Aire River					
Yambuk Wetlands					
Tower Hill					
Princetown Wetlands					
Lake Connewarre State Wildlife Reserve					
Lower Aire River Wetlands					
Lower Merri River Wetlands					
Point Napean Defence					

Table 2-5: Summary of Priority Monitoring Locations (Total Submerged Hydrocarbons)

Location	Receptor Types	Potential Exposure from LOWC (Condensate)		Potential Exposure from Vessel Collision (MDO)	
		Probability of Contact % @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Minimum time to Contact (Days) @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Probability of Contact % @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Minimum time to Contact (Days) @ ≥10 ppb (Autumn-Winter/ Spring-Summer)
Summary of receptors impacted by submerged hydrocarbons from the oil spill modelling (GHD, 2022)					
Bridgewater	IBRA	- / 1.0	- / 8.3	-/ 0.5	- / 24.3
Glenelg Plain	IBRA	-	-	-/ 0.5	- / 24.0
Wilsons Promontory	IBRA	1.0 / -	39.7 / -	-	-
Gippsland Plain	IBRA	28.2 / 4.1	18.3 / 45.3	2.5 / -	9.7 / -
Otway Plain	IBRA	100 / 94.8	1.1 / 1.3	73.5 / 31.1	0.9 / 1.1
Warrnambool Plain	IBRA	100 / 100	0.3 / 0.3	96.1 / 96.9	0.1 / 0.2
Otway Ranges	IBRA	100 / 99.0	0.6 / 1.1	73.5 / 35.7	0.6 / 0.9
Victorian Volcanic Plain	IBRA	- / 1.0	- / 31.0	- / 0.5	- / 5.1
Strzelecki Ranges	IBRA	1.0 / -	36.8 / -	1.0 / -	22.3 / -
Point Addis	State Marine Parks	3.9 / 1.0	31.4 / 78.1	-	-
The Arches	State Marine Parks	-	-	9.8 / 19.4	0.4 / 0.3
Twelve Apostles	State Marine Parks	100 / 100	0.3 / 0.4	77.0 / 63.3	0.2 / 0.2
Apollo	Australian Marine Parks	87.4 / 25.8	1.7 / 8.2	31.4 / 1.5	1.1 / 3.7
Bonney Coast Upwelling	Key Ecological Feature	- / 14.4	- / 8.1	0.5 / 3.6	4.4 / 3.9
Beagle	Australian Marine Parks	1.0 / -	84.3 / -	-	-
Otway	IMCRA	100 / 100	0.1 / 0.1	100 / 100	0.1 / 0.1
Central Victoria	IMCRA	95.1 / 48.5	1.8 / 8.3	37.7 / 3.1	1.3 / 2.5
Central Bass Strait	IMCRA	72.8 / 13.4	2.3 / 24.1	17.6 / -	1.7 / -
Flinders	IMCRA	3.9 / -	39.7 / -	-	-
Summary of Priority Monitoring Locations identified for Submerged Accumulated Hydrocarbons					
Subtropical and Temperate Coastal Saltmarsh	Water Quality. Shoreline Sediment Quality. Benthic Infauna. Marine Mammals. Benthic Habitats and Benthic	Considered relevant based upon location			
Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion					
Assemblages of species associated with open-coast salt-wedge estuaries of western					

Location	Receptor Types	Potential Exposure from LOWC (Condensate)		Potential Exposure from Vessel Collision (MDO)	
		Probability of Contact % @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Minimum time to Contact (Days) @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Probability of Contact % @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Minimum time to Contact (Days) @ ≥10 ppb (Autumn-Winter/ Spring-Summer)
and central Victoria ecological community	Primary Producers. Commercial and Recreational Fish Species. Fishes.				
Natural Damp Grassland of the Victorian Coastal Plains					
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains					
Giant Kelp Marine Forests of South East Australia					

Table 2-6: Summary of Priority Monitoring Locations (Total Dissolved Hydrocarbons)

Location	Receptor Types	Potential Exposure from LOWC (Condensate)		Potential Exposure from Vessel Collision (MDO)	
		Probability of Contact % @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Minimum time to Contact (Days) @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Probability of Contact % @ ≥10 ppb (Autumn-Winter/ Spring-Summer)	Minimum time to Contact (Days) @ ≥10 ppb (Autumn-Winter/ Spring-Summer)
Summary of receptors impacted by dissolved hydrocarbons from the oil spill modelling (GHD, 2022)					
Otway Plain	IBRA	99.0 / 69.1	1.1 / 1.3	13.7 / 2.0	0.9 / 1.1
Warrnambool Plain	IBRA	100 / 100	0.3 / 0.3	81.9 / 88.3	0.1 / 0.2
Otway Ranges	IBRA	100 / 96.9	0.6 / 1.1	23.5 / 5.1	0.7 / 0.9
The Arches	State Marine Parks	-	-	2.5 / 1.0	0.7 / 0.8
Twelve Apostles	State Marine Parks	100 / 100	0.3 / 0.4	52.5 / 46.4	0.3 / 0.3
Apollo	Australian Marine Parks	58.3 / 6.2	1.7 / 39.3	2.0 / -	1.5 / -
Otway	IMCRA	100 / 100	0.1 / 0.1	100 / 100	0.1 0.1
Central Victoria	IMCRA	55.3 / 5.2	1.8 / 48.1	2.0 / -	1.6 / -
Central Bass Strait	IMCRA	25.2 / 3.1	3.8 / 56.8	0.5 / -	2.3 / -
Summary of Priority Monitoring Locations identified for Submerged Accumulated Hydrocarbons					
See Table 2-5					

3 Relevant Sources of Existing Baseline Information

Woodside has access to a number of different baseline data sources that are relevant to the high value receptors in the EMBA. These include:

- Australian Ocean Data Network (AODN);

  The Australian Oceans Data Network (AODN) is the primary access point for search, discovery, access and download of data collected by the Australian marine community. Data is presented as a regional view of all the data available from the Australian Ocean Data Network. Primary datasets are contributed to by Commonwealth Government agencies, State Government agencies, Universities, and the Integrated Marine Observing System (IMOS) an Australian Government Research Infrastructure project.

- Victorian Oil Spill Response Atlas (OSRA);

  The Victorian Oil Spill Response Atlas (OSRA) is a spatial database of environmental, logistical and oil spill response data. Using a geographical information system (GIS) platform, OSRA displays datasets collated from a range of custodians allowing decision-makers to visualise environmental sensitivities and response considerations in a selected location. Oil spill trajectory modelling (OSTM) can be overlaid to assist in determining protection priorities, establishing suitable response strategies and identifying available resources for both contingency and incident planning. OSRA is managed by the Oil Spill Response Coordination unit within Vic Department of Transport (DoT) Marine Safety and is part funded through the National Plan for Maritime Environmental Emergencies and the Australian Maritime Safety Authority (AMSA).

- The Atlas of Living Australia (ALA);

  The Atlas of Living Australia (ALA) is a collaborative, online, open resource that contains information on all the known species in Australia aggregated from a wide range of data providers. It provides a searchable database when considering species within the EMBA. The ALA receives support from the Australian Government through the National Collaborative Research Infrastructure Strategy (NCRIS) and is hosted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

- Department of Agriculture, Water and the Environment (DAWE);

  DAWE provides access to open source information for the Australian Heritage Database, Species Profile and Threats Database, Australian RAMSAR Wetlands and Australian Fisheries information relevant to this document.

- Parks Australia website:

  Parks Australia website provides access to information and publication of Australian National and Marine Parks, including Marine Protected Areas, and access to information from the Director of National Parks, which is a corporation established under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the principal Commonwealth legislation for establishing and managing protected areas. The corporation is constituted by the person appointed to the office named the Director of National Parks.

Further detail on protected species and ecological communities within the EMBA covered by species recovery plans is provided in Section 14. Additional information on protected species can be accessed via the following link: http://www.environment.gov.au/cgi-bin/sprat/public/publicshowallrps.pl

Commercial and Recreation Fisheries baseline information can be accessed from the following sources:

- Commonwealth:
  - Australian Fisheries Management Authority: https://www.afma.gov.au/
  - South East Trawl Fishing Industry Association: https://setfia.org.au/

- Victorian State:
  - Victorian Fisheries Authority: https://vfa.vic.gov.au/commercial-fishing
  - Seafood Industry Victoria: https://www.siv.com.au/

Aboriginal Cultural Heritage:

- Victorian Aboriginal Heritage Council: https://www.aboriginalheritagecouncil.vic.gov.au/

4 Baseline Data Review

In addition to the baseline data detailed in Section 3, Appendix A: Baseline Data Sources details other relevant baseline data sources.

The EMBA intersects the South-east Marine Region (SEMR), which extends from the south coast of New South Wales to Kangaroo Island in South Australia and around Tasmania (DNP, 2013). The SEMR shows significant variation in seafloor features and water depth, contributing to the high level of species diversity in the region (DoE, 2015). There are areas of continental shelf, which includes Bass Strait and Otway Shelf, where rocky reefs and soft sediments support a wide range of species. The shelf break increases currents, eddies and upwelling, and the area is especially biodiverse, including species that are fished recreationally and commercially. There are seafloor canyons along the continental shelf which provide habitat for sessile invertebrates such as temperate corals (DNP, 2013).

Compared to other marine areas, the SEMR is relatively low in nutrients and primary productivity; however, in some locations, water bodies converge and mix to create areas of relatively high biological productivity (DNP, 2013). One of these is the Bonney Upwelling Key Ecological Feature (KEF) in south-eastern South Australia which occurs during autumn and summer. This season of higher primary productivity attracts whale species and other species (including EPBC-listed species) to the area to feed on the plankton swarms (krill) (DoE, 2015).

The SEMR is recognised as a major marine biogeographic region with a high diversity of species and also a large number of endemic species (DNP, 2013). There is an abundance of fish species in the region of approximately 600 species, of which 85% are thought to be endemic. Additionally, approximately 95% of molluscs, 90% of echinoderms, and 62% of macroalgae (seaweed) species are endemic to these waters (DNP, 2013).

The SEMR is further regionalised by the Integrated Marine and Coastal Regionalisation of Australia (IMCRA) version 4.0, with the Minerva field located in the Otway Marine Bioregion located in the Western Bass Strait Shelf provincial bioregion which extends from Cape Otway (Victoria) to Cape Jaffa (South Australia) and includes the western islands of the Bass Strait such as King Island (NOO, 2002).

Woodside has evaluated the baseline data relevant to the high value receptors in the EMBA and reviewed this baseline information to assess the spatial and temporal relevance of this data and comparison of methods and parameters to those outlined in the Joint Industry SMPs. This review focused on priority monitoring locations with a minimum hydrocarbon contact timeframe of less than seven days for the worst-case spill.

The criteria used during the baseline data review is outlined in Table 4-1.

Table 4-1: Assessment Criteria for Baseline Data Review

Year of Most Recent Data Capture	Duration of Monitoring Program	Frequency of Data Capture	Similarity of Methods to Joint Industry SMP	Similarity of Parameters to Joint Industry SMP
High = 2015-2021	High = >4 years	High = 4+ sampling trips per year	High	High
Medium = 2010-2015	Medium = 2-4 years	Medium = 2-3 sampling trips per year	Medium	Medium
Low = 2010	Low = <2 years	Low = one-off sampling trip	Low	Low

This assessment was then used to determine if the available baseline data could be used to detect change in receptors at priority monitoring locations in the event of a significant oil spill, compares priority monitoring locations and receptors, and provides guidance on where post-spill, pre-impact monitoring should be prioritised.

The different categories listed include:

- Not applicable (N/A) – this receptor and relevant SMP is not applicable to the priority monitoring location (i.e. shoreline habitat not present at submerged shoals);
- Survey – Current monitoring/knowledge is considered sufficient (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; and
- Priority survey – Current monitoring/knowledge is not in place, not suitable or not practicable; and post-spill pre-impact baseline data collection should be prioritised.

It is noted that it is difficult to obtain absolute statistical proof of oil spill impacts, due to the variability (spatially and temporally) of the natural environment, the lack of experimental control due to the nature of spills and because suitable baseline data may not be available (Kirby *et al*., 2018). Alternative approaches exist for detecting impacts where post-spill, pre-impact monitoring may not be feasible. These include impact versus control design approaches and/or a gradient approach. The Joint Industry OSMP Framework (APPEA, 2021b) provides guidance and considerations for survey designs to enable the acquisition of sufficiently powerful data during SMP implementation.

Once SMP monitoring reports are drafted (post-spill) they should be peer reviewed by an expert panel (refer to Section 20).

A summary of baseline data assessment results and recommended priority monitoring locations versus SMPs is presented below in Table 4-2.

Table 4-2: Relevant Scientific Monitoring Plans for Recommended Priority Monitoring Locations

Priority Monitoring Locations	Water Quality Impact Assessment	Sediment Quality Impact Assessment	Intertidal and Coastal Habitat Assessment	Seabirds and Shorebirds	Marine Megafauna Assessment	Marine Reptiles Assessment	Benthic Habitat Assessment	Marine Fish Assessment	Fisheries Impact Assessment	Heritage and Social Impact Assessment
Surface hydrocarbon exposure sites: Otway Plain Warrnambool Plain Otway Ranges The Arches Twelve Apostles Otway	Priority Survey	N/A	N/A	Survey	Survey	Survey	N/A	Survey	Priority Survey (Locations to be determined in consultation with key stakeholders to reflect current fishing zones/effort)	Priority Survey (Locations to be determined in consultation with key stakeholders)
Shoreline exposure sites: Flinders Wilsons Promontory (Tas) Glenelg Plain Wilsons Promontory (Vic) Gisspland Plain Otway Plain Warrnambool Plain Otway Ranges Victorian Volcanic Plain Strzelecki Ranges	Survey	Priority Survey	Priority Survey	Priority Survey	N/A	Priority Survey	N/A	N/A		
Submerged hydrocarbon exposure: Bridgewater Glenelg Plain Wilsons Promontory Gippsland Plain Otway Plain Warrnambool Plain Otway Ranges Victorian Volcanic Plain Strzelecki Ranges Point Addis The Arches Twelve Apostles Apollo Bonney Coast Upwelling Beagle Otway Central Victoria Central Bass Strait Flinders	Priority Survey	Survey	N/A	Suvey	Survey	Survey	Survey	Survey		
Dissolved hydrocarbon exposure: Otway Plain Warrnambool Plain Otway Ranges The Arches Twelve Apostles Apollo Otway Central Victoria Central Bass Strait	Priority Survey	Survey	N/A	Suvey	Survey	Survey	Survey	Survey		

5 IMT Organisational Structure and OSM Management Team

The Woodside Incident and Crisis Management Procedure (WM0000PG10078169) describes the Incident and Crisis Management (I&CM) process requirements intended to ensure the Company remains prepared to manage incidents and crisis effectively. The Woodside I&CM structure is shown in Figure 5-1. The Incident Management Team (IMT) will be responsible for coordinating OSM activities, which will be led by the Planning Coordinator within the IMT, with support from other functions, in particular the Operations and Logistics Coordinators.

Where the Vic DoT is the Controlling Agency, the IMT will be managed through coordinated command and Woodside will still be expected to continue monitoring activities in Victoria State waters, with oversight from Vic DoT.

Figure 5-2 illustrates the structure of the OSM Management Team during the response phase. The IMT Corporate Incident Coordination (CICC) Leader is ultimately accountable for managing the response operation, which includes this plan. Depending on the scale of the event, individual people may perform multiple roles; similarly, multiple people may share the same role.

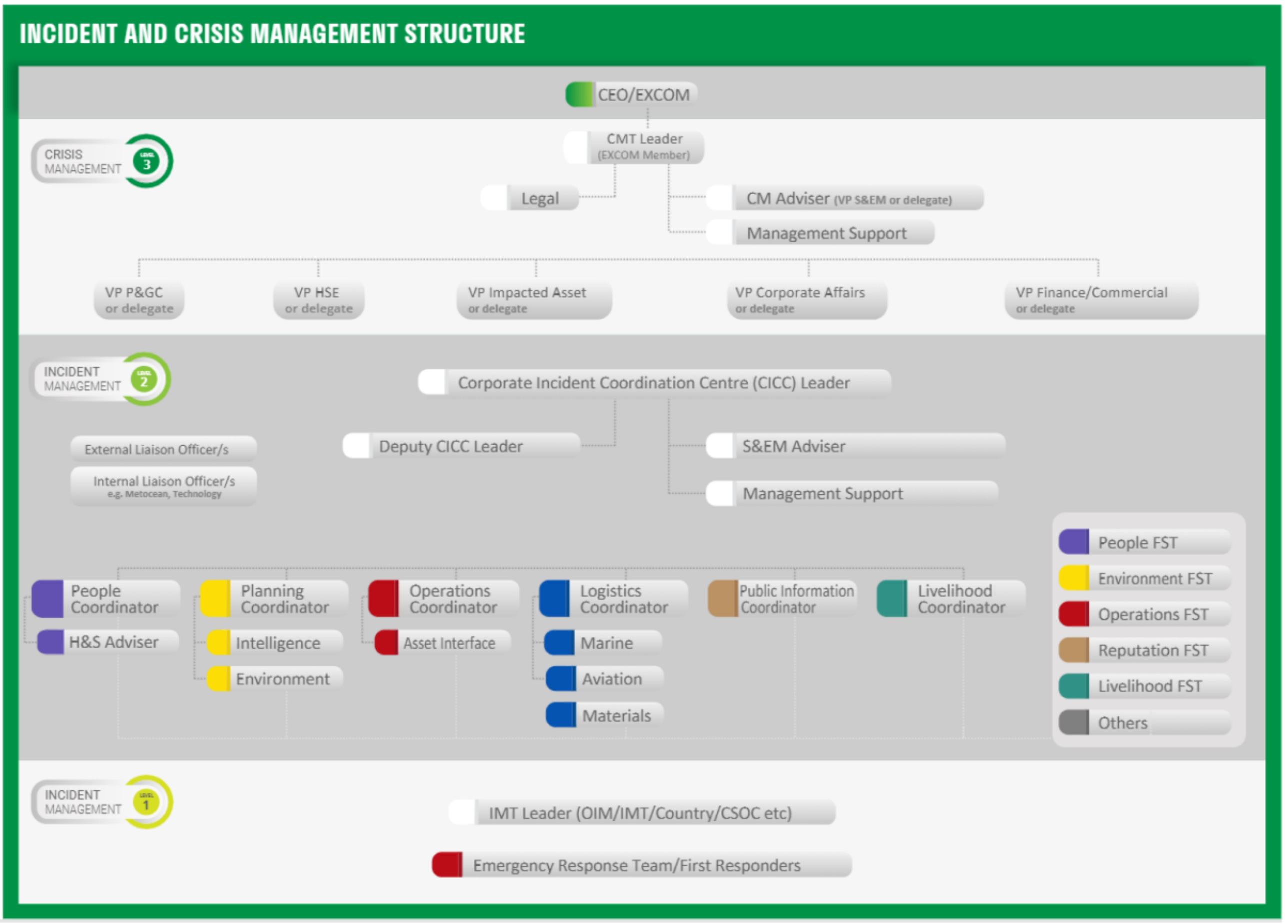

Figure 5-1: Incident and Crisis Management Structure

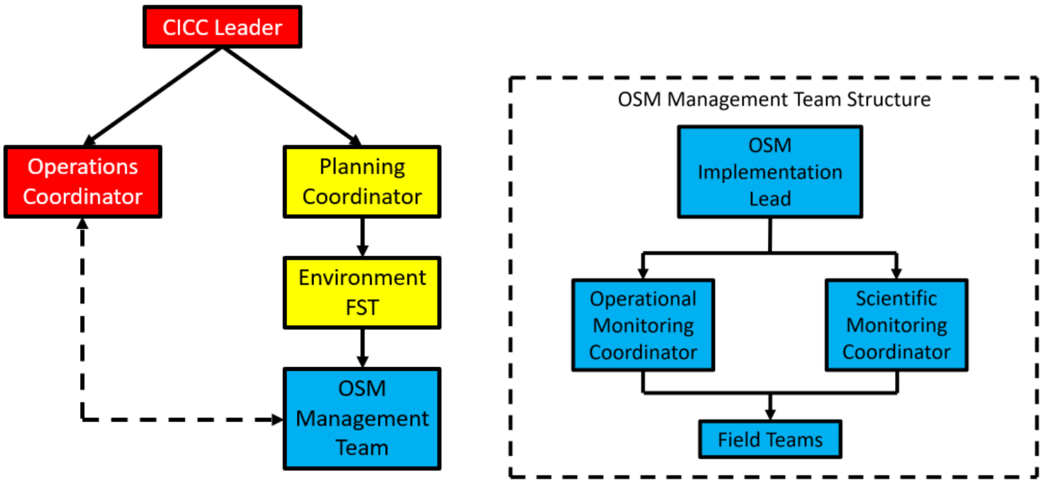

Figure 5-2: Woodside IMT with OSM Management Team

6 OSM Roles and Responsibilities

Table 6-1 outlines the roles held by Woodside and the OSM Service Providers within the OSM Management Team. Table 6-2 outlines the responsibilities of the OSM roles.

During the post-response phase, the Woodside Environment Funtional Support Team (FST) Lead and the OSM Service Provider OSM Implementation Lead will continue to be responsible for the coordination and delivery of monitoring plans.

Table 6-1: OSM Roles (Woodside and Service Providers)

Role	Position Held By
Environment FST Lead	Woodside HSE Principal (or delegate)
OSM Implementation Lead	OSM Service Provider
Operational Monitoring Coordinator and Scientific Monitoring Coordinator	OSM Service Provider
OSM Field Operations Manager	OSM Service Provider
OSM Field Teams	OSM Service Providers

Table 6-2: Roles and Responsibilities for OSM

Role	Key Responsibilities
Planning Coordinator	Ultimately accountable to the CICC Leader for the implementation of the OSMP. Specific responsibilities to the OSMP include: • Ensure OSMP-specific roles are established • Integrate operational and scientific monitoring with the spill response • Ensure that OMP and SMP components are implemented according to their specific initiation criteria and within nominated response times • Ensure that the OSM Implementation Lead and Environment FST are sufficiently resourced to oversee and guide implementation of OSMP activities
Environment Functional Support Team (FST) Lead (Woodside)	The Environment FST Lead is the key position for relaying information between the IMT and the OSMP Implementation Lead. Key OSMP responsibilities include: • Mobilise OSMP Service Provider • Validate protection and monitoring priorities with OSMP Implementation Lead • Validate strategic SIMA to generate the initial operational SIMA • Main point of contact between IMT and OSMP Service Provider • Provide overarching technical advice • Analysing data received from monitoring teams (this task may be delegated to OSMP Management Team) and ensuring the information is incorporated into the current/next operating periods IAP • Advise on environmental impact from implementing monitoring • Management of scientific monitoring components once spill response operation is terminated • Disseminating monitoring information to the Intelligence Lead within the Planning Function • Submitting access and permit applications to all relevant jurisdictional authorities to conduct monitoring of OMPs and SMPs, in consultation with the relevant Controlling Agency
OSMP Implementation Lead (OSM Service Provider)	Responsible for overseeing implementation of OMP and SMP components in accordance with this Plan, specifically: • Identify the relevant OMP and SMP components that may be triggered based on the information collected during the initial response and OMP monitoring • Implementation of response options to ensure that the relevant OMP and SMP components are implemented at the appropriate times • Liaise with Environment FST Lead for advice on scientific monitoring components • Liaise with Environment FST Lead throughout monitoring period (response phase and post-response) • Confirm monitoring priorities with Environment FST Lead and continually re-evaluate • Integrate any protected matters requirements into final monitoring designs • Approve sampling and analysis plans for the SMP components within the nominated time frame of the SMP component being triggered • Approve reactive baseline data requirements, determine if control sites are required and determine the number of samples and sampling sites as part of finalising the monitoring designs for each SMP • Ensure mobilisation of resources for sampling and analysis plans within the nominated time frame of the SMP component being triggered

Role	Key Responsibilities
	• Liaise with relevant stakeholders and regulators on monitoring design, monitoring priorities, and results via the Woodside Liaison Officer
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Service Provider)	The Operational Monitoring Coordinator and Scientific Monitoring Coordinator are the technical leads for each monitoring type. Responsibilities include: • Assist OSMP Implementation Lead in finalising monitoring design for individual OMPs and/or SMPs • Understand the data metrics collected in the event of a spill • Advise the OSMP Implementation Lead on data collection, logistical support required, and monitoring priorities if constraints (e.g. safety, time, logistics) are encountered • Oversee data analyses and interpretation • Manage data, including spatial data • Present data in an appropriate and informative format to allow for timely decisions
OSMP Field Operations Manager (OSM Service Provider)	Responsible of the coordination of resources and developing a schedule of movements, in close consultation with the IMT Logistics Coordinator. Key responsibilities include: • Determine locations where monitoring teams are required and resource requirements for specific locations • Keep track of vessel/aerial movements associated with monitoring activities • Monitor resource availability • Direct communications with relevant monitoring coordinator and field team leads • Monitor and coordinate simultaneous operations
OSMP Field Teams (OSM Service Provider)	A field team includes one Field Team Lead, who is the key contact point to the relevant Monitoring Coordinator during field deployment. The responsibilities of all field team members include: • Understand the details of monitoring methods • Ensure that they are supplied with adequate equipment and field data collection sheets to undertake the monitoring equipment • Ensure awareness and understanding of the QA/QC procedures • Help with report preparation if required

7 Mobilisation and Timing of OMP and SMP Implementation

The time it takes to mobilise and implement each OMP and SMP will vary according to the spill risk profile, proximity of the spill to sensitive receptors, mobilisation constraints and logistical requirements. Table 7-1 provides an indicative implementation schedule for OMP and SMPs within the EMBA and adjacent waters. The locations listed are aligned to the initial monitoring priorities described in Section 2. Blue text in Table 7-1 highlights OMPs and SMPs that align with those in Tables 5-1 and Table 6-1 of the APPEA Joint Industry Operational and Scientific Monitoring (OSM) Plan Framework, and where text deviates from APPEA Joint Industry OSM Bridging Implementation Plan Template.

OMPs are sufficiently developed to immediately initiate in the event of a worst-case discharge in liaison with relevant jurisdiction authority. Not all OMPs will require implementation within 24 hours e.g. satellite imagery.

Note: 'Initiation' means that the monitoring plan has been triggered and the IMT/Monitoring Provider has commenced finalisation of the plan including implementation of the following actions (which may take 48-72 hours to complete all actions):

- Activate internal OSMP personnel and external contracts
- Select/confirm monitoring sites
- Finalise sampling techniques and sampling analysis plans
- Determine suitable sampling frequency
- Finalise standard operating procedures
- Allocate number of teams, personnel, equipment and supporting resource requirements
- Finalise Health, Safety and Environment (HSE) documentation prior to mobilisation of field teams
- Confirm logistics (e.g. flights, accommodation, vessels)
- Commence deployment of field teams.

For SMPs:

- Gather existing baseline data and/or establish control/reference sites
- Establish benchmarks and guidelines to be used
- Confirm indicator species
- Confirm parameters and metrics.

Table 7-1: Indicative OMP and SMP Implementation Schedule for OSM Activities if Initiation Criteria are met

Priority Monitoring Locations	Monitoring Type	0-6 Hours from OSM activation	0-48 Hours from OSM Activation	Within 72 Hours of OSM Activation	~7 days from OSM Activation	>2 weeks from OSM Activation
Offshore waters adjacent to release location **Surface hydrocarbon exposure sites:** Otway Plain Warrnambool Plain Otway Ranges The Arches Twelve Apostles Otway **Identified Marine National Marine Parks (MNP) / Marine Sanctuaries (MS):** Apollo Australia Marine Park Beagle Australia Marine Park **State Marine Park** Bunurong MNP Churchill MNP Discovery Bay MNP Point Addis MNP Port Phillip Heads MNP Twelve Apostles MNP Wilsons Promotory MNP Marengo Reefs MS Barwon Bluff MS Eagle Rocj MS Merri MS Mushroom Reef MS Point Danger MS	Operational Monitoring	• Activation of OMP Team Leads • Finalise OMPs • Commence activation and mobilisation of OM personnel	• Continue to finalise OMPs • Continue activation and mobilisation of OM personnel • Activation of APU RS2 Monitor and Evaluate (AOHSE-ER-0053): • Vessel Surveillance • Aerial Surveillance (AOHSE-ER-0041) • Oil Spill Trajectory Modelling (AOHSE-ER-044) • OSTB Deployment (AOHSE-ER-0033) • Satellite Imagery • Activation of OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • Activation of OMP: Water Quality Assessment • Activation of OMP: Sediment Quality Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of OMP: Marine Fauna Assessment APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)	• OMP: Air quality modelling (responder health and safety) APU First Responder Air Quality Monitoring Work Plan (11203237). Note: Deviation from Joint Industry OSM Bridging Implementation Plan Template that has implementation within 0-6 hrs. In the event of an oil spill event such as a loss of well control, health and safety risks would prevent implementation in 0-6 hrs. Woodside would implement when safe to do so. • Continue to finalise OMPs • Continue to activate and mobilise OM personnel • Continue OMP monitoring	• Continue to activate and mobilise OM personnel • Continue OMP monitoring	As results from implemented OMPs are available, data is provided to relevant personnel in IMT (Intelligence Function) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met.
	Scientific Monitoring	• Activation of SMP Team Leads • Finalise SMPs • Commence activation and mobilisation of personnel	• Continue to finalise SMPs • Continue activation and mobilisation of personnel • Activation of SMP: Water Quality Impact Assessment • Activation of SMP: Sediment Quality Impact Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of SMP: Marine fauna Assessment: APU RS10 Environmental Monitoring:	• Continue to finalise SMPs. • Continue to activate and mobilise personnel. • Continue SMP monitoring	• Continue to finalise SMPs • Continue to activate and mobilise personnel • Continue SMP monitoring until termination criteria are met	Continue SMP monitoring until termination criteria are met

Priority Monitoring Locations	Monitoring Type	0-6 Hours from OSM activation	0-48 Hours from OSM Activation	Within 72 Hours of OSM Activation	~7 days from OSM Activation	>2 weeks from OSM Activation
			• Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)			
Locations with Shoreline exposure where modelling shows contact within 72 hours (minimum predicted time to contact @ ≥10 g/m²) Otway Plain Warrnambool Plain Otway Ranges	Operational Monitoring	• Activation of OMP Team Leads • Finalise OMPs • Commence activation and mobilisation of OM personnel	• Continue to finalise OMPs • Commence activation and mobilisation of OM personnel • Activation of APU RS2 Monitor and Evaluate (AOHSE-ER-0053): • Vessel Surveillance • Aerial Surveillance (AOHSE-ER-0041) • Oil Spill Trajectory Modelling (AOHSE-ER-044) • Satellite Imagery • Activation of OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • Activation of OMP: Water Quality Assessment • Activation of OMP: Sediment Quality Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of OMP: Shoreline Clean-Up Assessment Activation of APU RS5 Shoreline Protection (AOHSE-ER-0057) including SCAT APU RS8 Shoreline Clean-Up (AOHSE-ER-0058) • Activation of OMP: Marine Fauna Assessment APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)	• Continue to finalise OMPs • Continue to activate and mobilise OM personnel • Continue OMP monitoring	• Continue to activate and mobilise OM personnel • Continue OMP monitoring	As results from implemented OMPs are available, data is provided to relevant personnel in IMT (Intelligence Function) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met.

Priority Monitoring Locations	Monitoring Type	0-6 Hours from OSM activation	0-48 Hours from OSM Activation	Within 72 Hours of OSM Activation	~7 days from OSM Activation	>2 weeks from OSM Activation
	Scientific Monitoring	• Activation of SMP Team Leads • Finalise SMPs requiring reactive baseline monitoring data to be obtained pre-impact • Commence activation and mobilisation of personnel	• Implementation of reactive baseline data monitoring (if applicable) • Finalisation of the remaining SMPs (where individual SMP initiation criteria are met) • Continue activation and mobilisation of personnel • Activation of SMP: Water Quality Impact Assessment • Activation of SMP: Sediment Quality Impact Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of SMP: Intertidal and Coastal Habitat Assessment • Activation of SMP: Benthic Habitat Assessment APU Monitoring Effects of an Oil Spill on Benthic Habitats and Benthic Primary Producers (AOHSE-ER-0040) • Activation of SMP: Marine fauna Assessment: APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051 • Activation of Woodside Aboriginal Heritage Procedures activated by Woodside Heritage Team.	• Relevant SMPs are being implemented where resources are deployed • Continue to activate and mobilise personnel. • Continue SMP monitoring	• Continue to finalise SMPs • Continue to activate and mobilise personnel • Continue SMP monitoring until termination criteria are met	Continue SMP monitoring until termination criteria are met
Locations with Shoreline exposure where modelling shows contact >3 days (minimum predicted time to contact @ ≥10 g/m²) Flinders Wilsons Promontory (Tas) Glenelg Plain Wilsons Promontory (Vic) Gisspland Plain Victorian Volcanic Plain Strzelecki Ranges	Operational Monitoring			• Activation of OMP Team Leads • Finalise OMPs • Commence activation and mobilisation of OM personnel • Activation of APU RS2 Monitor and Evaluate (AOHSE-ER-0053): • Aerial Surveillance (AOHSE-ER-0041) • Activation of OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • Activation of OMP: Water Quality Assessment • Activation of OMP: Sediment Quality Assessment	• Continue to finalise OMPs • Continue to activate and mobilise OM personnel • Continue OMP monitoring	As results from implemented OMPs are available, data is provided to relevant personnel in IMT (Intelligence Function) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met.

Priority Monitoring Locations	Monitoring Type	0-6 Hours from OSM activation	0-48 Hours from OSM Activation	Within 72 Hours of OSM Activation	~7 days from OSM Activation	>2 weeks from OSM Activation
				APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of OMP: Shoreline Clean-Up Assessment Activation of APU RS5 Shoreline Protection (AOHSE-ER-0057) including SCAT APU RS8 Shoreline Clean-Up (AOHSE-ER-0058) • Activation of OMP: Marine Fauna Assessment APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)		
	Scientific Monitoring			• Activation and mobilisation process • Finalise SMPs • Activation of SMP Team Leads and finalisation of SMPs • Activation of SMP: Water Quality Impact Assessment • Activation of SMP: Sediment Quality Impact Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of SMP: Intertidal and Coastal Habitat Assessment • Activation of SMP: Benthic Habitat Assessment APU Monitoring Effects of an Oil Spill on Benthic Habitats and Benthic Primary Producers (AOHSE-ER-0040) • Activation of SMP: Marine fauna Assessment: APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048)	• Continue to finalise SMPs • Continue to activate and mobilise personnel • Continue SMP monitoring until termination criteria are met	Continue SMP monitoring until termination criteria are met.

Priority Monitoring Locations	Monitoring Type	0-6 Hours from OSM activation	0-48 Hours from OSM Activation	Within 72 Hours of OSM Activation	~7 days from OSM Activation	>2 weeks from OSM Activation
				• Fishes (AOHSE-ER-0051 • Activation of Woodside Aboriginal Heritage Procedures activated by Woodside Heritage Team.		
Location where submerged hydrocarbon exposure modelled (> 10ppb): Bridgewater Glenelg Plain Wilsons Promontory Gippsland Plain Otway Plain Warrnambool Plain Otway Ranges Victorian Volcanic Plain Strzelecki Ranges Point Addis The Arches Twelve Apostles Apollo Bonney Coast Upwelling Beagle Otway Central Victoria Central Bass Strait Flinders	Operational Monitoring	• Activation of OMP Team Leads • Finalise OMPs • Commence activation and mobilisation of OM personnel	• Continue to finalise OMPs • Continue activation and mobilisation of OM personnel • Activation of APU RS2 Monitor and Evaluate (AOHSE-ER-0053): • Vessel Surveillance • Aerial Surveillance (AOHSE-ER-0041) • Oil Spill Trajectory Modelling (AOHSE-ER-044) • OSTB Deployment (AOHSE-ER-0033) • Satellite Imagery • Activation of OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • Activation of OMP: Water Quality Assessment • Activation of OMP: Sediment Quality Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of OMP: Marine Fauna Assessment APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)	• Continue to finalise OMPs • Continue to activate and mobilise OM personnel • Continue OMP monitoring	• Continue to activate and mobilise OM personnel • Continue OMP monitoring	As results from implemented OMPs are available, data is provided to relevant personnel in IMT (Intelligence Function) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met.
	Scientific Monitoring	• Activation of SMP Team Leads • Finalise SMPs • Commence activation and mobilisation of personnel	• Continue to finalise SMPs • Continue activation and mobilisation of personnel • Activation of SMP: Water Quality Impact Assessment • Activation of SMP: Sediment Quality Impact Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037)	• Continue to finalise SMPs. • Continue to activate and mobilise personnel. • Continue SMP monitoring	• Continue to finalise SMPs • Continue to activate and mobilise personnel • Continue SMP monitoring until termination criteria are met	Continue SMP monitoring until termination criteria are met

Priority Monitoring Locations	Monitoring Type	0-6 Hours from OSM activation	0-48 Hours from OSM Activation	Within 72 Hours of OSM Activation	~7 days from OSM Activation	>2 weeks from OSM Activation
			• Activation of SMP: Marine fauna Assessment: APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)			
Location where dissolved hydrocarbon exposure modelled (> 10ppb): Otway Plain Warrnambool Plain Otway Ranges The Arches Twelve Apostles Apollo Otway Central Victoria Central Bass Strait	Operational Monitoring	• Activation of OMP Team Leads • Finalise OMPs • Commence activation and mobilisation of OM personnel	• Continue to finalise OMPs • Continue activation and mobilisation of OM personnel • Activation of APU RS2 Monitor and Evaluate (AOHSE-ER-0053): • Vessel Surveillance • Aerial Surveillance (AOHSE-ER-0041) • Oil Spill Trajectory Modelling (AOHSE-ER-044) • OSTB Deployment (AOHSE-ER-0033) • Satellite Imagery • Activation of OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g. Supply Vessel with onboard sampling equipment). • Activation of OMP: Water Quality Assessment • Activation of OMP: Sediment Quality Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of OMP: Marine Fauna Assessment APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)	• Continue to finalise OMPs • Continue to activate and mobilise OM personnel • Continue OMP monitoring	• Continue to activate and mobilise OM personnel • Continue OMP monitoring	As results from implemented OMPs are available, data is provided to relevant personnel in IMT (Intelligence Function) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met.

Priority Monitoring Locations	Monitoring Type	0-6 Hours from OSM activation	0-48 Hours from OSM Activation	Within 72 Hours of OSM Activation	~7 days from OSM Activation	>2 weeks from OSM Activation
	Scientific Monitoring	• Activation of SMP Team Leads • Finalise SMPs • Commence activation and mobilisation of personnel	• Continue to finalise SMPs • Continue activation and mobilisation of personnel • Activation of SMP: Water Quality Impact Assessment • Activation of SMP: Sediment Quality Impact Assessment APU Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037) • Activation of SMP: Marine fauna Assessment: APU RS10 Environmental Monitoring: • Marine Reptiles (AOHSE-ER-0043) • Marine Mammals and Megafauna (AOHSE-ER-0039) • Avifauna (AOHSE-ER-0038) • Commercial and Recreational Fish Species (AOHSE-ER-0048) • Fishes (AOHSE-ER-0051)	• Continue to finalise SMPs. • Continue to activate and mobilise personnel. • Continue SMP monitoring	• Continue to finalise SMPs • Continue to activate and mobilise personnel • Continue SMP monitoring until termination criteria are met	Continue SMP monitoring until termination criteria are met

8 Resource Requirements

The resources required to assist the IMT / CICC in the coordination and management of OSM are outlined in Table 8-1. The resources required to implement operational and scientific monitoring components are presented in Table 8-2 and Table 8-3 respectively, which is based on the monitoring priorities in Section 2 and implementation schedule outlined in Table 7-1. This assessment is based on a LOWC scenario (Condensate) in the Minerva Field. It should be noted that a single spill will not contact all locations and receptors listed Table 7-1.

Table 8-1: Resources Required for Key OSM Coordination Roles

Role	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
OSM Implementation Lead (OSM Service Provider)	1 x Principal Scientist	1 x Principal Scientist	1 x Principal Scientist	OSM Service Provider Service Level Agreement
Operational Monitoring Coordinator and Scientific Monitoring Coordinator (OSM Service Provider)	2 x Principal Scientists	2 x Principal Scientists	2 x Principal Scientists	
OSM Field Operations Manager (OSM Service Provider)	1 x Senior Scientist	1 x Senior Scientist	1 x Senior Scientist	

Table 8-2: Indicative Resources Required for Implementation of Operational Monitoring Plans

OMP	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
Hydrocarbon properties and weathering behaviour at sea* **APU Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037)**	Total 4 team leaders and 12 team members (3 per team) 1 team (spill site and surrounds including AMPs) 1 team (Port Campbell - Twelve Apostles)	Replicate from week 1 Note: these resources may not be required if relevant scientific monitoring components initiation criteria have been triggered.	Replicate from week 1 & week 2	Woodside have a Service Level Agreement with a NATA accredited laboratory Woodside have a Service Level Agreement with OSM Service Provider

OMP	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
	1 team (Twelve Apostles - Princetown) 1 team (Princetown – Lower Gellibrand)			Contract includes provision of equipment
Shoreline clean-up assessment **APU RS5 Shoreline Protection (AOHSE-ER-0057)**	Total 3 team leaders and 9 team members (3 per team) 1 team (Port Campbell - Twelve Apostles) 1 team (Twelve Apostles - Princetown) 1 team (Princetown – Lower Gellibrand)	Replicate from week 1 Note: these resources may not be required if relevant scientific monitoring components initiation criteria have been triggered.	Replicate from week 1 & week 2	AMOSCPlan (Woodside is AMOSC member) OSRL (Woodside has Service Level Agreement) AMSA (State Response Team)
Water quality assessment **APU Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037)**	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites) Additional teams, if required (dependent upon any modifications to sampling locations, frequency etc.)	Woodside have a Service Level Agreement with a NATA accredited laboratory
Sediment quality assessment* **APU Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037)**	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites)	Refer to OMP: Hydrocarbon properties and weathering behaviour at sea resourcing* (all sites) Additional teams, if required (dependent upon any	Woodside have a Service Level Agreement with a NATA accredited laboratory Woodside have a Service Level Agreement with OSM Service Provider

OMP	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
			modifications to sampling locations, frequency etc.)	Contract includes provision of equipment
Marine fauna assessment **APU Incident Action Plan – Marine Mammals and Megafauna (AOHSE-ER-0039)**	1 team to conduct initial aerial surveys for spill site, Site A, Site B, Site C (2 observers per aircraft). Note: these resources may not be required if relevant scientific monitoring components initiation criteria have been triggered.	If vessel based surveys selected: 4x Teams Total 4 team leaders and 12 team members (3 per team)	If vessel based surveys selected: 4x Teams Total 4 team leaders and 12 team members (3 per team)	Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment
Air quality monitoring (responder health and safety) **APU Petroleum First Responder Air Monitoring Work Plan (11203437)**	1 team (onshore) 1 team (offshore)	1 team (onshore) 1 team (offshore)	1 team (onshore) 1 team (offshore)	Internal Woodside HSE Specialists

* Initial co-mobilisation between OMP: Hydrocarbon properties and weathering behaviour at sea, OMP: Water quality assessment and OMP: Sediment quality assessment

Table 8-3: Indicative Resources Required for Implementation of Scientific Monitoring Plans

SMP	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
Water quality assessment **APU Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037)**	4 x Teams Total 4 team leaders and 12 team members (3 per team)	4 x Teams Total 4 team leaders and 12 team members (3 per team) Note: these resources may not be required if relevant scientific monitoring components initiation criteria have been triggered.	4 x Teams Total 4 team leaders and 12 team members (3 per team)	Woodside have a Service Level Agreement with a NATA accredited laboratory Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage
Sediment quality assessment **APU Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna (AOHSE-ER-0037)**	Refer to SMP: Water quality assessment* (all sites)	Refer to SMP: Water quality assessment* (all sites)	Refer to SMP: Water quality assessment* (all sites)	Woodside have a Service Level Agreement with a NATA accredited laboratory Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage Aviation contract with service provider
Intertidal and coastal habitat assessment **APU Incident Action Plan – Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and**	3 x Teams Total 3 team leaders and 9 team members (3 per team)	3 x teams Total 3 team leaders and 9 team members (3 per team) Replicate from week 1	3 x Teams Total 3 team leaders and 9 team members (3 per team)	Woodside have a Service Level Agreement with a NATA accredited laboratory

SMP	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
Effects on Benthic Infauna (AOHSE-ER-0037)	1 team (Port Campbell - Twelve Apostles) 1 team (Twelve Apostles - Princetown) 1 team (Princetown – Lower Gellibrand)		Replicate from week 1 and week 2	Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage
Seabirds and Shorebirds APU Incident Action Plan – Seabirds and Migratory Shorebirds (AOHSE-ER-0038)	3 x Teams Total 3 team leaders and 9 team members (3 per team) Note: Can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMPs termination criteria are triggered	3 x Teams Total 3 team leaders and 9 team members (3 per team)	3 x Teams Total 3 team leaders and 9 team members (3 per team)	Woodside have a Service Level Agreement with Specialist Environmental Consultants Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage Aviation contract with a service provider
Marine fauna assessment APU Incident Action Plan – Marine mammals and Megafauna (AOHSE-ER-0039)	1 team to conduct initial aerial surveys for spill site, and surrounding area Total 2 team leaders and 6 team members (4 per team). Note: Can initially be performed by the same team as the relevant OMP: Marine fauna assessment. This SMP may replace the relevant OMP: Marine fauna assessment if the	If vessel based surveys selected: 4x Teams Total 4 team leaders and 12 team members (3 per team)	If vessel based surveys selected: 4x Teams Total 4 team leaders and 12 team members (3 per team)	Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage

SMP	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
	OMPs termination criteria are triggered			Aviation contract with a service provider
Marine reptiles assessment **APU Incident Action Plan – Marine Reptiles (AOHSE-ER-0043)**	4 x Teams Total 4 team leaders and 12 team members (3 per team). Note: Can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds.	4 x Teams Total 4 team leaders and 12 team members (3 per team)	4 x Teams Total 4 team leaders and 12 team members (3 per team)	Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage Aviation contract with a service provider
Benthic habitat assessment **APU Incident Action Plan – Benthic Habitats and Benthic Primary Producers (AOHSE-ER-0040)**	3 x Teams Total 3 team leaders and 9 team members (3 per team) 1 team (Port Campbell - Twelve Apostles) 1 team (Twelve Apostles - Princetown) 1 team (Princetown – Lower Gellibrand)	3 x teams Total 3 team leaders and 9 team members (3 per team) Replicate from week 1	3 x Teams Total 3 team leaders and 9 team members (3 per team) Replicate from week 1 and week 2	Woodside have a Service Level Agreement with a NATA accredited laboratory Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage
Marine fish and elasmobranch assemblages assessment **APU Incident Action Plan – Effects of an Oil Spill on Fishes (AOHSE-ER-0051)**	3 x Teams Total 3 team leaders and 9 team members (3 per team) Note: can initially be performed by the same team as OMP:	3 x Teams Total 3 team leaders and 9 team members (3 per team)	3 x Teams Total 3 team leaders and 9 team members (3 per team)	Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment

SMP	Week 1 (total)	Week 2 (total)	Week 3 (total)	Arrangement
	Marine fauna assessment – fish. This SMP may replace OMP: Marine fauna assessment – fish if the OMPs termination criteria are triggered			Marine Contractors via vessel brokerage
Fisheries impact assessment **APU Incident Action Plan – Commercial and Recreational Fish Species (AOHSE-ER-0048)**	2 teams (Commonwealth fisheries with the potential to be impacted/are being impacted Total 2 team leaders and 6 team members (3 per team) Note: Can initially be performed by the same team as OMP: Marine fauna assessment – fish. This SMP may replace OMP: Marine fauna assessment – fish if the OMPs termination criteria are triggered	2 teams (Commonwealth fisheries with the potential to be impacted/are being impacted Total 2 team leaders and 6 team members (3 per team)	2 teams (Commonwealth fisheries with the potential to be impacted/are being impacted Total 2 team leaders and 6 team members (3 per team)	Woodside have a Service Level Agreement with a NATA accredited laboratory Woodside have a Service Level Agreement with OSM Service Provider Contract includes provision of equipment Marine Contractors via vessel brokerage
Heritage features assessment **Woodside Aboriginal Heritage Procedures activated by Woodside Heritage Team**	1 team Total 1 team leader and 2 team members (3 per team)	1 team Total 1 team leader and 2 team members (3 per team)	1 team Total 1 team leader and 2 team members (3 per team)	Internal Woodside Heritage Team

* Initial co-mobilisation between OMP: Hydrocarbon properties and weathering behaviour at sea, OMP: Water quality assessment and OMP: Sediment quality assessment

9 Capability Arrangements

Woodside maintains a list of pre-approved vendors (OSM Service Providers) who can be called upon at short notice to provide environmental monitoring services in the event of an oil spill.

9.1 Personnel Competencies

Competencies required for key OSM roles and SMP Field Teams will be in accordance with Table 11-1 and Appendix D respectively of the APPEA Joint Industry OSM Plan Framework.

In addition and where practicable, Woodside will engage its most qualified local environment advisors in the initial stages of the monitoring program to help activate and mobilise monitoring teams and support the OSM Service Provider in the finalisation of monitoring designs.

9.2 Equipment

Equipment requirements are listed in the individual OMPs and SMPs. A generalised breakdown of equipment types and the source is listed in Table 9-1.

In accordance with the OSM services contract, the OSM Service Provider will provide all specialised field monitoring equipment to implement individual OMPs and SMPs. Woodside will remain responsible for support and field logistics, including monitoring platforms (e.g. vessels, vehicles and aircraft), flights and accommodation for personnel and transportation/couriers for samples to be sent back to laboratories.

Availability of field equipment will be listed in the OSM Service Provider's Standby Capability and Competency Report.

Table 9-1: OSM Equipment

Equipment Type	Source
Desktop equipment (e.g. Oil Spill Response Atlas, GIS)	Coordinated through Woodside IMT intelligence Function
In-field specialised monitoring equipment (e.g. fluorometers, sample bottles, ROVs)	Coordinated through the OSMP Service Provider's standby OSMP response and implementation services, including: OSRL Service Level Agreement; OSM Service Providers ROV capability via Woodside
Logistical equipment (e.g. in-field accommodation, vessels, aircraft)	Coordinated via Woodside IMT (Logistics Coordinator)

9.3 Exercises

Woodside conducts a number of different exercise types that may include a component of operational and scientific monitoring, which are outlined in Table 9-2.

Table 9-2: Exercise Types

Exercise Type	Description	Frequency
Notification Exercise	Test procedures to notify and activate the IMT, oil spill response organisations, third-party providers (including OSM Service	Prior to undertaking a new offshore activity; or

Exercise Type	Description	Frequency
	Providers) and regulators	At least annually
Desktop Exercise	Normally involves interactive desktop discussions of a simulated scenario. OSM Desktop exercises may involve the following focus areas: • Test the time required to finalise monitoring design; • Test arrangements for delivery and use of data by IMT in decision-making; or • Data exchange test with field (opportunistic when contractors in in the field)	Prior to undertaking a new offshore activity; or At least annually
Major Incident Management Exercise	Involves IMT activation to establish command, control, and coordination of a Level 2 or 3 incident. Can simulate several different aspects of an oil spill incident and may involve third parties. OSM activation may be included as component of this exercise.	Prior to undertaking a new offshore activity; or At least annually

The purpose of these exercises is to test the preparedness of OSM Service Providers to respond in a timely manner to a potential Level 2 / Level 3 emergency oil pollution event and confirm adequacy of response arrangements.

Woodside routinely undertakes post-exercise debriefings following Level 2 / Level 3 exercises and drills to identify opportunities for improvement and communicate lessons learned. Actions that are derived from drills and exercises including debriefs are documented in an action tracking system and tracked to closure.

Woodside regularly tests its standby arrangements and activation process with its OSM Service Providers, to ensure CICC roles and key OSM Service Provider personnel are familiar with the activation process and to check the OSM Service Provider’s Standby Capability and Competency Report.

10 Capability Assessment

Table 10-1: OSM Capability

Component	Total Personnel Required (Weeks 1–2) [1]	Personnel Available via OSM Service Provider Standby Contract	Personnel Available via OSROs	Woodside	Total Personnel Available
OSM Personnel embedded in IMT/CICC	1 OSM Implementation Lead 1 Operational Monitoring Coordinator 1 Scientific Monitoring Coordinator 1 Field Operations Manager	1 OSM Implementation Lead 1 Operational Monitoring Coordinator 1 Scientific Monitoring Coordinator 1 Field Operations Manager	N/A	1 OSM Implementation Lead (initial)	1 OSM Implementation Lead 1 Operational Monitoring Coordinator 1 Scientific Monitoring Coordinator 1 Field Operations Manager
OMPs					
Hydrocarbon properties and weathering behaviour at sea*	2 team leaders 4 team members	2 team leaders 4 team members	N/A	N/A	5 team leaders 10 team members
Shoreline clean-up assessment / (AOHSE-ER-0043)	3 team leaders 6 team members	3 team leaders 6 team members	13 team leaders (AMOSC) 12 team leaders (OSRL)	N/A	26 team leaders 36 team members

[1] If additional resources are required for week 3 onwards then this will be identified early in the monitoring process and Woodside will activate additional contracted resources through its OSM Services Provider to increase capacity

Water quality assessment* (AOHSE-ER-0037)	Refer to *Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna* (AOHSE-ER-0037)				
Sediment quality assessment* (AOHSE-ER-0037)	Refer to *Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna* (AOHSE-ER-0037)				
Marine mammals and megafauna assessment (AOHSE-ER-0039)	1 aerial team (including 1 Marine Mammal Observer (MMO) and 1 Aerial survey observer) 3 vessel teams (including 2 vessel-based survey trained MMOs, 1 experienced vessel survey observer per team)	16 MMOs 11 Aerial survey observers 21 vessel survey observers 6 experienced ornithologists 2 personnel with pathology or veterinary skills	N/A	N/A	16 MMOs 11 Aerial survey observers 21 vessel survey observers 6 experienced ornithologists 2 personnel with pathology or veterinary skills
Air quality monitoring (responder health and safety) APU Petroleum First Responder Air Monitoring Work Plan (11203437)	2 Air Quality Specialist			2 Air Quality Specialist Specialists from Project and Technology Team	2 Air Quality Specialist Specialists from Project and Technology Team
SMPs					
Water quality impact assessment (AOHSE-ER-0037)	Note: can initially be performed by the same team as OMP: Water quality assessment. This SMP may replace OMP: Water quality assessment if the OMPs termination criteria are triggered Refer to *Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna* (AOHSE-ER-0037)				

Sediment quality impact assessment (AOHSE-ER-0037)	Refer to *Monitoring of Oil Hydrocarbons in Marine Waters, Sediments and Effects on Benthic Infauna* (AOHSE-ER-0037)				
Intertidal and coastal habitat assessment (AOHSE-ER-0037)	3 team leaders 3 team members	3 team leaders 33 team members	N/A	N/A	12 team leaders 21 team members
Seabirds and shorebirds (AOHSE-ER-0038)	Note: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP: Marine fauna assessment – seabirds and shorebirds if the OMPs termination criteria are triggered				
Marine reptiles assessment (AOHSE-ER-0043)	Note: can initially be performed by SCAT team then replaced by OSM Service Provder.				
Marine mammals and megafauna assessment (AOHSE-ER-0039)	Note: can initially be performed by the same team as OMP: Marine fauna assessment. This SMP may replace OMP: Marine fauna assessment if the OMPs termination criteria are triggered				
Benthic habitats and benthic primary producers assessment (AOHSE-ER-0040)	4 team leaders 8 team members	4 team leaders 8 team members	N/A	N/A	6 team leaders 12 team members
Marine fish and elasmobranch assemblages assessment (AOHSE-ER-0051)	2 team leaders 4 team members	2 senior marine scientists trained in fish identification and necropsy 4 scientists with fish survey and ROV/BRUV experience 6 team members	N/A	N/A	2 senior marine scientists trained in fish identification and necropsy 9 scientists with fish survey and ROV/BRUV experience 7 team members
Commercial and recreational fish species impact	2 team leaders 6 team members	2 senior marine scientists trained in fish identification and necropsy	N/A	N/A	2 senior marine scientists trained in fish identification and necropsy 9 scientists with fish survey and ROV/BRUV experience

assessment (AOHSE-ER-0048)		6 scientists with fish survey and ROV/BRUV experience 8 team members			7 team members
Heritage features assessment Woodside Aboriginal Heritage Procedures activated by Woodside Heritage Team.	1 team leader 2 team members (including either ROV operator or marine diver/s)	1 team leader 2 team members	N/A	3–4 Cultural heritage specialists	1 team leaders 2 team members (including either ROV operator or marine diver/s)

11 Review of Plan

As part of the Woodside internal document review system, this document will be reviewed annually and revised if necessary. This could include changes required in response to one or more of the following:

- When major changes have occurred, which affect either Operational Monitoring or Scientific Monitoring in either coordination, implementation, or capabilities. This includes a change of Service Providers or systems being used by the titleholder.
- Changes to the activity that affect Operational and/or Scientific Monitoring coordination or capabilities such as an increase of risk regarding the oil spill being responded to.
- Changes to legislation that impact or are related to Operational and/or Scientific Monitoring (e.g. EPBC Act, Environment Regulations, and others necessary to the project and implementation of OMP and SMPs).
- Following routine testing of the OSM if improvements or corrections are identified, or
- After a Level 2 or Level 3 spill incident.

The extent of changes made to this OSMP and requirements for regulatory submission will be informed by the relevant Commonwealth regulations, i.e. the Environment Regulations.

Part B – Implementation

12 Activation Process

Woodside's IMT Environment Lead is responsible for activating OSMP components, subject to approval from the CICC leader. Table 12-1 outlines the OSM activation process.

Table 12-1: OSM Activation Process

Responsibility	Task	Timeframe	Complete
Environment Lead (Woodside)	Review initiation criteria of OMPs and SMPs during the preparation of the initial Incident Action Plan (IAPs) and subsequent IAPs; and if any criteria are met, activate relevant OMPs and SMPs	Within 4 hours of spill notification	
	Obtain approval from CICC Leader to initiate OSM	Within 4 hours of spill notification	
	Contact OSM Service Provider and notify on-call officer of incident, requesting provision of OSM Implementation Lead to the IMT	Within 4 hours of spill notification	
	Provide monitor and evaluate data (e.g. aerial surveillance, fate and weathering modelling, tracking buoy data) to OSM Service Provider	Within 1 hour of data being received by IMT	
	Liaise directly with OSM Service Provider to confirm which OMPs and SMPs are to be fully activated	Within 3 hours of monitor and evaluate data being received from IMT	
	Provide purchase order to OSM Service Provider (cross reference OSM Standby Services Scope of Work)	Within 72 hours of initial notification to OSM Service Provider	
	Record tasks in Personal Log	At time of completion of task	
OSM Service Provider	On-call officer to notify OSM Service Provider Manager of activation and contact OSM Implementation Lead and Scientific Logistics Coordinator	Within 8 hours of notification being made to OSM Service Provider	
	Send OSM Implementation Lead and Scientific Logistics Coordinator to IMT	Within 12 hours of notification being made to OSM Service Provider	
	Liaise directly with Environment Lead to confirm which OMPs and SMPs are to be fully activated	Within 4 hours of monitor and evaluate data being received from IMT	
	Confirm availability of initial personnel and equipment resources	Within 5 hours of monitor and evaluate data being received from IMT	

13 Monitoring Priorities

As described in Section 2, the available spill trajectory modelling has been analysed to understand the likely initial monitoring priorities for its activities in the EMBA. In addition, Table 4-2 lists comparability of available baseline data for receptors, to assist in identifying where post-spill, pre-impact monitoring should be prioritised.

The monitoring priorities provided in Section 2 and Table 4-2 are to be used for guidance when confirming monitoring priorities in consultation with key stakeholders and OSM Service Providers (including subject matter experts, where available) at the time of the spill. Table 13-1 provides a checklist to assist in the confirmation of monitoring priorities for individual spills.

Table 13-1: Checklist for Determining Monitoring Priorities

Responsibility	Task	Timeframe	Complete
OSM Service Provider with input from Environment Lead	Confirm monitoring locations for activated OMPs and SMPs based on: • Current monitor and evaluate data (i.e. situational awareness data, including predicted time to receptor impact, aerial/vessel surveillance observations, tracking buoy data, satellite data); • Nature of hydrocarbon spill (i.e. subsea blowout, surface release, hydrocarbon characteristics, volume, expected duration of release); • Seasonality and presence of receptors impacted or at risk of being impacted; • Current information on transient and broadscale receptors (surface and subsea); • Current operational considerations (e.g. weather, logistics); • Nature of hydrocarbon spill (i.e. subsea blow out, surface release, hydrocarbon characteristics, volume, expected duration of release); • Monitoring priorities identified previously (see Section 2); • Existing literature, baseline data, and monitoring programs.	Within 12 hours of monitor and evaluate data being received from IMT	
	Evaluate monitoring priorities in consultation with key stakeholders, including the appointed State/Territory Environment and Science Coordinator	Within 12 hours of monitor and evaluate data being received from IMT	
	Using the results of the baseline data analysis in Table 4-2 and the information above, determine the priority locations for post-spill and pre-impact monitoring	Within 12 hours of monitor and evaluate data being received from IMT	
	Confirm the need for any additional reactive baseline monitoring data for SMPs and determine suitable locations, noting that suitable control or reference sites may be outside of the EMBA	Within 12 hours of monitor and evaluate data being received from IMT	
	Continually re-evaluate monitoring priorities in consultation with Environment Lead and relevant key stakeholders throughout spill response	Ongoing	

14 Protected Matters Requirement

Table 14-1 provides a checklist to ensure monitoring personnel consider protected matters requirements in the finalisation of OMPs and SMPs.

Appendix B: Protected Matters Requirements outlines the management plans, recovery plans and conservation advice statements relevant for the protected matters within the EMBA that are likely to be relevant to the final design of the OMPs and SMPs. Appendix B: Protected Matters Requirements also includes relevant priority monitoring locations where these receptors are known to occur in order to expedite consideration of relevant information into finalised monitoring designs.

Table 14-1: Checklist for Inclusion of Protected Matters into Monitoring Design

Responsibility	Task	Complete
OSM Service Provider with input from Environment Lead	Review Monitoring, Evaluation and Surveillance data and available OMP data to determine likely presence and encounter of protected species in predicted trajectory of the spill	
	Review the relevant recovery plan/conservation advice/management plan in Appendix B: Protected Matters Requirements and determine if there have been any updates to the relevant conservation threats/actions. Integrate relevant considerations into the final monitoring design for affected OMPs and SMPs	
	Review restrictions on marine mammal and marine turtles buffer distances in SMPs and ensure this is included in all relevant response and monitoring IAPs (e.g. Shoreline Protection Plan, Shoreline Clean-up Plan, OSM Plan), so that response and monitoring field teams maintain required buffer distances from fauna during operations	

15 Finalising Monitoring Design

The methods presented in the Joint Industry OSMP framework designed by APPEA (2021b) are designed to allow OSM Service Providers with the flexibility to modify the standard operating procedures. This is so the latest research, technologies, equipment, sampling methods, and variables may be used. Monitoring designs may also be varied in-situ, according to the factors presented in the APPEA Joint Industry OSM Framework Section 10.6.

Table 15-1 shows a checklist for the finalisation of the monitoring design that will be approached by the OSM Service Provider. The OSM Implementation Lead will be responsible for approving the finalised monitoring design used in the OMPs and SMPs.

Table 15-1: Checklist for Finalising Monitoring Design

Responsibility	Task	Timeframe	Complete
OSM Service Providers	Confirm survey objectives, sampling technique, for each initiated OMP and SMP	Within 48 hours of initial monitoring priorities being confirmed by IMT	
	Determine suitable sampling frequency	Within 48 hours of initial monitoring priorities being confirmed by IMT	
	Finalise standard operating procedures	Within 48 hours of initial monitoring priorities being confirmed by IMT	
	Scientific monitoring: • Establish benchmarks and guidelines to be used • Confirm indicator species • Confirm parameters and metrics	Within 96 hours of initial monitoring priorities being confirmed by IMT	

16 Mobilisation

When the monitoring design has been finalised for each OMP and SMP, the OSM Service Provider shall work in conjunction with the Titleholder to develop and execute a monitoring mobilisation plan, which will be incorporated into the Incident Action Planning process.

OSM Service Provider will be required to coordinate the availability of personnel and equipment for all monitoring programs. Woodside will be responsible for flights, accommodation and victualing for field personnel. Woodside will also be required to procure all vessels, aerial platforms and vehicles for OMP and SMP implementation. A checklist for mobilising monitoring teams is provided in Table 16-1.

Table 16-1: Checklist for Mobilisation of Monitoring Teams

Responsibility	Task	Complete
OSM Service Provider with input from Environment Lead	Confirm availability of all monitoring personnel	
	Allocate number of teams, personnel, equipment, and supporting resource requirements	
	Undertake HAZIDs as required and consolidate/review the field documentation including safety plans, emergency response plans, and daily field reports	
	Develop site-specific health and safety plans / JHAs which is compliant with health safety and environment systems (including call in timing and procedures)	
	Conduct pre-mobilisation meeting with monitoring team/s on survey objectives, logistics, safety issues, reporting requirements, and data management collection requirements	
	Determine data management delivery needs of the IMT and process requirements, including data transfer approach and frequency/timing	
	Confirm data formats and metadata requirements with personnel receiving data	
	Logistics	
	Confirm flights, accommodation, and car hire arrangements are in place	
	Develop field survey schedules, detailing staff rotation	
	Equipment	
	Arrange survey platform (vessel, vehicle, aircraft) as required to survey or access survey sites and ensure they are equipped with appropriate fridge and freezer space for transportation of samples (and carcasses if collecting)	
	Ensure vessels have correct fit-out specifications (e.g. winches, GPS, satellite, hiab, sufficient deck space, water supplies, (fresh and/or salt), accommodation) and are shallow-hulled for nearshore waters.	
	Confirm consumables (including personal protective equipment) have been purchased and will be delivered to the required location	
	Liaise with NATA-accredited laboratories to confirm availability, sampling holding times, transportation, obtain sample analysis quotes, and arrange provision of appropriate sample containers, chain of custody (CoC) forms and suitable storage options for all samples. Make arrangements with couriers if necessary.	
	Confirm specialist equipment requirements and availability (including redundancy)	
	Check GPS units, satellite phones and digital cameras are working and that sufficient spare batteries and memory cards are available	
	Confirm sufficient equipment to allow integration of survey software and navigational systems (e.g. GPS, additional equipment and adaptors), and additional GPS units prepared	
	Confirm GPS survey positions (where available) have been QA/QC checked and pre-loaded into navigation software/positioning system	
	Check field laptops, ensuring they have batteries (including spares), power cable, and are functional	
	Check if a first aid kit or specialist PPE is required	
	Confirm arrangements for freight to mobilisation port is in place	

17 Permits and Access Requirements

Permits and access requirements apply to Marine Parks, Marine Protected Areas, restricted heritage areas, operational areas of industrial sites, defence locations, certain fauna and managed fisheries. Table 17-1 lists the relevant protected areas, location, and jurisdictional authority.

The OSM Management Team reporting to the Planning Coordinator is responsible for submitting access and permit applications to all relevant jurisdictional authorities to conduct monitoring for OMPs and SMPs, in consultation with the relevant Controlling Agency.

Table 17-1: Permits and Access Requirements

Receptor	Location	Jurisdictional Authority	Relevant Information on Permits
Permits for monitoring fauna	N/A	State government department with jurisdiction for fauna Department of Agriculture, Water and the Environment (DAWE)	Any interactions involving nationally listed threatened fauna may require approval from DAWE (http://www.environment.gov.au/biodiversity/threatened/permits) Victoria-approriate permit information can be found at: https://www.vic.gov.au/sites/default/files/2022-02/Guidance%20notes%20for%20research%20permit%20applicants.pdf
State Marine National Parks (MNP); Marine Sanctuaries (MS)	• Bunurong MNP • Churchill MNP • Discovery Bay MNP • Point Addis MNP • Port Phillip Heads MNP • Twelve Apostles MNP • Wilsons Promotory MNP • Marengo Reefs MS • Barwon Bluff MS • Eagle Rock MS • Merri MS • Mushroom Reef MS • Point Danger MS	State government department with jurisdiction for parks and wildlife State government department with jurisdiction for fisheries	No specific permitting requirements exist for monitoring in Victoria marine protected areas, but additional information is available at - https://vfa.vic.gov.au/recreational-fishing/recreational-fishing-guide/waters-with-fishing-restrictions/marine-waters-closed-to-recreational-fishing/restricted-areas-marine-national-parks
Australian Commonwealth Marine Parks	• Apollo • Beagle	Parks Australia	Permit and licence application information for Marine Protected Areas (including monitoring) can be found at - https://onlineservices.environment.gov.au/parks/australian-marine-parks and https://onlineservices.environment.gov.au/parks/australian-marine-parks/permits Additional information on permitting requirements in Australian Marine Parks can be obtained through Parks Australia via email marineparks@environment.gov.au or phone 1800 069 35
Ramsar Wetlands	• Western Port • Port Phillip Bay	Commonwealth Department of Environment, Land, Water and Planning	Additional information on Ramsar wetlands and how they are protected as a matter of national environmental significance under the EPBC Act is available at https://www.environment.gov.au/epbc/what-is-protected/wetlands Information of Victoria's RAMSAR wetlands is available: https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/wetlands
Wetlands of National Importance	• Western Port • Swan Bay and Swan Island • Aire River	Commonwealth Department of Environment, Land, Water and Planning	Additional information of national significant wetlands is available at: https://www.awe.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands

Receptor	Location	Jurisdictional Authority	Relevant Information on Permits
	• Yambuk Wetlands • Tower Hill • Princetown Wetlands • Lake Connewarre State Wildlife Reserve • Lower Aire River Wetlands • Lower Merri River Wetlands		
State/Territory Managed Fisheries	• Southern Rock Lobster • Blacklip Abolone	State/Territory government department with jurisdiction for fisheries	No specific permitting requirements exist for Vic Fisheries More information is available: https://vfa.vic.gov.au/
Commonwealth Managed Fisheries	• Bass Strait Central Zone Scallop Fishery; • Eastern Tuna and Billfish Fishery (ETBF); • Eastern Skipjack Tuna Fishery (Australian Fishing Zone, Sub-Area 03); • Small Pelagic Fishery (SPF) (Western Sub-Area); • Southern and Eastern Scalefish and Shark Fishery (SESSF); Southern Bluefin Tuna Fishery; and • Squid Jig Fishery (SSJF).	Australian Fishing Management Authority	Commonwealth Managed Fisheries (scientific permit for research/monitoring in an Australian Fishing Zone) https://www.afma.gov.au/fisheries-services/fishing-rights-permits
Indigenous Cultural Heritage	Sites are located throughout the EMBA	State/Territory government department with jurisdiction for indigenous heritage	Entry Access permits to Aboriginal Lands in Victoria & request a heritage advisor – Cultural Heritage Permits | First Peoples - State Relations (firstpeoplesrelations.vic.gov.au) Aboriginal heritage sites in Victoria – https://www.aboriginalheritagecouncil.vic.gov.au/
Industry (e.g. operational zone of offshore oil or gas platform)	• Otway Offshore Development – Beach • JUR Drilling & Bass strait operations - ESSO • Basker Manta Gummy and Casino Henry Netherby fields’	Operating Company	Safety zones (up to 500 m from the outer edge of well or equipment) – https://www.nopsema.gov.au/safety/safety-zones

Receptor	Location	Jurisdictional Authority	Relevant Information on Permits
	operations – Cooper Energy		
Shipwrecks	• Several underwater cultural heritage sites (39) found within Victorian waters.	State/Territory or Commonwealth government department with jurisdiction for maritime cultural heritage/archaeology	Underwater heritage protected zones and maritime heritage permit (Commonwealth) – https://www.heritage.vic.gov.au/heritage-listings/maritime-heritage Commonwealth permit application – https://www.heritage.vic.gov.au/permits-and-approvals/maritime-heritage-permits

18 Use of Data in Response Decision-Making

18.1 Operational Monitoring to Inform Response Activities

The OSM Service Provider is responsible for the collection of data by field teams, which shall be QA/QC checked by the Field Team Lead in accordance with the requirements listed in the finalised OMPs and SMPs (where applicable). The Team Lead will be responsible for communicating data back to the OSM Management Team via field reporting forms, debriefs and reports. Laboratory analysis reports should also be directed to the OSM Management Team.

The OSM Management Team is responsible for the interpretation and analysis of data. OMP data should be analysed rapidly so that it may be used to inform response planning and decisions in the current and/or next operating period. SMP data is designed to be more scientifically robust and long-term in nature and is not relied upon by the IMT / CICC for decision-making. Therefore, SMP data will be analysed more thoroughly by the OSM Management Team.

Once data is analysed and checked by the Field Team Lead, it will be provided to the IMT Situation Unit Lead / CICC Intelligence Coordinator, who will then distribute the data from each monitoring component to the relevant IMT / CICC Unit and/or Section.

Table 18-1 provides guidance on the type of data generated from each OMP, which IMT Section/Unit requires the data and how the data may be used during a response. All SMP data received during a response will be received by the IMT Intellegence Lead and IMT Environment Lead simultaneously.

Analysed data will then be incorporated into the Common Operating Picture (managed by the Intellegence Lead) and used by the Environment Unit Lead during development of the operational SIMA, which would be included in the IAP for the current or next operating period.

As ultimately responsible for the IAPs, the Planning Coordinator will be required to determine if the response options can be commenced, continued, escalated, terminated, or if controls need to be put in place to manage impacts of the response activities. These decisions will be communicated to the broader IMT during regular situation debriefs.

Table 18-1: Data generated from each OMP and how this may be used by IMT in decision-making

Operational Monitoring Plan	Data Generated[2]	IMT Section Requiring Data	How Data May Be Used by IMT
Hydrocarbon properties and weathering behaviour at sea (AOHSE-ER-0037)	Hydrocarbon physical characteristics (e.g. viscosity, asphaltene content, fingerprinting, weathering ratios of hydrocarbon chains)	Planning Section to aid in response option selection / modification	Changes to the hydrocarbon properties will affect the window of opportunity for particular responses and the associated logistical requirements of these responses, such as recovery and pumping equipment suitability, hydrocarbon storage and hydrocarbon disposal requirements
Shoreline clean-up assessment (AOHSE-ER-0057)	Assessment of shoreline character; assessment of shoreline oiling; recommendations for response activities; post-treatment surveys	Planning Section to aid in IAP development and response option selection / modification	Confirmation of shoreline character, habitats and fauna present which may influence selection of response tactics (e.g. no mechanical recovery if turtles are known to be nesting); Oil deposition and/or removal rate for a shoreline sector will help determine effectiveness of relevant tactics (e.g. shoreline protection and/or clean-up operations); Assessment teams provide ground-truthing of sites that are not possible via satellite imagery, therefore the IMT can rely on the recommendations of Assessment Teams (e.g. flagging access issues, suitable tactics, likely resourcing needs)
Surface chemical dispersant effectiveness and fate (AOHSE-ER-0055)	Not applicable to Minerva Gas Condensate or Marine Diesel Oil (MDO)		
Subsea dispersant injection (API 1152)	Not applicable to Minerva Gas Condensate. Additionally, Capping Stack System (CSS) not feasible response option within Minerva Field.		
Water quality assessment (AOHSE-ER-0037)	Distribution of oil in water column and change in hydrocarbon concentrations (e.g. total recoverable hydrocarbons, BETEX, PAH), physio-chemical parameters and dispersant detection (when applicable)	Situation Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill within the water column and verify spill modelling and surveillance data; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites. Data can also influence ongoing use of dispersant through ongoing operational SIMA (when applicable).

[2] Summary only. For additional detail, please refer to individual OMPs. Also note data outputs will be reliant on finalised monitoring design.

Sediment quality assessment (AOHSE-ER-0037)	Distribution of oil in sediment and change in hydrocarbon concentrations (e.g. total recoverable hydrocarbons, BETEX, PAH)	Situation Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP	Confirm spatial extent of spill; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites
Marine fauna assessment (AOHSE-ER-0039)	Rapid assessment of presence and distribution of marine fauna; evaluate impact of spill and response activities on fauna	Planning Section for use in IAP; Oiled Wildlife Unit/Division to help in developing Wildlife Response Sub-plan	Understanding of species, populations and geographical locations at greatest risk from spill impacts. IMT can use this information to help qualify locations with highest level of protection priority; understanding the impacts of spill response activities can help IMT to modify or terminate activities if they are assessed as creating more harm than the oil alone (e.g. large shoreline clean-up teams and staging areas may disturb shorebird nesting resulting in adults abandoning chicks)
Air quality monitoring (responder health and safety) APU Petroleum First Responder Air Monitoring Work Plan (11203437)	Modelled outputs of airborne hydrocarbons, gases and chemicals and their predicted distribution	Operations Section to help determine safe zones in close vicinity of spill; Planning Section for use in IAP	Determine safe distances from spill source for response personnel; determine the presence and persistence of volatile organic compounds to know if response areas are safe for personnel, including source control.

18.2 Impacts from Response Activities

Table 10-4 of the Joint Industry OSM Framework (APPEA, 2021b) outlines the potential impacts from response activities and the relevant OMP/SMP for monitoring impacts. For example, if shoreline clean-up was being considered as a response option, then possible impacts resulting from that activity could include physical presence, ground disturbance, water/sediment quality decline and lighting/noise impacts to fauna.

When finalising monitoring designs, the OSM Implementation Lead shall review Table 10-4 of the Joint Industry OSM Framework (APPEA, 2021b) to ensure potential impacts from response activities are considered and incorporated into relevant OMP/SMP designs.

18.3 Operational Monitoring of Effectiveness of Control Measures and Meeting Performance Standards

When finalising monitoring designs, the OSM Implementation Lead and Environment Lead (or delegate) shall review the Environmental Performance Standards listed in the Woodside OPEP and integrate checks into the monitoring design that will help determine if relevant Environmental Performance Standards are being met.

19 Data Management

The following reporting to Woodside should be undertaken:

- Operational monitoring reports will be provided to the IMT / CICC as soon as possible to maintain situational awareness and advise response option requirements.
- Daily field survey reports detailing activities undertaken, HSE performance and survey progress.
- All sampling data and data interpretation provided in spatial data format and spreadsheets as appropriate.
- Technical survey reports detailing whether the termination criteria have been reached, including recommendations on the requirements of future monitoring. Where possible, reports will investigate if monitoring results indicate that the concentrations of hydrocarbons/chemicals are equal to or below reference/baseline data or benchmark levels. Reporting should include spatial assessment of the distribution of hydrocarbons/chemicals over time. Where possible, reporting should also include an assessment of performance of the response options against the environmental performance objectives in the relevant regulatory environmental permits other relevant environmental management documentation.

20 Quality Assurance and Quality Control

Robust quality assurance and quality control (QA/QC) measures are required to instill confidence in the operational and particularly the scientific monitoring plans. The requirements for QA/QC for Woodside's monitoring plans include:

- Use of chain of custody forms, procedures for sampling, data collection templates and a data management plan;
- Quality control/review steps performed on the statistical analysis and interpretation (where applicable) – Peer review / expert panel review;
- Adhering to handling, storage, holding times and transport requirements in accordance with the finalised monitoring design;

- Collection and analyses of QA/QC samples in accordance with the finalised monitoring design;
- Archiving samples where applicable;
- Maintenance and calibrations of systems and equipment;
- Maintenance of metadata; and
- Data backup, storage, and archiving.

21 Communication Protocol

Communication protocols between Woodside and its OSM Service Providers with respect to delivery of the OMPs and SMPs (during both preparedness and implementation) are intentionally defined to ensure clear and consistent information is provided in both directions. This clear and consistent messaging is critical in what would be a highly dynamic and evolving solution.

In addition, Woodside has obligations under various legislation to share monitoring outputs with regulatory agencies/authorities. This is described in Section 10.12 of the Joint Industry OSM Framework (APPEA, 2021b).

21.1 OSM Service Providers

Communication protocols between Woodside and its OSM Service Providers with respect to delivery of the OMPs and SMPs (during both preparedness and implementation) are intentionally defined to ensure clear and consistent information is provided in both directions.

The following communication protocols must be observed:

- Communication between Woodside and its OSM Service Providers during the preparedness phase (pre-spill) and during activation (prior to deployment) will be between the Environmental Lead and the OSM Service Provider Leads respectively.
- During implementation (post deployment), primary communication occurs via two pathways:
    - Environment Lead and the OSM Service Provider Lead for contractual, management, scientific, and general direction matters; and
    - Woodside On-Scene Commander and the OSM Service Provider’s Field Operations Manager for on-site matters.
- All OSMP operational decisions should be logged in an OSMP decision log by key personnel.
- All OSMP tasks, actions, and requirements should be documented in an IAP during the response phase of the spill.
- The Woodside Environment Lead will keep the Operations Coordinator, Logistics Coordinator, and Planning Coordinator briefed of the OSMP status as required.
- All correspondence (copies of emails and records of phone calls) between Woodside and the OSM Service Providers during a response should be recorded and kept on file.
- All communication received by OSM Service Providers not in line with these protocols should be reported to the Environment Lead who will seek guidance on the accuracy of the information received.
- Unless related to safety (e.g. evacuation), any direction or instruction received by the OSM Service Providers outside of these protocols should be confirmed via the Woodside Environment Lead or On-Scene Commander prior to implementation

During the post-response phase all communications shall be between the Woodside Environment Lead (or delegate) and the OSM Service Provider OSM Implementation Leads.

21.2 External Stakeholders

Results of OMPs and SMPs will be discussed with relevant stakeholders. Information will be shared with regulatory agencies and authorities as required and inputs received from stakeholders will be evaluated and where practicable, will be used to refine the ongoing spill response and/or ongoing operational and/or scientific monitoring.

Woodside's CICC External Liaison Officer will be the focal point for external engagement during the response operation.

Stakeholder communication post-response will be managed by Woodside's External (Government) Relations Team.

22 Stand Down Process

Monitoring for each component will continue until termination criteria for individual components are reached. Typically, OMPs will terminate when agreement has been reached by the jurisdictional authority relevant to the spill and to terminate the response. SMPs will continue after the spill response has been terminated and until such a time as their termination criteria are also reached.

After OMPs are terminated, the OMP monitoring teams will be advised to stand down. Following this stage, the OSM Service Providers will run a lessons-learnt meeting between Woodside, all monitoring providers, and other relevant stakeholders. It is the responsibility of Woodside to ensure that lessons learnt are communicated to the relevant stakeholder groups. The lessons discussed should include both positive actions to be reinforced and lessons for actions that could be improved in the future, on standby, or response campaigns.

References

API (2020). API Technical Report 1152: Industry Recommended Subsea Dispersant Monitoring Plan.

APPEA (2021a) Operational and Scientific Monitoring Bridging Implementation Plan Template. Rev A. March 2021

APPEA (2021b) Joint Industry Operational and Scientific Monitoring Plan Framework. Rev D.

GHD (2022) Minerva Decommissioning Oil Spill Modelling Report (12579278). Unpublished Report.

[ITS] Intertek Testing Services (2003). Minerva Condensate. Laboratory report prepared for BHP Billiton Petroleum by Intertek Testing Services (Caleb Brett). Report no. 880-0073/03.

Kirby, M.F., Brant, J., Moore, J., Lincoln, S. (eds) (2018) PREMIAM – Pollution Response in Emergencies – Marine Impact Assessment and Monitoring: Post-incident monitoring guidelines. Second Edition. Science Series Technical Report. Cefas, Lowestoft.

NOPSEMA (2020) Information Paper: Operational and Scientific Monitoring Programs. (N-04750-IP1349 A343826).

NOPSEMA (2021) Guidance Note: Oil Pollution Risk Management. (N-04750-GN1488 A382148).

NOPSEMA (2021) Regulatory Advice Statement on APPEA's Joint Industry Operational and Scientific Monitoring Framework.

Appendix A: Baseline Data Sources

Table A-0-1: Baseline Data Sources

Receptor	Existing Baseline Monitoring	Source / Data Custodian	Spatial Extent
Water and sediment quality	Signs of Healthy Parks (SHP) program. • Provide a framework for park managers to assess the status and trends in the ecological health of parks, the threatening processes affecting priority park values and the effectiveness of management actions • SHP is consistent with Victorian and Australian monitoring frameworks such as the Headline Indicators for the Victorian Government Land and Biodiversity Whitepaper and the Invasive Species Monitoring and Evaluation Framework.	Parks Victoria	Marine Natural Values Study: • Marine Protected Areas of the Otway Bioregion • Marine Protected Areas of the Central Victoria Bioregion • Marine Protected Areas of the Victorian Embayments • Bioregion • Marine Protected Areas of the Victorian Embayments • Bioregion • Marine Protected Areas of the Flinders and Twofold Shelf Bioregions
Shorelines and intertidal habitats	Signs of Healthy Parks (SHP) program.	Parks Victoria	Intertidal Reef Monitoring Program: • Intertidal Reef Biota of Central Victoria's Marine Protected Areas • Intertidal Reef Biota of Northern Port Phillip Bay Marine Sanctuaries • Reef biota in Central Victoria and Port Phillip Bay Marine Sanctuaries
			Shallow Water Habitat Mapping at Victorian Marine National Parks and Marine Sanctuaries: • Eastern Victoria • Western Victoria
			Mapping the Benthos in Victoria's Marine National Parks: • Cape Howe Marine National Park

			• Discovery Bay Marine National Park • Point Addis Marine National Park • Point Hicks Marine National Park • Twelve Apostles Marine National Park
	Rocky Shores of Marine National Parks and Sanctuaries on the Surf Coast Shire – Values, uses and impacts	Parks Victoria	Coastal Victoria
	dentification of threats to natural values in Victoria's Marine National Parks and Marine Sanctuaries	Parks Victoria	Coastal Victoria
	Monitoring the macroinvertebrates and soft sediments in the Marine National Parks in Western Port	Parks Victoria	Coastal Victoria
	Mud Islands Seagrass and Coastline Mapping 2011-12	Parks Victoria	Coastal Victoria
	Yaringa and French Island MNP Habitat Mapping	Parks Victoria	Coastal Victoria
Benthic communities and fish assemblages	Signs of Healthy Parks (SHP) program.	Parks Victoria	Subtidal Reef Monitoring Program: • Popes Eye Component of the Port Phillip Heads MNP • Reef Biota at Beware Reef Marine Sanctuary • Reef Biota at Bunurong Marine National Park and • Surrounding Coast • Reef Biota at Eagle Rock Marine Sanctuary • Reef Biota at Jawbone Marine Sanctuary • Reef Biota at Marengo Reefs Marine Sanctuary • Reef Biota at Marine Protected Areas in the Twofold Shelf region • Reef Biota at Merri Marine Sanctuary • Reef Biota at Phillip Island • Reef Biota at Point Addis Marine National Park • Reef Biota at Port Phillip Bay Marine Sanctuaries

			• Reef Biota at Port Phillip Heads Marine National Park • Reef Biota at Ricketts Point Marine Sanctuary • Reef Biota at Wilsons Promontory Marine National Park • Reef Biota on the Western Victorian Coast • Reef Biota within the Twofold Shelf Bioregion • Reef Surveys at Twelve Apostles Marine National Park and The Arches Marine Sanctuary • The Reef Biota at Point Cooke Marine Sanctuary • Western Victorian Coast
			Reef Life Survey
	Reefwatch https://vnpa.org.au/programs/reefwatch/	Victorian National Parks Association	Victoria
	Bruce, B. D., D. Harasti, K. Lee, C. Gallen & R. Bradford. (2019). Broad scale movements of juvenile white sharks Carcharodon carcharias in eastern Australia from acoustic and satellite telemetry. Marine Ecology Progress Series, 619: 1-15	Marine Ecology Progress Series	Victoria
Seabirds and shorebirds	Shorebirds 2020	Birdlife Australia	Coastal Victoria
	Species diversity and composition of benthic infaunal communities found in Marine National Parks along the outer Victorian coast	Parks Victoria	Coastal Victoria
	Managing Hooded Plover in Victoria		
	Birds as Environmental Indicators		
Marine mammals	McCauley, R. D., A. N. Gavrilov, C. D. Jolliffe, R. Ward, and P. C. Gill. (2018). Pygmy blue and Antarctic blue whale presence, distribution and	Deep-Sea Research Part II: Topical	Victoria

	population parameters in southern Australia based on passive acoustics. Deep-Sea Research Part II: Topical Studies in Oceanography 157-158: 154-168	Studies in Oceanography	
	Gill, P.C., M.G. Morrice, B. Page, R. Pirzl, A.H. Levings and M. Coyne (2011). Blue whale habitat selection and within-season distribution in a regional upwelling system off southern Australia. Marine Ecology Progress Series, 421: 243–263.	Marine Ecology Progress Series	Victoria
	Kirkwood, R., Warneke, R.M., Arnould. J.P. (2009). Recolonization of Bass Strait, Australia, by the New Zealand fur seal, Arctocephalus forsteri. Marine Mammal Science 25(2): 441 –449	Marine Mammal Science	Victoria
	Gill, P.C., R. Pirzl, M.G. Morrice & K. Lawton (2015). Cetacean diversity of the continental shelf and slope off southern Australia. The Journal of Wildlife Management.	The Journal of Wildlife Management	Victoria
	Gavrilov, A. (2012). Seismic signal transmission, pygmy blue whale abundance and passage and ambient noise measurements during and after the Bellerive seismic survey in Bass Strait, 2011, Curtin University centre for Marine Science	Curtin University Centre for Marine Science	Victoria
Commercial fisheries	Seafood Industry Victoria (SIV) https://www.siv.com.au/	Commercial Fishers	Victoria State
	South East Trawl Fishing Industry Association (SETFIA) https://setfia.org.au/	Commercial Fishers	Victoria State / Commonwealth
	Victorian Fisheries Authority: https://vfa.vic.gov.au/commercial-fishing	State	Victoria State
	Australian Fisheries Management Authority (AFMA) https://www.afma.gov.au/	Commonwealth	Commonwealth

Appendix B: Protected Matters Requirements

Table B-0-1: Summary of Relevant Species Recovery Plans, Approved Conservation Plans, and Threat Abatement Plans *

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
All Vertebrate Fauna				
All vertebrate fauna	Threat Abatement Plan for the impacts of marine debris on vertebrate wildlife of Australia's coasts and oceans (DoEE, 2018) There are four main objectives: • Contribute to the long-term prevention of the incidence of harmful marine debris • Remove existing harmful marine debris from the marine environment • Mitigate the impacts of harmful marine debris on marine species and ecological communities • Monitor the quantities, origins and impacts of marine debris and assess the effectiveness of management arrangements over time for the strategic reduction of debris.	Ship-sourced marine debris as a risk to vertebrate marine life through entanglement or ingestion	No explicit management actions for non-fisheries related industries (note that management actions in the plan relate largely to management of fishing waste (for example 'ghost' gear), and State and Commonwealth management through regulation.	SMP: Marine Mammals and Megafauna
Marine Mammals				
Sei Whale	Conservation Advice for the Sei Whale (TSSC, 2015a) Determine population abundance, trends and population structure for sei whales, and establish a long-term monitoring program in Australian waters. Describe the spatial and temporal distribution of Sei Whales and further define biologically important areas (feeding and breeding), and migratory routes within Australian and Antarctic waters.	Noise interference	Once the spatial and temporal distribution (including biologically important areas) of Fin Whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion,	OMP: Operational water sampling OMP: Vessel Surveillance OMP: OSTM/OSTB SMP: Marine Mammals and Megafauna

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			and coastal development).	
		Habitat degradation including pollution	No explicit relevant management actions; habitat degradation and pollution identified as threats.	
		Vessel strike	Minimising vessel collisions: • Develop a national vessel strike strategy that investigates the risk of vessel strikes on Sei Whales and also identifies potential mitigation measures. • Ensure all vessel strike incidents are reported in the National Vessel Strike Database.	
Blue Whale	Conservation Management Plan for the Blue Whale 2015-2025 (DoE, 2015a) The long-term recovery objective is to minimise anthropogenic threats to allow the conservation status of the Blue Whale to improve so that it can be removed from the threatened species list under the EPBC Act.	Noise interference	Assess and address anthropogenic noise: shipping, industrial and seismic noise.	
		Habitat modification	No explicit relevant management actions;	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			habitat modification identified as a threat.	
		Vessel disturbance	Minimise vessel collisions: • Develop a national vessel strike strategy that investigates the risk of vessel strike on blue whales and also identifies potential mitigation measures. • Ensure all vessel strike incidents are reported in the National Ship Strike Database. • Ensure the risk of vessel strikes on blue whales is considered when assessing actions that increase vessel traffic in areas where blue whales occur and, if required, appropriate mitigation measures are implemented.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
		Marine Debris	No explicit relevant management actions; marine debris identified as a threat.	
Fin Whale	Approved Conservation Advice for the Fin Whale (TSSC, 2015b) Determine population abundance, trends and population structure for fin whales, and establish a long-term monitoring program in Australian waters. Describe the spatial and temporal distribution of Fin Whales and further define biologically important areas (feeding and breeding), and migratory routes within Australian and Antarctic waters.	Noise interference	Once the spatial and temporal distribution (including biologically important areas) of Fin Whales is further defined, assess the impacts of increasing anthropogenic noise (including seismic surveys, port expansion, and coastal development).	
		Habitat degradation including pollution	No explicit relevant management actions; habitat degradation and pollution identified as threats.	
		Vessel strike	Develop a national vessel strike strategy that investigates the risk of vessel strikes on Fin Whales and identifies potential mitigation measures. Ensure all vessel strike incidents are reported in the National Vessel Strike Database.	
Southern Right Whale	Conservation Management Plan for the Southern Right Whale 2011-2021 (DSEWPaC, 2012a)	Noise interference	Assess and address anthropogenic noise:	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
	Long term recovery objective: • To minimise anthropogenic threats to allow the conservation status of the southern right whale to improve so that it can be removed from the threatened species list under the EPBC Act Interim Recovery Objective 5: • Anthropogenic threats are demonstrably minimised		shipping, industrial and seismic noise.	
		Habitat modification	No explicit relevant management actions; habitat modification identified as a threat.	
		Marine debris	No explicit relevant management actions; entanglement in marine debris identified as a threat.	
		Vessel disturbance / strike	Address vessel collisions: • Develop a national ship strike strategy that quantifies vessel movements within the distribution ranges of southern right whales and outlines appropriate mitigation measures that reduce impacts from vessel collisions.	
Australian Sea Lion	Recovery Plan for the Australian Sea Lion (DSEWPaC, 2013a) The overarching objective of this recovery plan is to halt the decline and assist the recovery of the Australian sea lion throughout its range in Australian waters by increasing the	Habitat degradation	No explicit management actions; habitat degradation recognised as a threat.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
	total population size while maintaining the number and distribution of breeding colonies with a view to: • Improving the population status leading to the future removal of the Australian sea lion from the threatened species list of the EPBC Act • Ensuring that anthropogenic activities do not hinder recovery in the near future or impact on the conservation status of the species in the future.	Pollution and oil spills	Implement jurisdictional oil spill response strategies as required.	
		Disease	No explicit management actions; disease and pathogens recognised as a threat.	
		Marine debris	Identify the sources of marine debris having an impact on Australian sea lion populations. Assess the impacts of marine debris on Australian sea lion populations. Develop and implement measures to mitigate the impacts of marine debris on Australian sea lion populations, noting the linkages with the Threat Abatement Plan for the Impact of Marine Debris on Vertebrate Marine Life.	
		Vessel Strike	Collect data on direct killings and confirmed vessel strikes.	
	Approved Conservation Advice on *Neophoca cinerea* Australian Sea Lion (TSSC, 2020a) Primary conservation actions: • Mitigate the impacts of marine debris on Australian Sea Lions	Marine debris	Assess the impacts of marine debris on Australian Sea Lion populations and identify the sources of marine debris which have an impact.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			Develop and implement measures to mitigate the impacts of marine debris on the species (including reducing the amount of these marine debris entering the oceans), noting linkages with the Threat Abatement Plan for the Impact of Marine Debris on Vertebrate Marine Life.	
		Disease and Parasites	Improve human wastewater management to minimise dispersal of bacteria, parasites and pollutants into the marine environment.	
		Habitat degradation and pollution	Require all vessels to have oil spill mitigation measures in place, and implement jurisdictional oil spill response strategies as required.	
		Noise interference	Monitor and mitigate impacts (including cumulative impacts) of human interactions on Australian Sea Lion colonies. Control access to breeding colonies to minimise the impacts of disturbance on Australian Sea Lions.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
Marine Reptiles				
EPBC Act listed marine turtles in the EMBAs: • Loggerhead Turtle • Green Turtle • Leatherback Turtle	National Light Pollution Guidelines for Wildlife, including marine turtles, seabirds and migratory shorebirds (DoEE, 2020) Lighting objectives will need to consider the regulatory requirements and Australian standards relevant to the activity, location and wildlife present. Objectives should be described in terms of specific locations and times for which artificial light is necessary. Consideration should be given to whether colour differentiation is required and if some areas should remain dark – either to contrast with lit areas or to avoid light spill. Where relevant, wildlife requirements should form part of the lighting objectives. A lighting installation will be deemed a success if it meets the lighting objectives (including wildlife needs) and areas of interest can be seen by humans clearly, easily, safely and without discomfort.	Light pollution	Best practice lighting design incorporates the following design principles: • Start with natural darkness and only add light for specific purposes. • Use adaptive light controls to manage light timing, intensity and colour. • Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill. • Use the lowest intensity lighting appropriate for the task. • Use non-reflective, dark-coloured surfaces. • Use lights with reduced or filtered blue,	OMP: Operational water sampling OMP: Vessel surveillance OMP: OSTM/OSTB SMP: Marine reptiles (AOHSE-ER-0043) Shoreline clean-up assessment technique (SCAT)

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			violet and ultra-violet wavelengths.	
	Recovery Plan for Marine Turtles (DoEE, 2017) Long-term recovery objective: • Minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list. Interim objective 3: • Anthropogenic threats are demonstrably minimised.	Marine debris	Reduce the impacts from marine debris: • Support the implementation of the EPBC Act Threat Abatement Plan for the impacts of marine debris on vertebrate marine life.	
		Chemical and Terrestrial Discharge	Minimise chemical and terrestrial discharge.	
		Vessel disturbance	Vessel interactions identified as a threat; no specific management actions in relation to vessels prescribed in the plan.	
		Light pollution	Minimise light pollution: • Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			displaced from these habitats. • Develop and implement best practice light management guidelines for existing and future developments adjacent to marine turtle nesting beaches. • Identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution.	
		Noise interference	Assess and address anthropogenic noise: • Understand the impacts of anthropogenic noise on marine turtle behaviour and biology.	
		Habitat modification	Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical to the survival.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			Manage anthropogenic activities in Biologically Important Areas to ensure that biologically important behaviour can continue.	
		Disease and pathogens	No explicit management actions; disease and pathogens recognised as a threat.	
Leatherback Turtle	Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle) (DEWHA, 2008) No explicit relevant objectives.	Boat strike	No explicit relevant management actions; vessel strikes identified as a threat.	
		Habitat degradation (changes to breeding sites and degradation to foraging areas)	Identify and protect migratory corridors between nesting beaches and common foraging areas to facilitate colonization.	
		Marine debris	No explicit relevant management actions; marine debris identified as a threat.	
Fish, Sharks and Rays				
Eastern Dwarf Galaxias	National Recovery Plan for the Dwarf Galaxias (*Galaxiella pusilla*) (DSE, 2010) The long-term objective of recovery is to minimise the probability of extinction and ensure long-term survival of Dwarf Galaxias in the wild and to increase the probability of important populations becoming self-sustaining in the long term.	Habitat degradation	Management practices that should be adhered to by land and water managers in order to avoid threatening processes believed to be responsible for the decline in the Dwarf Galaxias:	OMP: Operational water sampling OMP: Vessel surveillance OMP: OSTM/OSTB

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			• No direct loss of habitat through wetland drainage on either public or private land.	SMP: Commercial and Recreational Fish Species SMP: Fishes
		IMS	No explicit relevant management actions; introduced species identified as a threat.	
Whale Shark	Approved Conservation Advice for the Whale Shark (*Rhincodon typus)* (DoE, 2015b) To maintain existing levels of protection for the whale shark in Australia while working to increase the level of protection afforded to the whale shark within the Indian Ocean and Southeast Asian region to enable population growth so that the species can be removed from the threatened species list of the EPBC Act.	Marine debris Habitat disruption Boat strike	Minimise offshore developments and transit time of large vessels in areas close to marine features likely to correlate with Whale Shark aggregations along the northward migration route that follows the northern Western Australian coastline along the 200 m isobath (as set out in the Conservation Values Atlas, DoE, 2014).	
White Shark	National Recovery Plan for the White Shark (*Carcharodon carcharias* (DSEWPaC, 2013b) The overarching objective of this recovery plan is to assist the recovery of the white shark in the wild throughout its range in Australian waters with a view to: • Improving the population status leading to future removal of the white shark from the threatened species list of the EPBC Act • Ensuring that anthropogenic activities do not hinder recovery in the near future, or impact on the conservation status of the species in the future.	Habitat modification	No explicit relevant management actions; habitat modification and climate change identified as threats.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
	The specific objectives of the recovery plan (relevant to industry) are: • Objective 7: Continue to identify and protect habitat critical to the survival of the white shark and minimise the impact of threatening processes within these areas.			
Birds (general)				
Seabirds and migratory shorebirds	National Light Pollution Guidelines for Wildlife, including marine turtles, seabirds and migratory shorebirds (DoEE, 2020) Lighting objectives will need to consider the regulatory requirements and Australian standards relevant to the activity, location and wildlife present. Objectives should be described in terms of specific locations and times for which artificial light is necessary. Consideration should be given to whether colour differentiation is required and if some areas should remain dark – either to contrast with lit areas or to avoid light spill. Where relevant, wildlife requirements should form part of the lighting objectives. A lighting installation will be deemed a success if it meets the lighting objectives (including wildlife needs) and areas of interest can be seen by humans clearly, easily, safely and without discomfort.	Light pollution	Best practice lighting design incorporates the following design principles: • Start with natural darkness and only add light for specific purposes. • Use adaptive light controls to manage light timing, intensity and colour. • Light only the object or area intended – keep lights close to the ground, directed and shielded to avoid light spill. • Use the lowest intensity lighting appropriate for the task.	OMP: Aerial Surveillance OMP: OSTM/OSTB OMP: Water sampling SMP: Seabirds and Migratory Shorebirds SCAT

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
			• Use non-reflective, dark-coloured surfaces. • Use lights with reduced or filtered blue, violet and ultra-violet wavelengths.	
Shorebirds				
All Migratory Shorebirds	Wildlife Conservation Plan for Migratory Shorebirds (CoA, 2015) Anthropogenic threats to migratory shorebirds in Australia are minimised or, where possible, eliminated.	Habitat degradation and modification	No explicit relevant management actions; identified as a threat.	OMP: Aerial Surveillance OMP: OSTM/OSTB OMP: Water sampling SMP: Seabirds and Migratory Shorebirds SCAT
		Anthropogenic disturbance	Investigate the significance of cumulative impacts on migratory shorebird habitat and populations in Australia. Ensure all areas important to migratory shorebirds in Australia continue to be considered in development assessment processes (specifically for coastal developments).	
Australasian Bittern	Approved Conservation Advice for *Botaurus poiciloptilus* (Australasian bittern) (TSSC, 2019)	Habitat loss disturbance and modifications		

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
Australian Painted Snipe	Approved Conservation Advice for Australian painted snipe (*Rostratula australis*) (DSEWPaC, 2013c)	None listed relevant to the Activity		
Bar-Tailed Godwit (baueri)	Approved Conservation Advice for the bar-tailed godwit (western Alaskan) (*Limosa lapponica baueri*) (TSSC, 2016)	Habitat loss and degradation from pollution		
Curlew Sandpiper	Approved Conservation Advice for the curlew sandpiper (*Calidris ferruginea*) (DoE, 2015c)	Habitat loss and degradation from pollution		
Eastern Curlew	Approved Conservation Advice for eastern curlew (*Numenius madagascariensis*) (TSSC, 2015c)	Habitat loss and degradation from pollution		
Eastern Hooded Plover	Conservation Advice *Thinornis rubricollis rubricollis* hooded plover (eastern) (DoE, 2014)	Oil spills		
		Entanglements and ingestion of marine debris		
Great Knot	Approved Conservation Advice for the great knot (*Calidris tenuirostris*) (TSSC, 2016a)	Habitat loss and degradation from pollution		
Greater Sand Plover	Approved Conservation Advice for the greater sand plover (*Charadruis leschenaultii*) (TSSC, 2016b)	Habitat loss and degradation from pollution		
Lesser Sand Plover	Approved Conservation Advice *Charadrius mongolus* (Lesser sand plover) (TSSC, 2016c)	Habitat loss and degradation from pollution		
Red Knot	Approved Conservation Advice for the red knot (*Calidris canutus*) (TSSC, 2016d)	Habitat loss and degradation		

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
		Pollution/ contamination impacts		
Birds – Seabirds				
All Seabirds	Draft Wildlife Conservation Plan for Seabirds (CoA, 2019) Seabirds and their habitats are protected and managed in Australia.	Habitat degradation and modification	No explicit relevant management actions; identified as a threat.	OMP: Aerial Surveillance OMP: OSTM/OSTB OMP: Water sampling SMP: Seabirds and Migratory Shorebirds SCAT
		Anthropogenic disturbance	Ensure all areas of important habitat for seabirds are considered in the development assessment process. Manage the effects of anthropogenic disturbance to seabird breeding and roosting areas.	
		Pollution (marine debris, light, water)	Enhance contingency plans to prevent and/or respond to environmental emergencies that have an impact on seabirds and their habitats.	
		Invasive species	Ensure seabirds are protected from the adverse effects of invasive species.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
Relevant EPBC Act-listed seabirds: • Antipodean Albatross • Black-Browed Albatross • Buller's Albatross • Campbell Albatross • Gibson's Albatross • Indian Yellow-Nosed Albatross • Northern Buller's Albtross • Northern Giant Petrel • Northern Royal Albatross • Soft-Plumaged Petrel • Southern Giant Petrel • Shy Albatross • Sooty Albatross • Southern Royal Albatross • Wandering Albatross • White-Capped Albatross	Background Paper, Population Status and Threats to Albatrosses and Giant Petrels Listed as Threatened under the EPBC Act 1999 (DSEWPaC, 2011a) National recovery plan for threatened albatrosses and giant petrels 2011-2016 (DSEWPaC, 2011) Overall objective: • To ensure the long-term survival and recovery of albatross and giant petrel populations breeding and foraging in Australian jurisdiction by reducing or eliminating human related threats at sea and on land. Specific objectives: • Land-based threats to the survival and breeding success of albatrosses and giant petrels breeding within areas under Australian jurisdiction are quantified and reduced. • Marine-based threats to the survival and breeding success of albatrosses and giant petrels foraging in waters under Australian jurisdiction are quantified and reduced.	Marine pollution	Where feasible, population monitoring programs also monitor, in a standardised manner, the incidence of oiled birds at the nest.	OMP: Aerial Surveillance SMP: Seabirds and Migratory Shorebirds
		Parasites and disease	No explicit management actions; parasites and disease recognised as a threat.	
Australian Fairy Tern	Approved Conservation Advice for Australian fairy tern (*Sternula nereis nereis*) (DSEWPaC, 2011b) No explicit relevant objectives.	Oil spills	Ensure appropriate oil spill contingency plans are in place for the subspecies' breeding sites that are vulnerable to oil spills.	

Species or Group	Relevant Plan/Conservation Advice and Relevant Objectives	Threats and or Management Strategies Relevant to the Activity	Relevant Conservation Actions	Relevant OMPs and SMPs
Blue Petrel	Approved Conservation Advice for the blue petrel (*Halobaena caerulea*) (TSSC, 2015d) No explicit relevant objectives.	Habitat loss, disturbance and modification	No explicit relevant management actions; habitat loss, disturbance and modification recognised as a threat.	
Fairy Prion (southern)	Approved Conservation Advice for fairy prion (southern) (*Pachyptila turtur subantarctica*) (TSSC, 2015e) No explicit relevant objectives.	Habitat loss, disturbance and modification	No explicit management actions; habitat loss, disturbance and modification recognised as a threat.	
Grey-Headed Albatross	Approved Conservation Advice for *Thalassarche chrysostoma* (Grey-headed Albatross) (DEWHA, 2009) No explicit relevant objectives.	Habitat loss, disturbance and modification	No explicit management actions; habitat loss, disturbance and modification recognised as a threat.	
Shy Albatross	Approved Conservation Advice for *Thalassarche cauta* (Shy Albatross) (TSSC, 2020c) Conservation Advice refers to the objectives set out in the National Recovery Plan for Threatened Albatrosses and Giant Petrels 2011-2016 (DSEWPaC 2011).	Marine debris (plastics)	No explicit management actions; marine debris recognised as a threat.	
		Disease	No explicit management actions; disease recognised as a threat.	
Soft-Plumaged Petrel	Approved Conservation Advice for the soft-plumaged petrel (*Pterodroma mollis*) (TSSC, 2015f) No explicit relevant objectives.	Habitat loss, disturbance and modification	No explicit management actions; habitat loss, disturbance and modification recognised as a threat.	

* References quoted in this table can be found in the reference list of the activity-specific *Minerva Decommissioing Environment Plan*

Table B-0-2: Summary of Protected Areas within the EMBA

Area Type	Title	IUCN Classification	Operational Area	MDO EMBA	LOWC EMBA
World Heritage Areas	NA	-	-	-	-
Wetland of International Importance (RAMSAR)	Western Port	-	-	✓	✓
	Port Phillip Bay	-	-	✓	✓
Wetlands of National Importance	Western Port	-	-	✓	✓
	Swan Bay and Swan Island	-	-	-	✓
	Aire River	-	-	✓	✓
	Yambuk Wetlands	-	-	-	✓
	Tower Hill	-	-	✓	✓
	Princetown Wetlands	-	-	✓	✓
	Lake Connewarre State Wildlife Reserve	-	-	-	✓
	Lower Aire River Wetlands	-	-	✓	✓
	Lower Merri River Wetlands	-	-	✓	✓
National Heritage Places	Point Napean Defence	-	-	✓	✓
Commonwealth Heritage Places	NA	-	-	-	-
Threatened Ecological Communities (TEC)	Subtropical and Temperate Coastal Saltmarsh	-	-	✓	✓
	Karst springs and associated alkaline fens of the Naracoorte Coastal Plain Bioregion	-	-	-	✓
	Assemblages of species associated with open-coast salt-wedge estuaries of western and central Victoria ecological community	-	-	✓	✓

	Natural Damp Grassland of the Victorian Coastal Plains	-	-	✓	✓
	Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	-	-	✓	✓
	Giant Kelp Marine Forests of South East Australia	-	-	✓	✓
Key Ecological Features (KEF)	West Tasmania Canyons	-	-	✓	✓
	Bonney Coast Upwelling	-	-	✓	✓
Australian Marine Parks (AMP)	Apollo	Multiple Use Zone (IUCN VI)	-	✓	✓
	Beagle	Multiple Use Zone (IUCN VI)	-	-	✓
State Marine Parks	Bunurong Marine National Park	National Park (IUCN II)	-	✓	✓
	Churchill Island Marine National Park	National Park (IUCN II)	-	-	✓
	Discovery Bay Marine National Park	National Park (IUCN II)	-	-	✓
	Point Addis Marine National Park	National Park (IUCN II)	-	✓	✓
	Port Phillip Heads Marine National Park	National Park (IUCN II)	-	✓	✓
	Twelve Apostles Marine National Park	National Park (IUCN II)	-	✓	✓
	Wilsons Promontory Marine National Park	National Park (IUCN II)	-	✓	✓
	Marengo Reefs Marine Sanctuary	Natural Monument or Feature (IUCN III)	-	✓	✓

	The Arches Marine Sanctuary	Natural Monument or Feature (IUCN III)	-	✓	✓
	Barwon Bluff Marine Sanctuary	Natural Monument or Feature (IUCN III)	-	-	✓
	Eagle Rock Marine Sanctuary	Natural Monument or Feature (IUCN III)	-	✓	✓
	Merri Marine Sanctuary	Natural Monument or Feature (IUCN III)	-	✓	✓
	Mushroom Reef Marine Sanctuary	Natural Monument or Feature (IUCN III)	-	✓	✓
	Point Danger Marine Sanctuary	Natural Monument or Feature (IUCN III)	-	-	✓

Table B-0-3: Summary of Listed National Heritage Sites

Name	EMBA Presence	
	Operational Area	Wider EMBA
Natural		
The Point Napean National Heritage Property	x	✓
Indigenous		
Coastal Aboriginal heritage sites include mostly shell middens, some stone artefacts, a few staircases cut into the coastal cliffs, and at least one burial site. The various shell middens within the Port Campbell National Park and Bay of Islands Costal Park are close to coastal access points that are, in some cases, now visitor access points (Parks Victoria, 1998).	x	✓
Historic		
Napier – wrecked in 1878	x	✓
Nowra – wrecked in 1891	x	✓
Newfield – wrecked in 1892	x	✓
Young Australian – wrecked in 1877	x	✓
Schomberg – wrecked in 1855	x	✓
Falls of Halladale – wrecked in 1908	x	✓
Unnamed – located west of Peterborough in waters less than 10 m deep	x	✓
Loch Ard – wrecked in 1878	x	✓
Frankston – Fairey Firefly – wrecked in 1947	x	✓
RAAF – B25 – Wrecked in 1945	x	✓
USAF – B57	x	✓
Twin Engine – Lady Julia Percy Is	x	✓
None of the wrecks on the Victorian west coast are covered by underwater heritage protected zones declared under Section 103 of the Victorian Heritage Act 1995 (DELWP, 2016)		