WOOLLYBUTT OIL POLLUTION EMERGENCY PLAN - FIELD MANAGEMENT AND PLUG AND ABANDONMENT

IN THE EVENT OF AN OIL SPILL GO DIRECTLY TO SECTION 2 (FIRST STRIKE PLAN) AND COMPLETE THE NOTIFICATIONS AND RELEVANT ACTIONS.

ADDITIONAL SUPPORTING INFORMATION THAT MAY INFORM THE RESPONSE IS PRESENTED IN SECTIONS 5 – 8.

PR-DE	07	02/06/21	Final Issue	Eni				
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eni australia				Project name: **WOOLLYBUTT DECOMMISSIONING**		Company identification: 000105_DV_PR.HSE.1045.000; Job N. ___		
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						Plant Area	Plant Unit	

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1. ACRONYMS AND DEFINITIONS USED IN THIS DOCUMENT

Acronym	Definition
AFMA	Australian Fisheries Management Authority
AHS	Australian Hydrographic Survey
AHT	Anchor Handling Tug
ALARP	As Low As Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMOSPlan	Australian Marine Oil Spill Plan
AMP	Australian Marine Park
AMV	Annulus Master Valve
AMSA	Australian Maritime Safety Authority
APASA	Asia-Pacific Applied Science Associates
API	American Petroleum Institute
APPEA	Australian Petroleum Production and Exploration Association
AQIS	Australian Quarantine and Inspection Service
ATSB	Australian Transport Safety Bureau
AWV	Annulus Wing Valve
$BaSO_4$	Barium Sulphate
bbl	Barrels
BOD	Biological Oxygen Demand
BoM	Bureau of Meteorology
$CaCO_3$	Calcium Carbonate
CALM	Conservation and Land Management
CAMBA	China-Australia Migratory Bird Agreement
CDU	Control Distribution Unit
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
cSt	Centistokes
CFC	Chlorofluorocarbon
CHARM	Chemical Hazard and Risk Management
CITHP	Closed in Tubing Head Pressure
cm	Centimetres
CMID	International Marine Contractors Association
Cwth	Commonwealth
DAFF	Department of Agriculture, Fisheries and Forestry
dB	Decibels
DEC	Department of Environment and Conservation

Acronym	Definition
DEH	Department of the Environment and Heritage
DEWHA	Department of Environment, Water, Heritage and the Arts
DNP	Director of National Parks
DoAWE	Department of Agriculture, Water and Environment
DoF	Department of Fisheries
DoT	Department of Transport
DP	Dynamic Positioning
DSPM	Disconnectable Single Point Mooring
DWCS	Diamond Wire Cutting System
EHU	Electro-Hydraulic Umbilical
Eni	Eni Australia Limited
ENVID	Environmental Hazard Identification
EP	Environment Plan
EPBC	Environment Protection and Biodiversity Conservation
et al.	And others
Field Management	Ongoing management of remaining ENI subsea equipment (refer to EP)
GOR	Gas Oil Ratio
GHG	Greenhouse gas
HLV	Heavy Lift Vessel
hr	Hour(s)
HSE	Health, safety and environment
HSEMS	Health, Safety and Environment Management System
HXT	Horizontal Xmas Tree
Hz	Hertz
IAPP	International Air Pollution Prevention
IMCA	International Marine Contractors Association
IMP	Incident Management Plan
IMO	International Maritime Organisation
IMS	Integrated Management System
IMT	Incident Management Team
IOPP	International Oil Pollution Prevention
IOTC	Indian Ocean Tuna Commission
ISO	International Standards Organisation
ISPP	International Sewage Pollution Prevention
IUCN	International Union for Conservation of Nature and Natural Resources
IV	Intervention Vessel

Acronym	Definition
JAMBA	Japan-Australia Migratory Bird Agreement
JV	Joint Venture
kg	Kilograms
kJ	Kilojoules
km	Kilometres
kPa	Kilopascals
L	Litres
LC	Lethal Concentration
LD	Lethal Dose
m	Metres
M	Migratory
mg	Milligrams
mL	Millilitres
Mol.	Molecular
MPA	Marine Protected Area
MPRA	Marine Parks and Reserves Authority
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto
MEE	Western Australia State Hazard Plan for Maritime Environmental Emergencies.
MEECC	Maritime Environmental Emergency Coordination Centre
MDB	Mid Depth Buoy
MMbbl	Million barrels
MMO	Marine Mammal Observer
MNES	Matters of National Environmental Significance
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit
MSDS	Material Safety Data Sheets
MSV	Multifunction Support Vessel
NACE	National Association of Corrosion Engineers
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NOPTA	National Offshore Petroleum Titles Authority
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NORM	Naturally occurring radioactive material
NOTAM	Notice to Airmen
NO_x	Oxides of nitrogen

Acronym	Definition
NSW	New South Wales
NWSP	North West Shelf Province
NWXA	North West Australia Exercise Area
OCIMF	Oil Companies International Marine Forum
OCNS	Offshore Chemical Notification Scheme
ODS	Ozone depleting substance
OIW	Oil in Water
OLGA	Commercial pipeline flow assurance and well dynamics simulation package
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006*
OPGGS(E) Regulations	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations
OPMF	Onslow Prawn Managed Fishery
OPRC 90	Oil Pollution Preparedness, Response and Co-operation 1990
OPEP	Oil Pollution Response Plan
OSC	On Scene Commander
OSTM	Oil Spill Trajectory Model
OSV	Offshore support vessel
OVID	Offshore Vessel Inspection Database
OWS	Oily Water Separator
P&A	Well Plug and Abandonment
Pa	Pascal
PAH	Polycyclic Aromatic Hydrocarbon
PFW	Produced Formation Water
PIC	Person In Charge
PMV	Production Master Valve
ppm	Parts per million
PWV	Production Wing Valve
ppb	Parts per billion
PPE	Personal Protective Equipment
PTF	Pilbara Trawl Fishery
PTMF	Pilbara Trap Managed Fishery
QPAR	Quarantine Pre-arrival Report
RET	Department of Resources, Energy and Tourism
RHD	Reel Hub Drive
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
ROV	Remote Operated Vehicle
RRRMs	Recommended Risk Reduction Measures

Acronym	Definition
RSO	Radiation Safety Officer
SB1M	SB1 Manifold
SB1	Scalybutt-1
SBT	Scalybutt Tree
Scf	Standard cubic feet
SCM	Subsea Control Modules
SCSSSVs	Surface Controlled Sub Surface Safety Valves
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SFR	Statutory Fishing Right
SITREP	Situation Report
SMFG	Size Management Fish Grounds
SOPEP	Shipboard Oil Pollution Emergency Plan
SO_x	Oxides of sulfur
SUTU	Subsea Umbilical Termination Unit
t	Tonnes
T	Threatened
TGB	Transition Guide Base
UNCLOS	United Nations Convention on the Law of the Sea 1982
UNFCCC	United Nations Framework Convention on Climate Change
UTA	Umbilical Termination Assembly
VSC	Vessel Safety Case
WA	Western Australia
WAFIC	Western Australian Fishing Industry Council
WB4	Woollybutt-4
WB2	Woollybutt-2A-ST1
WB1	Woollybutt-1
WB4M	WB4 Manifold
WTBF	Western Tuna and Billfish Fishery
ZPI	Zone of Potential Impact
µ	Micro
°C	Degrees Celsius

2. FIRST STRIKE PLAN

QUICK REFERENCE SECTION - OIL SPILL RESPONSE

OIL SPILL RESPONSE PRIORITIES

Response priorities in the event of an oil spill are:

- PEOPLE
- ENVIRONMENT
- ASSETS
- REPUTATION.

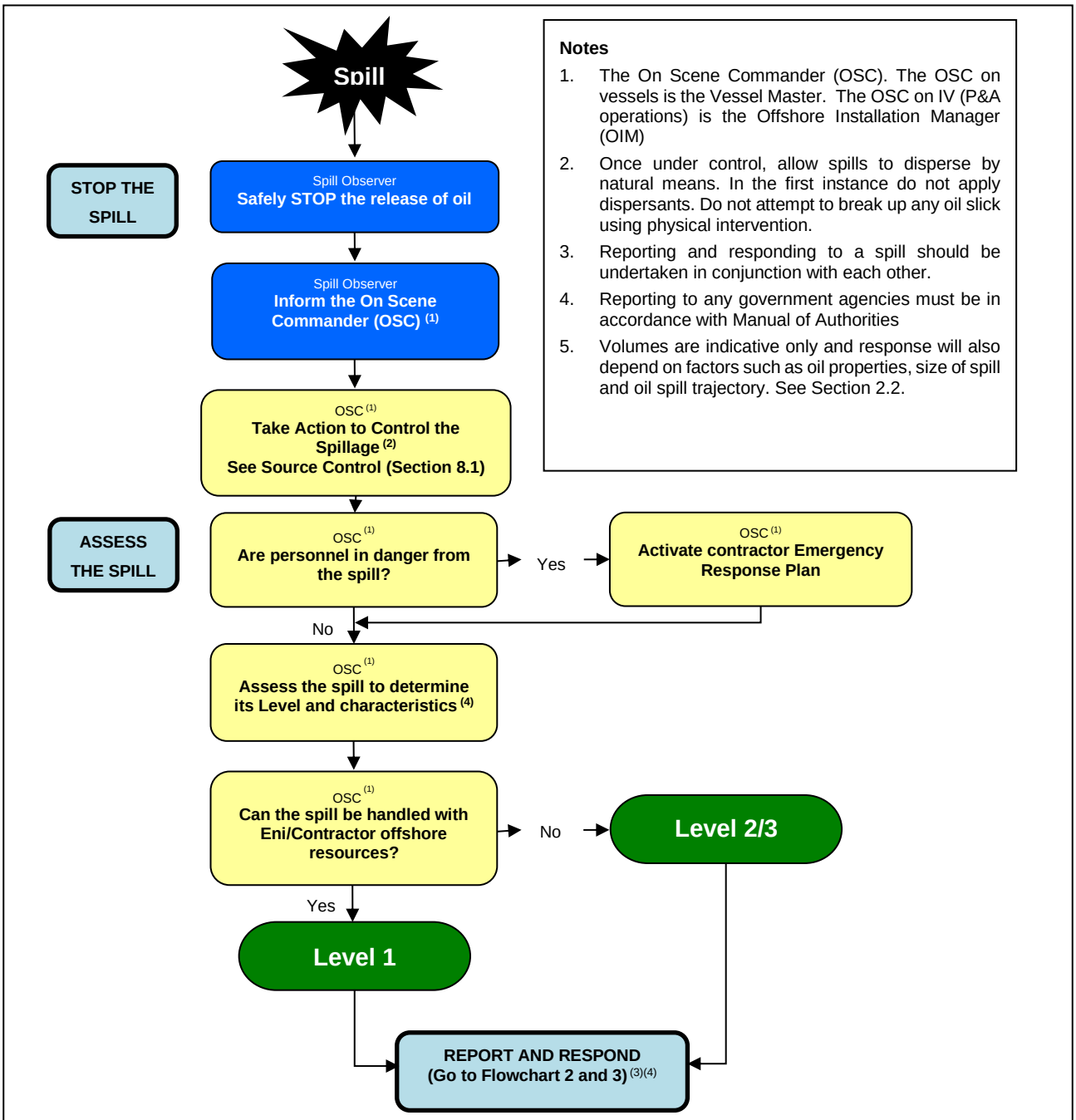
WHAT TO DO IF AN OIL SPILL OCCURS OFFSHORE?

1 Stop the Spill (Flowchart 1).
2 Assess the Spill (Flowchart 1).
3 Report the Spill (Flowchart 2).
4 Monitor the Spill (Flowchart 3).
5 Combat the Spill (Flowchart 3).

TEN QUESTIONS

1 What is it (hydrocarbon type)?
2 Where?
3 How big (quantity/size)?
4 Is the source contained?
5 Are all personnel safe?
6 What is in the way/what could it contact?
7 How long is it until it gets there?
8 Weathering?
9 Worst credible scenario?
10 What can we do?

FLOWCHART 1 – STOP AND ASSESS THE SPILL

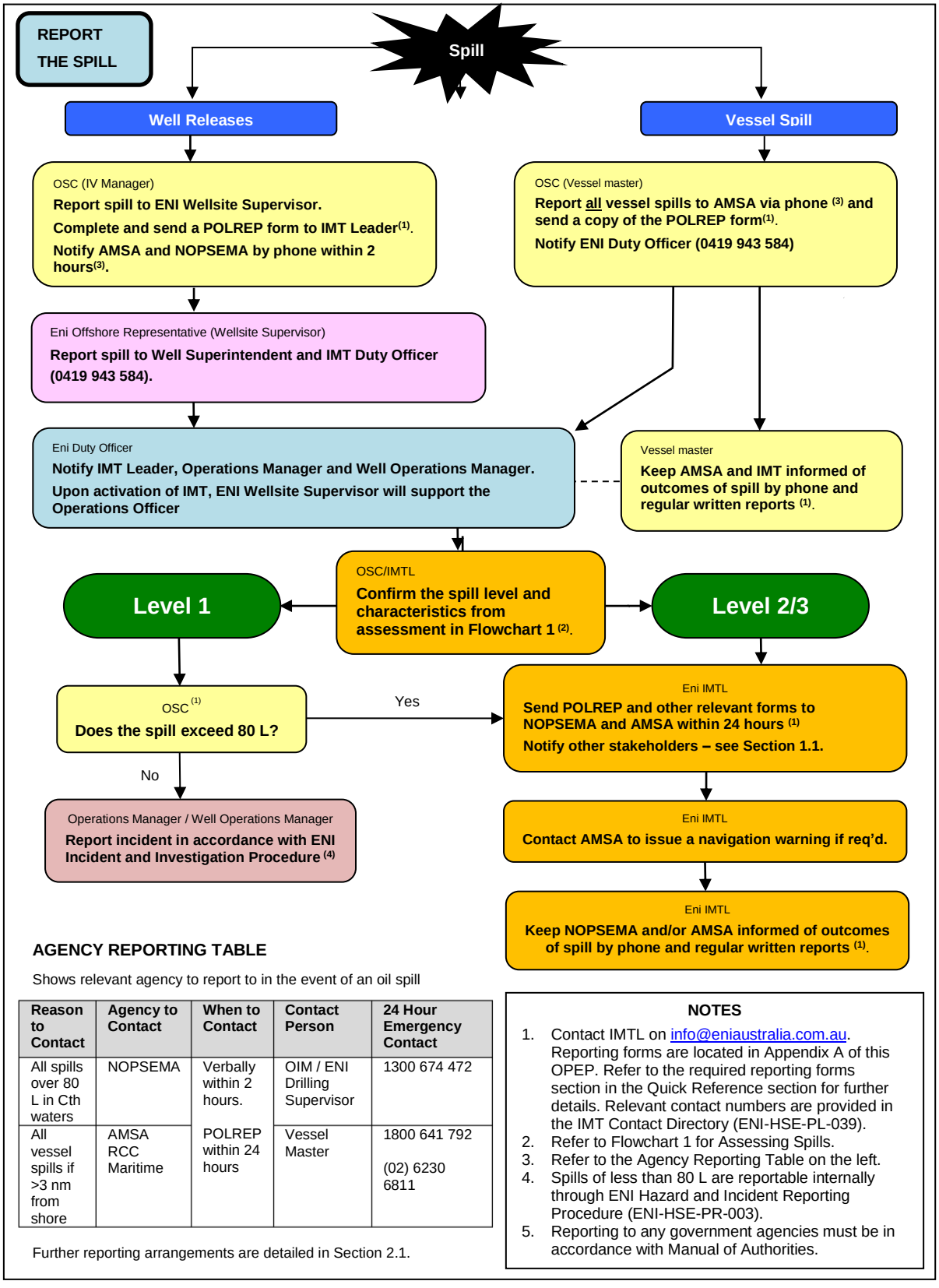


Notes

1. The On Scene Commander (OSC). The OSC on vessels is the Vessel Master. The OSC on IV (P&A operations) is the Offshore Installation Manager (OIM)
2. Once under control, allow spills to disperse by natural means. In the first instance do not apply dispersants. Do not attempt to break up any oil slick using physical intervention.
3. Reporting and responding to a spill should be undertaken in conjunction with each other.
4. Reporting to any government agencies must be in accordance with Manual of Authorities
5. Volumes are indicative only and response will also depend on factors such as oil properties, size of spill and oil spill trajectory. See Section 2.2.

	Level 1	Level 2	Level 3
Spill Size (indicative)	0–10 tonnes (5)	10–1000 tonnes (5)	>1000 tonnes (5)
Potential Environmental Harm	Low, not significant	Moderate, localised and short-term	Higher, regional or long-term

FLOWCHART 2 – REPORT THE SPILL



AGENCY REPORTING TABLE

Shows relevant agency to report to in the event of an oil spill

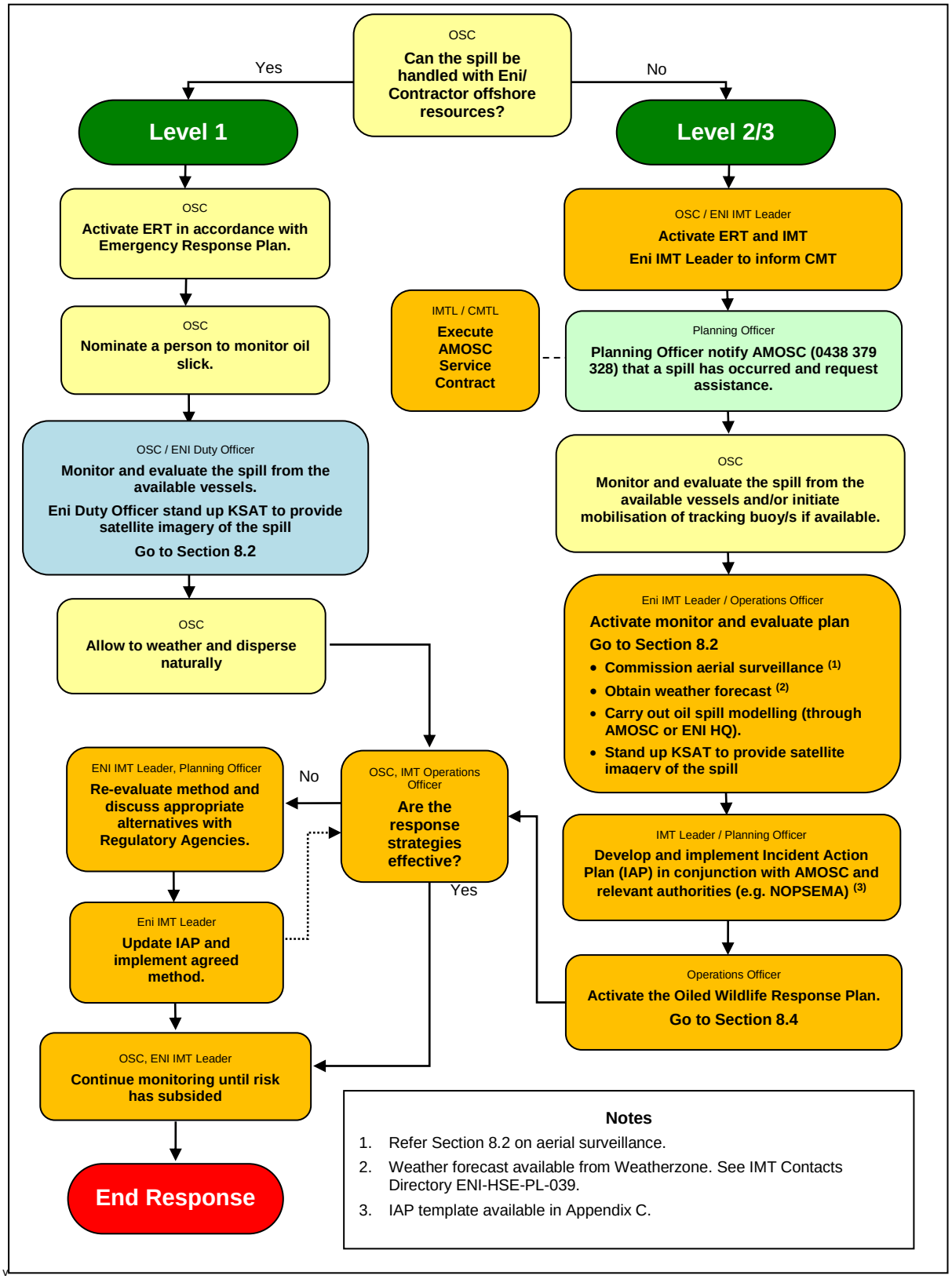
Reason to Contact	Agency to Contact	When to Contact	Contact Person	24 Hour Emergency Contact
All spills over 80 L in Cth waters	NOPSEMA	Verbally within 2 hours.	OIM / ENI Drilling Supervisor	1300 674 472
All vessel spills if >3 nm from shore	AMSA RCC Maritime	POLREP within 24 hours	Vessel Master	1800 641 792 (02) 6230 6811

Further reporting arrangements are detailed in Section 2.1.

NOTES

1. Contact IMTL on info@eniaustralia.com.au. Reporting forms are located in Appendix A of this OPEP. Refer to the required reporting forms section in the Quick Reference section for further details. Relevant contact numbers are provided in the IMT Contact Directory (ENI-HSE-PL-039).
2. Refer to Flowchart 1 for Assessing Spills.
3. Refer to the Agency Reporting Table on the left.
4. Spills of less than 80 L are reportable internally through ENI Hazard and Incident Reporting Procedure (ENI-HSE-PR-003).
5. Reporting to any government agencies must be in accordance with Manual of Authorities.

FLOWCHART 3 – RESPONSE (MONITOR AND COMBAT)



IMMEDIATE NOTIFICATIONS		
	P&A Activities	**Vessel spill**
Initial evaluation by OSC	IV Manager	Vessel Master
Internal Notification	IV Manager notifies ENI Wellsite Supervisor	Vessel Master informs the Duty Officer 0419 943 584 If within 500m of the IV, notify the IV Manager
	Eni Offshore Representative (Wellsite Supervisor) notifies • Well Superintendent • Duty Officer 0419 943 584	
	Duty Officer notifies • IMTL • Well Operations Manager • Operations Manager	
	Spills of less than 80 L are reportable internally through ENI Hazard and Incident Reporting Procedure (ENI-HSE-PR-003).	
Completion of POLREP by OSC	IV Manager (OSC)	Vessel Master (OSC)
External Notification	Spills to be reported to AMSA within 2 hours by the Vessel Master or IV Manager	
	Vessel Master or IV Manager report spills over 80 L in Commonwealth waters via phone to NOPSEMA within 2 hrs. Send POLREP and other relevant forms (Appendix A) For ongoing response in event of Level 2/3 the IMTL will send the POLREP and SITREP.	

REQUIRED REPORTING FORMS (All reporting forms are contained within Appendix A)			
Form No.	**Form Title**	**Use**	**Submit to**
028	Marine Pollution Report (POLREP)	Primarily a "first report" used to notify Government agencies, AMOSC and ENI IMT of a spill.	• AMSA (vessel spills) • AMOSC (all spills where support is required) • NOPSEMA (spills in Commonwealth waters) • WA DoT (spills in WA waters) • Eni IMT Leader/Duty Manager
029	Marine Pollution Situation Report (SITREP)	For ongoing reports. Spill response activities are reported on this form.	As for Form 028
FM0831	NOPSEMA Reportable Environmental Incident Form	A "reportable incident" is an incident associated with the activity that has caused or has the potential to cause moderate to significant environmental damage (e.g. oil spill of greater than 80 L).	NOPSEMA (within three days of incident).
FM0928	Recordable Environmental Incident Monthly Summary Report	A monthly report used to summarise any recordable incidents. A recordable incident is an incident arising from the activity that breaches a performance objective or standard in the EP and is not a reportable incident.	NOPSEMA (not later than 15 days after the end of the calendar month).

For contact details, refer to Section 1.1 Notifications or ENI IMT Emergency Contacts Directory ENI-HSE-PL-039.

2.1. Notifications

All ENI staff and contractors must report spills or observations of oil or oily substances on the sea immediately to the IV Manager for P&A and equipment removal activities. On a support vessel, the observer must notify the Vessel Master, who in turn will notify the IV Manager if within the 500 m of the IV.

The On-Scene Commander (OSC) is appointed by default as follows:

- Vessel activities: Vessel Master
- P&A and equipment removal activities: IV Manager.

The OSC shall report spills greater than 80 litres to NOPSEMA verbally within two hours. NOPSEMA's contact number for reporting an environmental incident is (08) 6461 7090. The Operations Manager (Level 1 spill) or IMTL (Level 2/3) is responsible for written reporting to NOPSEMA and other external authorities. A written report of the event must be provided to NOPSEMA within three days. ENI shall report spills less than 80 litres to NOPSEMA within 15 days of the end of the reporting month.

All spills must be reported to AMSA, regardless of location. The OSC shall notify AMSA within two hours. AMSA's contact number for reporting any marine pollution is (02) 6230 6811 or 1800 641 792. A POLREP form (Appendix A) is required to be sent to AMSA in order to provide details of the spill. The OSC shall prepare the POLREP form.

For spills requiring, or potentially requiring external assistance (i.e. Level 2/3 spills), the ENI's IMT Leader (IMTL) is responsible for subsequent activations and notifications, which will depend on the circumstances of the spill.

For the full list of contacts and contact details, refer to the IMT Emergency Contact Directory ENI-HSE-PL-039.

Table 2.1: Notifications by the IMT if activated (Level 2/3)

NOTIFICATIONS TO BE COMPLETED BY ENI's INCIDENT MANAGEMENT TEAM			
Notification Timing	**Authority/ Company**	**Contact Number**	**Instruction**
As soon as practicable	AMOSC	+61 438 379 328 amosc@amosc.com.au	Notify AMOSC that a spill has occurred, and ENI will require the stand-up of the resources and equipment consistent with the AMOSPlan.
As soon as practicable	OSRL	+65 6266 1566 (Singapore) +61 8 6557 8552 (Perth)	Notify OSRL that a spill has occurred, and ENI may require the stand-up of the resources and equipment.

NOTIFICATIONS TO BE COMPLETED BY ENI's INCIDENT MANAGEMENT TEAM			
Notification Timing	**Authority/ Company**	**Contact Number**	**Instruction**
Within 2 hours	NOPSEMA	1300 674 472	Verbally notify NOPSEMA for spills >80 L. Record notification using Initial Verbal Notification Form or equivalent and send to NOPSEMA as soon as practicable.
Within 2 hours	AMSA	1800 641 792 https://amsa-forms.nogginoca.com/public/	Verbally notify AMSA Response Coordination Centre (RCC) of the hydrocarbon spill. Follow up with a written POLREP as soon as practicable following verbal notification.
As soon as possible if spill affects WA state waters	WA DoT	+61 8 9480 9924	Verbally notify the Marine Environmental Emergency Response (MEER) Duty Officer WA DoT. Follow up with a written MOP Incident Report Form to marine.pollution@transport.wa.gov.au as soon as practicable following verbal notification.
Within 1 day	National Offshore Petroleum Titles Administrator (NOPTA)	(08) 6424 5303	Provide a verbal or written incident summary.
Within 1 day	Department of Mines, Industry Regulation and Safety (DMIRS)	+61 419 960 621 petroleum.environment@dmirs.wa.gov.au	Provide verbal notification. Follow up with a written incident summary to petroleum.environment@dmirs.wa.gov.au as soon as practicable following verbal notification.
Within 3 days	NOPSEMA	submissions@nopsema.gov.au	Provide a written NOPSEMA Incident Report Form as soon as practicable (no later than 3 days after notification).

NOTIFICATIONS TO BE COMPLETED BY ENI's INCIDENT MANAGEMENT TEAM			
Notification Timing	**Authority/ Company**	**Contact Number**	**Instruction**
Within 7 days	Department of Agriculture, Water and the Environment (DoAWE)	+61 2 6274 1111 epbc.permits@environment.gov.au	Provide a written report if spill incident injures or kills one or more of the following in a Commonwealth area: • an EPBC Act listed threatened species • a member of EPBC Act listed threatened ecological community • a cetacean.
Activate when there is imminent or actual impact to wildlife	DBCA	+61 8 9474 9055	Provide a verbal incident summary.
Incidences which occur within an Australian Marine Park (AMP) or are likely to impact on a AMP	Director of National Parks (DNP)	24-hour Marine Compliance Duty Officer on 0419 293 465	The DNP should be made aware of oil/gas pollution incidences which occur within a AMP or are likely to impact on a AMP as soon as possible
Within 24 hours after reporting to NOPSEMA an oil spill or discharge of any other pollutant into the environment	WA DPIRD	0439 258 575 environment@fish.wa.gov.au	Contact the WA DPIRD Response Officer within 24 hours of reporting the incident to the appropriate authority.

2.2. Escalation and De-Escalation of Response Levels

Table 2.2 lists escalation and de-escalation response triggers. The OSC is responsible for de-escalation and termination of the response for Level 1 spills. The IMT Leader is responsible for escalation and de-escalation of Level 2 or 3 spills.

Table 2.2: Escalation and de-escalation triggers for oil spill response

Escalation Triggers	De-escalation Triggers
An incident will escalate from Level 1 to a 2 if: • greater than 10 m^3 of oil has been spilt or is predicted to spill in the near future, or • additional support resources are required at local, regional or national level.	The incident will be de-escalated from Level 2 to 1 if the hydrocarbon source is under control and additional support resources are no longer required.
The level will escalate from Level 2 to a 3 if: • greater than 1000 m^3 of oil has been spilt or is predicted to spill in the near future, or • the surface slick is predicted to reach a shoreline, or • significant external support (from local, regional, national and international organisations) and/or a response of an extended duration is required. Incident controller delegates all incident management functions to focus on leadership and strategy.	The incident will be de-escalated from Level 3 to 2 when: • continued response activities will have no further improvements, or • endpoint criteria for response strategies in have been met (Section 8).

2.2.1. Spill Response Levels

Eni's incident response levels broadly align with state, territory and national incident response plans including the Western Australia State Hazard Plan for Maritime Environmental Emergencies. (MEE) and the NatPlan. Spill response levels help to identify the severity of an oil spill incident and the level of response required to manage the incident and mitigate environmental impacts. Incident response levels are further detailed in Table 2.3 for hydrocarbon spills.

Table 2.3: Eni oil spill response levels

Level 1	
An incident which will not have an adverse effect on the public or the environment. **An incident which can be controlled by the use of resources normally available on-board vessel in the case of this EP without other external assistance.**	
As a guide only – spills up to 10 tonnes (0–70 bbl or 0–11 m^3). Oil is contained within the incident site. Spill occurs within immediate site proximity. Able to respond to the spill immediately.	Source of spill has been contained. Oil is evaporating quickly and no danger of explosive vapours. Spill likely to naturally dissipate. No media interest/not have an adverse effect on the public.
Level 2	
An incident that cannot be controlled by using onsite resources alone and requires external support and resources to combat the situation; or **An incident that can be controlled onsite but which may have an adverse effect on the public or the environment.**	
All spills between 10 and 1000 tonnes (71–7000 bbl or 11 m^3–1113 m^3). Danger of fire or explosion. Possible continuous release. Concentrated oil accumulating in close proximity to the site or vessel. Potential to impact other installations.	Level-1 resources overwhelmed, requiring additional regional resources. Potential impact to sensitive areas and/or local communities. Local/national media attention/may adversely affect the public or the environment.
Level 3	
An incident which has a wide-ranging impact on Eni. **An incident which may require the mobilisation of external state, national or international resources to bring the situation under control.**	
Loss of well integrity. Actual or potentially serious threat to life, property, industry. Major spill beyond site vicinity. As a guide – spills above 1,000 tonnes (>7000 bbl or >1113 m^3). Significant shoreline environmental impact.	Level-2 resources overwhelmed, requiring international assistance. Level-3 resources to be mobilised. Significant impact on local communities. International media attention.

2.2.2. Initial OPEP activations for a Level 1 spill

The OSC is responsible for initial activations for a Level 1 spill. Also refer to Flowcharts 1, 2 and 3.

Table 2.4: Activations for Level 1 spills

When	Activation	Who
Immediate	Manage the safety of personnel on the vessel / IV and in operational area.	OSC
Immediate	Control the source using resources as per the SOPEP or source control plan. Refer Source Control Plan – go to Section 8.1	OSC
30 minutes	Make initial notifications. Activate the Notifications – go to Section 2.1	OSC
90 minutes	Monitor and evaluate the spill from the available vessels. Go to Section 8.2	OSC
Ongoing	Provide updates and incident reporting in accordance with Notifications Plan – go to Section 2.1 For vessel spills in Commonwealth waters, ENI will act as Control Agency until such time that AMSA assumes the role of Control Agency in which case ENI will follow direction of AMSA and provide all necessary onsite resources. For spills from a wellhead ENI is the Control Agency and will remain in this position until response strategy termination criteria are met. NOPSEMA maintain a Jurisdictional Authority role as the spill has originated in their area of jurisdiction.	N/A

2.2.3. Initial OPEP activations for a Level 2/3 spill

Following activation of the first strike plan outlined in Flowcharts 1, 2 and 3, the OPEP will be activated as follows.

Table 2.5: Activations for Level 2/3 spills response

FOR IMMEDIATE RESPONSE ACTIVATIONS (<1 HR) REFER TO FLOW CHART 1, 2 AND 3			
When	**Objective**	**Strategy**	**Who**
90 minutes	Gain situational awareness and undertake spill surveillance.	Activate the Monitor and Evaluate Plan – go to Section 8.2 Activate Response Plans as appropriate – go to Section 8	Operations Officer Logistics Officer Environmental Advisor
3 hours	Use operational inputs to inform the response planning	Initiate the development of Incident Action Plan – go to Section 3.7 and template in Appendix C. Activate Response Plans as appropriate – go to Section 8	Planning Officer Environment Advisor
5 hours	Prevent/mitigate impacts to wildlife.	Activate the Oiled Wildlife Response Plan– go to Section 8.4	Environmental Advisor Operations Officer
8 hours	Manage the safety of all responders.	Initiate the development of a Safety Management Plans.	Safety Officer
1 day	Assess and monitor impacts from spill and response.	Activate Scientific Monitoring Plan – go to Section 8.6	Environmental Advisor Planning Officer Logistics Officer
1 day	Manage the handling and disposal of any oil contaminated materials.	Initiate the development of a Waste Management Plan – go to Section 8.5	Planning Officer Logistics Officer
Ongoing	For vessel spills in Commonwealth waters, following notification of a Level 2/3 vessel spill, AMSA and/or DoT, as the legislated Control Agency/s, may formally assume control of the spill response and provide direction to those activities already commenced by Eni. For spills from a wellhead ENI is the Control Agency and will remain in this position until response strategy termination criteria are met. NOPSEMA maintain a Jurisdictional Authority role as the spill has originated in their area of jurisdiction.		N/A

2.3. Mobilisation of Response Strategies

The following response strategies have been identified in the non-operational NEBA (Section 7.1). Mobilisation of response strategies is dependent on the spill level (Refer to Flowchart 1 for Spill Response Levels). Table 2.6 and Table 2.7 below present the first response actions relevant for Level 1 and Level 2/3 spills respectively and should be enacted by the IMT as appropriate. Response strategies should be re-evaluated in an Operational NEBA (Section 7.2).

Details on the Operational and Scientific Monitoring capability is included in the OSMP (Appendix G).

Table 2.6: NEBA summary and operational plans for response strategies – Level 1

Strategy		Hydrocarbon type			First response actions	Action	Resource
		Hydraulic fluid	Marine diesel	Woollybutt crude			
Monitor and Evaluate		Yes	Yes	Yes	Appoint vessel crew to observe the spill area or slick	On Scene Commander	Section 8.2 Appendix G (OSMP)
					Stand up KSAT to provide satellite imagery of the spill	Duty Officer	
Source control	Vessel	Yes	Yes	Yes	Implement SOPEP	Vessel Master	Vessel SOPEP
Waste Management		Yes	Yes	Yes	Dispose of hazardous waste in accordance with vessel Garbage Management Plan	Vessel Master	Section 8.5 000105_DV_PR.HSE.1011.000 (EP)

Table 2.7: NEBA summary and operational plans for response strategies – Level 2/3

Strategy		Hydrocarbon type		First response actions	Action	Resource
		Marine diesel	Woollybutt crude			
Monitor and Evaluate		Yes	Yes	Implement OMP1 –mobilise vessel and aircraft for surveillance and marine megafauna observation	IMT Leader	Section 8.2 Appendix G (OSMP)
				Deployment of satellite tracking buoy	Operations Officer	
				Implement OMP2 – sampling of hydrocarbon for chemical and physical properties.	IMT Leader	
				Source real time OSM via AMOSC	Planning Officer	
				Stand up KSAT to provide satellite imagery of the spill	Operations Officer	
				Depending on results of modelling and monitoring, consider OMP3. Mobilise resources for shoreline assessment	IMT Leader	
Source control	Vessel	Yes	No	Implement SOPEP	Vessel Master	Vessel SOPEP
	Wells/ facility	No	Yes	Mobilise resources and personnel for source control	Operations Officer	Section 8.1 ENI-WOP-PL-001 (Source Control Plan)
Shoreline clean up		No	Yes	Equipment from AMOSC, OSRL, WA DOT and AMSA stockpiles and relevant personnel mobilised.	Logistic Officer	Section 8.3
Oiled wildlife response		No	Yes	Equipment from AMOSC, OSRL WA DoT and AMSA Western Australian Stockpiles and relevant personnel mobilised.	Logistic Officer	Section 8.4
Waste Management		Yes	Yes	Appoint a Waste Management Coordinator (WMC)	Planning Officer	Section 8.5 ENI-HSE-ST-059 (Waste Management Standard)
				Develop Waste Management Sub-Plan in line with ENI Waste Management Standard	Waste Management Coordinator	
Scientific Monitoring		Yes	Yes	Notify contractor to set up Purchase Order under ENI Environment and Social Impact Consultancy Services Panel Contract.	Logistic Officer	Section 8.5.4 Appendix G (OSMP)

3. OIL POLLUTION EMERGENCY PLAN OVERVIEW

This document is the accompanying Oil Pollution Emergency Plan (OPEP) to the Woollybutt P&A and Equipment Removal Environment Plan (EP) (000105_DV_PR.HSE.1011.000), as required by Regulation 14(8) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS (E) Regulations).

3.1. Summary of Proposed Activity

Eni Australia Ltd (ENI) as Titleholder conducts passive field management activities on the Woollybutt Field within Permit Area WA-25-L.

The 'operational area' of the Activity defines the boundary within which activities described in the EP will occur and will be located entirely within Commonwealth waters. The Woollybutt Field is located in Production Licence WA-25-L, approximately 65 km north of Onslow and 35 km west of Barrow Island. It lies on the continental shelf in 100 m water depth.

3.2. Purpose and Scope of this OPEP

The OPEP is an operational document and contains all information necessary for ENI to carry out a response to an emergency oil spill arising from the Activity.

This OPEP has been developed to meet all relevant requirements of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS (E) Regulations). It is consistent with the National and State (WA) systems for oil pollution preparedness and response, being the National Plan for Maritime Environmental Emergencies (NatPlan) managed by the Australian Maritime Safety Authority (AMSA) and the WA State Hazard Plan for Marine Oil Pollution (WestPlan-MOP).

3.3. High-Level Objectives of OPEP

The overall aim of this OPEP is to prevent long term significant environmental impacts by safely limiting the adverse environmental effects from an unplanned release of hydrocarbons to the marine environment to a level that is as low as reasonably practicable (ALARP); this will be achieved through the implementation of the various strategies presented throughout this OPEP, each with their own objectives.

3.4. Interface with External Plans

The OPEP is integrated with a number of government plans as well as oil industry mutual assistance plans. These are listed in Table 3.1.

Table 3.1: Associated external plans

Jurisdiction	Plan Title	Administering Agency	Function/Application
Industry (all waters)	Australian Marine Oil Spill Centre Plan (AMOS Plan	Australian Marine Oil Spill Centre (AMOSC)	Sets out industry arrangements for mutual aid and access to AMOSC resources.
Commonwealth of Australia (Commonwealth waters)	National Plan for Maritime Environmental Emergencies (NatPlan)	AMSA	Sets out oil spill preparedness and response procedures under the NatPlan.
Western Australia (WA)	Western Australia State Hazard Plan for Maritime Environmental Emergencies. (MEE)	WA DoT	Response to oil in WA waters. Arrangements for managing marine oil pollution and marine transport emergencies. Amalgamation of Westplan – Marine Oil Pollution and Westplan – Marine Transport Emergency
	WA Marine Hazardous Materials Emergency Management Plan (WestPlan-HAZMAT)	Department of Fire and Emergency Services (DFES)	Response to spills of non-oil chemicals or other hazardous substances.
	WA Oiled Wildlife Plan	WA Department Parks and Wildlife (DPaW)	Response plan for managing oiled wildlife in WA waters.

3.5. Interface with other Operators

Due to the presence of the Chevron-operated Wheatstone trunkline within the WA-25-L permit area and its proximity to a number of the Woollybutt wells, a hydrocarbon spill from the pipeline during the Woollybutt activities is considered credible (Section 8.9 of the Woollybutt P&A and Equipment Removal Environment Plan (000105_DV_PR.HSE.1011.000)). The impacts of a pipeline loss of containment at the Woollybutt field location are expected to be within the scenarios modelled for a subsea release due to loss of well integrity and for a vessel marine diesel spill. Therefore, existing Eni spill response capabilities described in this OPEP are considered sufficient to support a response for any Woollybutt-project related spill that originates from within the permit area WA-25-L, with the exception of Wheatstone trunkline source control, which is covered in the Chevron Oil Pollution and Emergency Plan.

Prior to commencing P&A, Eni will continue to engage Chevron to define the emergency and operational arrangements for ongoing activities within WA-25-L, including testing.

Table 3.2: Relevant external operator plans

Facility	Plan Title	Operator	Function/Application
Wheatstone trunkline	Environment Plan	Chevron	Describes the environmental risks, impacts and controls associated with the operation of the Wheatstone trunkline, including where it passes through

Facility	Plan Title	Operator	Function/Application
			WA-25-L. Relevant information includes hydrocarbon properties, source control, and any other spill risk reduction measures.
Wheatstone trunkline	Oil Pollution Emergency Plan	Chevron	Describes specific response measures and procedures that would be implemented to minimise the impact of a hydrocarbon spill from the Wheatstone trunkline.

3.6. Interface with Internal Documents

This OPEP interfaces with other relevant ENI crisis and emergency plans as detailed in Table 3.3.

Table 3.3: Eni Crisis and Emergency Management Plans

Document Title	Document Number	Scope and Function
Eni HSE IMS Framework	ENI-HSE-IN-002	Describes the way in which security, safety, health and the environment is managed by Eni.
Eni Crisis Management Plan	ENI-HSE-PL-033	Company-wide plan setting out Crisis Management Team (CMT) procedures.
Eni Incident Management Plan (IMP)	ENI-HSE-PL-034	Covers company-wide emergency management. Integrated with facility and Project environmental management plans.
IMT Support Team Manual	ENI-HSE-PL-037	Covers operation and roles and responsibilities of IMT support teams, including Oil Spill Response Planning Team, Aerial Surveillance Team, and Oil Spill Response Logistics team. Provides support team checklists.
IMT Emergency Contact Directory	ENI-HSE-PL-039	Provides extensive list of government, contractor and ENI contacts and contact details.
Source Control Response Plan	ENI-WOP-PL-001	Covers well source control, including relief well drilling.
Vessel Shipboard Oil Pollution Emergency Plans (SOPEPs)	As per contractor document control	SOPEPs as per International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL) requirements.

3.7. Incident Action Plan

The Incident Action Plan (IAP) is a key step in managing any significant response, recognising that all incidents are different and will be subject to variable factors such as weather, timing (seasons), sea state, duration, size and nature of release. The purpose of the IAP is to consider all these variable and changing factors, to ensure the response continues to be suitable for the event.

The IAP will use operational monitoring inputs to inform the response planning. The IAP will detail the response mechanisms and priority areas for protection based on the actual circumstances of the event, taking into account the spill trajectory, weather conditions and safety considerations.

Given the range of potential outcomes from a release event, an IAP is a critical step identified in the response strategy. Key activities to be addressed by the IAP include a review of the Net Environmental Benefit Analysis (NEBA) (Section 7), oil spill modelling (OSM), and ongoing consultation with affected/ involved stakeholders. To ensure that the IAP is appropriate for the nature of the spill, ENI shall seek the advisory support of technical experts as nominated by AMSA, AMOSC and operators with activities within the spill area.

Table 3.4 presents the steps for developing the IAP. A blank IAP template is provided in Appendix C.

Table 3.4: Incident Action Plan procedure

Task		Description	Action
1	Set Response Aim	This Response Aim is a broad statement of the overriding aim of the response, i.e. what the response is aiming to achieve. It may also set priorities. The aim may be set by the IMT Leader, Crisis Manager or Statutory Authority.	IMTL
2	Set Objectives	These are "goal statements" and indicate desired individual outcomes of the response (e.g. containment and recovery at location A). They are generally set by the IMT Leader.	Entire IMT
		Objectives may be set for all functions within the response. For example, "Delivery of equipment to the Shore Base" might be an objective for the Logistics Officer.	
		Objectives should be ranked according to priorities, which are decided by the IMT Leader.	
3	Determine Response Strategies	Strategies describe how the IMT (operations) plan to achieve the stated objectives.	Relevant IMT Officers
		Strategy options may be limited by weather, availability of equipment or by a range of operational constraints.	
		The NEBA (Section 7) will present viable and appropriate strategies.	Planning Officer
		Some strategies may require regulatory approval. Obtain any permits required.	IMTL

Task		Description	Action
4	Determine Tactics or Methods	Methods for implementing may be written as a series of tasks detailing the deployment of personnel and equipment.	Relevant IMT Officers
	Prepare/ Review	This may include, aerial surveillance, marine response, media, etc.	
5	Sub Plans	The Planning Officer should identify relevant plans for achieving the set objectives and coordinate the development of these plans, e.g. aerial surveillance, vessel surveillance, shoreline clean-up, waste management.	Planning Officer
		The Logistics Officer should compile a list of equipment, personnel and service requirements for the planned response.	Logistics Officer
6	Collate the IAP	Collate the IAP (Aim, Objectives, Strategies, Methods and Logistics etc.) and distribute to IMT and IMT officers.	Planning Officer
7	Approve IAP	The IMTL must approve the IAP and any revisions to the IAP. The IMT Leader is responsible for ensuring the IAP is consistent with regulatory requirements and this OPEP.	IMTL
8	Monitor	Monitor the progress of the response and assess against objectives.	Planning Officer
		Notify IMTL of the need to revise the IAP.	
9	Revise IAP	Repeat this process during the response as the situation, objectives, strategies or tactics change.	N/A

4. OPEP REQUIREMENTS AND LEGISLATIVE FRAMEWORK

The OPEP has been developed to meet all relevant requirements of the OPGGS (E) Regulations. It is consistent with the national system for oil pollution preparedness and response: The National Plan for Maritime Environmental Emergencies (NatPlan) managed by the Australian Maritime Safety Authority (AMSA) and the Western Australian (WA) State Hazard Plan for Marine Oil Pollution (WestPlan-MOP). The OPEP also provides information consistent with Appendix 5 of the Offshore Petroleum Industry Guidance Note - Marine Pollution: Response and Consultation Requirements.

This OPEP is made available to the following Regulatory agencies:

- National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA);
- Australian Maritime Safety Authority (AMSA); and
- Western Australia Department of Transport as the Hazard Management Authority (WA DoT).

4.1. Jurisdictional Authorities and Controlling Agencies

During a spill response there will be both a Jurisdictional Authority and a Control Agency assigned to the oil spill incident for all Spill Response Levels. The Jurisdictional Authority is the relevant Statutory Authority that has responsibilities for oil pollution in that jurisdiction. The Control Agency is the agency or company assigned by legislation, administrative arrangements or within the relevant contingency plan to control response activities to an oil pollution emergency (Table 4.1).

In all instances, ENI will act in the role of Control Agency, and implement a first-strike response, until such time that another Control Agency takes control.

Based on spill modelling undertaken for worst case spill scenarios, it is expected that spill response will take place primarily, and potentially completely, within offshore Commonwealth waters. However, shoreline accumulation may occur in State waters. Therefore, arrangements for State waters response are outlined in the event that spill trajectories reach State waters.

Table 4.1: Marine oil pollution arrangements

Role	Spill Level	State Waters		Commonwealth waters	
		Facility	Vessel	Facility	Vessel
Control Agency	1	Petroleum Titleholder (Eni)	DoT	Petroleum Titleholder (Eni)	AMSA
	2/3	DoT	DoT	Petroleum Titleholder (Eni)	AMSA
Jurisdictional Authority	1/2/3	DoT	DoT	NOPSEMA	AMSA

4.1.1. Response to Spills in Commonwealth Waters

Vessels

For a vessel incident originating in Commonwealth waters, the Jurisdictional Authority and Control Agency is AMSA. AMSA is the national shipping and maritime industry regulator and was established under the Australian Maritime Safety Authority Act 1990. AMSA manages the NatPlan on behalf of the Australian Government, working with State and the Northern Territory governments, emergency services and private industry to maximise Australia's marine pollution response capability.

Eni is required to have adequate preparedness arrangements for spills from vessels undertaking Petroleum Activities within Commonwealth waters under OPGGS Act 2006 and OPGGS (E) Regulations.

Eni will be responsible for coordinating a first-strike response to a vessel based spill in Commonwealth waters until such time as AMSA takes over the role as Control Agency, at which time ENI would provide all available resources as a Supporting Agency.

Well releases

For well releases in Commonwealth waters from Woollybutt wellhead the Jurisdictional Authority is NOPSEMA and the Control Agency is Eni. ENI is responsible for coordinating the response.

4.2. Jurisdictional Authorities and Controlling Agencies

4.2.1. NOPSEMA

The function of the NOPSEMA includes regulation of environmental management of offshore petroleum activities in the Commonwealth offshore areas and in coastal waters where State powers have been conferred.

NOPSEMA is the National Authority for offshore petroleum activities and a Statutory Authority under the NatPlan. In these roles, NOPSEMA is responsible for the oversight of response actions to pollution events from offshore petroleum operations (excluding vessel-only spills) in areas of Commonwealth jurisdiction.

4.2.2. Australian Marine Oil Spill Centre (AMOSC)

Industry assistance is available through the Australian Marine Oil Spill Centre (AMSOC), an industry funded response facility based in Fremantle, WA and Geelong, Victoria. As a member company of AMOSC, ENI has access to AMOSC's oil spill recovery and response equipment, training, technical capabilities along with those resources held by member companies as outlined in the AMOSPlan.

The IMT Leader has authorisation to request the mobilisation of AMOSC resources. AMOSC support is facilitated through the AMOSPlan using various legal instruments signed by all members. The AMOSPlan also provides a link into the NatPlan (AMSA) resources.

AMOSC Core Group of up to 100 personnel re-validate their competencies every two years through additional training and exercises at AMOSC and relies on competence based training for its skill-base. This ensures personnel have appropriate training and competency for oil spill response to ensure tasks, for example offshore containment and recovery, shoreline protection and deflection can be completed effectively. AMOSC Core Group personnel provide the surge capability in response to a level 2 or 3 spill.

AMOSC will supply a liaison person directly to the IMT to assist the IMT Leader and Planning and Operations Co-ordinators.

4.2.3. AMSA

Eni has a MoU in place with AMSA which outlines respective roles and responsibilities when responding to vessel based hydrocarbon spills. When ENI is the control agency (for petroleum activities) arrangements outlined in this OPEP will apply and AMSA may provide and co-ordinate resources of the National Plan request from ENI IMT.

A master services agreement is in place between Australian Marine Oil Spill Centre (AMOSC) and AMSA, enabling AMSA to hire equipment and personnel from AMOSC in accordance with the National Plan. These resources include both AMOSC's own resources and those that may be available from Participating Companies. The agreements in place with AMOSC allow resources from these companies to be hired through AMOSC by AMSA on behalf of the NatPlan (including DoT for State waters).

4.2.4. WA DoT

As outlined in Section 2, ENI will notify the DoT Maritime Environmental Emergency Response (MEER) unit as soon as practicable (within 2 hours of spill occurring). On notification, the HMA will activate their Maritime Environmental Emergency Co-ordination Centre (MEESS) and the DoT IMT.

In the event of a level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters. However, ENI will conduct initial response actions in State waters in accordance with this OPEP and will continue to manage those operations until formal incident control can be established by DoT. In performing the Control Agency function, DoT will use this OPEP as a starting point for all aspects of a response, including response assets and contracts specified in this OPEP, e.g. waste management, transport and personnel, as well as arrangements with third party responders including AMOSC.

Once DoT is notified of a spill entering State waters, DoT will establish an IMT. DoT's IC will establish contact with ENI's IC and complete the Control Agency Transfer Checklist (Appendix B).

Eni will provide appropriately qualified personnel (as defined in Section 9) to join the IMT as outlined in Section 5.4. These individual's will not occupy roles on ENI's IMT to ensure full availability for supporting DoT's IMT.

To facilitate effective coordination between ENI's and DoT's IMTs, a Joint Strategic Coordination Committee (JSCC) will be established (Figure 4.1). The JSCC will be jointly chaired by the WA DOT State Marine Pollution Coordinator (SMPC) and ENI's CMT Leader.

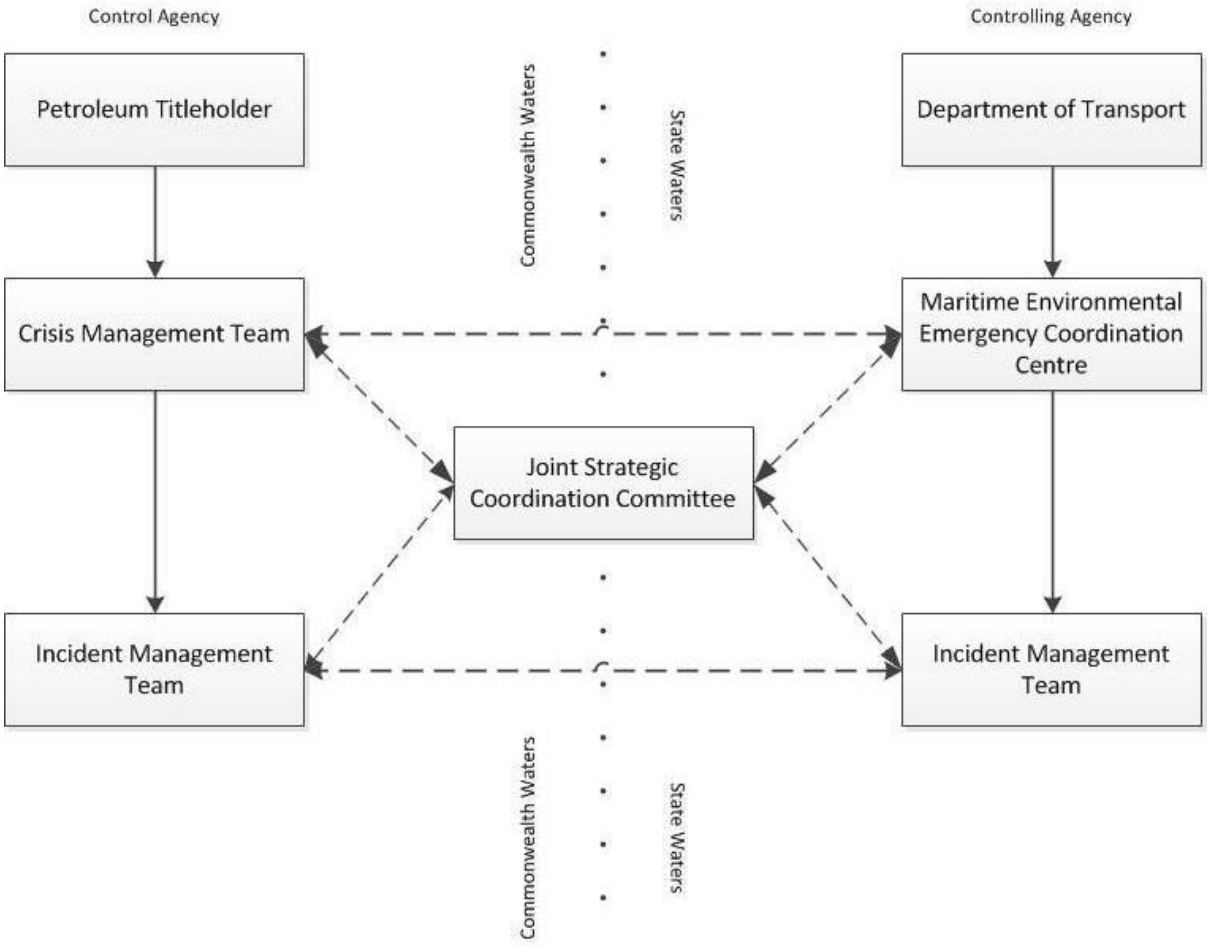


Figure 4.1: Cross jurisdictional controlling/control agency coordination structure

4.2.5. Oil Spill Response Ltd (OSRL)

Eni has access to additional oil spill resources through OSRL, which is based in Singapore and Southampton. If required, ENI has access to 50% of OSRL's oil spill response equipment.

OSRL can provide up to 18 trained personnel to assist with response in the event of an oil spill. These personnel can be mobilised from Singapore to Australia in less than 24 hours. A second team is also available in the event of a further incident from another member and OSRL maintains a minimum pool of 80 dedicated response staff.

OSRL personnel can assist and provide technical advice to the ENI IMT as required. In addition, these personnel can be mobilised in the field as they are trained in operational

activities such as containment and recovery, aerial surveillance, fluorometric monitoring, shoreline assessment and clean-up. OSRL can also provide a wide range of spill response equipment and services, such as logistics support, surveillance and satellite imagery every 12 hours in the event of a spill occurring. If required, AMOSC will coordinate and facilitate OSRL assistance on behalf of the ENI IMT.

5. ENI INCIDENT AND CRISIS MANAGEMENT STRUCTURE

5.1. ICM Organisational Structure

Eni's Incident and Crisis Management (ICM) organisation consists of the three core levels: Crisis Management Team (CMT), Incident Management Team (IMT) and Site Response. The principal duties of each level are shown in Figure 5.1 below.

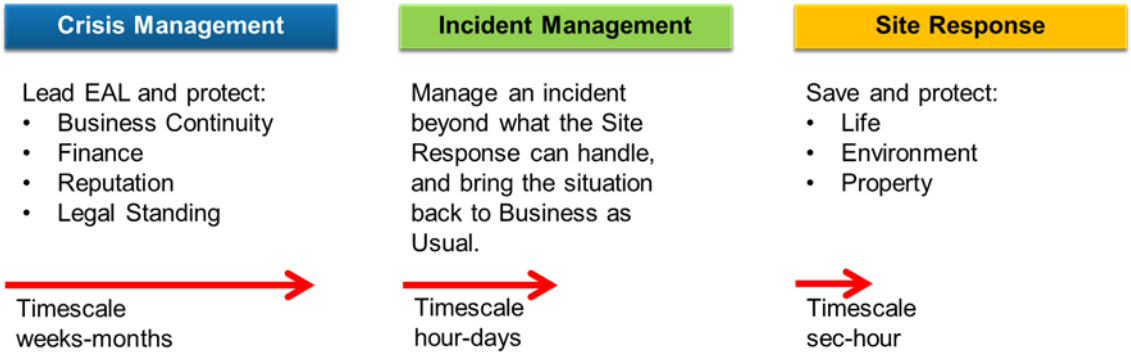
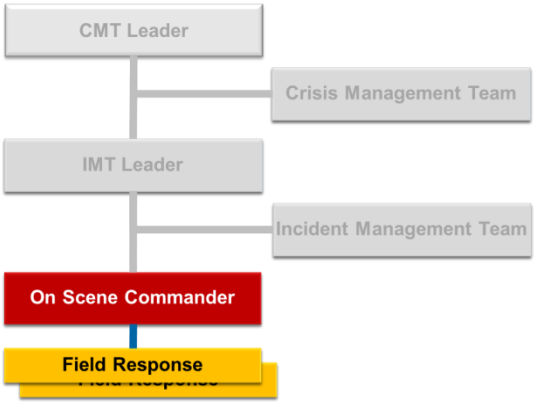
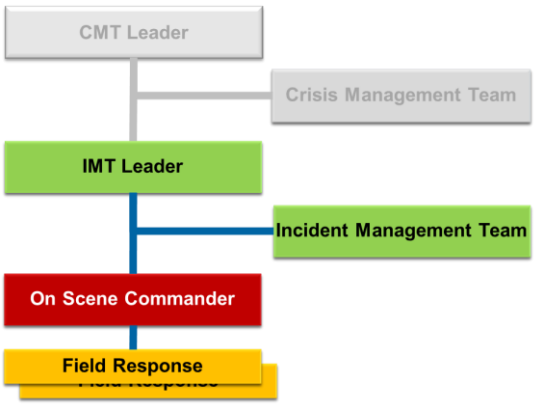


Figure 5.1: The ICM organisation's principal duties and timescales

5.2. Activation

Activation of the ICM organisation is to be executed in the following three steps:

Severity Level	Activation & Notification	Illustration (Activated parts of the organisation in colour)
Pre-alarm Any event, strictly defined as a process safety event or event generated on the equipment/plant by natural risks, which does not lead to an emergency but is visible, audible or in any case noticeable by the population, Institutions, Administrations and Bodies responsible for health, safety and the environment and which may have a significant media impact at local or national level.	Operational response only IMT Informed	
Level 1 An event that can be managed at site level with the personnel and equipment available on site, under the responsibility of the Employer.	Planned tactical response only IMT informed	
Level 2 An event that can be managed at Subsidiary level under the responsibility of the Employer with assistance from the EAL IMT and from Authorities and public administrations at a local and regional level.	Planned tactical response IMT mobilised. MD EAL informed CMT mobilised (MD Discretion)	

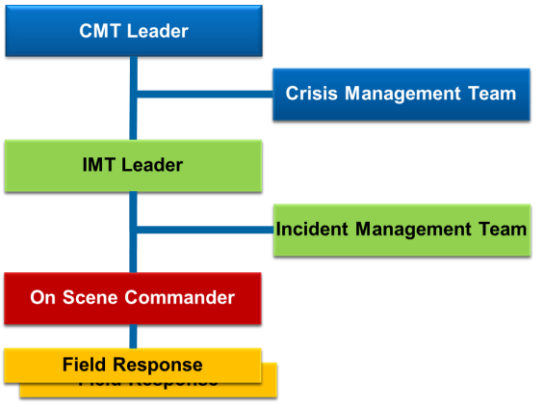
Level 3 An event that can be managed at Subsidiary level under the responsibility of the Employer with assistance from the EAL IMT, CMT, ENI Upstream Head Quarter ERT and from Authorities and public administrations at a local, regional and national level.	Planned tactical response IMT mobilised CMT mobilised Eni HQ mobilised	

Figure 5.2: Activation of levels in the ICM organisation

5.3. Site Response

Site Response conducts the mitigation work and can involve, but is not limited to, Emergency Response Teams (ERT), first aiders, evacuation team and oil spill response teams. For each incident an On Scene Commander (OSC) is appointed by default or self-appointment.

The ERT will be determined by the Contractor, and will report to the OSC, who is in contact with the IMT via the Operations Officer.

All ENI staff and contractors must report spills or observations of oil or oily substances on the sea immediately to the On Scene Commander (OSC). On a vessel, the observer must notify the Vessel Master, who in turn will notify the ENI Offshore Representative. If within 500 m of the IV during P&A and equipment removal, the Vessel Master will notify the IV Manager.

The OSC will make an initial evaluation of the spill, establish its tier level and assesses whether the incident has the potential to escalate. If IMT assistance is required, the OIM will then contact the IMT Leader (IMTL) via the Duty Officer. The POLREP form shall be completed immediately by the IV Manager to aid the response teams. IV Manager will notify the Operations Manager who will notify NOSPEMA.

5.4. Incident Management Team

The structure of the IMT, including oil spill response support teams if required, is shown in Figure 5.3.

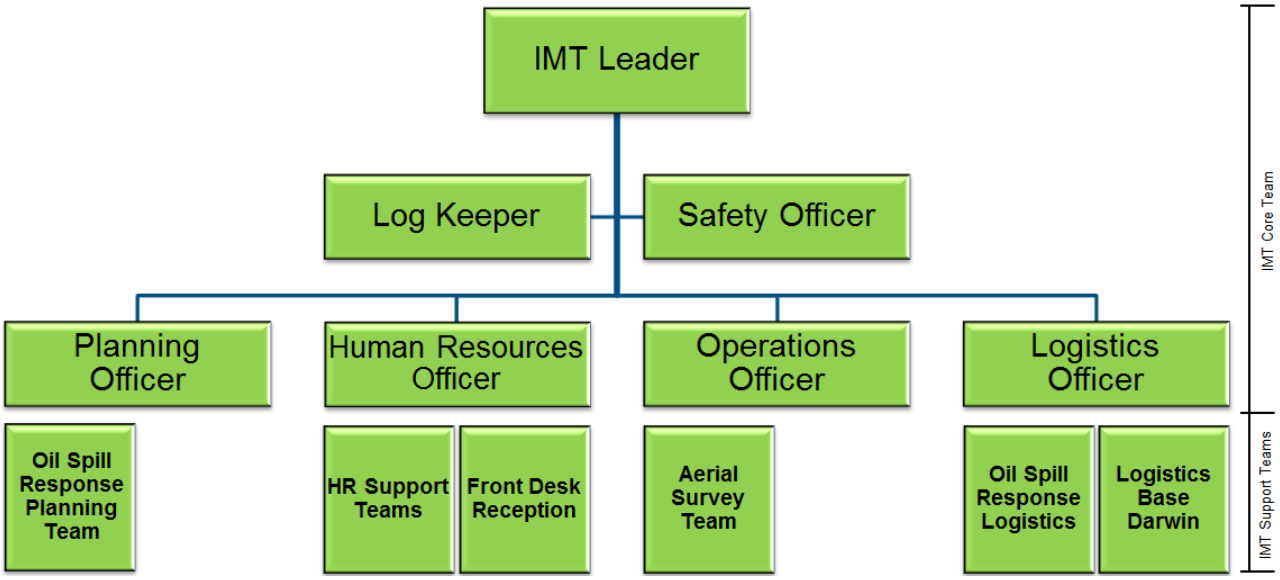


Figure 5.3: IMT and Support Teams for Oil Spill Response operation.

5.4.1. Roles and Responsibilities

For level 2 and 3 spills the IMT Leader (IMTL) is the Incident Controller. The IMT and the role of each team member are further described in the Incident Management Plan (IMP) (Eni-HSE-PL-034). The IMTL reports to the CMT Leader if CMT is activated, otherwise the IMTL reports to the Managing Director (MD) of Eni.

Should a level 2 or 3 spill enter State waters, the DoT will be Control Agency for the portion of the spill that occurs in state waters. DoT will establish an IMT which will require representatives from Eni. The roles of these representatives are provided in Section 5.4.1. Since simultaneous response operations may also be occurring in Commonwealth waters, members of the ENI IMT cannot also represent ENI in the DoT IMT.

The OSC shall report spills greater than 80 litres to NOPSEMA verbally within two hours. NOPSEMA's contact number for reporting an environmental incident is (08) 6461 7090. The Operations Manager (Level 1 spill) or IMTL (Level 2/3) is responsible for written reporting to NOPSEMA and other external authorities. A written report of the event must be provided to NOPSEMA within three days. ENI shall report spills less than 80 litres to NOPSEMA within 15 days of the end of the reporting month.

All spills must be reported to AMSA, regardless of location. The OSC shall notify AMSA within two hours. AMSA's contact number for reporting any marine pollution is (02) 6230 6811 or 1800 641 792. A POLREP form (Appendix A) is required to be sent to AMSA in order to provide details of the spill. The OSC shall prepare the POLREP form.

For spills requiring, or potentially requiring external assistance (i.e. Level 2/3 spills), the ENI's IMT Leader (IMTL) is responsible for subsequent activations and notifications, which will depend on the circumstances of the spill.

Table 5.1: Main responsibilities of key roles involved in an oil spill response

Role	Main Responsibility
Non IMT/CMT	
On scene Commander (OSC)	• Assess facility-based situations / incidents and develop the incident action plan • Single point of communications between facility/site and IMT • Communicates the incident action plan and delegates actions to the Incident Coordinator • Manage the incident in accordance with Facility Incident Response Plan, Third Party Incident Response Plan, and/or activity specific OSCP or OPEP. • Coordinates medical evacuations as required
Eni Offshore Representative (Wellsite Supervisor)	• Contact the Duty Officer • Notifies the Well Superintendent • Support the IMT Operations Officer
Well Superintendent	• Coordinates Woollybutt project field activities
Well Operations Manager	• Overall responsibility for well operations
Operations Manager	• Written notification to NOPSEMA and other external authorities in the event of a Level 1 spill.
Vessel master	• Make an initial evaluation of vessel based spill, establish its tier level and assesses whether the incident has the potential to escalate • Notification and reporting vessel based spills to AMSA RCC and NOPSEMA • Notifies IV Manager of spill if observed from a vessel
IMT	
Duty Officer / Operations Officer	• Stand up satellite monitoring (KSAT). • Manage all activities and response to resolve the incident. • Point of communications between IMT and OSC/ERT.
IMT Leader	• Coordinate all onshore support in accordance with the Pollution Emergency Plan. • Set the response objectives and strategic direction
	• Oversee the development and implementation of Incident Action Plans • Oversee implementation of Memorandum of Understandings (MoUs) and contracted support for 'mutual aid' • Ensure co-ordination with external organisations/police, etc. • Prepare and review strategic and tactical objectives with the CMT • Liaise with the CMT and provide information
Planning Officer	• Collect and document situational awareness information of the incident

Role	Main Responsibility
	• Develop, document, communicate and implement Incident Action Plans to achieve incident objectives • Determine the status of action/s or planned activities under the Incident Action Plans and assess and document performance against the objectives. • Assess long term consequences of incident and plan for long term recovery
Logistics Officer	• Mobilise response equipment, helicopters, vessels, supplies and personnel • Provide transport and accommodation for evacuated personnel • Oversee the implementation of the Waste Management Plan throughout a level 2 or level 3 oil spill response. • Liaise with the Supply Team to activate supply contracts and arrange procurements. • Coordinate authorities for search and rescue.
Human Resources Officer	• Responsible for contacting Next of Kin during and post-incident. • Area of management include Security, Health, Relative Response, HR Support Services, HR Planning and Next of Kin.
Log Keeper	• Ensure that the IMT can communicate and operate. • Keep the IMT room sufficiently manned. • Distribute manuals, contact lists and supporting information to IMT personnel. • Record and collect all information associated with the response to the incident. • Maintain filing system for Incident Response.
Safety Officer	• Manage notification to Designated Safety Authorities and liaise as required. • Develops and delivers information within the organisation (Eni and its contractors). • Assist in the development of Incident Action Plans. • Oversee the development and implementation of incident Safety Management Plans as required.
Personnel available to join DoT IMT	
CMT Liaison Officer	• Provide a direct liaison between the CMT and the Maritime Environmental Emergency Coordination Centre (MEECC). • Facilitate effective communications and coordination between the CMT Leader and SMPC. • Offer advice to SMPC on matters pertaining to ENI's crisis management policies and procedures.
IMT Liaison officer	• Provide a direct liaison between ENI's IMT and DoT IMT. Facilitate effective communications and coordination between ENI's IC and the DoT IC.

Role	Main Responsibility
	• Offer advice to the DoT IC on matters pertaining to ENI's incident response policies and procedures. • Offer advice to the Safety Coordinator on matters pertaining to ENI's safety policies and procedures, particularly as they relate to ENI's employees or contractors operating under the control of the DoT IMT.

6. IDENTIFIED SPILL RISKS

6.1. Credible Spill Scenarios

The environmental risk assessment detailed in Section 7 of the EP identified the following spill scenarios:

- Subsea release of Woollybutt crude due to loss of well control during P&A and equipment removal activities – volume 10,589 m^3 (Section 8.5 of EP)
- Sublease release of Woollybutt crude due to corrosion and valve failure during field management activities – volume 14,490.5 m^3 (Section 8.6 of EP)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days) (Section 8.6 of EP)
- Vessel collision resulting in fuel tank rupture and release of diesel – volume of largest fuel tank-maximum volume 500 m^3 (Section 8.7 of EP)
- Outboard leaks of hydraulic fluids (e.g. ROVs) Hydraulic fluid spill – maximum volume of 5 L (Section 8.8 of EP)

The worst case credible scenario is used for response planning purposes and for determining the applicable response strategies, detailed in Section 7, all other scenarios are of a lesser scale and extent.

A definition of the different spill levels is provided in Section 2.2.1.

6.2. Hydrocarbon characteristics and behaviour

Two types of hydrocarbons may be accidently released during activities:

- Woollybutt crude
- Marine diesel from vessels

6.2.1. Woollybutt crude

The physical and chemical properties of Woollybutt crude were determined from the Woollybutt Crude Assay Report (Intertek, 2002).

Table 6.1 and Table 6.2 show the physical characteristics and boiling point ranges for Woollybutt crude, respectively.

Table 6.1: Physical properties of Woollybutt crude (Intertek, 2002)

Physical Properties	Woollybutt Crude
Density (kg/m^3)	785.0 (at 15 °C)
API	48.6
Dynamic viscosity (cP)	1.342 (at 25 °C)
Pour point (°C)	-42.0
Hydrocarbon property category	Group I
Hydrocarbon persistence classification	Non-persistent

Table 6.2: Boiling-point breakdown of Woollybutt crude (Intertek, 2002)

Oil Type	Volatiles (%)	Semi-Volatiles (%)	Low Volatiles (%)	Residual (%)	Aromatics (%)
Boiling point (°C)	<180 C4 to C10	180 - 265 C11 to C15	265 - 380 C16 to C20	>380 >C20	Of whole oil <380 BP
	Non-persistent			Persistent	
Woollybutt crude	43.4	25.4	24.7	6.5	2.9

Woollybutt Crude contains a relatively low proportion (6.5% by mass) of hydrocarbon compounds that will not evaporate at atmospheric temperatures. These compounds will persist in the marine environment.

The mixture is composed of hydrocarbons that have a wide range of boiling points and volatilities at atmospheric temperatures, and which will begin to evaporate at different rates on exposure to the atmosphere. Evaporation rates will increase with temperature, but in general about 43.4% of the oil mass should evaporate within the first 12 hours (BP < 180 °C); a further 25.4% should evaporate within the first 24 hours (180 °C < BP < 265 °C); and a further 24.7% should evaporate over several days (265 °C < BP < 380 °C).

6.2.2. Marine diesel

Marine diesel is a light, refined petroleum product with a relatively narrow boiling range. When spilled on water, most of the oil will evaporate or naturally disperse within a few days or less. Diesel fuel properties (including the components) are summarised in Table 6.3.

Table 6.3: Properties of marine diesel (APASA, 2021)

Oil Type	Volatiles (%)	Semi-Volatiles (%)	Low Volatiles (%)	Residual (%)	Aromatics (%)
Boiling point (°C)	< 180 C4 to C10	180-265 C11 to C15	265-380 C16 to C20	> 380 > C20	Of whole oil < 380 BP
	Non-persistent			Persistent	
Marine Diesel	6	34.6	54.4	5	3

6.3. Response Planning Thresholds and Shoreline Hydrocarbon Exposure

As thresholds to determine the ZPI are used to predict and assess environmental impacts (further detailed in Section 5 of the EP).

The following information is derived from oil spill response planning literature and industry guidance, and supports the selection of the response planning thresholds presented for this Petroleum Activity. The thresholds used for response planning are summarised in Table 6.4.

Table 6.4: Hydrocarbon thresholds for response planning

Hydrocarbon threshold (g/m²)	Description	Response Planning Literature
>10	Predicted minimum threshold for commencing operational monitoring, scientific monitoring	The 10 g/m² threshold has been selected to define the minimum threshold for visibility of the hydrocarbon, dull metallic colours as per the Bon Agreement Oil Appearance Code.
50	Predicted minimum surface oil threshold for protection and deflection, containment and recovery, surface dispersant application.	Containment and recovery, protection and deflection and dispersant are not used for this activity. Refer to the NEBA section in Section 9.9 of the Woollybutt Operations EP for further justification.
100	Predicted minimum shoreline accumulation threshold for shoreline assessment and shoreline clean-up operations.	Recommended in AMSA's foreshore assessment guide as the acceptable minimum thickness that does not inhibit the potential for recovery, concentration below this threshold is best remediated by natural coastal processes alone (AMSA, 2015b). Cleaning the shoreline below this threshold may result in damage to the shoreline.

Note that thresholds for surface oil do not exceed 50 g/m^3. Therefore, protection and deflection, containment and recovery and surface dispersant application is not presented in this OPEP.

6.4. Spill Trajectory Modelling and Sensitive Receptors

Oil spill modelling (OSM) was conducted to inform the environmental risk assessment detailed in the EP. The same OSM can be used to inform oil spill response plans. In line with the spill scenarios outlined above, OSM was conducted for three scenarios:

- Subsea release of Woollybutt crude at 900 bpd over 74 days (total volume 10,589 m^3)
- Sublease release of Woollybutt crude at 250 bpd over 365 days (total volume 14,490.5 m^3)
- Instantaneous release of 500 m^3 marine diesel

A justification for flow rates and duration of spill is provided in Section 9 of the EP.

A summary of the modelling with regards to biological impacts is provided in Section 9 of the EP. The following summary presents results of the Oil Spill Modelling (OSM) with regards to response thresholds; for details regarding methods used, refer to Section 9 of the EP.

6.5. Modelling summary

Subsea release of Woollybutt crude from loss of well control during P&A activities- volume 10,589 m^3 over 74 days

Modelling indicates that floating and shoreline oil concentrations at or greater than 1 g/m^2 could travel up to 54 km from the WB4 well (in the winter season). The maximum extents at 10 g/m^2 concentration is 2 km (in winter). Concentrations are not set to exceed 25 g/m^2.

Entrained oil concentrations at or greater than the 100 ppb could travel up to 251 km from the WB4 well (summer).

Probability of contact by entrained oil concentrations are predicted to be greatest in summer at Ningaloo AMP (30%) at 100 ppb (Table 6.5).

Sensitive receptors are not predicted to be contacted by floating oil or shoreline at any threshold in any season.

For further details on the modelling results see Section 8.6 of the EP.

Table 6.5: Expected entrained oil outcomes at sensitive receptors resulting from a 74-day surface release of Woollybutt Crude at the WB4 well location (APASA, 2019)

Receptor	Probability (%) of entrained hydrocarbon concentration contact at ≥100 ppb			Minimum time to receptor waters (hours) at ≥100 ppb			Maximum entrained hydrocarbon concentration (ppb), at any depth in worst case replicate		
	Summer	Winter	Transitional	Summer	Winter	Transitional	Summer	Winter	Transitional
Ningaloo MP	18	16	8	379	299	1,113	184	223	236
Murion Islands	-	22	14	-	362	1,646	-	454	146
Ningaloo Coast	4	10	8	512	299	1,119	147	193	236
Montebello AMP	4	4	10	1,803	186	235	156	168	168
Ningaloo AMP	30	16	14	181	581	1,103	204	242	138
Gascoyne AMP	18	6	16	357	296	120	175	203	125

Subsea release of Woollybutt from corrosion and valve failure during field management activities – volume 14,490.5 m³ over 365 days

Surface hydrocarbons were predicted to travel up to 110 km when exceeding the 1 g/m^2 threshold. No geographic features or Australian Marine Parks were predicted to be contacted by surface oil above this threshold.

Accumulated hydrocarbons exceeding 100 g/m^2 were predicted to reach shorelines of Barrow Island, Muiron Islands, Montebello Islands and the Ningaloo coast. Moderate to high contact probabilities (60 – 100%) were predicted for this threshold at Barrow Island, Muiron Islands, the Montebello Islands and the Ningaloo Region. The maximum time-averaged shoreline loadings predicted at these receptors, when above the 100 g/m^2 threshold were 14.9, 5.5, 3.2 and 1.6 tonnes at the Ningaloo Region, Barrow Island, the Muiron Islands and the Montebello Islands, respectively. Thevenard Island, the Onslow Region, the Lowendal Islands and the Carnarvon Region were also predicted to receive hydrocarbons exceeding 100 g/m^2, however contact probabilities at these receptors were low (13 – 35%) and total shoreline loadings were below 0.5 tonnes (Table 6.6).

The majority of the total entrained hydrocarbons exceeding 70 ppb was within 70 km of the release location, with only two other model cells contacted above this threshold near the Ningaloo shoreline, approximately 150 km from the release location. The maximum predicted concentration at these location is 74.1 ppb (Table 6.7).

For further details on the modelling results see Section 8.7 of the EP.

Table 6.6: Summary results for oil on shorelines above 100 g/m²

Receptor	Total Probability Exposure (%)					Maximum total time-averaged shoreline mass (tonnes)					Minimum Arrival Time (days)					Maximum contacted shoreline length (km)				
	Q1	Q2	Q3	Q4	**Yearly**	Q1	Q2	Q3	Q4	**Yearly**	Q1	Q2	Q3	Q4	**Yearly**	Q1	Q2	Q3	Q4	**Yearly**
Barrow Island	50.0	75.0	42.9	25.0	**52.2**	1.1	1.6	2.6	1.0	**2.6**	12.7	6.3	61.5	31.8	**6.3**	5.2	5.2	7.9	2.6	**7.9**
Muiron Islands	25.0	25.0	28.6	25.0	**26.1**	1.8	1.9	2.2	2.3	**2.3**	199.2	54.2	107.6	34.7	**34.7**	5.2	5.2	5.2	5.2	**5.2**
Montebello Islands	NC	37.5	NC	25.0	**17.4**	NC	1.5	NC	0.6	**1.5**	NC	44.2	NC	4.4	**4.4**	NC	2.6	NC	2.6	**2.6**
Ningaloo Region	50.0	25.0	42.9	50.0	**39.1**	10.3	10.9	11.2	10.1	**11.2**	17.7	68.4	107.0	34.1	**17.7**	18.4	23.6	21.0	18.4	**23.6**

Table 6.7: Summary of stochastic results for total WAF when above 70- ppb

Receptor Type	Receptor	Total Probability of Exposure (%)					Maximum Time-Averaged Concentration (ppb)					Maximum Exposure Time (days)				
		Q1	Q2	Q3	Q4	**Yearly**	Q1	Q2	Q3	Q4	**Yearly**	Q1	Q2	Q3	Q4	**Yearly**
Geographic features	Ningaloo Region	25	25	28.6	NC	**21.7**	74.1	72.6	70.6	NC	**74.1**	0.2	0.2	0	NC	**0.2**
Protected areas	Ningaloo Marine Park	25	25	28.6	NC	**21.7**	74.1	72.6	70.6	NC	**74.1**	0.2	0.2	0	NC	**0.2**
Key Ecological Features	Ancient coastline at 125 m depth contour	100	100	100	100	**100**	140.2	154.8	135.6	134.2	**154.8**	1.1	1.1	1	1	**1.1**
	Continental Slope Demersal Fish Communities	100	100	100	100	**100**	98.2	111.6	104.8	104.1	**111.6**	0.2	0.4	0.3	0.3	**0.4**

Instantaneous release of 500 m³ marine diesel

Modelling indicates:

- Surface concentrations at or greater than 1 g/m² could travel up to 75 km from the release location. Sensitive receptors are not predicted to be contacted by surface oil above 1 g/m²
- Entrained oil concentrations at or greater than 100 ppb could travel up to 300 km from the release location.
- Dissolved aromatic hydrocarbon concentrations at or greater than 6 ppb could travel up to 250 km from the release location

For further details on the modelling results see Section 8.8 of the EP

6.6. Environmental and Socio-Economic Sensitivities

Environmental and socio-economic response priorities are hierarchically presented below, from priority 1 to 4, to be consistent with the national framework:

- Habitat, cultural resources;
- Rare and/or endangered flora and fauna (including species listed as threatened or migratory);
- Commercial resources; and
- Amenities.

These resources would be prioritised in a spill response only after human health and safety needs have been met.

Protection priority areas, based on trajectory spill modelling, together with key sensitivities are included in Table 6.8 below.

Table 6.8: Protection Priority areas and key sensitivities

Protection Priority Area	Key sensitivities
Barrow Island	Turtle nesting – particularly flatback (western side) and green turtles (eastern side) Mangroves and mudflats (shorebird foraging) – Bandicoot Bay Coral and other subsea benthic primary producers Seabird nesting Migratory shorebirds* - particularly Bandicoot Bay
Montebello Islands	Turtle nesting – particularly hawksbill turtles Mangroves – particularly Stephenson Channel

	Coral and other subsea benthic primary producers* Seabird nesting Migratory shorebirds* Humpback/ Pygmy blue whale migration
Ningaloo Coast	Turtle nesting –loggerhead, green Mangroves – Mangrove Bay and Yardie Creek Whale sharks Seabird nesting Humpback/ Pygmy blue whale migration* Tourism
Muiron Islands	Turtle nesting – major loggerhead site Coral and other subsea benthic primary producers Seabird nesting Humpback whale migration

Further details on protection priorities is presented in Section 7.2.1.

7. NET ENVIRONMENTAL BENEFIT ANALYSIS

7.1. Pre-operational NEBA

A NEBA has been conducted to assess the net environmental benefit of different response strategies at locations identified in the OSM. The assessment of effectiveness and positive and negative impacts summarised in Table 7.1 was used to determine the net benefit of each response strategy. These include receptors which have potential for the following:

- Surface contact (>10 g/m^2)
- Shoreline accumulation (>100 g/m^2)

The non-operational NEBA is provided in Section 9.8.3 of the EP. Based on the identified spill risks for the field management and P&A activity the available oil spill response strategies have been identified as applicable or not applicable through assessment of oil type and worst-case spill scenarios, as summarised in Table 7.1 below.

Table 7.1: NEBA summary and response option considerations

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
Source control	Well Intervention	Applicable to: • Subsea release of Woollybutt crude due to loss of well control during P&A activities (10,589 m^3 over 74 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m3 over 88 days) All four suspended shut in wells were producing with assistance of gas lift. Of four suspended shut-in wells, WB4 is the only well currently capable of flowing naturally. The other three wells can produce limited gas / oil / water (due to the presence of small gas cap in the well) and will be then naturally killed by the hydrostatic of the water produced from the reservoir. The analysis had been modelled using OLGA software in house. The non-free flowing wells, in the event of a blowout event during P&A would be contained through self-kill.	**Woollybutt Crude**	**Adopt**
			Marine Diesel	**Reject**
	Deployment of subsea first response toolkit	Applicable to: • Subsea release of Woollybutt crude due to loss of well control during P&A (10,589 m^3 over 74 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days)	**Woollybutt Crude**	**Adopt**
			Marine Diesel	**Reject**

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
		Subsea first response equipment has the ability to clean around the wellhead, enable intervention and prepare for relief well drilling and installation of a capping device. A Subsea First Response Toolkit (SFRT) and capping stack may be mobilised to site if technical and safety considerations allow and would be mobilised concurrently with relief well activation and mobilisation.		
	Installation of a capping stack	Applicable to: • Subsea release of Woollybutt crude due to loss of well control during P&A activities (10,589 m^3 over 74 days) and the spill cannot be contained through intervention • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days) A capping stack is designed to be installed on a subsea well and provides a temporary means of sealing the well, until a permanent well kill can be performed through either a relief well or well re-entry. A Subsea First Response Toolkit (SFRT) and capping stack may be mobilised to site if technical and safety considerations allow and would be mobilised concurrently with relief well activation and mobilisation.	**Woollybutt Crude**	**Adopt**
			Marine Diesel	**Reject**
	Drilling a relief well	Applicable to: • Subsea release of Woollybutt crude due to loss of well control during P&A (10,589 m^3 over 74 days)	**Woollybutt Crude**	**Adopt**
			Marine Diesel	**Reject**

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
		• Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days) The drilling of relief well is considered to be the primary control in event of a loss of well control and will be implemented regardless of any other controls in place. This control when implemented successfully will prevent further loss of hydrocarbon to the environment.		
	Vessel SOPEP	Applicable to diesel spills from vessels only. • Vessel collision leading to release of (500 m^3) marine diesel • Refuelling SOPEP is the procedure for responding to a ruptured fuel tank or bunkering incident.	**Woollybutt Crude**	**Reject**
			Marine Diesel	**Adopt**
Monitor and evaluate	Monitor and evaluate is used to predict and monitor the trajectory and fate of the spill, to determine the effectiveness of response strategies and to identify and report on any potential/actual contacts to flora, that occurs.	Applicable to • Vessel collision leading to release of (500 m^3) marine diesel • Refuelling • Subsea release of Woollybutt crude due to loss of well control during P&A activities (10,589 m^3 over 74 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days) There are various specific techniques (vessel/aerial surveillance, oil spill modelling) within this response strategy which may be suitable. Use will	**Woollybutt Crude**	**Adopt**
			Marine Diesel	**Adopt**

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
		be based on the spill fate / volumes as well as other considerations such as access to locations and environmental / metocean conditions. Monitor and evaluate is used to inform further response planning and execution and the operational NEBA.		
Subsea chemical dispersant	Subsurface chemical dispersant involves dispersant applied directly into the wellhead location at the release point. Subsea chemical dispersant injection is used to disperse the oil either to enable safe implementation of the subsequent controls.	The dispersibility of Woollybutt crude was tested in 2002 by Geotechnical Services Ltd (Geotech, 2002). Corexit was applied to the dispersant in two tests: • Test (purge and trap and whole oil analysis) on the effect of Corexit 9527 on Woollybutt crude in a water column designed to simulate conditions on the North West Shelf • Test involving dispersing 100 mL of the oil on a 4L water column using 10 mL (neat) of Corexit 9527 Based on the results from the purge and trap, and whole oil analyses, after the addition of Corexit 9527, the dispersant has not had a significant effect on the Woollybutt crude. However, from the additional experiment where 10 mL of Corexit 9527 was mixed with 100 mL of oil there does appear to be a depletion of the oil slick (approximately 10% reduction). It is therefore concluded that the application of dispersant is not anticipated to have a significant effect on the reduction of oil. A qualitative assessment has also been made that chemical dispersant would be ineffective on Woollybutt Crude: Although possible for Group II oil, the size of potential spill volume and the natural tendency of spreading into very thin films is evidence that dispersant application will be an ineffective response. The dispersant droplets will penetrate through the thin oil layer and cause 'herding' of the oil which creates areas of clear water and should not be mistaken for successful dispersion (see ITOPF - Technical Information Paper No. 4: The Use of Chemical Dispersants to Treat Oil Spills).	**Woollybutt Crude** **Marine Diesel**	**Reject** **Reject**

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
		The injection of subsea dispersants will increase the concentration of entrained oil and dissolved aromatic hydrocarbons within deeper waters and near the seabed. This could potentially result in increased impacts to seabed habitat in the vicinity of the well. However, the application of subsea dispersants is expected to reduce the wide-scale spatial distribution of entrained oil including the 500 ppb impact threshold and also the surface oiling. Given there the application of subsea chemical dispersant is not determined to be of net environmental benefit.		
Surface chemical dispersion	Chemical dispersant is applied to break down the hydrocarbons and allow/enhance dispersion into the water column, thereby preventing/reducing potential shoreline contact and increasing biodegradation.	Diesel is not conducive to chemical dispersion due to rapid evaporation and low surface concentrations. As above. The application of dispersant is not anticipated to have a significant effect on the reduction of oil. In addition the Woollybutt crude weathering results for the variable-wind case indicate that the wind conditions will have a large impact on the proportion of oil that remains afloat, with very little oil mass predicted to persist on the sea surface (<1% after 24 hours).	**Woollybutt Crude**	**Reject**
			Marine Diesel	**Reject**
Physical dispersion	Physical dispersion is undertaken by running vessels through the hydrocarbon plume and using the turbulence developed by the propellers or hydro-blasting from vessel hydrants to break up the slick. The process enhances dispersion.	Diesel and Woollybutt crude are not conducive to physical dispersion due to low surface concentrations. Surface hydrocarbons in the event of a 250bbl per day leak were not expected to exceed 10 g/m2. Surface hydrocarbons in the event of a 900bbl per day well-blowout were only expected to exceed 10 g/m2 in the immediate vicinity of the well.	**Woollybutt Crude**	**Reject**
			Marine Diesel	**Reject**

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
Containment and recovery	Containment and recovery of hydrocarbons can offer a preventive form of protection to sensitive receptors. Skimmers (mechanical) and booms will be used at sea. This strategy is only effective in calm conditions.	Diesel and Woollybutt crude are not conducive to physical dispersion due to low surface concentrations. Surface hydrocarbons in the event of a 250bbl per day leak of Woollybutt crude were not expected to exceed 10 g/m2. Surface hydrocarbons in the event of a 900bbl per day well-blowout of Woollybutt crude were only expected to exceed 10 g/m2 in the immediate vicinity of the well. Containment and recovery is effective on oil concentrations >50 g/m2 and therefore not effective.	**Woollybutt Crude**	**Reject**
			Marine Diesel	**Reject**
Protection and deflection	Protection and deflection activities involve the use of booms to deflect spills away from sensitive receptors and deflect spills to an area that provides increased opportunity for recovery activities.	This strategy will be dependent on the shoreline location and metocean conditions. Booms may be used to deflect the hydrocarbon away from high sensitive habitats. Activities are focused on areas of high protection value in low energy environments when metocean conditions are favourable for an effective implementation. Diesel and Woollybutt crude are not conducive to physical dispersion due to low surface concentrations. In addition, no surface hydrocarbons are expected to at the shorelines from a 250bbl per day leak of Woollybutt crude or 900bbl per day well-blowout of Woollybutt crude.	**Woollybutt Crude**	**Reject**
			Marine Diesel	**Reject**
Shoreline clean-up	During a spill response, clean-up of the oiled shorelines will be implemented using suitable methods, provided it will be beneficial to the environment based on the NEBA performed on the affected areas based on actual site conditions.	Applicable to: • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days) Contacted shorelines will be assessed for their shoreline clean-up potential based on an Operational NEBA. The clean-up can have the potential to remediate the shoreline quicker than if being left to natural remediation.	**Woollybutt Crude**	**Adopt**
			Marine Diesel	**Reject**

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
		Natural collection points along the coastline will be the focus of the shoreline clean-up. If turtle or seabird nesting season, there may be less impact not undertaking shoreline clean-up. There is no shoreline accumulation from a 900bbl per day well-blowout of Woollybutt crude or a diesel spill. Shoreline accumulation >100 g/m2 may occur in the event of a shorelines from a 250bbl per day leak of Woollybutt crude over 365 days. Owens and Sergy (1994) define accumulated hydrocarbon <100 g/m2 to have an appearance of a stain on shorelines. French-McCay (2009) defines accumulated hydrocarbons ≥100 g/m2 to be the threshold that could impact the survival and reproductive capacity of benthic epifaunal invertebrates living in intertidal habitat		
Oiled wildlife response (OWR)	Oiled wildlife response aims at preventing wildlife from becoming oiled and/or the treatment of animals that do become oiled.	Applicable to: • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m3 over 365 days) The shorelines of Barrow Island, Murion Islands, Montebello Islands and the Ningaloo coast have the potential for hydrocarbons in the event of a 250bbl per day leak of Woollybutt crude for 365 days. These shorelines have been identified as having potential wildlife inhabiting them. Mobilisation of experts, trained work forces, facilities and equipment will then be needed. Wildlife response activities may take place at sea, on shorelines and in specialised treatment facilities further inland. Options for wildlife management have to be considered and a strategy determined guided by the Western Australian Oiled Wildlife Response Plan (WAOWRP).	**Woollybutt Crude** **Marine Diesel**	**Adopt** **Reject**

Strategy	Description	Applicability and Environmental Benefit	Hydrocarbon type	Adopted/ Reject
		Turtle nesting occurs between the months of December to January, and hatchlings can be expected between February and March. Avifauna are present year round.		
In-situ burning	Technique involves the controlled burning of oil that has spilled (from a vessel or a facility). On conducive hydrocarbons, and when conditions are favourable and conducted properly, in situ burning will reduce the amount of oil on the water.	For in-situ burning to be undertaken oil has to be thicker than 1-2 mm. Diesel is not conducive to in-situ burning due to rapid evaporation and low surface concentrations. Surface hydrocarbons in the event of a 250bbl per day leak of Woollybutt crude were not expected to exceed 10 g/m2. Surface hydrocarbons in the event of a 900bbl per day well-blowout of Woollybutt crude were only expected to exceed 10 g/m2 in the immediate vicinity of the well.	**Woollybutt Crude**	**Reject**
			Marine Diesel	**Reject**
Scientific Monitoring	This is the main tool for determining the extent, severity and persistence of environmental impacts from an oil spill and allows operators to determine whether their environmental protection outcomes have been met (via scientific monitoring activities). This strategy also evaluates the recovery from the spill.	Applicable to • Vessel collision leading to release of (500 m^3) marine diesel • Subsea release of Woollybutt crude due to loss of well control during P&A activities (10,589 m^3 over 74 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days) • Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days) Scientific monitoring is especially beneficial for the purpose of monitoring entrained and dissolved oil impacts as response strategies are generally targeted to manage the surface oil impacts.	**Woollybutt Crude**	**Adopt**
			Marine Diesel	**Adopt**

7.2. Operational NEBA

The operational NEBA confirms that the response strategies (selected from the non/pre-operational NEBA) are appropriate to reduce the potential consequences of the spill and provide a net environmental benefit. The operational NEBA is a key operational control that manages the environmental risks and impacts of implementing the selected response strategies.

If a spill were to occur, the pre-operational NEBA would be re-evaluated before implementation of the response strategies and throughout the response, to reflect changing conditions of the event, oil trajectory and protection priorities, until the termination criteria have been agreed and met.

7.2.1. Protection priorities

The NEBA matrix table (Table 7.2) prioritises environmental sensitivities and assesses the individual net benefit that each response option may provide This process enables the trade-off effect to be achieved and provides the ability for an informed decision to be made. If there are conflicting outcomes for a particular response option, then the sensitivity with the higher priority becomes the preferred response option. NEBA is a decision-making process and will ultimately result in a trade-off of priorities and response strategies.

When deciding upon whether this trade-off is of net overall environmental benefit the receptors of 'High' protection priority should take precedence.

Table 7.2: NEBA matrix table and protection priorities

Sensitivity	Protection Priority	Response Strategy (↑ Increase in environmental benefit; ↓ Decrease in environmental benefit; X not applicable)	
		Monitor and evaluate	Shoreline clean-up
Offshore			
Humpback Whales	High (T,M)	↑	X
Blue Whales	High (T,M)	↑	X
Dugongs	High (M)	↑	X
Dolphins	High (M)	↑	X
Whale sharks	High (T,M)	↑	X
Other threatened sharks	High (T,M)	↑	X
Turtles	High (T,M)	↑	↑
Migratory birds	High (T,M)	↑	↑
Seabirds	Medium	↑	X
Shorebirds	Medium	↑	↑
Coral spawning	Medium	↑	X
Intertidal reef	Medium	↑	↑
Coral reef	Medium	↑	X
Macro-algae	Medium	↑	X
Seagrasses	Medium	↑	X
Fisheries	Low	↑	X
Petroleum activity	Low	↑	X
Shoreline			
Turtles Beaches	High (T,M)	↑	↑
Mangroves	High	↑	↓
Marshland	Medium	↑	↓
Mudflats	Medium	↑	↓
Subtidal reef	Low	↑	X
Sandy beaches	Low	↑	↑
Rocky shore	Low	↑	X
Open waters	Low	↑	X

8. RESPONSE STRATEGIES

8.1. Source Control

Hydrocarbon	Applicability
Subsea Release (Woollybutt Crude)	✓
Vessel Release (Diesel)	✓

8.1.1. Overview

The ENI Source Control Plan (ENI-WOP-PL-001) includes the process for the IMT to mobilise resources for:

- Intervention
- SFRT support
- capping support.
- Relief well drilling

The Source Control Plan will be used in combination with the existing IMT structure. Once the IMT is assembled and the nature of the incident is established, the relevant subject matter experts and drilling operations personnel will be summoned to assist the IMT and are responsible for initiating the SFRT and Source Control Response

The Source Control Plan (ENI-WOP-PL-001) outlines source control options and implementation in detail. Key aspects include, but are not limited to:

- Planning for logistics, response organisation, command & control.
- Requirement for debris removal, site survey, subsea containment, identification of ancillary equipment, ROV requirements, Support Vessel requirements.
- Pre-engineering documentation to ensure that response equipment is suited to the upcoming well and campaign facilities. As per WPM, this is part of standard well engineering work as well as campaign planning.
- Ensure compliance with corporate and local regulatory standards.

Eni would deploy as appropriate, the following response options specific to a loss of well control event (P&A Operations), or on detection of valve failure on pressure-containing equipment due to corrosion (field management):

- Well intervention;
- Subsea First Response Toolkit (SFRT) debris clearance/removal**;**
- Capping stack deployment**;** and
- Relief well drilling**.**

A Subsea First Response Toolkit (SFRT) and capping stack may be mobilised to site if technical and safety considerations allow and would be mobilised concurrently with relief well activation and mobilisation.

In a Level 2 or Level 3 spill, ENI will contact AMOSC and will inform them of the incident. ENI is part of the Mutual Aid MoU which sets up a framework for 'best endeavours' mutual assistance arrangements in drilling relief wells. The MoU commits the signatories to share rigs, equipment, personnel and services to assist another operator in need.

Source control procedures for a vessel collision are detailed in the vessel SOPEP.

Note, All four suspended shut in wells were producing with assistance of gas lift. Of four suspended shut in wells, WB4 is the only well currently capable of flowing naturally. The other three wells can produce limited gas / oil / water (due to the presence of small gas cap in the well) and will be then naturally killed by the hydrostatic of the water produced from the reservoir.

8.1.2. Capability and resources

Intervention

Applicable to:

- Subsea release of Woollybutt crude due to loss of well control during P&A activities (10,589 m^3 over 74 days)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days)

The BOP intervention package is aimed to provide a proactive response option to attempt to function the BOP and shut the well in if the IV hasn't done so already.

The BOP intervention package includes 1 x large subsea accumulator module, 2 x ROV/BOP intervention skids and 1 x dual BOP interface which can enable 2 x ROV hot stabs in case increased flow and pressure is required to act on the BOP ram close function.

An ROV can be used in an attempt to manually activate the BOP either through hydraulic pressure supplied from the ROV or through a subsea hydraulic accumulator (through AMOSC). The ROV available on the IV can be deployed in 48 hours in an initial attempt to activate the BOP. A hydraulic accumulator contained as part of the SFRT can be mobilised and deployed through AMOSC from the Henderson, WA. with well intervention attempted within 6 days (5 days for SFRT mobilisation and 1 day for BOP Intervention). This would occur concurrently with the ROV deployment.

For a leak from a shut-in well an ROV will be deployed from a vessel initially to investigate. ROV's and vessels for deployment are available through existing contracts and are available for deployment in 7 days (as per the ENI Source Control Plan). The applicable source control strategy based on technical and safety considerations will then be initiated.

Full details on the equipment deployment timeframes is contained in the ENI Source Control Plan (ENI-WOP-PL-001).

Subsea First Response Toolkit (SFRT): debris clearance/removal

- SFRT is deployed by AMOSC from the Oceaneering yard in Henderson, WA.
- The SFRT comprises ROV operated tooling that is used to inspect damage, remove damaged or redundant items and allow better access to the well.

Applicable to:

- Subsea release of Woollybutt crude due to loss of well control during P&A and equipment removal activities (10,589 m^3 over 74 days)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days)

Site survey equipment is intended to be utilised as a first response to gather an initial assessment of the state of the subsea BOP and Wellhead and the status of the blowout or leaking well; therefore, it is vital to have the possibility of conducting such survey. An ROV from the IV (P&A activity only) is the initial tool to be used; however, if the IV is not operational or adrift, or in the case of a leaking well, then a vessel with a ROV is required to survey the scene. ROV's and vessels for deployment are available through existing contracts and are available for deployment in 7 days (as per the ENI Source Control Plan).

In some cases debris may be required to be cleared from the area allowing access for proper inspection. This can occur using the debris clearance equipment within the AMOSC SFRT. The AMOSC SFRT would be mobilised from Henderson, WA. The mobilisation of the SFRT would take place in parallel with mobilisation of the capping stack to ensure initial ROV surveys and debris clearance have commenced before the arrival of the capping stack.

The SFRT can be mobilised by AMOSC from the Oceaneering yard in Henderson, WA within 9 days. Full details on the equipment deployment timeframes is contained in the ENI Source Control Plan (ENI-WOP-PL-001).

The following list of personnel is required for one IV. For two IV (one for BOP intervention/debris clearance the number of ENI supervisors/ROV personnel and Subsea engineers will need to be adjusted).

Company	Position Required	Mob. Location
Oceaneering	1 x Project Manager	Henderson, Perth
Oceaneering	2 x Project Engineer	Henderson, Perth
Oceaneering	4 x Tooling Technician	Henderson, Perth
ROV SP	6 x Operator/Supervisor	TBD
Eni	2 x Intervention Sup.	Perth
Eni	2 x Subsea Engineer	Perth
Marine Vessel	3 x Crane Operator	Onboard the Vessel
Marine Vessel	Seamen – as required	Onboard the Vessel

Capping stack

Eni has a global agreement with WildWell Control (WWC) for the provision of a capping stack from Aberdeen or Singapore.

WWC can also provide technical and operational support on source control plan creation.

Applicable to:

- Subsea release of Woollybutt crude due to loss of well control during P&A and equipment removal activities (10,589 m^3 over 74 days) and the spill cannot be contained through intervention
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days)

An independent subsea plume and gas dispersion study will be completed to assess the applicability to the Woollybutt shut-in wells prior to P&A and equipment removal activities.

A capping stack is designed to be installed on a subsea well and provides a temporary means of sealing the well, until a permanent well kill can be performed through either a relief well or well re-entry. The sea freight is preferred due to the shorter time required to get the capping stack on-site.

A capping stack deployment is as follows:

- Capping Stack Mobilisation (occurring concurrently during capping stack transport)– 10 days, Capping Stack assumed to be mobilized from Singapore by Sea - Securing the vessel included

- Capping stack transport to location – 19 days
- Capping stack – containment – 3 days

Full details on the equipment deployment timeframes is contained in the ENI Source Control Plan (ENI-WOP-PL-001).

The below personnel list will be in addition to the requirement set out for SFRT personnel. As detailed in the ENI Source Control Plan (ENI-WOP-PL-001).

Company	Position Required	Mob. Location
WWC	1 x Senior Well Control Specialist	Houston, USA
WWC	3 x Well Control Specialist	Houston, USA
WWC	1 x Relief Well Specialist	Houston, USA
WWC	1 x Senior Engineer	Houston, USA
WWC	1 x Explosive Demolition Specialist	Houston, USA
WWC	1 x Heavy Equipment Specialist	Houston, USA
Eni	2 x Intervention Sup	Perth
ROV SP	6 x Operator/Supervisor	TBD
Marine Vessel	3 x Crane Operator	Onboard the Vessel
Marine Vessel	Seamen – as required	Onboard the Vessel

Relief well drilling

Applicable to:

- Subsea release of Woollybutt crude due to loss of well control during P&A and equipment removal activities (10,589 m^3 over 74 days)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m^3 over 365 days)
- Subsea release of Woollybutt crude during field management due to corrosion and valve failure (11,144.8 m^3 over 88 days)

Eni is part of the Mutual Aid MoU which sets up a framework for 'best endeavours' mutual assistance arrangements in drilling relief wells. The MoU commits the signatories to share rigs, equipment, personnel and services to assist another operator in need.

The drilling of a relief well is considered to be a control in event of a loss of well control and will be implemented regardless of any other controls in place. This control when implemented successfully will prevent further loss of hydrocarbon to the environment.

Eni has considered the time to complete the drilling of a relief well in the Woollybutt field and have determined that it can be achieved in 74 days based on the depth of the relief wells (~3,300m Maximum Depth (MD)). 74 days for relief well drilling is also stipulated in the ENI Source Control Plan (ENI-WOP-PL-001).

The 74 day blowout duration has been determined as a worst case duration and is based on the maximum depth of the hydrocarbon reservoir being open and the estimated time to drill a relief well under the MoU. 74 days relief well drilling is based on the details within Table 8.1.

Table 8.1: Woollybutt relief well drill times

Phase	Details	Duration (days)
Mobilisation	Time to secure the well and mobilisation duration. Access to a MODU to drill the relief well would be via the APPEA MoU for mutual aid	35
Drill relief well - Based on Eni, Woollybutt production well design	Drill 42” hole	25
	Run LPWHH w/36” conductor	
	Drill 17-1/2” hole	
	Run 13-3/8” casing	
	Run BOP stack	
	Drill 12-1/4” hole to ~2400mD	
	Run 9-5/8” liner	
Intersect and kill	Based on Eni, production well design	7
Plug and abandon	Based on Eni, production well design	7
Total days		**74**

The time to source and contract the MODU through the MOU and other stages to secure the rig are presented in Table 8.2, contingency duration is also included.

Table 8.2: Maximum durations and phases to for MODU sourcing

Phase	Duration (days)
Activate MOU. Complete relief well design. Secure relief well equipment	10
Transit to location of well	5
Backload and loadout bulks and equipment	5

Sign-off of relief well design.	
Contingency	15
Total Days	**35**

Mobilisation

Eni Source Control Plan (ENI-WOP-PL-001) details the default mobilisation time for relief well drilling at 35 days. Given the Woollybutt field is not remote and within the NWS it is assumed that mobilisation can occur within this time duration.

All long lead items and equipment required for relief well drilling will be available at location within the 35 day period of MODU mobilisation. A relief well plan specific to Woollybutt will be developed prior to P&A activities which will detail the required long lead items.

Drill relief well

The drilling of the relief well to 3,500m measured depth (MD) can be achieved within the 25 day duration. Other Woollybutt well duration to total depth have occurred over approximately 25 to 35 days and therefore validate the drilling of the relief well within the 25 days, considering advanced drilling technologies and MODUs.

The activities required to support the drilling operation on the MODU (e.g. Logistics, contracting and engineering design) do not impact the ability of the rig to drill the relief well in 25 day timeframe. Additional resources (e.g. additional personnel, additional road freight, supply vessels) are available locally, through existing ENI contracts and can be deployed to meet the requirements of the accelerated schedule.

Intersect and kill

The duration to intersect and kill is 7 days and is stated within the ENI Source Control Plan (ENI-WOP-PL-001). 7 days is a typical duration for intersect and kill and is based on three iterations on finding and intersecting the well at that depth.

Safety Case considerations

Eni have identified a number of scenarios which may alter the duration of safety case approvals:

- Scenario 1: MODU has NOPSEMA approved safety case in place appropriate for relief well drilling
- Scenario 2: MODU has NOPSEMA approved safety case, but revision is required for relief well drilling.
- Scenario 3: MODU does not have NOPSEMA approved safety case.

Eni will primarily look to source and contract a MODU through the Mutual Aid MoU that is operating within Australia with an approved Safety Case. Should that not be possible, ENI will source and contract a MODU outside Australia with an approved Australian Safety Case or any other form of HSE case. In the highly unlikely event that a MODU is not available that has an approved HSE case, then ENI will source a rig that does not have an approved safety case and will develop a new safety case. Durations for each of the scenarios are detailed in Table 8.3. All durations assume safety case preparation is undertaken 24/7.

The timings for safety case approvals for all scenarios is determined to fit within the mobilisation timeframe of 35 days.

Table 8.3: Safety Case durations for MODU safety case scenarios

Details	Duration (days)
Scenario 1: **MODU has NOPSEMA approved Safety Case (SC) in place appropriate for relief well drilling**	
HAZID	1
Review and document HAZID outputs	1
Prepare Safety Case revision	2
Approve Safety Case Revision (SCR)	5
Total	**9**
Scenario 2: **MODU has approved safety case, but revision to the SC and the provision of SCR are required for relief well drilling**	
HAZID	1
Review and document HAZID outputs	1
Safety case preparation / revision	2
Review and sign-off on submission	8
Total	**12**
Scenario 3: **MODU does not have NOPSEMA approved safety case**	
HAZID	1
Review and document HAZID outputs	1
New safety case preparation	19
Review and sign-off on submission	14
Total	**35**

The aim is to secure a MODU and begin relief well drilling in the fastest possible timeframe. Cost or resources are no considered limiting factors.

The availability for MODUs in Australian waters, plus rig activities of Australian operators and rigs with approved safety cases, will be identified prior to the P&A and equipment removal activities to ensure that the best available MODU option can be sourced for relief well drilling. ENI will first look at sourcing a MODU with an approved Australian safety case from the nearest location to the well -blowout.

8.1.3. Termination criteria

The source control strategy will terminate once all of the following criteria are satisfied:

- Release of hydrocarbons to the marine environment has ceased; and
- For vessel tank rupture, the cargo in the ruptured fuel or storage tank is secured and release to the marine environment has ceased.

8.1.4. Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria

SOURCE CONTROL		
EPO: Stop the release of hydrocarbons into the marine environment		
Control	**EPS**	**MC**
SFRT	SFRT Mobilised to site for deployment within 9 days	IAP documentation
	Oceaneering support staff available all year round, via contract, to assist with the mobilisation and operation of the SFRT equipment.	Contract in place with Oceaneering demonstrating year-round staff support
	ROV's and vessels for deployment are available through existing contracts and are available for deployment in 7 days	IAP documentation
Capping Stack	Wild Well Control staff available all year round to assist with the mobilisation and operation of the capping stack and well intervention equipment.	Contract in place with WildWell Control demonstrating year-round staff support
	Vessel mobilised from Singapore to site for capping stack deployment within 19 days (conventional capping)	IAP documentation
	Once on location capping stack containment occurs within 3 days	IAP documentation
Relief well	MODU mobilised to site for relief well drilling within 35 days	IAP documentation
	First well kill attempt completed within 74 days.	IAP documentation
	MODU and vessel contracts include clause outlining requirement for support in the event if an emergency	Vessel and MODU contracts

SOURCE CONTROL		
EPO: Stop the release of hydrocarbons into the marine environment		
Control	**EPS**	**MC**
	Access to MODU through Mutual Aid MoU for relief well drilling	Mutual Aid MoU in place for accessing rig for relief well drilling
Safety case	Prioritize MODU or vessel(s) for intervention work(s) that have an existing safety case	IAP documentation
Vessel and MODU support	MODU and vessel contracts include clause outlining requirement for support in the event of an emergency	Vessel and MODU contract

8.2. Monitor and evaluate

Hydrocarbon	Applicability
Subsea Release (Woollybutt Crude)	✓
Vessel Release (Diesel)	✓

8.2.1. Overview

The ongoing monitoring and evaluation of the oil spill is essential to maintaining situational awareness. Situational awareness based on the likely fate and trajectory of the spilt oil is fundamental to putting in place an oil spill response that will be efficient and effective. Key methods that may be used for monitoring a spill:

1. real time OSTM;
2. observations from a vessel;
3. aerial surveillance; and
4. satellite surveillance.

If criteria are triggered, Operational and Scientific Monitoring programs (Section 8.5.4) shall also be undertaken as part of the monitoring and assessment response. Through AMOSC, ENI has access to the NatPlan environmental mapping resource, the Oil Spill Response Atlas (OSRA) (username/password: WMAENI01/Teresa_Lui_Yuen1132). OSRA utilises a Geographic Information System (GIS) platform and maps sensitive habitats and areas in Australian waters that could be potentially impacted by an oil spill and will be used to supplement environmental data on potentially affected sites as described in the EP and relevant baseline studies.

8.2.2. Capability and Resources

This strategy is summarised in Table 8.4, highlighting the minimum time standard for deployment upon activation.

Table 8.4: Monitor and evaluate strategy summary

Task	Outcome	Resources	Location	Resource owner	Minimum standard
Visual observation	Identify extent and direction of oil, visual characteristics. Manual calculations estimating likely spill trajectory and time scales to contact environmental sensitivities.	1 x on-site observer	On-site	Eni	Immediate (visual observations). Within 3 hours (spill trajectory calculations).
Visual observation – from vessels of opportunity	Identify extent and direction of oil, visual characteristics.	As available	On-site	As available	Within 24 hours
OSTM	Forecast the behaviour of the surface slick. Identify and assess risks to environmental sensitivities within the ZPI. Inform development of the IAP.	APASA, via AMOSC	Fremantle, WA	ASMOC	Within 24 hours
		HSE Panel consultants	Perth, WA	Eni	
Visual observation – from aircraft/ helicopter	Identify extent and direction of oil, visual characteristics.	One trained observer	Fremantle, WA	AMOSC, AMSA or OSRL	Within 24 hours
		One Aircraft (Eni approved aviation providers)	Darwin, NT Perth, WA	Eni contractors Can be contracted through TOLL and FCM.	
		One Aerial support base	Perth, WA	To be confirmed between AMOSC and Eni	

Task	Outcome	Resources	Location	Resource owner	Minimum standard
Determination of surface and dispersed oil trajectory and fate	Identify the likely trajectory and fate of the spill and dispersed oil, timeframes for the oil (surface or dispersed) to interact with environmental sensitivities.	One person with oil spill assessment training.	Fremantle, WA	AMOSC	Within 24 hours of OSTM being undertaken.
Satellite imagery	High fidelity photographs using different spectrums to identify the trajectory of the oil.	KSAT	n/a	Eni	Within 24 hours and every 24 hours thereafter.
Visual observation – from chartered vessels	Identify extent and direction of oil, visual characteristics.	One Vessel One Observer	On-site	Eni May also engage through TOLL	Within 72 hours.

Oil Spill Trajectory Modelling

Real time OSTM will be used to estimate the likely movement and behaviour of the spill and will be verified by field observations. The OSTM will be sourced, via AMOSC, within 24 hours using their 24/7 emergency capability. The location of the slick predicted by OSTM will be verified by field observations. Preliminary estimations using visual observations from the field and manual calculations will be available within approximately three hours to inform the mobilisation of equipment and resources in preparation for potential response strategies.

Vessel Surveillance

Vessel surveillance will involve visual monitoring from vessels of opportunity, which may be engaged immediately in the event of a spill. Vessel surveillance may assist in determining if additional response actions are required.

Within 12 hours of a spill, the IMT Logistics Officer will identify any vessels within the immediate area with a capability to assist with the response. The Logistics Officer may identify vessel of opportunity by making contact with Shipping Agents within WA.

Eni may also engage through TOLL all vessel operators and owners in NT and Singapore to charter suitable vessels. TOLL has contracted ISS as Toll's (Australian) national emergency responder.

Company	Function	Contact Details
TOLL	ISS emergency response	ISS 24/7 emergency responder: 1300 131 001 or 1800 639 621 or +61 (03) 8545 1000
	Reception	+61 8 9320 1111
	Logistics – Support	+61 488 101 637

Vessel surveillance will incorporate operational monitoring studies as outlined in the OSMP, this will involve various monitoring and sampling methodologies of water to determine the extent of surface, entrained and dissolved hydrocarbons in the water column and near sensitive receptors.

Visual observations from chartered vessels occur within 72 hours of mobilisation.

Aerial Surveillance

Eni has contracts in place with Canadian Helicopter Company (CHC) and Corporate Travel Management. On behalf of Eni, CTM can contract approved aviation companies (Hardy Aviation, Air North and Pearl Aviation) for the provision of services using dedicated aircraft based at Truscott and Darwin.

Contact for aerial surveillance is provided below:

Company	Contact Details
Babcock Offshore Services Australia Mungalalu/Truscott Airfield WA (Contract in place)	+61 8 9161 4072 Babcock.truscott@babcock.com.au
CHC helicopters	+61 86217 7400 (reception) 1800 707 729 (emergency)
Air North	+61 8 8920 4009 +61 439 234 010

Aerial surveillance will be undertaken for Level 2 and 3 spills. Visual observations may be undertaken from specially mobilised aircraft. Procedures for visually tracking the movement and behaviour of the spill are provided in Appendix E and F. Trained observers are to be present on the surveillance aircraft. Trained observers will be sourced from AMOSC, AMSA and OSRL to undertake the required aerial surveillance in the event of a spill.

Aerial surveillance may assist in determining if additional response actions are required. Minimum requirements are:

- one visual observer
- one aircraft (helicopter or fixed wing)
- one aerial support base

If aerial surveillance is required, an over-flight schedule is developed by the IMT. The frequency of flights will be sufficient to ensure that the information collected during each flight (i.e. observer log and spill mapping) meets the information needs to validate dispersion of the spill.

During each flight a photographic record and marine fauna sighting record sheet is completed for each marine fauna sighting made and recorded on the observer log.

Aerial surveillance would be used at the start of a spill to assess its trajectory (in conjunction with revised real-time OSM); data collected is vital to developing operational IAPs and deciding on appropriate initial and ongoing responses.

It would also be used during the response to monitor ongoing OSM, changes to spill and visual effectiveness and assessment of response strategies used.

Initial reconnaissance may be basic, whilst later observations may require more skill/calculations to estimate behaviour, therefore trained observers are critical.

For surveillance tasks, aircraft will have:

- good downward visibility (e.g. helicopters or fixed wing aircraft with an over-fuselage wing)
- space for observers, excluding pilot(s)

- visibility from both sides
- pilot-observer and pilot to vessel communications
- navigational aids to follow proposed flight path.

If acting in support of marine response, aircraft should be equipped with radios that allow direct communication with the vessels or other aircraft that are carrying out the spraying.

Satellite Monitoring

Eni has contracted KSAT to provide satellite monitoring for its operations. ENI may also access KSAT through AMOSC.

KSAT provide high fidelity photographs using different spectrums to identify the trajectory of the oil. In case of a spill reported to KSAT by Eni, KSAT will activate its Emergency Response Team that is targeted to be assembled within 24 hours.

KSAT can be contacted as below:

Company	Contact Details
KSAT	Direct phone: +47 77 60 02 51 Switchboard: +47 77 60 02 50 Fax: +47 77 60 02 99

8.2.3. Termination criteria

Vessel-based surveillance is undertaken at scheduled intervals during daylight hours, and continues for 24 hours after the source is under control and a surface sheen is no longer observable, or

- until no net environmental benefit is being achieved, or
- as directed by the Control Agency.

NB: Vessel surveillance will terminate if there are unacceptable safety risks associated with gas and Volatile Organic Compounds at the sea surface.

Aerial surveillance undertaken at scheduled intervals during daylight hours and continues for 24 hours after the source is under control and a surface sheen is no longer observable, or

- until no net environmental benefit is being achieved, or
- as directed by the Control Agency.

Tracking buoy deployment will continue for 24 hours after the source is under control and a surface sheen is no longer observable, or

- until net environmental benefit is no longer being achieved, or
- as directed by the relevant Control Agency.

Satellite monitoring will continue until no further benefit is achieved from continuing; or as advised by relevant Control Agency.

The 'monitor and evaluate' response strategy will terminate once all the following criteria are satisfied:

- The source of the spill is contained and no more hydrocarbons are being leaked to the environment.
- Water and sediment quality monitoring demonstrates there are no longer any hydrocarbons above baseline levels (as determined from baseline/reactive monitoring data and/or control sites).
- OSM indicates the coastline will not/no longer be impacted by surface or entrained oil.
- Surveillance following cessation of the spill reports no visible sheen (daylight), i.e. a 'silvery/grey' sheen as defined by the BAOAC is not observable.

8.2.4. Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria

MONITOR AND EVALUATE		
EPO: Gain situational awareness from monitor and evaluate techniques and predict the fate of the spill		
Control	**EPS**	**MC**
Satellite imagery	Contract in place with satellite provider to enable access and analysis of satellite imagery.	Contract with KSAT (satellite imagery provider)
	First image received with 24 hours	IAP documentation
	Satellite Imagery services available during response.	Contract with KSAT (satellite imagery provider) IAP documentation
Oil spill trajectory modelling	Detailed modelling service available for the duration of the incident upon activation through AMOSC.	AMOSC Participating Member Contract
	Modelling can be sourced, via AMOSC, within 24 hours of	AMOSC Participating Member Contract IAP documentation

	activation. using their 24/7 emergency capability	
Aerial surveillance	Visual observation – from aircraft/ helicopter are made within 24 hours of mobilisation.	IAP documentation
	Trained observer is mobilised and making visual observations within 24 hours of mobilisation	IAP documentation
	Aerial surveillance shall continue until termination criteria detailed in Section 8.2.3 have been met	Criteria have been met prior to termination of the response strategy. Detailed in IAP documentation.
Vessel surveillance	Visual observations from chartered vessels occur within 72 hours of mobilisation.	IAP documentation
	Vessel surveillance shall continue until termination criteria detailed in Section 8.2.3 have been met	Criteria have been met prior to termination of the response strategy. Detailed in IAP documentation.

8.3. Shoreline Clean-up

Hydrocarbon	Applicability
Subsea Release (Woollybutt Crude)	✓
Vessel Release (Diesel)	

8.3.1. Overview

In the event of a level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters. Shoreline protection and clean-up will be directed by the DoT. ENI will provide support to DoT which could include providing equipment, trained personnel and technical specialists.

Predicted locations of shoreline hydrocarbon accumulation above 100 g/m^2 (as per predicted modelling, see Section 6.3) are:

- Ningaloo Coast (2.6 tonnes)
- Muiron Island (2.3 tonnes)
- Montebello Islands (1.5 tonnes)
- Ningaloo Region (11.2 tonnes)

An inventory (location and quantities) of shoreline clean-up stockpiles available to ENI is maintained and available on the ENI Share-point / Intranet.

8.3.2. Capability and Resources

Shoreline clean-up stockpiles available to ENI and the transport method to be utilised in the event of a spill are presented in Table 8.5.

An inventory of shoreline clean-up stockpiles available to ENI is maintained and available on the ENI Share-point / Intranet.

Table 8.5: Shoreline Clean-up stockpiles available to Eni

	Time period from notification to mobilise to Woollybut		
	<24 hours	**48-72 hours**	**> 96 hours**
AMOSC	Deploy from various stockpile locations. Transport: Aircraft	Deploy from stockpile locations. Transport: Aircraft/truck/boat–optimum will be chosen. • Skimmers • Power Packs, Pumps • Sorbents, Pads and Booms • Waste Storage <10,000 L	Deploy from various stockpile locations. Transport: Aircraft/truck–optimum will be chosen. • Waste Storage • Communications

	Time period from notification to mobilise to Woollybut		
	<24 hours	**48-72 hours**	**> 96 hours**
AMSA	Deploy from various locations Transport: Aircraft	Deploy from stock pile locations. Transport: Truck/boat/aircraft–optimum will be chosen. • Skimmers • Power Packs, Pumps • Sorbents, Pads and Booms • Waste Storage <10,000 L	Deploy from various stockpile locations. Transport: Aircraft/truck–optimum will be chosen. • Skimmers and Sorbents • Power Packs, Pumps and Accessories • Waste Storage • Communications

Shoreline consumables and decontamination facilities are available through hardware, PPE and specialist oil/chemical spill suppliers (e.g. Global Spill Control) and mobile plant is available through hire outlets in Perth, Exmouth and other regional centres.

The level of deployment of equipment and personnel for clean-up will be commensurate to the spatial extent of shoreline contact, the volume of oil arriving and the sensitivity and access constraints of the shoreline in question. Equipment/ personnel requirements and deployment locations will be communicated to the ENI IMT from the DoT IMT following shoreline assessments. Deployment of shoreline clean-up equipment and personnel occurs through staged escalation throughout an incident response.

Table 8.6 presents a summary of the shoreline clean-up strategy, resources and timelines.

Table 8.6: Shoreline clean-up strategy summary

Task	Outcome	Resources	Location	Resource owner	Minimum Standard
Assessment of spill trajectory via manual calculations	Forecast likelihood of spill threatening sensitive resources.	Eni IMT.	Perth, WA	Eni	Within 3 hours of spill being detected.
Assessment of spill trajectory via OSTM	Forecast the behaviour of the hydrocarbons. Identify and assess risks to environmental sensitivities within the ZPI. Inform NEBA and development of the IAP.	AMOSC contract with APASA to undertake OSTM.	Fremantle, WA	AMOSC	Within 24 hours of spill of spill being detected.
NEBA	Determine if response strategy will have a net environmental benefit. Inform development of the IAP.	Eni IMT.	Perth, WA	Eni	Within 24 hours (ongoing NEBA every 24 hours and as required) of spill being detected.
Shoreline assessment	Shorelines are assessed as to their level of hydrocarbon stranding, and priority for clean-up.	Shoreline clean-up assessment teams (AMOSC, OSRL and AMSA shoreline assessment specialists)	Various	AMOSC OSRL AMSA DoT	Onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact).
	Equipment available to facilitate shoreline assessment	Shovels, plastic bags, rakes, buckets, wheelbarrows, absorbents, PPE. Decontamination kit. Mechanical tiller (if required).	Broome, WA Exmouth, WA Fremantle, WA	AMOSC	On site within 5 days.
	Crews are safe, fed, in contact with other parts of the response and hydrated.	PPE, food, water, shelter, communications network. Amenities established.	Various	AMOSC	Until termination of shoreline clean-up.

Task	Outcome	Resources	Location	Resource owner	Minimum Standard
Shoreline clean-up	Clean-up teams are led by competent and trained personnel.	Personnel who are qualified to take on the role of Shoreline Clean-up Specialist	Various	AMOSC DoT	Onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact).
	Shorelines removed of hydrocarbons	Shoreline clean-up teams	Various	Labor hire through contractor Eni	Onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact).
	Equipment available to facilitate shoreline clean-up	Shovels, plastic bags, rakes, buckets, wheelbarrows, absorbents, PPE. Decontamination kit. Skimmers Power Packs, Pumps and Accessories Sorbents, Pads and Booms	Broome, WA Exmouth, WA Fremantle, WA	AMOSC Eni DoT	On site within 5 days.
	Crews are safe, fed, in contact with other parts of the response and hydrated.	PPE, food, water, shelter, communications network. Amenities established.	Various	Eni	Until termination of shoreline clean-up.
Vessels	Marine vessel(s) capable of carrying clean-up crew and spill equipment to remote islands.	Marine vessels capable of carrying crew and clean-up equipment to remote islands. Capable of logistics support/accommodation for up to 12 POB, crew. Vessels may be used that have ceased other response activities (containment and recovery).	Darwin, NT Exmouth, WA	Eni – through vessel contracts	On site within 8 days.

Note: DBCA should be activated when there is imminent or actual impact to wildlife

Contact details: +61 8 9474 9055

Shoreline Assessment Teams

Shoreline Assessment Teams will be deployed initially with the specialist skills to make an assessment of the actual and potential impact to the shoreline sensitivities and the resources that are required to implement a clean-up operation. This Shoreline Clean-up Specialists will be resourced through AMSA, AMOSC and OSRL.

Shoreline Clean-up Specialist responsibilities may include:

- Evaluate oiling conditions;
- Factor in shoreline types;
- Identify sensitive resources;
- Determine need for clean-up;
- Recommend clean-up methods and endpoints;
- Place constraints on clean-up if necessary, due to safety, ecological, economic or cultural concerns; and
- Communicating with the IMT Leader on response equipment and personnel needs required for clean-up activities.

Shoreline assessment team onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact). Initial assessment of shoreline areas predicted for impact would take initially 1-2 days post spill.

Shoreline Response Teams

In the event of a level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters. Shoreline clean-up will be directed by the DoT.

The number of resources required (vessels, equipment and personnel) will vary significantly depending on the level of shoreline clean-up required.

Shoreline Response Teams shall be led by AMOSC Core Group Responders; typically 1 x Team Leader to 6 -10 x clean-up personnel (depending on the location of the spill). Through AMOSC training, the Core Group Responders maintain competency for leading a Shoreline Clean-up Team.

The Team Leader, will provide direction to the clean-up personnel, oversee the shoreline response operations and report progress to the DoT /IMT.

Supporting resources to supplement the shoreline clean-up team leads will be sourced from local labour hire companies where possible. ENI can also access labour through TOLL who have immediate access to labour through their personnel network in Darwin and Perth that could assist in the event of a spill:

Company	Function	Contact Details
TOLL	ISS emergency response	ISS 24/7 emergency responder: 1300 131 001 or 1800 639 621 or +61 (03) 8545 1000
	Reception	+61 8 9320 1111
	Logistics – Support	+61 488 101 637

Shoreline Response Teams will be mobilised within 24 hours.

The number of Shoreline Response Teams deployed will be determined by the shoreline team assessment reports and DoT as the Control Agency.

Based on the maximum shoreline accumulation volume on the Ningaloo coast of 11.2 tonnes it is considered that two teams of 6-10 persons can clean-up up the spill (based on each team collecting 1 tonne of hydrocarbon per day), however this will be dependent on the spread of hydrocarbons along the coast. Should additional personnel resources be required these can be accessed through AMOSC and TOLL labour hire.

The IMT will contain representation from AMOSC, in the event a spill is predicted to impact shorelines of Barrow Island, ENI will request AMOSC to activate Chevron resources under the agreements of the AMOSPlan Mutual Aid. ENI will supply all resources necessary in addition to Chevron to assist in the Barrow Island response.

Table 8.7 below identifies potential shoreline clean-up methods and various substrates that may be implemented in the event of oil stranding on shore.

Table 8.7: Shoreline clean-up methods

Shoreline Type				Clean-up Method R – recommended; C – Conditional based on SCAT assessment; NA – Not applicable			
Substrate	**Form/ exposure**	**Positives**	**Negatives**	**Natural Recovery**	**Manual Removal of Oil and Debris**	**Use of Sorbents**	**Mechanical Tiller to assist Bioremediation**
Bedrock	Cliff (exposed)	Consider extent of oiling and capacity for natural recovery to determine the level and method of clean-up required. Consider the health and safety aspects of accessing and working in tidal zones and the potential for slips and falls. Use response strategies that minimise damage to flora and fauna.	Do not wash oil into ecologically sensitive lower intertidal zone. Avoid over cleaning or removal of bedrock.	R	NA	C	NA
	Cliff (sheltered)			R	C	C	NA
	Platform (exposed)			R	C	C	NA
	Platform (sheltered/broken)			R	R	C	NA
Boulder	Beach (exposed)			R	R	C	NA
	Beach (sheltered)			C	R	C	NA
Cobble	Beach			R	R	C	NA
Pebble	Beach			R	R	R	NA
Gravel/Grit	Beach			R	R	R	NA
Course Sand	Beach	Consider seasonal effects on local amenities/ecological impacts to determine level of clean-up required. Use strategies that maximise access and logistics conditions and minimise waste generation. Utilise the natural advantages of the tidal movement with surf washing and sediment relocation. Use response strategies that minimise damage to flora and fauna.	Avoid over cleaning or removing more sand than is necessary. Avoid burying the oil further into the sand substrate, for example personnel or machinery on shoreline. Prevent re-oiling of adjacent beaches and avoid cross-contamination of oil into clean areas.	C	R	R	C
Fine Sand	Beach			C	R	R	C

Shoreline Type				Clean-up Method R – recommended; C – Conditional based on SCAT assessment; NA – Not applicable			
Substrate	**Form/ exposure**	**Positives**	**Negatives**	**Natural Recovery**	**Manual Removal of Oil and Debris**	**Use of Sorbents**	**Mechanical Tiller to assist Bioremediation**
Mud/Silt	Intertidal Flats	Consider the ecological sensitivities of the area when determining the most appropriate response strategy. Use booms to protect areas not impacted. Herd oil into less sensitive areas. Use absorbents on small patches of accessible oil. Using natural absorbents will reduce the necessity of recovering the sorbent material. Be aware of tidal ranges and ensure safety of personnel.	Avoid both personnel and machinery entering the area. Avoid forcing oil into the substrate. Prevent re-oiling of adjacent flats, mangroves and avoid cross-contamination of oil into clean areas. Avoid cosmetic clean-up. Avoid over cleaning or removing oiled vegetation and substrate.	C	C	C	NA
	Mangroves/Salt marsh			R	C	C	NA
Coral	Intertidal Reef/Reef	Utilise the natural advantages of the tidal movement with surf washing	Avoid both personnel and machinery entering the area.	R	NA	NA	NA

Accommodation

Where possible local facilities will be used to accommodate assessment and clean-up personnel in Exmouth. It is determined that approximately 20 people will need accommodation for 5 days during a clean-up response. This is based on 2 teams of 10 persons cleaning 11.2 tonnes of hydrocarbons on the Ningaloo coast (worst case shoreline accumulation volume from the leak scenario) within 5 days (approximately 1 tonne per day per team).

In the event of a remote island response persons will be accommodated on vessels.

Transportation to respective work sites will be facilitated via modal and multimodal transport solutions, dictated by the geographical constraints of each site. Under current contractual arrangements ENI has access to transportation providers for land, air and marine operations. Transport from accommodation locations to clean-up locations would be via road using the services of a third-party contractor. Should additional services be required to meet the demand, this would be engaged under a Service Agreement as determined and authorised by the IMT.

Waste

Waste consolidation and storage on site areas is an important aspect of the shoreline cleanup response.

DoT as the Control Agency for shoreline response is responsible for overseeing the consolidation and storage of collected waste prior to collection of the waste by a waste contractor.

The DoT Waste Management Sub-Plan (Appendix H to the DoT OSCP 2015) provides guidelines to assist DoT with preparing site-specific waste management plans for clean-up activities controlled by DoT.

Eni will provide a contracted waste provider for the collection, treatment and disposal of waste from an oil spill response (See Section 8.5).

Shoreline Clean-up Techniques

Sorbent Materials

Sorbent materials may be used in the event hydrocarbons strand along the shorelines when still in a liquid phase, however this is not expected given the weathering characteristics of the Woollybutt condensate. A key consideration when using sorbent materials is managing the resulting waste. Specific locations will be identified by the shoreline assessment teams in which sorbent boom can be laid along the shorelines in order to capture the most oil, whilst minimising the extent of intertidal area impacted. Stranded oil will be collected by shoreline clean-up personnel via sorbent pads.

On intertidal mudflats and mangrove areas, the use of natural absorbents is preferred as it reduces the necessity of recovering the sorbent material.

Sorbent materials would be stored in a contained storage area prior to transport and disposal to prevent any further contamination of habitats. Refer to Section 9.2 of the EP for potential impacts of utilising sorbent materials.

Mechanical Tiller to assist Bioremediation

Small mechanical tillers can be used to assist with breaking down the wax in to smaller particles and moving it into the surf zones to assist and increase the rate of natural bioremediation. Assessment by the shoreline teams will be made prior to mobilisation on whether mechanical tillers could be used. In some cases, this may be the preference as it requires smaller teams and does not result in the large volumes of waste. Depending on the volumes a shore, a combination of manual clean up and mechanical tillering may be utilised in order to reduce the volume ashore and increase the natural recovery for the remaining oil.

Manual Removal of Oil and Debris

Manual clean-up of oil will be undertaken in a methodical way at natural collection points along the shoreline to minimise the impact of the environment. Defined pathways will be established, so that disturbance to habitats are minimised and can be restored upon termination of the shoreline clean-up. Waste minimisation is a key aspect of this strategy.

The oil expected to strand on the shorelines will be of waxy nature, therefore it is expected to sit on top of the sand. At cooler times of the day, wax is expected to remain in a hardened state. Clean-up personnel will be instructed to collect the wax and minimise the volume of sand collected to ALARP during these periods. This will keep the volume of waste to be stored and disposed of to ALARP and will also minimise the impact on the beach habitat and profile. In some cases, the oily waste may be moved to above the high tide line of the beach to be picked up in a more efficient manner at a later stage. This will be assessed as part of the IAP and NEBA process.

During the warmer parts of the day, the wax will become softer or melt. An assessment will be made if manual clean-up is still the optimum response at this stage, other strategies may be more effective.

Access to remote location

In the initial instance, shoreline clean-up assessment of remote shorelines can be conducted by using the aerial transport resources described in Section 8.2. These resources will be used to monitor the spill and undertake regular assessment of shorelines throughout the region, noting predicted locations of shoreline contact.

Vessels will then be used to access any remote locations and deliver personnel, clean-up equipment and PPE

The IMT Logistics Officer will identify any vessels within the immediate area with a capability to assist with the response and have the ability to deliver crew and resources to remote locations identified. The Logistics Officer may identify vessel of opportunity by making contact with Shipping Agents within WA.

The IMT Logistics Officer may also engage through TOLL all vessel operators and owners in WA, NT and Singapore to charter suitable vessels:

Shallow draft vessels will be used to access remote shorelines to minimise the impacts associated with seabed disturbance on approach to the shorelines. Vessels are capable of grounding out; therefore, potentially the vessels would come in on high tide and ground out, unload then depart on the next high tide.

If vessels are required for to anchor, locations will be selected to minimise disturbance to benthic primary producer habitats. In first instance, sandy seabed habitat should be used to anchor over.

Remote locations/island response

The main protection priority for remote locations and islands are:

- Turtle nesting beaches –nesting and hatching seasons
- Mangroves

Due to the difficulty of access to the many islands (such as Montebello), and the susceptibility to erosion induced by intrusive shoreline response techniques, a small number of clean-up teams will be used to help minimise secondary impacts and allows flexibility (i.e. ease of mobilisation) for accessing the numerous beaches that may be affected by a spill.

In the event a spill is predicted to impact shorelines of Barrow Island, ENI will request AMOSC to activate Chevron resources under the agreements of the AMOSPlan Mutual Aid. ENI will supply all resources necessary in addition to Chevron to assist in the Barrow Island response. ENI can provide labour resources through the TOLL contract.

Murion and Montebello Islands shoreline clean-up is to be undertaken through manual recovery and through low pressure high volume sea water flushing. This coastline has substantial area of rocky outcrops. Oil that cannot be remobilised is to be collected and put into waste oil bags.

Given the remote locations of Murion and Montebello Islands and access issues for manual clean-up teams, the priority clean-up tactic is to manually flush oil back to ocean, where there is significant proportion of the deposited Woollybutt crude within the crevices of the rocky shorelines. These deposits are to be shifted by low pressure salt water flushing.

If oil contacted the shorelines of the Ningaloo Coast, clean-up response operations would include removal of contamination from sandy beaches and natural recovery.

8.3.3. Termination criteria

The shoreline clean-up response strategy will terminate once the following criteria are satisfied:

- Clean-up is having no further beneficial effects on the shoreline or associated plants or animals.
- The extent and degree of oiling is judged to be acceptable or having little or no adverse effects NEBA concludes that continued activity will produce little or no environmental benefit.

8.3.4. Response Required and Adequacy

Shoreline protection and clean-up will be directed by the DoT.

Eni will have 2 shoreline clean-up teams ready to be deployed in the event a shoreline response is required. However this will be dependent on the clean-up response required and can be scaled up or down.

Shoreline hydrocarbon accumulation is predicted in the event of a 250 bbl per day leak for modelled 365 days, given the release is a leak there is a slower accumulation of hydrocarbons on the shoreline, which is determined to be in the magnitude of 0.03 tonnes per day, based on 11.2 tonnes of shoreline accumulation over 365 days. It is highly likely that accumulated hydrocarbons on the shoreline will be remobilised and weathered over a period of 365 days, due to wave and tide motions and there will be a lower volume on the shoreline than predicted in the modelling. A shoreline response is therefore unlikely, however is presented in this OPEP to show clean-up capability, should one be required.

8.3.5. Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria

SHORELINE CLEAN-UP		
EPO: Remove bulk and stranded hydrocarbons from shorelines with the aim to encourage shoreline habitat recovery.		
Control	**EPS**	**MC**
Shoreline responders	Communication line to be maintained between IMT and shoreline clean-up response to ensure awareness of protection priorities and progress against IAP.	Detailed in IAP documentation and communication logs
	Shoreline Assessment Team onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact).	Detailed in IAP documentation
	Maintenance of access to shoreline clean-up personnel through AMOSC, AMSA National Plan and OSRL throughout activity.	MoU for access to National Plan resources through AMSA AMOSC Participating Member Contract OSRL Associate Member Contract
	The safety of shoreline response operations will be considered and appropriately managed during a response	Detailed in IAP documentation
Shoreline clean-up equipment	Equipment mobilised from State, AMOSC, AMSA Stockpiles within 5 days	Detailed in IAP documentation
	Maintenance of access to shoreline clean-up equipment through AMOSC, AMSA National Plan and OSRL throughout activity.	MoU for access to National Plan resources through AMSA AMOSC Participating Member Contract OSRL Associate Member Contract
	If vessels are required for access, anchoring locations will be selected to minimise disturbance to benthic habitats.	Detailed in IAP documentation
	Shallow draft vessels will be used to access remote shorelines to minimise the impacts associated with seabed disturbance on approach to the shorelines.	Detailed in IAP documentation

SHORELINE CLEAN-UP		
EPO: Remove bulk and stranded hydrocarbons from shorelines with the aim to encourage shoreline habitat recovery.		
Control	**EPS**	**MC**
	Vehicle access will be limited or restricted on dunes, turtle nesting beaches and in mangroves	Detailed in IAP documentation
	Eni will request shoreline clean-up resources from AMOSC. In the event a spill is predicted to impact shorelines of Barrow Island, ENI will request AMOSC to activate Chevron resources under the agreements of the AMOSPlan Mutual Aid. Quadrant Energy will supply all resources necessary in addition to Chevron to assist in the Barrow Island response.	Detailed in IAP documentation
	Removal of vegetation will be limited to moderately or heavily oiled vegetation	Detailed in IAP documentation

8.4. Oiled Wildlife Response

Hydrocarbon	Applicability
Subsea Release (Woollybutt Crude)	✓
Vessel Release (Diesel)	

8.4.1. Overview

In the event of a well release ENI is the Control Agency. However, for spills moving from Commonwealth to State waters (cross-jurisdictional) DoT may assume Control Agency responsibilities. Under that scenario, DBCA (under DoT) would control oiled wildlife response across State waters.

Note: DBCA are relevant Statutory Authorities for the protection of wildlife State waters and will be notified of potential for oiled wildlife.

DBCA should be activated when there is imminent or actual impact to wildlife

Contact details: +61 8 9474 9055

Oiled wildlife response is conducted in accordance with the Western Australian Oiled Wildlife Response Plan (WA OWRP), to ensure the strategy is conducted in accordance with legislative requirements to house, release or euthanise fauna under the *Animal Welfare Act 2002.*

The WAOWRP was developed by AMOSC (on behalf of the petroleum industry) and Department of Biodiversity Conservation and Attractions (DBCA) to define the minimum standards for OWR in WA as a sub-plan to MEE. The plan would be implemented by DoT in the event of a hydrocarbon spill entering State waters and can be used as guidance for OWR planning in Commonwealth waters. The Pilbara Region OWRP, which sits within WAOWRP, provides operational guidance to respond to injured and oiled wildlife in the Pilbara region.

Hazing and pre-emptive capture techniques will be conducted in accordance with the WAOWRP, specifically vessels used in hazing/pre-emptive capture will approach fauna at slow speeds to ensure animals are not directed towards the hydrocarbon and deterrence/hazing and pre-emptive capture

Shoreline access will be considered as part of the operational NEBA. Vehicle access will be restricted on dunes, mangroves and turtle nesting beaches

8.4.2. Capability and Resources

Oiled wildlife equipment available to ENI and the time to mobilise are presented in Table 8.10. The equipment in Table 8.10 can treat up to 600 wildlife per day by day 6 once mobilised.

Each oiled fauna kit provides the capability to treat approximately 100 wildlife. Each containerised washing station can treat up to 250 wildlife for a five day period.

Table 8.8: Oiled Wildlife stockpiles available to Eni

Resource Owner	Type of Equipment and Number	Available to be mobilised
AMOSC	1 x oiled fauna kit (Dampier)	Day 1
	1 x portable containerised washing station* (Fremantle) 1 x oiled fauna kit (Karratha) 1 x oiled fauna kit (Exmouth)	Day 2
	1 x oiled fauna kit	Day 3
	1 x portable containerised washing station **2** x oiled fauna kits	Day 5
OSRL – Through National Plan access	Equipment to support intake and triage; cleaning and rehabilitation and a wildlife rehabilitation unit.	Day 6

Table 8.9 presents a summary of the oiled wildlife response, resources and timelines

To deploy a response that is appropriate to the nature and scale of the spill event, ENI would implement an oiled wildlife response in consultation with DBCA and use the capability outlined in the WA OWRP. Additional personnel can be accessed through a labour hire contract with TOLL.

Table 8.9: Oiled wildlife strategy summary

Task	Outcome	Resources	Location	Resource Owner	Minimum Standard
Assessment	Assessment of wildlife at risk.	Aircraft and vessels.	Various	Eni contractor	As part of the Operational and Scientific Monitoring Programs (OSMP) operational monitoring.
NEBA	Determine if response strategy will have a net environmental benefit. Inform development of the IAP.	Eni IMT.	Perth, WA	Eni	Within 24 hours of spill being detected (ongoing NEBA every 24 hours and as required).
Oiled Wildlife Response Team	Oiled Wildlife Commander in IMT. Oiled wildlife coordinators onsite. Trained wildlife response personnel can be mobilised to site and lead teams of volunteers at staging centres. Treatment centres for oiled wildlife in Dampier.	Oiled Wildlife Advisor to provide assistance to the IMT.	Various	AMOSC	Oiled Wildlife Advisor notified within 24 hours of spill being detected. Assist with operational monitoring.
		Ability to provide labourers to assist in wildlife response.	Various	Eni AMOSC	Notified within 24 hours of spill being detected.
Equipment	Equipment required for oiled wildlife response	Oiled fauna kits Portable containerised washing station	Karratha, WA Exmouth, WA Dampier, WA Fremantle, WA	AMOSC AMSA	1 kit available to be mobilised within 24 hours. See Table 8.8

Task	Outcome	Resources	Location	Resource Owner	Minimum Standard
Vessels	Vessels can be utilised to support oiled wildlife response activities. Such as hazing, pre-emptive capture	Vessels through existing contracts with providers an TOLL (see Section 8.2)	Darwin, NT Exmouth, WA	Eni	Within 72 hours
Rehabilitation	Move the oiled fauna to a rehabilitation centre if deemed necessary.	Transportation to a rehabilitation centre.	Various	AMOSC	Within 4 days of being captured.
	Resources to assist at staging centres in Dampier.	Recruitment agencies to provide a sustainable supply of resources during the response.	Various	AMOSC	Onsite within 7 days.

Activation of WAOWRP

The IMT Leader will activate the WAOWRP as outlined in Figure 8.1.

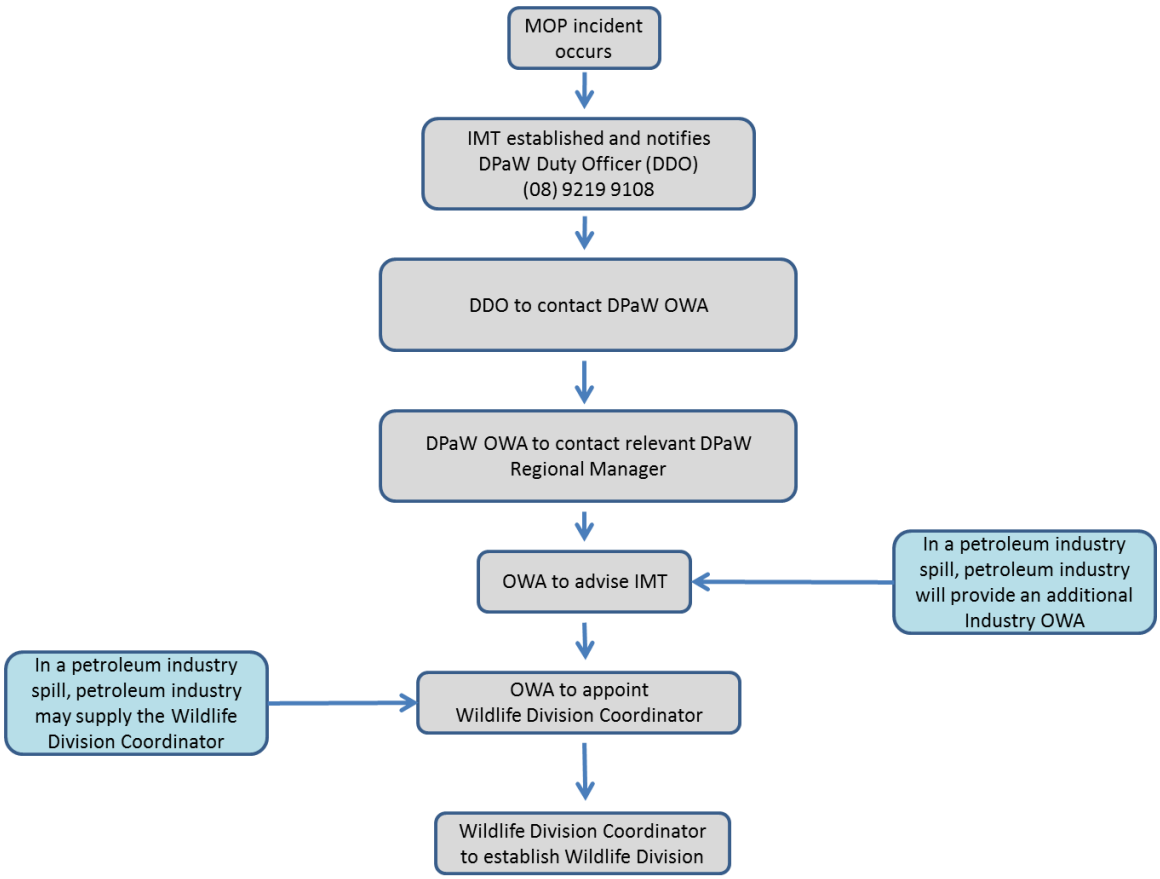


Figure 8.1: Activation of the WAOWRP (WA ORP, 2014)

Note, the Wildlife Division Coordinator must be DBCA representative.

Response Activities

Oiled Wildlife Response activities are described in detail in the WAOWRP and the Pilbara Region OWRP. These include:

Stage 1: Wildlife first strike response

Stage 2: Mobilisation of resources

Stage 3: Wildlife reconnaissance

Stage 4: Incident Action Plan wildlife subplan development

Stage 5: Wildlife rescue and staging

Stage 6: Oiled wildlife response facility

Stage 7: Wildlife rehabilitation

Stage 8: Oiled wildlife response termination

The WAOWRP outlines OWR incident levels based on the scale and severity of oiled wildlife impacts. Table 8.10 provides the indicative OWR level descriptions.

Table 8.10: WAOWRP OWR Levels (WA ORP, 2014)

OWR level	Duration of OWR	Birds general	Birds OWR complex #	Turtles - hatchlings / juveniles / adults	Dolphins / Whales	Pinnipeds	Mammals terristrial	Reptiles	Dugongs
Level 1	<3 days	1-2 birds per day or < 5 total	No complex birds	None	None	None	None	None	None
Level 2	4-14 days	1-5 birds per day or <20 total	No complex birds	< 20 hatchlings no Juveniles or adults	None	None	None	None	None
Level 3	4-14 days	5-10 birds per day or < 50 total	1-5 birds per day or <10 total	< 5 juv/adults, < 50 hatchlings	None	< 5 seals	< 5	< 5 - no crocodiles	None
Level 4	>14 days	5-10 birds per day or < 200 total	5-10 birds p/day	< 20 juv/adults < 500 hatchlings	< 5 or known habitats affected	5-50 seals	5-50 mammals	5-50 reptiles	Dugong habitat affected only
Level 5	>14 days	10-100 birds per day or > 200 total	10-50 birds per day	>20 juv/adults, > 500 hatchlings	>5 dolphins	> 50 seals	> 50 mammals	>50 reptiles	Dugongs oiled
Level 6	>14 days	>100 birds for day	10-50 birds per day	>20 juv/adults, > 500 hatchlings	>5 dolphins	> 50 seals	> 50 mammals	>50 reptiles	Dugongs oiled
# Threatened species, protected by treaty, or specialist feeders									

The WAOWRP also provides indicative personnel numbers and role requirements for each OWR Level shown in Table 8.11

Table 8.11: Indicative OWR personnel resourcing

Category	Role	OWR Skill Level	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Strategic	Oiled Wildlife Advisor	OWR 4	1^{+1}	1^{+1}	1^{+1}	1^{+1}	1^{+1}	1^{+1}
	Wildlife Division Coordinator**	OWR 4	1	1	1	1	1	1
	Wildlife Operations Officer**	OWR 3			1	1	1	1
	Wildlife logistics Officer	OWR 3			1	1	1	1
	Wildlife Plannning Officer	OWR 3			1	1	1	1
	Wildlife Finance/Admin Officer	OWR 3			1	1	1	1
	Wildlife Communications Officer	OWR 2		1	1	1	1	1
	Wildlife Situation Officer	OWR 2			1	1	1	1
	Wildlife Supply/Resource Officer	OWR 2			1	1	1	1
	Wildlife Safety Officer	OWR2			1	1	1	1
	Wildlife Volunteer Coordinator	OWR 2			1	1	1	1
Staging Area / Facilities	Wildlife Staging Area Manager*	OWR 2	1	1	1	1	2	2
	Wildlife Staging Area / intake Team	OWR 1			3	3	6	8
	Wildlife Facilities Manager *	OWR 2			1	1	1	1
	Wildlife Trades assistants	Specified Skill			1	2	3	3
	Wildlife housekeeper	OWR 1			1	1	2	3
	Wildlife Security	Specified Skill			1	1	1	1
Re-connaissance	Wildlife Reconnaissance Officer	OWR 2	1	1	1	1	1	1
	Wildlife Aviation Supervisor	OWR 2			1	1	1	1
	Wildlife Vessel Supervisor	OWR 2			1	1	1	1
	Wildlife Shoreline Supervisor	OWR 2			1	1	1	1
	Wildlife Reconnaissance Team	OWR 1			2	4	6	8
Rescue	Wildlife Rescue Officer	OWR 2	2	1	1	1	1	1
	Wildlife Exposure Modification Officer	OWR 2		1	1	1	1	1
	Wildlife Field Collection Team	OWR 1		3	6	9	22	22
	Wildlife Transport Officer	OWR 2		1	1	1	1	1
Rehabilitation	Triage officer	OWR 2	2	1	1	1	1	1
	Triage team	OWR 1		1	4	5	5	6
	Wildlife Vetrinarian *	Specified Skill		1	1	3	3	3
	Wildlife Vetrinarian technician *	Specified Skill			1	1	1	1
	Wildlife Stabilisation Officer	OWR 2		1	1	1	1	1
	Wildlife Rehabilitation Officer	OWR 2		1	1	1	1	1
	Facilities Team	OWR 1		3	4	6	8	8
	washing/drying personnel ***	OWR 1		4	6	10	15	15
	Recovery/release personnel ***	OWR 1		3	8	10	20	20
Total number of personnel			**6**	**26**	**59**	**77**	**116**	**122**
NOTES	* 1 person per facility	*** Volunteers can be used to make up more numbers in this category where necessary						
	** May have deputy	Note: All Supervisor/coordinator positions should employ a scribe from level 4>						
	1^{+1} = In an industry spill there may be two oiled wildlife advisors (1 DPaW, 1 industry)							

Oiled wildlife response core group first mobilises to the staging post and/or vessel(s) and spill location, it may be some time before they can rely on the IMT supply chain for delivery of specialised equipment (for fauna capture, stabilisation, containment and transport to an oiled wildlife response facility). Oiled Wildlife Coordinators will mobilise with sufficient PPE and fauna triage equipment to last for at least 72 hours. This will enable larger quantities of equipment to be procured and mobilised aligned with the scale of the response.

8.4.3. Termination criteria

The oiled wildlife response strategy will only cease when all affected/recovered animals are cleaned and rehabilitated. As directed by Control Agency.

8.4.4. Response Required and Adequacy

The capability detailed in Table 8.10 provides the capacity for a level 5 OWR (ability to treat approximately 600 wildlife by day 6 of mobilisation), with additional capacity available through the National Plan. Materials for holding facilities, portable pools, enclosures and rehabilitation areas would be sourced as required.

Shoreline hydrocarbon accumulation is predicted in the event of a 250 bbl per day leak for 365 days, given the release is a leak there is a slower accumulation of hydrocarbons on the shoreline, which is determined to be in the magnitude of 0.03 tonnes per day, based on 11.2 tonnes of shoreline accumulation over 365 days. It is highly likely that accumulated hydrocarbons on the shoreline will be remobilised and weathered over a period of 365 days, due to wave and tide motions and there will be a lower volume on the shoreline than predicted in the modelling. A shoreline oiled wildlife response is therefore unlikely, however is presented in this OPEP to show clean-up capability, should one be required.

Surface oiling is not extensive for either a well blowout event or a leak scenario. Surface hydrocarbons in the event of a 250bbl per day leak were predicted to travel up to 110 km when exceeding the 1 g/m^2 threshold and were not expected to exceed 10 g/m^2. Surface hydrocarbons in the event of a 900bbl per day well-blowout were predicted to travel up to 100km when exceeding the 1 g/m^2 threshold and were only expected to exceed 10 g/m^2 in the immediate vicinity of the well. An extensive offshore oiled wildlife response is therefore not anticipated.

8.4.5. Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria

OILED WILDLIFE		
EPO: Oiled Wildlife Response is conducted in accordance with the Western Australian Oiled Wildlife Response Plan (WAOWRP) and is also conducted in accordance *Animal Welfare Act 2002*.		
Control	**PS**	**MC**
Wildlife response equipment	Contracted capability for one fauna kit for immediate mobilisation, which can treat up to 100 individual fauna.	AMOSC Participating Member Contract
	National plan access to additional resources under the guidance of the DoT (up to a Level 5 oiled wildlife response as specified in the WAOWRP).	MoU for access to National Plan resources
Wildlife responders	Wildlife responders to be accessed through existing contracts.	AMOSC Participating Member Contract
	Oiled wildlife operations (including hazing) would be implemented with advice and assistance from the Oiled Wildlife Advisor from the DBCA.	IAP documentation

8.5. Waste Management

Hydrocarbon	Applicability
Subsea Release (Woollybutt Crude)	✓
Vessel Release (Diesel)	✓

8.5.1. Overview

The temporary storage, transport, treatment and disposal of waste material must be correctly managed to safeguard against any adverse environmental effects which may inhibit clean-up activities or pose unnecessary threat to the environment. In line with ENI Waste Management Standard (ENI-HSE-ST-059), the waste management hierarchy will be implemented during a response option. The priorities are as follows:

- prevention;
- reduction;
- re-use;
- recycling/recovery; and
- responsible disposal.

The IMT Operations Officer may appoint a Waste Management Coordinator (WMC) (see Figure 5.3) to undertake the task of managing waste. For any spill likely to produce significant amounts of waste, the WMC will develop a Waste Management Sub-Plan. Marine response units will require assistance in the establishment of storage facilities on jetties or other locations. Shoreline units may require assistance in the establishment of temporary waste storage areas behind beaches being cleaned.

As far as reasonably practicable, wastes will be segregated in accordance with Table 8.12. For large spills, or those where it is not possible to effectively segregate wastes entirely in the field, the 'field' segregations can be used.

Table 8.12: Segregation of wastes

Field Segregation		Preferred Segregation
Liquid	**Oils**	Non-emulsified oils.
		Emulsified oils.
	Waste water	Water from temporary storage.
		Water from heat or gravity separation of emulsions.
		Water from chemically demulsified oil.
Solid	**Oils**	High pour point oils.
		High viscosity emulsions.
		Tar balls.
	Oily debris	Oil mixed with cobble or sand.
		Oil mixed with wood, vegetation, plastics or sorbents.

Field Segregation		Preferred Segregation
	Oiled pollution response equipment	Sorbents, pads, shovels, PPE, drums and bags.
	Domestic waste	Food waste, drink bottles.

Note: Any container used for storage must be covered if rain is forecast, to avoid overflow. Attention should be given to the prevention of leaching or spillage from the storage area by the use of plastic sheeting.

8.5.2. Capability and resources

In the event of a spill, AMOSC resources would be deployed to manage waste from shoreline clean-up. Table 8.13 lists some of the equipment available for transporting of wastes along shorelines and provides some handling guidelines.

Table 8.13: Temporary waste storage and handling

Product	Qty available	Location	Resource Owner
Vikotank 13000 litres	1	Broome, WA	AMOSC
IBC	2	Broome, WA	
	2	Exmouth, WA	
Fastank Temporary Storage	2	Exmouth, WA	
	2	Fremantle, WA	
Wheelbarrow	10	Exmouth	
25 Cube Deck Storage Tanks	3	Fremantle, WA	
LCT 11.4 Collapsable Storage Tank	4	Fremantle, WA	

Note: Care should be taken that all vessels, vehicles, or containers used for the transport of oily wastes are sealed and leak-proof.

Shoreline waste will be stored initially onshore at the clean-up location in dedicated areas above the high tide line, then pickup and disposal will occur. The location on which it is stored will be determined as part of the shoreline clean-up assessment. ENI has logistics contact in place

The Logistics contract includes disposal of waste. Contractor will dispose of the oily waste at a licensed facility in the following ways:

- hydrocyclone processing;
- evaporation ponds;
- landfill; and
- remediation.

8.5.3. Termination criteria

Waste management response strategy will only cease when:

- Clean-up is having no further beneficial effects on the shoreline or associated plants or animals.
- The extent and degree of oiling is judged to be acceptable or having little or no adverse effects NEBA concludes that continued activity will produce little or no environmental benefit.
- Collected oil from waste recovery activities is collected and removed from the site.

8.5.4. Response Required and Adequacy

Shoreline hydrocarbon accumulation is predicted in the event of a 250 bbl per day leak for 365 days, given the release is a leak there is a slower accumulation of hydrocarbons on the shoreline, which is determined to be in the magnitude of 0.03 tonnes per day, based on 11.2 tonnes of shoreline accumulation over 365 days. It is highly likely that accumulated hydrocarbons on the shoreline will be remobilised and weathered over a period of 365 days, due to wave and tide motions and there will be a lower volume on the shoreline than predicted in the modelling. A shoreline clean-up response involving significant waste volumes is therefore unlikely, however is presented in this OPEP to capability, should one be required.

8.5.5. Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria

Waste Management		
EPO: Waste will be managed, tracked and disposed of in accordance with laws and regulations		
Control	**PS**	**MC**
Waste management	Recovered hydrocarbons and wastes will be transferred to licensed treatment facility.	Waste transfer notes
	Contract with waste management services for transport, removal, treatment and disposal of waste	Contract in place with for logistics, treatment and disposal of wasters
	Waste management provider support staff available year-round to assist in the event of an incident with waste management as detailed in contract.	Contract in place with shows access to labour hire.

8.6. Operational and Scientific Monitoring

Hydrocarbon	Applicability
Subsea Release (Woollybutt Crude)	✓
Vessel Release (Diesel)	✓

8.6.1. Overview

Eni has prepared an OSMP (Appendix G).The OSMP provides guidance on how and when monitoring data will be collected in the event of a hydrocarbon spill. The data generated will be used to:

- determine the magnitude of short and long term environmental impacts associated with the spill (and its response), including the extent, severity and persistence of the impacts;
- support the planning and execution of the hydrocarbon spill response activities set out in the OPEP;
- inform remediation efforts, if required; and
- determine whether environmental performance outcomes have been achieved.

Individual Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs) OSMP are activated in accordance with the activation criteria, as defined in the OSMP (Appendix G).

8.6.2. Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria

Operational and Scientific Monitoring		
EPO: OSMP is implemented to meet the objectives of the individual Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs)		
Control	**EPS**	**MC**
To maintain a state of readiness for implementation of the OSMP	Arrangements in place for implementation OMP1 (Monitoring of Hydrocarbons: Distribution at Sea) through AMOSC, AMSA National Plan and OSRL.	The following is current and in place: • MoU for access to National Plan resources through AMSA • AMOSC Participating Member Contract • OSRL Associate Member Contract
	Arrangements in place for implementation OMP2 (Monitoring of Hydrocarbons: Weathering and Behaviour) through AMOSC, AMSA National Plan and OSRL.	The following is current and in place: • MoU for access to National Plan resources through AMSA • AMOSC Participating Member Contract • OSRL Associate Member Contract
	Arrangements in place for implementation OMP3 (Shoreline Assessment	The following is current and in place: • MoU for access to National Plan resources through AMSA

Operational and Scientific Monitoring		
EPO: OSMP is implemented to meet the objectives of the individual Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs)		
Control	**EPS**	**MC**
	Surveys) through AMOSC, AMSA National Plan and OSRL.	• AMOSC Participating Member Contract • OSRL Associate Member Contract
	Arrangements in place for implementation of SMP1 (Wildlife Impact Monitoring and Sampling)	The following is current and in place: • AMOSC Participating Member Contract • Resources detailed in the WA Oiled Wildlife Response Plan
	Arrangements in place for implementation of SMP2 (Shoreline Ecological Assessment Aerial Surveys)	The following is current and in place: • MoU for access to National Plan resources through AMSA • AMOSC Participating Member Contract • OSRL Associate Member Contract • The ENI Environment and Social Impact Consultancy Services Panel Contract which provides an existing framework for immediate engagement of a contractor.
	Arrangements in place for implementation of SMP3 (Assessment of fish for the presence of hydrocarbons)	The following is current and in place: • MoU for access to National Plan resources through AMSA • AMOSC Participating Member Contract • OSRL Associate Member Contract • The ENI Environment and Social Impact Consultancy Services Panel Contract which provides an existing framework for immediate engagement of a contractor.
	Arrangements in place for implementation of SMP4 (Fisheries Assessment)	The following is current and in place: • AMOSC Participating Member Contract • The ENI Environment and Social Impact Consultancy Services Panel Contract which provides an existing framework for immediate engagement of a contractor.
	Arrangements in place for implementation of SMP5 (Shoreline Ecological Surveys)	The following is current and in place: • AMOSC Participating Member Contract • The ENI Environment and Social Impact Consultancy Services Panel Contract which provides an existing framework for immediate engagement of a contractor.
	Arrangements in place for implementation of SMP6	The following is current and in place: • AMOSC Participating Member Contract

Operational and Scientific Monitoring		
EPO: OSMP is implemented to meet the objectives of the individual Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs)		
Control	**EPS**	**MC**
	(Hydrocarbon Fate and Effects)	• The ENI Environment and Social Impact Consultancy Services Panel Contract which provides an existing framework for immediate engagement of a contractor.
	Arrangements in place for implementation of SMP7 (Intertidal and Subtidal Benthic Habitats)	The following is current and in place: • AMOSC Participating Member Contract • The ENI Environment and Social Impact Consultancy Services Panel Contract which provides an existing framework for immediate engagement of a contractor.
	An annual audit of ENI's environmental panel contract capability is completed against the capability listed in Table 1.7 of the Woollybutt OSMP to ensure capability is maintained to implement the Woollybutt OMSP	Records show an annual audit of ENI's environmental panel contract capability is completed against the capability listed in Table 1.7 of the Woollybutt OSMP and actions are taken to ensure the environmental panel capability is maintained to implement the Woollybutt OMSP
Vessel availability	Vessel is available within 72 hours of relevant OMPs and SMPs activation	IAP documentation shows vessel was mobilised within 72 hours
Aircraft / helicopter availability	Aircraft/ helicopter is available within 24 hours of relevant OMPs and SMPs activation	IAP documentation shows aircraft/ helicopter is available within 24 hours of relevant OMPs and SMPs activation
Termination criteria	Individual OMPs and SMPs are terminated when specific criteria has been met as per individual plans	IAP documentation shows OMPs and SMPs are terminated when specific criteria has been met

8.6.3. Spill Response Termination

Response termination of the individual OMPs and SMPs are described in the Woollybutt OSMP (Appendix G).

9. TRAINING, EXERCISE AND AUDIT

9.1. CMT/IMT Training

All personnel nominated to the IMT, must be trained to an appropriate level and in appropriate procedures relevant to their role. Training specific to each IMT role is identified in the HSE Training Needs Analysis.

Predetermined IMT members shall endeavour to attend at least one IMT training event per year. Training activities consist of:

- Basic IMT training, comprising role specific training and team training, during which at least two scenarios shall be included;
- Refresher IMT training, during which at least one scenario shall be included, which may include oil spill;
- Relevant IMO or ICS training courses or refresher sessions;
- Project specific briefings, prior to the commencement of operation or if major changes take place to a project; and
- Level 2 and 3 emergency drills as per the 1 and 4Y program.

Classroom training will be supported by regular exercises to ensure that acquired competencies are maintained. In addition, the minimum oil spill response training level required for each ENI oil spill response related IMT positions are summarised below (Table 9.1).

Table 9.1: Minimum oil spill response training requirements for Eni

Position	Minimum Training Level				
	IMT and oil spill response training*	**Oil spill response IMO2**	**Oil spill response IMO3**	**Exercises and drills**	**Environment Scientific and Technical training**
Frequency	Annual	Every 3 years	Every 3 years	Every 4 years	Every 3 years
IMT positions					
IMT Leader	✓		✓	✓	
Planning Officer	✓	✓		✓	
Operations Officer	✓	✓		✓	
Logistics Officer	✓	R		✓	
Safety Officer	✓	R		✓	R
Liaison Officer	✓	R		✓	
Non IMT position					
HSE & CSR Manager	✓	✓	R	✓	
Operations Manager	✓	✓	R	✓	
Drilling Manager	✓	✓	R	✓	
Emergency Coordinator	✓	✓	R	✓	R

Position	Minimum Training Level				
	IMT and oil spill response training*	**Oil spill response IMO2**	**Oil spill response IMO3**	**Exercises and drills**	**Environment Scientific and Technical training**
HSE Advisor	✓	✓	R	✓	R
Environment Advisor	✓	✓	R	✓	✓

R = recommended

*Includes Basic IMT training, project briefings, IMT workshops, lunch and learns and other oil spill response training

The objective of training these personnel is to provide knowledge on the safe and efficient response to oil spills, initial assessments of spill risk, how to initiate response to an oil spill, protection priorities, correct response options, limitations of response options and equipment, and the needs of the media.

Predetermined IMT members, including those who would represent ENI on DoT's IMT, shall endeavour to attend at least one IMT training event per year.

All members of the IMT are required to periodically participate in drills and oil spill response training workshops, which typically include:

- Scenario workshops
- Overview to oil spill response
- Overview of emergency response and IMT roles
- Familiarisation with OPEP
- Toolboxes.

9.2. Oil Spill Responders

In a spill, all response operations will be led by trained response personnel (AMOSC core group, AMSA National Response Team, OSRL). These lead personnel as a minimum are to have IMO Level 1 in Oil Spill Response (operations) training (as specified by the NatPlan and AMOSPlan competency requirements). Before undertaking a response operation (containment and recovery, wildlife clean-up), the lead person will provide additional training for the crew of responders that will specify:

- the response aims and objectives
- equipment/components involved
- practicalities of the response (deployment of booms)
- safety aspects of the operations.

These arrangements are appropriate to ensure all IMT personnel and vessel crews have the suitable level of training and competencies to perform their roles in an oil spill response.

Eni has access to external trained spill responder resources

- National Plan: National Response Team (NRT) – Trained oil spill response specialists including aerial observers, containment and recovery crews deployed under the direction of AMSA and IMT in a response. The NRT is trained and managed in accordance

with the National Response Team Policy, approved by the National Plan Strategic Coordination Committee (AMSA, 2014).

- MEE: Oil pollution response teams available to assist under the jurisdiction of the WA DoT.
- Workforce Labour Hire companies capable of supplying > 2000 personnel at short notice. Personnel will take up roles within Oiled Wildlife Response Teams.

9.3. Competency of Vessel Contractors

All contractors will attend relevant project specific briefings and project inductions, which will include oil spill awareness and guidance regarding visual observation.

Field response activities by vessel contractors will be limited to surveillance and activities related to their normal position (e.g. logistics). Therefore, no other specialised spill response training is anticipated for vessel contractors.

9.4. Oil spill response organisations

AMOSC undergoes annual audits of its oil spill preparedness and ability to respond according to the service level agreement. The reports are available on the AMOSC online member portal.

OSRL maintains assurance of its oil spill preparedness and capabilities through regular external and internal organisational audits, equipment audits, weekly checks, and a global programme of exercises to confirm personnel readiness.

9.5. Testing

A summary of arrangements for testing the response arrangements is provided below (Table 9.2).

Table 9.2: Testing requirements and arrangements

OPGGS(E)Requirements	Description
As per Regulation 14(8B) of the OPGGS(E)R 2009, the arrangements for testing the response arrangements must include:	
A statement of the objectives of testing	Testing provides an opportunity for crew to gain confidence in using onboard spill equipment and implementing incident response procedures, increase efficiency in the event of an emergency, review the efficiency of procedures and detect any failures in equipment.
A proposed schedule of tests	Regular drills and exercises (three monthly) are carried out on all vessels in line with IMO/SOPEP. These drills include, but are not limited to, spill response, collision and grounding, fire and explosion and helicopter emergency.
	A desk based OPEP exercise will occur prior to the activity commencing and every 12 months thereafter

OPGGS(E)Requirements	Description
Mechanisms to examine the effectiveness of response arrangements against the objectives of testing	In particular: • issues raised (if any) described in daily report • weekly checklist ensures spill monitoring equipment is in place and fully stocked • rudiments described for the review of the EP and OPEP • requirements described for testing below.
Mechanisms to address recommendations arising from tests	As mentioned, issues raised (if any) resulting from testing will be described in daily report. The Vessel Master is made aware that the change is managed to this OPEP and this EP through MoC
As per Regulation 14(8C) of the OPGGS(E)R 2009, the proposed schedule of tests must provide for the following:	
Testing the response arrangements when they are introduced	A SOPEP drill onboard all vessels will be carried out prior to the commencement of the activity.
	An OPEP exercise will be carried out prior to the commencement of the activity.
Testing the response arrangements when they are significantly amended	Any changes to the OPEP or EP will be introduced through the MoC or subject to team review. Where changes reasonably affect the arrangements in place, the changed arrangements will be tested prior to finalising the MoC.
Testing the response arrangements not later than 12 months after the most recent test.	SOPEP drills will occur every three (3) months
	OPEP testing will occur every 12 months as described above.
If a new location for the activity is added to the environment plan after the response arrangements have been tested, and before the next test is conducted—testing the response arrangements in relation to the new location as soon as practicable after it is added to the plan.	No activity will occur outside the Operational Area
If a facility becomes operational after the response arrangements have been tested and before the next test is conducted—testing the response arrangements in relation to the facility when it becomes operational.	Not applicable

9.6. Response Testing

Emergency response drills may be either desktop exercises or field-based response exercises. Testing of OPEP response arrangements will be conducted annually in accordance with the ENI 4Y Emergency Exercise Plan.

Eni will maintain a high standard of oil spill response preparedness through:

- training ENI personnel, particularly those nominated to IMT or CMT (See Section 9.1);
- Eni Incident Management Plan ENI-HSE-PL-034;
- ensuring Contractors can respond as required (e.g. that they have sufficient levels of trained personnel and response equipment);
- outlining ongoing capability through exercises and drills in accordance with the ENI 4Y Emergency Exercise Plan;
- completing ongoing audits to review that the above are being effective.
- The HSE & CSR manager is responsible for ensuring annual oil spill response drills and assessment of the performance of the IMT is undertaken. In addition, regular audits of oil spill response preparedness will be undertaken.

Testing oil spill preparedness is carried out against defined oil spill preparedness performance objectives and standards which are provided in the individual response strategies within Section 8, along with relevant measurement criteria.

Specific to the Woollybutt Field Management and P&A activities the following will occur:

- A level 2/3 desktop exercise prior to P&A activities

Following engagement with Chevron in relation to emergency and operational arrangements (Section 3.5), Eni will include such arrangements in its response testing as appropriate, prior to P&A activities.

9.7. OPEP Review and Audits

The HSE & CSR manager is responsible for ensuring that the OPEP is regularly revised and updated as required and for ensuring that any revisions are distributed. This OPEP will be kept up to date and will be reviewed:

- at least every two years;
- when major changes which may affect the oil spill response coordination or capabilities have occurred;
- following routine testing of the plan, or
- after an actual emergency.

The deployment readiness and capability of AMOSC's oil spill response equipment and resources in Geelong and Fremantle is audited every two years by AMOSC member companies on behalf of AMOSC member companies, including Eni. In the intervening year between Audits the progress of Audit Actions will be followed up. The intent of this audit is to provide assurances to ENI and associated members of AMOSC's ability to respond to an oil spill incident as per the methods and responsibilities defined in ENI's Oil Pollution Emergency Plans.

The deployment readiness and capability of OSRL's oil spill response equipment and personnel in Singapore is audited every two years by the Emergency & Oil Spill Coordinator or other Australian member company (Petroleum Titleholder) through agreement. The intent of this audit is to provide assurances to ENI of OSRL's ability to respond to an oil spill incident as per the methods and responsibilities defined in ENI's Oil Pollution Emergency Plans.

9.8. OPEP Consultation

Consultation, agreements or contracts that support ENI's oil spill response strategies and tactics have been put into place with agencies and organisations throughout the development of the OPEP so that roles and responsibilities are understood and accepted.

The OPEP will be revised and updated should a stakeholder's position change after acceptance of this OPEP.

APPENDICES

APPENDIX A:

SPILL RESPONSE FORMS

POLREP

MARINE POLLUTION REPORT

INCIDENT DETAILS

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

Location name/description:_____

_____

Incident Coordinates Latitude of spill_____ **Longitude of spill**_____

Format of coordinates used *(select one)*

☐ *Degrees & decimal degrees* ☐ *Degrees, minutes & decimal minutes* ☐ *Degrees, minutes &seconds*

Description of Incident:

_____

_____

POLLUTION SOURCE

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

Vessel type *(if known)* ☐ Tanker ☐ Container ☐ Bulk ☐ Cargo ☐ Fishing ☐ Defence ☐ Recreational ☐ Other

*(Specify)*_____

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

POLLUTANT

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

*(Specify)*_____

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

☐ **Garbage** Details/description: _____

☐ **Packaged** Details/description: _____

☐ **Sewage** Details/description: _____

☐ **Other** Details/description: _____

EXTENT

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

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

Has the discharge stopped? ☐ Yes ☐ No ☐ Unknown

Weather conditions at site: _____

_____

☐ **Photos taken** Details: _____ held by: _____

☐ **Video taken** Details: _____ held by: _____

☐ **Samples taken** Details: _____ held by: _____

☐ **Items retrieved** Details: _____ held by: _____

ADDITIONAL INFORMATION

Response action undertaken? ☐ Yes ☐ No

If yes, provide details below, please include any environmental impact.

Equipment used? ☐ AMSA ☐ State / NT ☐ Industry

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

ORIGINAL REPORT SOURCE

Name: _____ Position: _____ Phone: _____

Combat agency: _____ Statutory agency: _____

SENDER DETAILS

Name: _____ Agency: _____ Date: _____

Phone: _____ Fax: _____ Email: _____

Eni Duty Manager to be informed on 0419 943 584

This form is to be completed with as much information as possible (regardless of the size of the spill) and emailed to:

Eni Duty Manager/IMT Leader at <info@eniaustralia.com.au

For any additional information please add extra pages as required.

SITREP

MARINE POLLUTION SITUATION REPORT

Incident Name: _____ Ref. No. _____

Priority ☐ Urgent ☐ Immediate ☐ Standard

Final SITREP? ☐ Yes ☐ No Next SITREP on: _____

Date: _____ Time: _____

POLREP Reference: _____

Incident location Latitude _____ Longitude _____

Brief description of incident and impact: _____

Overall weather conditions: _____

Summary of response actions to date: _____

Current Strategies: _____

Summary of resources available/deployed: _____

Expected developments: _____

Other Information: _____

This form is to be completed with as much information as possible (regardless of the size of the spill) and emailed to:

Eni IMT Leader at <info@eniaustralia.com.au>

For any additional information please add extra pages as required

Information Required for Environmental Incident Reporting

1. Material facts and circumstances must be described, including:

a. The activity name, site/facility name or location where the incident occurred.
b. Name and business address of the titleholder of the petroleum activity.
c. Time and date of incident
d. Names and contact details of any witnesses
e. Name/position/telephone number of person submitting these details
f. Brief description and cause (if known) of the incident
g. Work/activity being undertaken at time of incident
h. For a fluid and/or gas escape:
   i) Estimated quantity and duration of escape; and
   ii) Composition of fluids or gases that escaped (including known toxicity information)
i. Environment Plan that this incident is being reported against
j. Details of the extent of the impact – including type of any environmental damage and/or areas at risk
k. Any impacts to Part 3 protected matters under the *Environment Protection and Biodiversity Conservation Act 1999*

2. Action taken to avoid or mitigate impact:

Immediate actions taken to avoid or mitigate adverse environmental impacts of the reportable incident

3. Corrective actions

Corrective actions taken, or proposed, to stop, control or remedy the reportable incident.

4. Action to prevent a similar incident

Actions taken, or proposed, to prevent a similar incident occurring in the future.

Notification of Reportable Environmental Incidents

Notification of Reportable Environmental Incident within 2 hours

When notifying NOPSEMA of a reportable environmental incident the titleholder must provide all the details that it knows or is able, by reasonable search or enquiry, to find out, as listed above in items 1 to 4. It is understood details might be limited at this early stage.

The NOPSEMA notification phone line is available to titleholders 24 hours a day. It will either be answered directly or the caller can leave a voice message, following which they will receive a call back.

Titleholders should **not** make notifications via the NOPSEMA general switchboard or their focal point specialist.

Titleholders are also required to give a written record of the notification to NOPSEMA, as well as the Titles Administrator (NOPTA) and the Department of the responsible State or Northern Territory Minister as soon as practicable after the oral notification.

Reporting of Reportable and Recordable Environmental Incidents

Written Reportable Incident Reports required within 3 days

A written report must be provided to NOPSEMA as soon as practicable, but in any case within 3 days of a reportable environmental incident unless otherwise agreed by NOPSEMA. The 3 day written report must include items 1 to 4. Titleholders may wish to utilise the NOPSEMA report form (N-03000-FM0831) available from the NOPSEMA Website: www.nopsema.gov.au

If NOPSEMA is not satisfied that the written report meets the requirements of the Regulations NOPSEMA may, by notice in writing, request additional written reports from the titleholder. The notice must identify the information to be contained in the report or matters to be addressed and specify when the report must be given to the Regulator.

Titleholders must also give a copy of the written report to both the Titles Administrator (NOPTA) and the Department of the responsible State or Northern Territory Minister within seven (7) days of giving the written report to NOPSEMA.

Written Recordable Incident Reports required each calendar month

A written report of all recordable incidents that occurred during any calendar month must be provided to NOPSEMA as soon as practicable but not later than 15 days after the end of the calendar month. The written report must contain a record of all recordable incidents during that month including details of items 1 to 4.

A Titleholder may wish to utilise the Recordable Environmental Incident Monthly Report template (N-03000-FM0928) available from the NOPSEMA Website: www.nopsema.gov.au

If no recordable incidents have occurred during any particular month a nil incident report should be submitted to NOPSEMA.

All written notifications and reports to NOPSEMA must be submitted to submissions@nopsema.gov.au or via secure file transfer at https://securefile.nopsema.gov.au/filedrop/submissions

[NOTE: This guidance note relates to the Environment Regulations in place from 28 February 2014. For environment plans accepted under the old regulations, refer to the previous incident reporting requirements.]

NOPSEMA

Guidance note

N-03000-GN0926 Rev 4, 28 February 2014

Notification and Reporting of Environmental Incidents

Core Concepts

- The titleholder has a duty to notify and report environmental incidents to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) under Regulations 26, 26A, 26AA and 26B of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.
- Regulation 26 requires the titleholder to notify NOPSEMA orally of a **reportable** environmental incident as soon as practicable but not later than two (2) hours after the first occurrence of the incident or after the time that the titleholder becomes aware of the incident.
- Regulation 26(6) requires the titleholder to give a written record of the notification to NOPSEMA, the Titles Administrator and the Department of the responsible State or Northern Territory Minister as soon as practicable after the oral notification.
- Regulation 26A requires the titleholder to give NOPSEMA a written report of a **reportable** incident as soon as practicable but not later than three (3) days after the first occurrence of the incident.
- Regulation 26A(5) requires titleholders to give a copy of the written report to both the Titles Administrator and the Department of the responsible State or Northern Territory Minister within seven (7) days of giving the written report to NOPSEMA.
- Regulation 26B requires the titleholder to submit a **recordable** environmental incident report not later than 15 days after the end of each calendar month.
- Failure to notify and report environmental incidents to NOPSEMA are ***offences of strict liability***.
- The titleholder remains responsible for making notifications and other reports to other persons or organisations as may be required.

To make an oral notification to NOPSEMA of a **reportable** environmental incident call:

(08) 6461 7090

A **reportable** environmental incident is defined in Regulation 4 as;

reportable incident, *for an activity, means an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage.*

The potential of an incident to cause moderate to significant environmental damage is determined during the preparation of an Environment Plan (EP). An EP should contain clear definitions of what is considered to be a reportable incident for a particular activity and should be referred to prior to notification of a reportable incident to NOPSEMA.

If in doubt, notify NOPSEMA

A **recordable** environmental incident is defined in Regulation 4 as;

recordable incident, *for an activity, means a breach of an environmental performance outcome or environmental performance standard, in the EP that applies to the activity, that is not a reportable incident*

This Guidance Note and others on the NOPSEMA website are intended to provide general guidance to the industry as to the approach that NOPSEMA takes in carrying out its regulatory functions and exercising powers under the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* and Regulations under that Act. The Guidelines should not be relied on as advice on the law, nor treated as a substitute for legal advice in any relevant situation.

NOPSEMA

Guidance Note

Notification and Reporting of Environmental Incidents

During an activity there is an environmental incident or the titleholder first becomes aware of an environmental incident

Take reasonable steps to:
- Help or rescue sick, injured or endangered personnel
- Maintain the safety of personnel and facilities
- Reduce the danger to personnel and facilities
- Contain the source of any spill or leak if safe to do so

Is the incident reportable under the environment plan for the activity?

Yes

Notify NOPSEMA orally within 2 hours

Provide a written record of the notification as soon as practicable

Provide a written record of the notification to the Titles Administrator (NOPTA) and the Department of the responsible State or NT Minister

Provide a written report to NOPSEMA within 3 days

Provide a copy of the written report to the Titles Administrator (NOPTA) and the Department of the responsible State or NT Minister, within 7 days of providing it to NOPSEMA

No

Does the incident breach a performance outcome or standard in the environment plan that applies to the activity, but it is not defined as a reportable incident?

Yes

Include the incident in the monthly recordable incident report to NOPSEMA

No

No requirement to report to NOPSEMA

Guidance

The titleholder must make an oral notification to NOPSEMA, via the dedicated NOPSEMA Phone No (08) 6461 7090, within two hours, or as soon as practicable having given due regard to any immediate emergency response.

A written record of the notification must also be provided to NOPSEMA as soon as practicable.

Guidance

A written reportable incident report must be provided to NOPSEMA as soon as practicable, and in any case within three days of the incident, unless otherwise agreed by NOPSEMA.

The written report should include as a minimum items 1 to **4** (see over) and be submitted to submissions@nopsema.gov.au or via secure file transfer at https://securefile.nopsema.gov.au/filedrop/submissions

Guidance

A written recordable incident report must be provided to NOPSEMA as soon as practicable after the end of the calendar month and in any case not later than 15 days after the end of the calendar month. The written report must contain all recordable incidents that occurred during the calendar month, should include items 1 to **4** (see over) for each incident and be submitted to submissions@nopsema.gov.au or via secure file transfer at https://securefile.nopsema.gov.au/filedrop/submissions

Guidance

If in doubt

Notify NOPSEMA

by calling

(08) 6461 7090

Submit reportable incident reports to NOPSEMA via email:

submissions@nopsema.gov.au

or via secure file transfer at https://securefile.nopsema.gov.au/filedrop/submissions

N-03000-GN0926

National Offshore Petroleum Safety and Environmental Management Authority A198752 Rev 4 28 February 2014 Guidance Note

NOPSEMA

FORM FM0831

N-03000-FM0831 Revision 8 January 2015

Report of an accident, dangerous occurrence or environmental incident

For instructions and general guidance in the use of this form, please see the last page.

Part 1 is required within 3 days of a notified incident.
Part 2 is required within 30 days of notified incident.

What was the date and time of the initial verbal incident notification to NOPSEMA?			
Date		**Time**	

NOTE: It is a requirement to request permission to interfere with the site of an accident or dangerous occurrence. Refer OPGGS(S)R, Reg. 2.49.

What is the date and time of this written incident report?			
Date		**Time**	

What type of incident is being reported?	***Please tick appropriate incident type***	
Accident or dangerous occurrence	☐	Complete parts 1A, 1B & part 2
Environmental Incident	☐	Complete parts 1A, 1C
BOTH (Accident or dangerous occurrence AND environmental incident)	☐	Complete ALL parts (1A, 1B, 1C, 2)

Please tick all applicable (one or more categories) — *To use electronically: MS Word 2007-10 – click in check box*

Categories *Please select one or more*	Accidents	Death or Serious injury	☐
		Lost time injury ≥3 days	☐
	Dangerous occurrences	Hydrocarbon release >1 kg or ≥80 L (gas or liquid)	☐
		Fire or explosion	☐
		Collision marine vessel and facility	☐
		Could have caused death, serious injury or LTI	☐
		Damage to safety-critical equipment	☐
		Unplanned event - implement ERP	☐
		Pipeline incident	☐
		Well kick >50 barrels	☐
		Other _____	☐
	Environmental incidents	Hydrocarbon release	☐
		Chemical release	☐
		Drilling fluid/mud release	☐
		Fauna Incident	☐
		Other _____	☐

Part 1A – Information required within 3 days of an accident, dangerous occurrence or environmental incident

General information – all incidents

1.	**Where did the incident occur?**	Facility / field / title name		
		Site name and location *Latitude/longitude*		
2.	**Who is the registered operator/titleholder or other person that controls the works site or activity?**	Name		
		Business address		
		Business phone no.		
3.	**When did the incident occur?**	Time and time zone		
		Date		
4.	**Did anyone witness the incident?**	Yes or no *If yes, provide details below*		
	Witness details	Witness no 1	Witness no 2	Witness no 3
	Full name			
	Phone no. (Business hours)			
	Phone no. (Home) (Mobile)			
	Email (Business) (Private)			
	Postal address			
	NB: If more witnesses, copy and insert this section (4) here , and add extra witness numbers appropriately			
5.	**Details of person submitting this information**	Name		
		Position		
		Email		
		Telephone no.		
6.	**Brief description of incident**			
7.	**Work or activity being undertaken at time of incident**			

Part 1A – Information required within 3 days of an accident, dangerous occurrence or environmental incident

General information – all incidents

8.	**What are the internal investigation arrangements?**					
9.	**Was there any loss of containment of any fluid (liquid or gas)?**	Yes or no *If Yes, provide details below*				
		Type of fluid (liquid or gas) *If hydrocarbon release please complete item no.15 as well*	Hydrocarbon ☐ *Please specify*_____ Non-hydrocarbon ☐ *Please specify*_____			
		Estimated quantity *Liquid (L), Gas (kg)*				
		Estimation details	Calculation ☐	Measurement ☐		
			*Please specify*_____			
		Composition *Percentage and description*				
		Known toxicity to people and/or environment	Toxicity to people			
			Toxicity to environment			
		How was the leak/spill detected?	F&G detection ☐ CCTV ☐	Visual ☐ Other ☐		
		Did ignition occur?	No ☐ Yes ☐	Immediate ☐ Delayed ☐		
			If yes, what was the likely ignition source	Hotwork ☐ Spark electrical source ☐ Spark metallic contact ☐ Hot surface ☐ Other ☐		
10.	**Has the release been stopped and/or contained?**	Yes or no				
		Duration of the release *hh:mm:ss*				
		Estimated rate of release *Litres or kg per hour*				
11.	**Location of release**	What or where is the location of the release?				
		What equipment was involved in the release?				
		Is this functional location listed as safety-critical equipment?				

Part 1A – Information required within 3 days of an accident, dangerous occurrence or environmental incident

General information – all incidents

12.	**Weather conditions** *Please complete as appropriate*	Ambient temperature C°				
		Relative humidity %				
		Wind speed m/s *NB: for enclosed areas use* Air change per hour				
		Wind direction e.g. from SW				
		Significant wave height m				
		Swell m				
		Current speed m/s				
		Current direction e.g. from SW				
13.	**Hydrocarbon release details** *If hydrocarbon fluid (liquid or gas) was released, please complete this section as well*	System of hydrocarbon release	Process ☐ Drilling ☐ Subsea / Pipeline ☐		Utilities ☐ Well related ☐ Marine ☐	
		Estimated inventory in the isolatable system *Litres or kg*				
		System pressure and size of piping or vessel *diameter (d in mm) length (l in m) or volume (V in L)*	Pressure MPag			
			Size Piping (d) and Piping (l) or Vessel (V)			
		Estimated equivalent hole diameter *d in mm*				

Part 1B - Complete for accidents or dangerous occurrences

Accidents and dangerous occurrences information

	Was NOPSEMA notified through the dedicated notification phone line? *Phone No. 08 6461 7090*		Yes	☐	No	☐
15.	**Action taken to make the work-site safe**	Was permission given by a NOPSEMA inspector to interfere with the site? OPGGS(S)R 2.49.	Yes	☐	No	☐
		Action taken				
		Details of any disturbance of the work site				

Part 1B - Complete for accidents or dangerous occurrences

Accidents and dangerous occurrences information

16.	**Was an emergency response initiated?**		Yes ☐		No ☐	
		Type of response	Manual ☐ Automatic alarm ☐		Muster ☐ Evacuation ☐	
		How effective was the emergency response?				
17.	**Was anyone killed or injured?** *Provide details below*		Yes ☐		No ☐	
	Injured persons (IP)	**Casualty No 1**				
	If different from item 2. Employer name		Employer address			
	Employer phone no.		Employer email			
	IP full name					
	IP date of birth		Sex	M ☐	F ☐	
	IP residential address					
	IP phone no. (Work)		IP phone no. (Home) (Mobile)			
	IP occupation/job title		Contractor or core crew			
	Details of injury					

Based on TOOCS (refer last page) Nature of injury	a. Intracranial injury b. Fractures c. Wounds, lacerations, amputations, internal organ damage	☐ ☐ ☐	d. Burn e. Nerve or spinal cord injury f. Joint, ligament, muscle or tendon injury g. Other _____	☐ ☐ ☐ ☐
Part of body	G1. Head or face G2. Neck G3. Trunk G4. Shoulder or arm	☐ ☐ ☐ ☐	G5. Hip or leg G6. Multiple locations G7. Internal systems G8. Other _____	☐ ☐ ☐ ☐
Mechanism of injury	G0. Falls, stepping, kneeling, sitting on object G1. Hitting object G2. Being hit or trapped	☐ ☐ ☐	G3. Exposure to sound or pressure G4. Muscular stress G5. Heat, cold or radiation G6/7 Chemical, biological substance G8. Other _____	☐ ☐ ☐ ☐ ☐
Agency of injury	1. Machinery or fixed plant 2. Mobile plant or transport 3. Powered equipment 4. Non-power equipment	☐ ☐ ☐ ☐	5/6. Chemicals, materials, substances 7. Environmental agencies 8. Human or animal agencies 9. Other _____	☐ ☐ ☐ ☐

Part 1B - Complete for accidents or dangerous occurrences

Accidents and dangerous occurrences information

	Details of job being undertaken					
	Day and hour of shift	Day *e.g. 5th day of 7 (5 / 7)*		Hour *e.g. 3rd hour of 12 (3 / 12)*		
	NB: If more casualties, please copy/paste this section (19) for each additional casualty and insert here					
18.	**Was there any serious damage?** *Provide details below*		Yes ☐		No ☐	
	Details	**Item 1**		**Item 2**		**Item 3**
	Equipment damaged					
	Extent of damage					
19.	**Will the equipment be shut down?** *Yes or No*					
	If Yes, for how long?					
	NB: If more equipment seriously damaged, please copy/paste this section as required					
20.	**Will the facility be shut down?**	Yes or no *If yes provide details below*				
	Facility shutdown	Date			dd/mm/yyyy	
		Time			24 hour clock	
		Duration			days / hours / minutes	
21.	**Immediate action taken/intended, if any, to prevent recurrence of incident.**	**Action**		**Responsible party**	**Completion date** *Actual or intended*	
22.	**What were the immediate causes of the incident?**					

Attachments

Are you attaching any documents?			Yes or no *If yes provide details below*	
No.	**ID**	**Revision**	**Date**	**Title/description**

Attachments

Are you attaching any documents?			Yes or no *If yes provide details below*	

Insert or delete rows as required

Part 1C – Complete for environmental incidents

Environmental Impacts

23.	**What is the current environment plan for this incident?**	Environment plan				
24.	**Has the incident resulted in an impact to the environment?**	Yes or no *If yes provide details below*				
		Incident details *e.g. estimated area of impact, nature/significance of impact*				
		ENVIRONMENTAL RECEPTORS				
		Open ocean Shoreline Population centre Stakeholders Other sensitivity *e.g. conservation area, nesting beach*	☐ ☐ ☐ ☐ ☐	Macroalgae Coral Reef Benthic invertebrates Seagrass Mangrove	☐ ☐ ☐ ☐ ☐	
		Further details				
	Details	**Environment 1**	**Environment 2**	**Environment 3**		
	Location of receiving environments *Lat/Long*					
	Date & time of impact					
	Action taken to minimise exposure					
	Specify each matter protected under Part 3 of the EPBC Act impacted					
	NB: If more environments were damaged, please copy/paste this section (Item E3) and add extra data					
25.	**Are any environments at risk?** ***Including as a result of spill response measures***	Yes or no *If yes, provide details*				
		Details *e.g. zone of potential impact*				
		AT RISK ENVIRONMENTS				

Part 1C – Complete for environmental incidents

Environmental Impacts

		Open ocean ☐ Shoreline ☐ Population Centre ☐ Stakeholders ☐ Other sensitivity ☐ *e.g. conservation area, nesting beach*			Macroalgae ☐ Coral Reef ☐ Benthic Invertebrates ☐ Seagrass ☐ Mangrove ☐		
	Details	**Environment 1**		**Environment 2**		**Environment 3**	
	Estimated location of 'at-risk' environments						
	Estimated impact date & time						
	Action required to minimise exposure						
	Specify each matter protected under Part 3 of the EPBC Act at risk						
	NB: If more environments at risk of damage, please copy/paste this section (Item E2) and add extra data						
26.	**Was an oil pollution emergency plan activated?**	Yes or no					
		If yes, what action has been implemented / planned?					
		If yes, how effective is/was the spill response?					
27.	**Was an environmental monitoring program initiated?**	Yes or no					
		If yes, what actions have been implemented and/or planned?					
28.	**Did the incident result in the death or injury of any fauna?**	Yes or no (If yes provide details of species in the table below)					
	Injured fauna	**Species 1**		**Species 2**		**Species 3**	
	Species name (common or scientific name)						
	Number of individuals killed or injured	Killed: Injured:		Killed: Injured:		Killed: Injured:	
	NB: If more species were injured or killed, please copy/paste this section (Item E4) and add extra data						
29.	**Actions taken to avoid or mitigate any adverse environmental impacts of the incident.**	**Action**		**Responsible party**		**Completion date** *Actual or intended*	
	NB: If more actions, please add extra rows as required						

Part 1C – Complete for environmental incidents

Environmental Impacts

		Action	Responsible party	Completion date *Actual or intended*
30.	**Corrective actions taken, or proposed, to stop, control or remedy the incident.**			
	NB: If more actions, please add extra rows as required			
		Action	**Responsible party**	**Completion date** *Actual or intended*
31.	**Actions taken, or proposed, to prevent a similar incident occurring in the future.**			
	NB: If more actions, please add extra rows as required			

Attachments

Are you attaching any documents?			Yes or no *If yes provide details below*	
No.	**ID**	**Revision**	**Date**	**Title/Description**
Insert or delete rows as required				

Part 2 – Information required within 30 days of accident or dangerous occurrence

NOPSEMA acknowledges that in many circumstances an operator may not have completed an investigation within 3 days of an accident or first detection of a dangerous occurrence and agrees that these items must be provided within 30 days unless otherwise agreed, in writing with NOPSEMA. In circumstances where an investigation has been completed within 3 days, and these items are available (supplemented, as required by any attachments) this part should also be completed at that time.

32.	**Has the investigation been completed?**	Yes or no	
	Root cause analysis *What were the root causes?*	Root cause 1	
		Root cause 2	
		Root cause 3	
		Other root causes	
	Full report *Describe investigation in detail, including who conducted the investigation and in accordance with what standard/procedure with reference to attachments listed in the 'attachments table' (following) as applicable*		

33.	**Actions to prevent recurrence of same or similar incident**	**Action**	**Responsible party**	**Completion date** *Actual or intended*
				NB: Add or delete rows as appropriate

Attachments (Insert/delete rows as required)

Are you attaching any documents?			Yes or no *If yes provide details below*	
No.	**ID**	**Revision**	**Date**	**Title/description**

Instructions and general guidance for use:

1. The use of this form is voluntary and is provided to assist operators and titleholders to comply with their obligations to give notice and provide reports of incidents to NOPSEMA under the applicable legislation.
2. Accidents, dangerous occurrences or environmental incidents can all be reported using this same form.
3. The applicable legislation for incident reporting is:
    a. Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009 [OPGGS(S)R]; and
    b. Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 [OPGGS(E)R], for facilities located in Commonwealth waters; or
    c. for facilities located in designated coastal waters, the relevant State or Territory Act and associated Regulations where there is a current conferral of powers to NOPSEMA.
4. In the context of this form an incident is a reportable incident as defined under:
    a. OPGGSA, Schedule 3, Clause 82.
    b. OPGGS(E)R, regulation 4.
5. This form should be used in conjunction with NOPSEMA Guidance Notes available on the NOPSEMA website:
    a. N-03000-GN0099 Notification and Reporting of Accidents and Dangerous Occurrences
    b. N-03000-GN0926 Notification and Reporting of Environmental Incidents
6. Part 1 requires completion for all incidents; then ALSO complete part 2 if the incident is an accident or dangerous occurrence.
7. NOPSEMA considers that a full report will contain copies of documentary material referenced and/or relied on in the course of completing this form, which may include (but not be limited to) as appropriate: witness statements, management system documents, drawings, diagrams and photographs, third party reports (audit, inspection, material analysis etc.), internal records and correspondence.
8. This form is intended to be completed electronically using Microsoft Word by completing the unshaded cells which will expand as required to accept the information required and the check boxes where relevant (NB: check boxes may appear shaded and have reduced functionality in MS Word versions prior to 2010).
9. The completed version of this form (and any attachments, where applicable) should be emailed to: submissions@nopsema.gov.au or submitted via secure file transfer at: https://securefile.nopsema.gov.au/filedrop/submissions as soon as practicable, but in any case within three days of the incident.

References

NOPSEMA website: www.nopsema.gov.au

TOOCS – Type of Occurrence Classification System.

The *Type of Occurrence Classifications System, Version 3.0* (TOOCS3.0) was developed to improve the quality and consistency of data. This system aligns with the International Classification of Diseases –Australian Modification (ICD10-AM).

http://www.safeworkaustralia.gov.au/sites/SWA/AboutSafeWorkAustralia/WhatWeDo/Publications/Documents/207/TypeOfOccurrenceClassificationSystem(TOOCS)3rdEditionRevision1.pdf

OPGGS(S)R. Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009. Select Legislative Instrument 2009 No. 382 as amended and made under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*.Commonwealth of Australia.

OPGGS(E)R. Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009. Statutory Rules 1999 No. 228 as amended and made under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006*. Commonwealth of Australia.

Privacy Notice

NOPSEMA collects your personal information for the purpose of investigating accidents, dangerous occurrences and environmental incidents under the Offshore Petroleum and Greenhouse Gas Storage Act 2006.

NOPSEMA will not use or disclose your personal information for any other purpose without your consent, unless it is required or authorised by law, or relates to NOPSEMA's enforcement activities. Your personal information may be disclosed to the following organisations, entities or individuals:

- individuals who make a request under the *Freedom of Information Act 1982*
- the Australian National Audit Office and other privately-appointed auditors
- other law enforcement bodies (for example, the police or the Coroner)
- NOPSEMA's legal advisors.

NOPSEMA may occasionally be required to disclose information to overseas recipients in order to discharge its functions or exercise its powers, or to perform its necessary business activities.

Information about how you can access, or seek correction to, your personal information is contained in NOPSEMA's APP Privacy Policy at www.nopsema.gov.au/privacy. If you have an enquiry or a complaint about your privacy, please contact NOPSEMA's Privacy Contact Officer on (08) 6188 8700 or by email at: privacy@nopsema.gov.au.

APPENDIX B:

CONTROL AGENCY TRANSFER CHECKLIST

Appendix 1 – Incident Control Transfer Checklist (State Waters)

☐ Confirm date and time of formal transfer of Incident Control in State Waters.
☐ Confirm respective Incident Controller lines of communication arrangements (including exchange of Liaison Officers in IMT).
☐ Confirm respective On-Scene Commander lines of communication arrangements (including exchange of Liaison Officers in FOB).
☐ Confirm the location of any PT FOB and Staging Areas.
☐ Confirm the details of all current response operations being conducted by PT in State Waters.
☐ Confirm the composition and status of all response resources, both personnel and equipment, currently being controlled by the PT that relate to response operations in State Waters.
☐ Confirm the composition and status of all response resources, both personnel and equipment, that has been mobilised by the PT and in transit to the spill site that will contribute to future response operations in State Waters.
☐ Confirm the composition and status of all response resources, both personnel and equipment that is in the process of being mobilised by the PT to contribute to future response operations in State Waters.
☐ Confirm current level of incident and the predicted level in the future.
☐ Confirm existence and adherence to an OPEP/OSCP and secure a copy for the relevant OPEP/OSCP plan.
☐ Secure a copy of the current Situation Report and incident prognosis.
☐ Secure a copy of the Product Material Safety Data Sheet (MSDS).
☐ Notification of significant Safety Risks.
☐ Secure a copy of the latest spill trajectory modelling.

☐ Secure a copy of the latest actual spill monitoring and surveillance information.
☐ Secure a copy of the current IAP as it relates to State Waters response operations, specifically the details of all immediate and future response operations planned by the PT in State waters.
Secure a copy of the most recent media statements.
Secure a summary of all community / stakeholder engagement activities undertaken to date and those planned in the immediate future that pertain to state waters impact.
Confirm deployment of initial PT personnel to DoT IMT and DoT FOB.
Reconfirm date and time of formal transfer of Incident Control in State Waters
DoT Incident Controller _____ Date_____ Time_____

Source: Appendix 1 of the WA Department of Transport Offshore Petroleum Industry Guidance Note, Marine Oil Pollution: Response and Consultation Arrangements (September 2018). Available online at: <https://www.transport.wa.gov.au/mediaFiles/marine/MAC_P_Westplan_MOP_OffshorePetroleumIndGuidance.pdf>

APPENDIX C:

INCIDENT ACTION PLAN TEMPLATE

INCIDENT ACTION PLAN (IAP)

NAME OF INCIDENT	
DATE/TIME OF PLAN	
AUTHOR	
ATTACHMENTS	
RESPONSE AIM (IMT LEADER)	
OBJECTIVE 1 (ENTIRE IMT)	
OBJECTIVE 2	
OBJECTIVE 3	
OBJECTIVE 4	
OPERATIONS	
GENERAL OUTLINE OF OPERATIONS	
SITE/AREA/ACTIVITY 1	
DESCRIPTION TASK(S) TIMINGS PERSONNEL SITE ADMINISTRATION & LOGISTICS	
SITE/AREA/ACTIVITY 2	
DESCRIPTION TASK(S) TIMINGS PERSONNEL SITE ADMINISTRATION & LOGISTICS	

SITE/AREA/ACTIVITY 3	
DESCRIPTION TASK(S) TIMINGS PERSONNEL SITE ADMINISTRATION & LOGISTICS	
WASTE PLAN	
COLLECTION STORAGE DISPOSAL FACILITIES & STORAGE SITES TRANSPORT OF WASTE	
ADMIN & LOGISTICS	
PERSONNEL INDUCTION HOURS OF WORK EQUIPMENT DISTRIBUTION MAINTENANCE RECORDS STORAGE TRANSPORT FUEL ACCOMMODATION	
COMMAND & COMMUNICATIONS	
COMMAND KEY PERSONNEL RESPONSIBILITIES ORGANISATIONAL CHART COMMUNICATION	

MARINE MONITORING PROGRAMS	
DESCRIPTION TASK(S) TIMINGS PERSONNEL SITE ADMINISTRATION & LOGISTICS	
IAP APPROVAL	
IMT LEADER	NAME DATE

APPENDIX D:

NET ENVIRONMENTAL BENEFIT ASSESSMENT

Procedure	Net Benefit Analysis (NEBA)
Responsibility	The IMT Planning Officer will be responsible for the completion of the NEBA, with the assistance of an Environmental Advisor. The Environmental Advisor is to have technical competence to undertake the NEBA assessment and have a thorough understanding of the potential areas to be impacted and sensitivities that exist at these places. An understanding of the potential impacts of different spill response options is also required. The Environmental Advisor will require support from the Safety, Logistics and Operations Officers in consultation with the IMT Leader. The IMT Planning Officer may request advice from technical experts in completing the NEBA.
Timing	From the occurrence of the spill, the NEBA will be developed to supplement the Incident Action Plan (IAP) being developed by the IMT Leader. The initial NEBA will be completed within 1 hour of receiving sufficient data input (spill modelling, current and forecasted weather conditions, volume of spill, the presence of sensitive receptors). Thereafter, the NEBA will be reviewed on a daily basis to inform the IAP. The reviews are flexible in the fact they can be more frequent, based on information from operational monitoring, resource availability, changes in weather and safety considerations. A review can be requested by the IMT leader at any stage.

Task	Action	Status
1 a)	Each NEBA undertaken is to have a cover page completed. The cover page is to be assigned a unique reference code which is of a standard format. For example: *NEBA X (NEBA number conducted)_ddmmyyyy (date)_00:00 (time)_* *Site Abbreviation Initials of Assessor* *e.g. NEBA5_01012013_15:15_Ashmore_JW* Note the site abbreviation will become prevalent once the locations to be impacted are determined (i.e. Ashmore, Cartier, Hibernia, etc.).	
b)	The details in the cover sheet are to be completed to the largest extent possible based on the information available. Details to be completed include: • Level of the spill • season • water depth • details of people completing the form • date of form • weather conditions • resources available • existing response strategies • spill modelling forecast: – areas predicted to be impacted – time to contact – volumes. • operational monitoring inputs.	
2a)	Populate the NEBA table with response strategies under consideration, sites and resources of interest.	

Task	Action	Status
	Part A is pre-prepared reference, the positive and negative environmental impacts as well as considerations for various response options. Review and update this as necessary based on the spill characteristics.	
b)	From the cover page add in the site names of potentially affected sites to the top row of the NEBA table (Part B).	
c)	List the key sensitivities for the potentially affected sites identified through modelling (refer to Section 6.6in the OPEP and the relevant Environment Plan) and additional information supplied by APASA (from OSRA) or other local environmental experts.	
d)	The initial NEBA will focus on primary response strategies (containment and recovery) which target reducing the volume of oil on the water surface and minimising the risk of shoreline contact. As the time to contact reduces, and potential volumes that may contact the sites become clear, secondary response strategies such as protection and deflection and shoreline clean-ups will become more prevalent and should be incorporated into the NEBA. It is important to include detail in the initial NEBA with an outlook for the future 48 hours so that the response strategies can be refined over the coming days. This will assist the Operational Officer in acquiring resources.	
e)	Review the peak migratory seasons for sensitivities such as: • Migratory Birds – peak migratory periods occurring during October to November. • Marine Reptiles (Turtles) – turtle nesting occurs between the months of December to January; Hatchlings can be expected between February and March. If the spill will affect key seasonal sensitivities, note this in each of the response strategy boxes.	
f)	For each response strategy review the positive/negatives and considerations in Section A, update as necessary and apply them to the sites and sensitivities listed in Section B to assess the relative benefits of each response under consideration.	
g)	If multiple sites are identified to be impacted and prioritisation is required. It is important to list the following details against the relevant response strategy for each location: • the time to contact • the volume predicted to impact • the length of shoreline to be impacted • state of weathering at impact • hydrocarbon phase at impact • tidal phases (spring tides etc.) • review migratory/nesting seasons for key sensitivities • review operational monitoring data on number and diversity of fauna currently present that could be impacted.	
h)	If a single site is to be impacted, detailed operational monitoring data will be used to identify where specific response strategies could be implemented (protection and deflection, shoreline protection) given the conditions at the time (sea state, currents, access). A site specific NEBA can be undertaken using as real time information to identify the most beneficial response strategies for each location within the site.	

Task	Action	Status
3a)	Once viable response options have been identified, this information can be incorporated into spill modelling to assess the outcome of the response and identify preferred locations for deploying the response.	
4a)	The Planning Officer and Environmental Advisor are to supply the IMT Leader with: 1. the completed NEBA 2. a list of the recommended response options for each site of interest 3. modelling results for response options (where applicable).	
b)	Ensure the NEBA and supporting information is saved in a dedicated location that is readily accessible to the IMT.	
c)	Prepare the template for the following NEBA, based on the existing NEBA so that it is ready to be reviewed and refined if requested at short notice by the IMT leader.	

NEBA Cover Sheet

Net Environmental Benefit Analysis Cover Sheet			
Document Number:		Location:	
Previous NEBA Document Number:			
Date:		**People Involved:**	
Time:			
Time (days) Since Spill:			
Prevailing Weather Conditions:	**Temperature: (range)**	**Wind: (Speed/direction)**	**Swell: (m)**
Spill Modelling Data:			
Relevant Operational Monitoring Data:			
Predicted Locations To Be Impacted:	**Time to shoreline contact**	**Hydrocarbon phase at impact**	**Volumes predicted ashore at each location**
Resources Available:	**Currently**	**<24 hours**	**>24 hours**

Section A - Information to Inform NEBA				Section B – Conceptual NEBA Receptor/Sensitivity		
				Location/Receptor	Location/Receptor	Location/Receptor
Response Strategy	**Negative Impacts**	**Positive Impacts**	**Consideration**	**Sensitivities at Receptor**	**Sensitivities at Receptor**	**Sensitivities at Receptor**
Natural recovery (surveillance and monitoring)	• Acute and chronic toxicity effects of surface oil on organisms • Physical effects e.g. smothering from surface oil • Potential extended exposure of surface water and inter-tidal resources • Survey vessels pose chance of disturbance/collision with marine fauna	• No additional impacts from clean-up activities • Identify emerging risks to sensitive areas • Limited risk to sub-tidal resources • No waste generation	• EPBC Regulations 2000, Part 8 Division 8.1 interactions with cetaceans • For most spills aerial surveillance will be required for effective monitoring of spill movement and extent • Requires trained observers			

Section A - Information to Inform NEBA				Section B – Conceptual NEBA Receptor/Sensitivity		
				Location/Receptor	Location/Receptor	Location/Receptor
Response Strategy	**Negative Impacts**	**Positive Impacts**	**Consideration**	**Sensitivities at Receptor**	**Sensitivities at Receptor**	**Sensitivities at Receptor**
Containment and Recovery	• Response vessel movement increase chance of disturbance/collision with marine fauna • Generation of oily waste requiring disposal.	• Reduces volume of surface slick • Reduced risk of oiling of wildlife and shorelines • Less waste generated than during shoreline cleanup	• Dependent on weather • Containment and recovery operations require surface slicks of thresholds >10 g/m² • Requires trained responders • Booms in shallow water monitored to free trapped wildlife and prevent damage to shallow reef structures • EPBC Regulations 2000, Part 8 Division 8.1 interactions with cetaceans			

Protection and deflection	• Increased vessel movement increase chance of disturbance/collision with marine fauna • Potential damage/disturbance to intertidal and benthic habitats • Disturbance of shoreline fauna, e.g. nesting birds or turtles	• Can reduce volume of surface slick • Reduce the risk of oiling of wildlife and shorelines • Less waste generated than during shoreline cleanup	• Requires trained responders • Booms in shallow water monitored to free trapped wildlife and prevent damage to shallow reef structures or booms • Flat bottom vessels, catamarans or vessels with tenders may be required to access shorelines to deploy booms and other protective equipment. • Beach profile must be restored after installing barriers/berms where practicable • EPBC Regulations 2000, Part 8 Division 8.1 interactions with cetaceans			
Shoreline clean up	• Potential intertidal and shoreline disturbance,	• Removes stranded hydrocarbons	• Remote area work requiring extensive logistic support			

Section A - Information to Inform NEBA				Section B – Conceptual NEBA Receptor/Sensitivity		
				Location/Receptor	Location/Receptor	Location/Receptor
Response Strategy	**Negative Impacts**	**Positive Impacts**	**Consideration**	**Sensitivities at Receptor**	**Sensitivities at Receptor**	**Sensitivities at Receptor**
	including fauna, nests etc, from landing vessels and personnel. • Large amounts of waste generated • Changes to beach profiles • Depending on environment may not speed natural recovery	from shorelines – reduces oil burial and long-term contamination • Reduces impacts associated with smothering effects • Reduces risk of wildlife contacting oil • Reduces potential for remobilisation of stranded oil to other sensitive receptors	including waste removal and transport • Access permits required for some areas. • Induction and training of onshore team accessing to uninhabited islands. Induction to include that spill response teams should avoid disruption of environment and take practical tactical precautions to avoid contact with flora and fauna • IMT to: Coordinate basic training to clean-up contractors; Oversee the clean-			

Section A - Information to Inform NEBA				Section B – Conceptual NEBA Receptor/Sensitivity		
				Location/Receptor	Location/Receptor	Location/Receptor
Response Strategy	**Negative Impacts**	**Positive Impacts**	**Consideration**	**Sensitivities at Receptor**	**Sensitivities at Receptor**	**Sensitivities at Receptor**
		• May speed shoreline recovery	up process to ensure appropriate procedures are used to minimise the impact on the environment; Provide advice on practical precautions to minimise contact with flora and fauna; and Assist with the NEBA process when selecting spill response strategies and to evaluate the impact of strategies			
Oiled wildlife response	• Increased vessel movement increase chance of disturbance/collision with marine fauna • Disturbance to shorelines and	• Prevent or reduce oiling of wildlife • May assist recovery of oiled wildlife	• Wildlife at risk will depend on seasonal factors as well as the location of the spill • Wildlife washing facility requires			

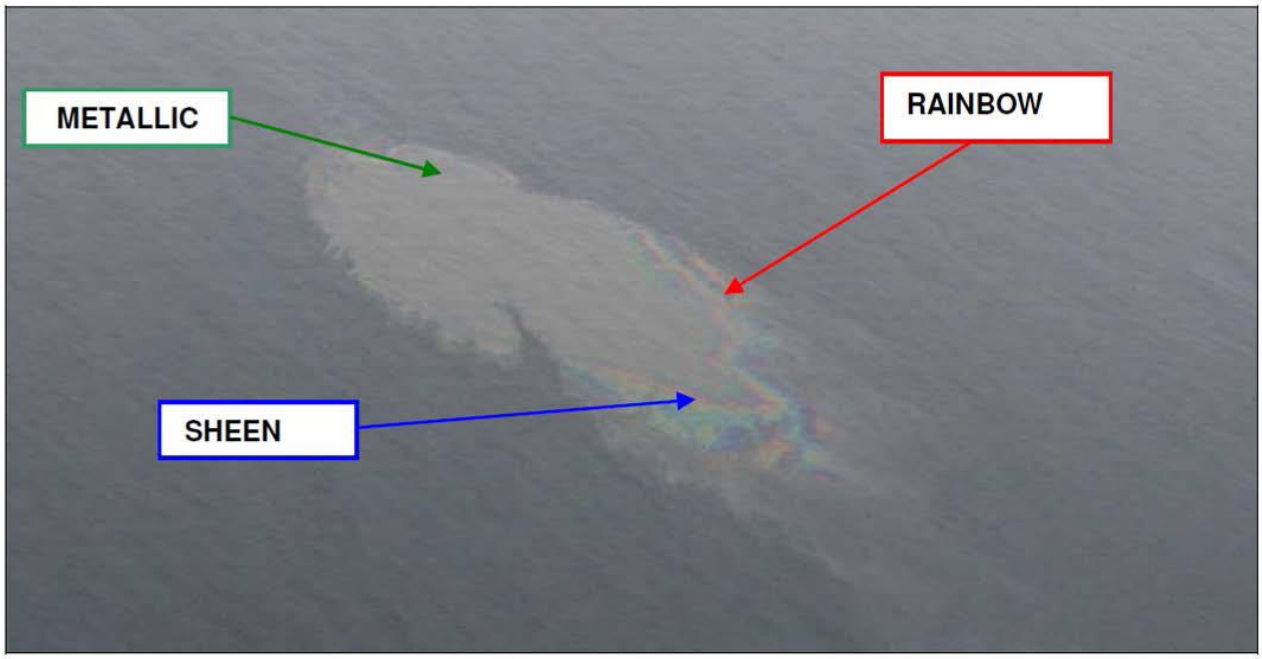
Section A - Information to Inform NEBA				Section B – Conceptual NEBA Receptor/Sensitivity		
				Location/Receptor	Location/Receptor	Location/Receptor
Response Strategy	**Negative Impacts**	**Positive Impacts**	**Consideration**	**Sensitivities at Receptor**	**Sensitivities at Receptor**	**Sensitivities at Receptor**
	intertidal areas during capture or marine fauna • Approaching marine fauna could drive individuals towards/into spill • Pre-emptive capture and relocation of turtle hatchlings may result in reduced survival (predation and/or exposure) • Large volumes of oily water and waste generated by bird washing		large area and large supply of clean water • Trained responders required for wildlife capture and care • Consider wildlife threatened or impacted by other operational activities associated with the response (e.g. containment and clean up, aviation etc.)			

APPENDIX E:

BONN APPEARANCE CODES

Bonn Appearance Codes

Code	Description - Appearance	Layer Thickness Interval (µm)	Litres per km^2
1	Sheen (silvery/grey)	0.04 to 0.30	40 – 300
2	Rainbow	0.30 to 5.0	300 – 5000
3	Metallic	5.0 to 50	5000 – 50,000
4	Discontinuous True Oil Colour	50 to 200	50,000 – 200,000
5	Continuous True Oil Colour	More than 200	More than 200,000



Oil Behaviour

The behaviour of oil at sea, and its subsequent fates and effects is influenced by a number of factors and these are outlined below.

Significance of Oil Character

The character of oil determines its behaviour at sea, and this in turn influences a number of aspects of spill management. The most important considerations are:

- Spreading rate. Oils like diesel, light crude oils and condensates will spread rapidly. This makes containment with booms difficult due to the time taken to deploy equipment and the large area covered by these oils in a short time. High spreading rates also results in a rapid evaporation of the oils and facilitate a rapid physical breakup of the slick due to the thin layer that is achieved through spreading. Breakup of some of these oils is so rapid that they are classed as "non persistent" (most condensates).
- Tendency to emulsify. Some oils, such as heavy fuel oils, tend to pick up water and form thick, viscous emulsions. This depends in apart on an oil's asphaltene content. These are persistent and difficult to recover from the sea using skimmers. Some light high wax oils will also form emulsions if high mixing energies are applied. This is one reason why it is not recommended to break up surface slicks with vessel's propeller action.
- Pour point. This is the temperature above which oil is liquid. If an oil has a pour point close to or below sea and air temperatures it may not spread or be amenable to some response strategies. This reflects an oil's wax content and asphaltene content.
- The resulting persistence of an oil is an important consideration in mounting a response, particularly in isolated areas. Non-persistent oils may not need cleanup, particularly if they are spilled a long way from sensitive resources or coastlines

The chemical and physical properties of the various oils has been assessed and the relevant data used as input into the oil fates and trajectory modelling.

Behaviour of Oils at Sea

Four oils could be spilled from commissioning and operations activities:

- Diesel fuel.

  These vary greatly in their constituents and consequent behaviour although all spread rapidly. Heavier diesels and tropical diesels may leave a significant residue after evaporative losses although these will tend to break up in the open sea.
- Lubricating oil.

  These are carried and transported in small quantities only.
- Crude oil.

  Montara crude is a medium (Group III) high pour point waxy crude (API Gravity of approximately 34.8°) with a wax content of 11.3%. A light crude oil is one with an API Gravity of between 33° and 45.5°. **Caution**: this oil poses an extreme fire hazard.
- Aviation fuel.

  Either avgas or jet fuels. These are light rapidly spreading oils.

Oil spilled at sea undergoes a number of physical and chemical changes, although the rate of change depends upon such factors as:

- The oil's initial physical and chemical characteristics
- Prevailing weather and sea conditions. Weathering is generally accelerated by:
  - High winds
  - High sea states which act to break surface oils up. However, this also promotes emulsification in some oils which reduces evaporative loss and spreading hence retarding break-up (see below)
- Whether the oil remains at sea or is washed ashore

APPENDIX F:

ESTIMATING OIL SLICKS AT SEA

GUIDE TO ESTIMATING OIL SLICKS AT SEA

Flight Plans

The first over flight of a large spill should be at 300 to 700 metres, to locate and determine its general orientation and dimensions.

Determining the colour of the oil is best made at lower altitudes. When searching for an oil slick, aircraft should undertake a "parallel track search" of the area in which the slick is considered to be located.

The longer search legs should be oriented with the direction of drift. This will maximise search effectiveness (better chance of slick detection).

Estimating Slick Volumes at Sea

Estimates of the volume of a slick can be made on the basis of its appearance at sea, and the area covered.

A trained observer must be present on surveillance aircraft to identify oil on the water or shoreline and to accurately report location to the Aerial Coordinator or Operations Officer. Photographs should be taken to aid later assessments.

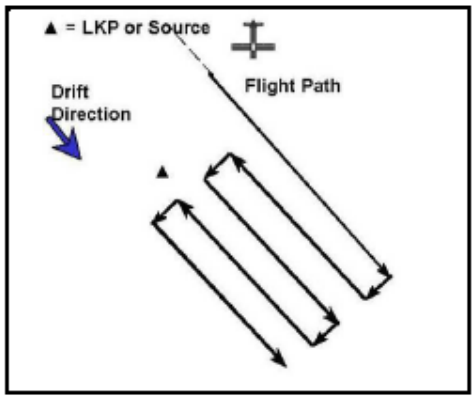


Figure I1: Parallel track search pattern

Suitably experienced observers can be identified and obtained through AMSA or AMOSC. In the long term PTTEP AA aims to train some aerial observers.

Table I1: Guidelines for estimation of slick volume

Appearance of Oil Slick	Volume of Oil per Km^2		
	m^3	Tonnes	Barrels
Barely Visible except under some light conditions	0.05	0.04	0.31
Silvery Sheen	0.10	0.09	0.43
Rainbow – Iridescence: Bright bands of colour	0.30	0.24	1.89
Dull Colours. Colours still visible but are dull	1.00	0.85	4.29
Dark Black or Brown (or very dark colour)	2.00	1.70	12.40

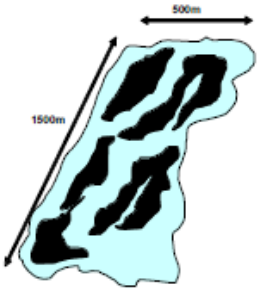
NOTES: Source Bonn Agreement.

The surface area of the slick can be estimated by:

1. Flying the length and breadth of the slick and equating the time taken to fly over the slick and the aircraft speed.
2. Calculating the slick area (i.e. length x breadth), and

3. Multiplying the area by the percentage of the slick that is oil (i.e. not clean water).
4. The areas covered by the various oil thicknesses should be calculated.
5. Calculate oil volumes using equation below.

Example of calculating slick volumes at sea



E.g: Area =1.5km x 0.5km = 0.75 sq km.
i) 40% of slick is black oil. So area of black oil is 40% of 0.75 sq km = 0.3 sq km.
ii) Using Table 6.1, volume in black oil is approximately: 2 x 0.3 = 0.6 cubic metres.
iii) 60% of slick is sheen. So area of sheen is 60% of 0.75 sq. km = 0.45 sq km.
iv) Using Table 9.1, volume of oil in the sheen is approximately: 0.05 x 0.45 = 0.0225 cubic metres.

Note that the sheen contains very little oil and estimated volume, in this example, is about 0.6 cubic metres of oil or oily emulsion.

APPENDIX G:

OPERATIONAL AND SCIENTIFIC MONITORING PROGRAM

WOOLLYBUTT OPERATIONAL AND SCIENTIFIC MONITORING PROGRAM

PR-DE	02	17/03/21	Final Issue	Advisian				Eni
Validity Status / Revision index	Rev. Number	Date	Description	Prepared by	Checked by	Approved by	Contractor Approval	Company Approval
eni australia				Project name **WOOLLYBUTT**		Company identification 000105_DV_PR.HSE.1025.000 Job N. ___		
						Contractor identification Contract ___		
Advisian Worley Group						Vendor identification …….. Order N……		
Facility Name WOOLLYBUTT			Location AUSTRALIA WA-25- LAUSTRALIA WA-25-L			Scale 1:1	Sheet of Sheets 1 / 98	
Document Title **WOOLLYBUTT OPERATIONAL AND SCIENTIFIC MONITORING PROGRAM**						Supersedes N…… Superseded by N……..		
						Plant Area	Plant Unit	

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ACRONYMS

ACRONYM	Definition
ADIOS II	Automated Data Inquiry for Oil Spills
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
APASA	Asia-Pacific Applied Science Associates
AUV	Automated Underwater Vehicle
BACI	Before After Control Impact
BAOAC	Bonn Agreement Oil Appearance Code
bbl	Barrels
BOM	Blue Ocean Marine
DPLH	Department of Planning, Lands and Heritage
Eni	Eni Australia BV
EP	Environment Plan
HSE	Health, Safety and Environment
IMP	Incident Management Plan
IMT	Incident Management Team
JSA	Job Safety Analysis
kg	Kilograms
km	Kilometres
L	Litres
LC	Lethal Concentration
LD	Lethal Dose
M-BACI	Multiple BACI
MGO	Marine Grade Oil
mg	Milligrams
mL	Millilitres
MSDS	Material Safety Data Sheet
NDVI	Normalised Difference Vegetation Index
NOSPEMA	National Offshore Petroleum Safety and Environmental Management Authority
OMP	Operational and Scientific Monitoring Program
OPEP	Oil Pollution Emergency Plan
OSMP	Operational and Scientific Monitoring Program

PPE	Personal Protection Equipment
ppb	Parts per billion
ROV	Remotely Operated Vehicle
SAP	Sampling and analysis plan
SCAT	Shoreline Clean-up Assessment Technique
SMP	Scientific Monitoring Plans
WA	Western Australia
WA DoT	Western Australian Department of Transport
ZPI	Zone of Potential Impact
µ	Micro
°C	Degrees Celsius

1. INTRODUCTION

The Operational and Scientific Monitoring Program (OSMP) is the principal plan for providing situational awareness and determining the extent, severity and persistence of environmental impacts from an oil spill and determining whether environmental protection goals are met.

ENI has prepared this OSMP for its activities in the Woollybutt field for use in the event of a Level 2 or 3 release. The OSMP provides guidance on how and when monitoring data will be collected.

1.1 Scope

In the event of a Level 2 or Level 3 hydrocarbon release or where requested by the Control Agency, a number of monitoring studies may be implemented. Operational Monitoring Plans (OMPs) may be used to inform the spill response and provide contextual information for impact assessment. Scientific Monitoring Plans (SMPs) may be used to evaluate the impacts and recovery to the marine environment. Spill levels are defined in the Woollybutt OPEP.

1.2 Zone of Potential Impact

The Zone of Potential Impact (ZPI) is based on the largest credible spill scenarios identified and modelled during the risk assessment process, these are presented in Table 1.1 along with the thresholds applied. Individual ZPIs for each of the scenarios were combined to create an overall ZPI (Figure 1.1) for the Petroleum Activities Program in the Woollybutt field.

Table 1.1: Credible spill scenarios and thresholds applied to create the ZPI

Spill scenario	Threshold applied to create the ZPI
Subsea release of Woollybutt crude due to loss of well control during P&A activities (10,589 m³ over 74 days)	Shoreline contact hydrocarbon (10 g/m²) Surface hydrocarbon (1 g/m²) Entrained hydrocarbon (100 ppb) Dissolved aromatic hydrocarbon (6 ppb)
Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m³ over 365 days)	Shoreline contact hydrocarbon (10 g/m²) Surface hydrocarbons (1 g/m²) Dissolved WAF (6 ppb) Total WAF (70 ppb)
Vessel or IV collision leading to release of (500 m³) marine diesel	Shoreline contact hydrocarbon (10 g/m²) Surface hydrocarbon (1 g/m²) Entrained hydrocarbon (100 ppb) Dissolved aromatic hydrocarbon (6 ppb)

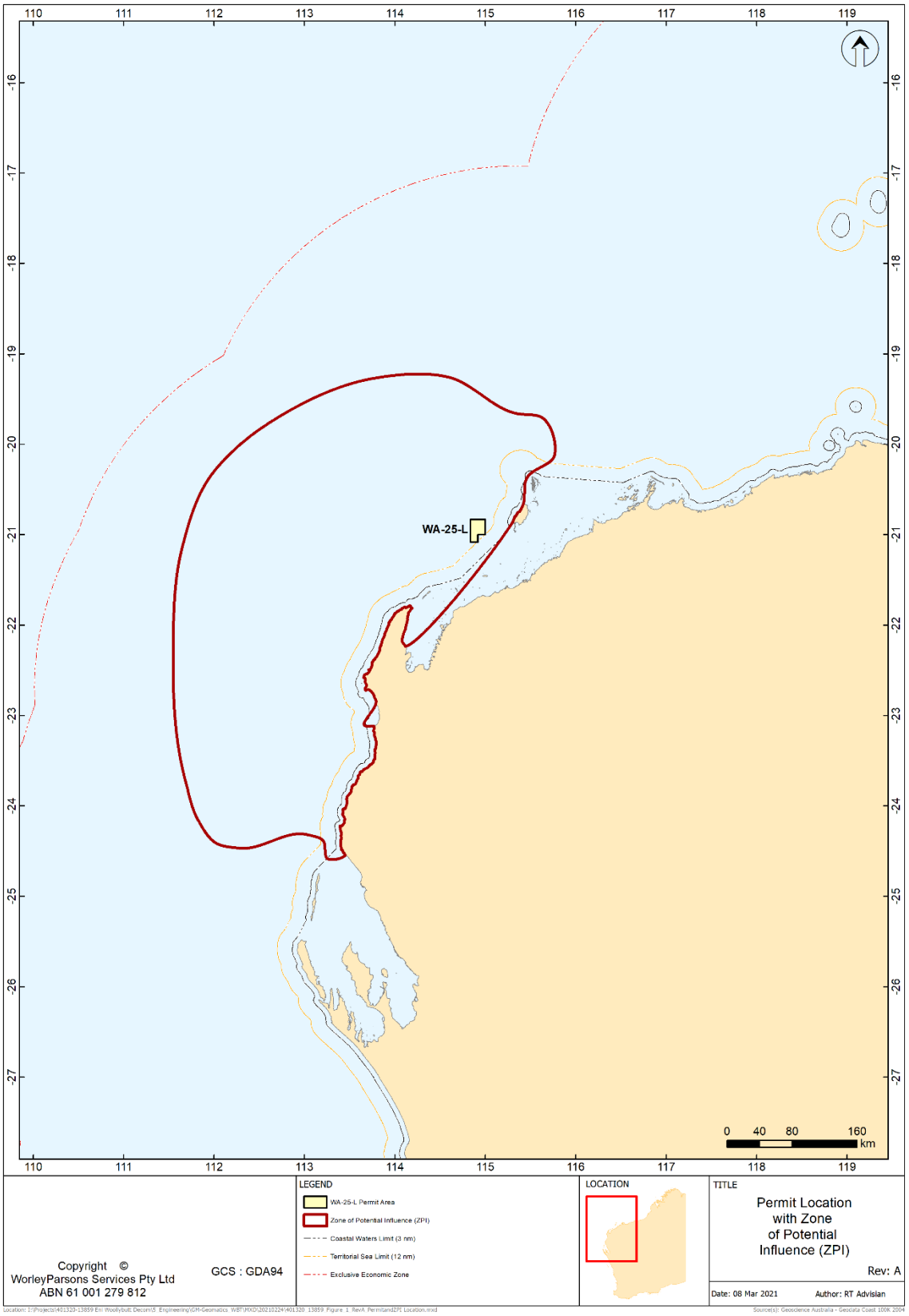

Figure 1.1: Zone of Potential Impact

1.3 Objectives

The overarching objectives of the OSMP are to:

- Guide ENI staff through the decisions and responses which will be required to monitor a spill and any environmentally sensitive receptors surrounding or in contact with the spill.
- Provide overall integrated monitoring logistics and coordination to carry out the operational monitoring studies to inform response planning/measures and scientific monitoring studies to quantify impacts to the environment and their subsequent recovery.
- Provide the strategy for each of the monitoring studies including an overview of the monitoring rationale, objectives, methodology and resources required.
- Determine the magnitude of short and long term environmental impacts associated with the spill (and its response), including the extent, severity and persistence of the impacts.
- Support the planning and execution of the hydrocarbon spill response activities set out in the OPEP.
- Inform remediation efforts, if required.
- Determine whether environmental performance outcomes have been achieved.

The objectives of each operational and scientific monitoring program vary and are presented for each program.

1.4 Operational and Scientific Monitoring

In a response to an oil spill, environmental monitoring may be operational (Type I) or scientific (Type II). Operational and scientific monitoring have very different objectives which significantly influence the monitoring methods likely to be used, the degree of scientific rigour required to meet the monitoring objectives, and the scope of studies. The type of monitoring programme implemented, however, will predominantly depend on the scale and nature of the incident and the potential sensitive receptors at risk. This OSMP consists of:

- Operational Monitoring Programs (OMPs) – aimed at obtaining situational awareness of a spill and providing information on potential impacts to environmental and socioeconomic receptors. A secondary objective of the OMPs is to assess the efficacy and potential impacts (both positive and negative) of spill response strategies.
- Scientific Monitoring Programs (SMPs) – outlines the process for conducting scientific assessment of spill impacts and the recovery of environmental and socio-economic receptors following a spill.

The objectives of each OMP and SMP are summarised in Table 1.2 (OMPs) and Table 1.3 (SMPs).

1.4.1 Operational Monitoring Programs

The following OMPs have been developed to obtain and process information regarding the nature and scale of a hydrocarbon spill and the resources at risk, so it can be acted upon as quickly as possible (Table 1.2).

Table 1.2: Operational monitoring programs

Study	Study Title	Description
OMP1	Monitoring of Surface Hydrocarbon Distribution at Sea and Visual Observation of Megafauna	The study will monitor the distribution of hydrocarbons at sea, including the extent and possible exposure to environmental receptors. This study includes: • Aerial and vessel observations • Oil spill trajectory modelling • Satellite imagery • Opportunistic observations of Marine Megafauna Opportunistic observations of marine mammals, large cartilaginous fish or marine reptiles will be recorded to help inform the oiled wildlife response and SMP1.
OMP2	Monitoring of Hydrocarbons: Weathering and Behaviour in Marine Waters	The study will obtain data on the physical and chemical properties of the hydrocarbon that is released. This will be used to inform the selection of response strategies and predict the potential impacts on the environment. This will include in situ hydrocarbon and water sampling and analysis. Data from this study will be used to assist in the determination of the extent of surface, entrained and dissolved hydrocarbons.
OMP3	Shoreline Assessment Surveys	The study will collect pre- and post-impact data for the shorelines, specifically the areas predicted to be impacted by the spill. The study will provide clean up recommendations to inform a shoreline response and data may be used to help inform SMP2 and SMP5.

1.4.2 Scientific Monitoring Programs

Scientific monitoring will provide qualitative or quantitative data for the assessment of short term and longer term impacts and recovery of sensitive receptors.

The SMPs listed in Table 1.3 have been selected as relevant for the nature and scale of hydrocarbon exposure from the releases presented in Table 1.1.

Table 1.3: Scientific monitoring programs

Study	Study Title	Description
SMP1	Wildlife Impact Monitoring and Sampling	The study will include determination of cause of death for wildlife carcasses (i.e. tissue analysis) (if any).

Study	Study Title	Description
SMP2	Shoreline Ecological Assessment Aerial Surveys	The study will collect shoreline data to evaluate the presence or absence of sensitive receptors and provide qualitative data on sensitive receptors for the assessment of impacts in SMP5.
SMP3	Assessment of Fish for the Presence of Hydrocarbons	The study will obtain data to determine the presence of hydrocarbons in fish, including species caught by commercial and subsistence fishermen. This will include in-field collection of fish species and lab analysis of the fish caught
SMP4	Fisheries Assessment	The study will collect data to assess the effects on fish and fisheries arising from the hydrocarbon spill. This will involve desktop and in-field studies.
SMP5	Shoreline Ecological Surveys	The study will obtain data to assess the impacts on and recovery of the shoreline environment. This will include ground surveys, which will be informed by SMP2.
SMP6	Hydrocarbon Fate and Effects Assessment	The study will obtain data to better understand the physical and chemical weathering of the hydrocarbon. This will be used to understand and inform the assessment of impacts on the environment and will follow on from OMP2.
SMP7	Assessment of Subtidal Benthic Communities	The study will assess the potential impacts to subtidal benthic communities through the collection of sediment samples (analysed for the presence/absence of contaminants) and seabed imagery.

Linkages between the environmental sensitivities identified in the EP and the relevant OMPs and SMPs are summarised in Table 1.4.

Table 1.4: Sensitivities to be monitored as part of the OSMP

Sensitivity	Spatial Extent	Hydrocarbon Phase	Applicable OSMP Program
Marine megafauna foraging and migration areas	Most of the megafauna species identified in the EP have the potential to occur across the ZPI and regional waters. See the Woollybutt EP (Section 4) For Zone of Potential Impact see Appendix C of the Woollybutt EP	Surface bound Entrained Dissolved	OMP1, SMP1
Commercial and recreational fish species	Commercial and recreational fishing occurs within the extent of the ZPI and hydrocarbon exposure. See the Woollybutt EP (Section 4) For Zone of Potential Impact see Appendix C of the Woollybutt EP	Surface bound Entrained Dissolved	OMP2, SMP3, SMP4
Marine avifauna foraging areas	All waters identified in the EP could function as feeding areas for seabirds and/or migratory species. See the Woollybutt EP (Section 4) For Zone of Potential Impact see Appendix C of the Woollybutt EP	Surface bound	OMP1, OMP3, SMP2
Turtle foraging and migration areas	Turtles may travel through the area. See the Woollybutt EP (Section 4) For Zone of Potential Impact see Appendix C of the Woollybutt EP	Surface bound	OMP1, OMP2, SMP1
Intertidal reefs (including coral communities, intertidal limestone pavement and macroalgae communities)	Intertidal reefs are located at: - Ningaloo Reef - Barrow/Montebello Island groups - Muiron Islands	Surface Bound, Entrained and Dissolved	OMP1, OMP2, SMP7
Submerged features	Ancient Coastline at 125 m Depth Contour KEF Continental Slope demersal fish communities KEF Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula KEF Commonwealth Waters Adjacent to Ningaloo Reef KEF Exmouth Plateau KEF	Entrained and Dissolved	OMP1, OMP2, SMP7

1.4.3 Scientific Monitoring Studies Approach

Study Design

To ensure that scientific monitoring plans can maximise the opportunities to utilise data collected from the operational monitoring programs, the Scientific Monitoring studies would be designed during the response phase.

A sampling and analysis plan (SAP) would be prepared for each activated SMP. These plans would be developed by experienced Environmental Consultants from ENI's Environmental Consultancy Panel. A Senior Environmental Consultant from ENI's Environmental Consultancy Panel would be responsible for the preparation of the SAPs. Each SAP would consider which of the below survey designs is most appropriate, with consideration given to the spill trajectory and available baseline data information.

Before After Control Impact (BACI) Study Design

BACI studies may be considered where no baseline data exists and there is sufficient time to collect baseline data prior to impact. Data must also be collected at control/reference site(s) to ensure any temporal changes can be assessed against any natural variation. Where sufficient time is available or where there is sufficient pre-existing baseline data, consideration of a Multiple BACI (M-BACI) study design should be considered, using multiple impact and reference sites with data collected over a period of time before and after impact.

Where suitable existing baseline data is available or where trajectory modelling completed as part of OMP1 shows contact is not predicted within 20 days, this survey approach may be considered.

ENI will notify relevant consultancies on the ENI Environmental Panel Contract list (Section 1.5.1) at the time of a large spill event (Level 2/3) with the potential for scientific monitoring studies to be triggered, this will allow mobilisation and monitoring to be undertaken within approximately 20 days which allows for sufficient time to source vessels/aircraft, finalise the monitoring design, prepare HSE documentation and mobilise to site.

Inference from Change Over Time

For some spills and some receptors there may not be suitable reference sites that can be considered comparable to the impact sites. Where suitable control/reference sites are not available, an Inference from Change Over Time study design should be considered. This study design is reliant on robust baseline information at sites that will be contacted from the spill. This data could be collected pre-impact where impact is not predicted until at least 20 days to allow for sufficient planning and preparation time, or where there are existing suitable baseline data sets. The data presented in Table 1.4 would be considered during the preparation of the SAP to determine whether the study can be replicated to inform an Inference from Change Over Time study design.

Inference from Change Over Space (gradient design)

This study design would be considered where limited or no pre-impact baseline data exists and data cannot be collected prior to impact. The studies would focus on representative sites at increasing distances from the source of impact (the spill). Additional temporal data may need to be considered when using this study design to account for other environmental factors (seasonality). Control or reference sites may be used in the design of these gradient based studies to help in the assessment of restoration.

Data from OMP1, OMP2 and OMP3 would be used in defining the area impacted from the spill when considering sites to assess the gradient of impact.

SAP assurance measures

A Senior Environmental Consultant from ENI's Environmental Consultancy Panel would be responsible for the preparation of the SAPs.

The following science assurance measures will be applied where appropriate to ensure SAPs are appropriate to meet the study objectives:

- Peer review;
- Input from environmental representatives from relevant State/Territory agencies.

Peer review may be used for SAPs for medium to long term studies. Peer review will be coordinated by the responsible panel consultant, who will select an expert third party provider to undertake the review, including but not limited to specialists identified in Table 1.8.

Input from environmental representatives from relevant State/Territory agencies will be sought through the IMT liaison channels where available.

SAPs will also be prepared in accordance with relevant standards and guidelines, such as the Oil Spill Monitoring Handbook (CSIRO 2016a) and Sediment Quality Assessment (CSIRO 2016b).

1.4.4 Pre Spill Assessment of Potential Study Designs and Approach

The spill modelling presented in the Woollybutt Environment Plan (000105_DV_PR.HSE.1011.000) has been considered when assessing the most suitable study design and assessing the scale of the SMPs. The modelling results have been used to complete a preliminary screening of study designs Table 1.5. These designs are subject to change dependent on the nature and scale of the actual spill.

Table 1.5: Scientific monitoring programs studies approach

Scientific Monitoring Plan	Sensitivity	Suggested study approach
SMP 1	Marine Fauna	Existing studies will be used to provide context on the existing distribution, behaviour and abundance of marine fauna. Marine fauna observations during

Scientific Monitoring Plan	Sensitivity	Suggested study approach
		and following a spill would be used to assess qualitatively whether marine fauna are demonstrating any signs of stress and whether there are any notable changes to distribution and/or abundance.
	Assessments of the cause of wildlife deaths	This study would use scientific analysis of tissue data and post mortems to determine whether wildlife deaths are caused by hydrocarbon pollution. No baseline data is required for this survey.
	Marine avifauna	Figure 5.11 of the EP shows the locations of BIAs for seabirds in relation to the ZPI. Modelling does not predict contact at impact thresholds, there is expected to be sufficient time to collect pre-impact baseline data at these BIAs in a MBACI survey design if trajectory modelling predicts impact.
SMP2	Shoreline - Aerial Surveys	Data collected as part of SMP2 would be used to inform the SAP for SMP5. Where data is collected prior to impact as part of SMP2 it may be used to inform an MBACI study. Where data is collected post impact it may be used to support a gradient survey design where there is sufficient spatial distribution of a receptor.
SMP3	Fish	A gradient survey design would be used for this study to ensure the area of impact is clearly delineated.
SMP4	Fisheries	A gradient survey design would be used for this study to ensure the area of impact is clearly determined by the study where feasible. An M-BACI study design may also be used where there is suitable pre-impact data for the fishery.
SMP5	Turtle nesting beaches	A major green turtle rookery is located on the west coast of Barrow Island within the ZPI and one of the largest known flatback turtle rookeries in WA is located along the east coast of Barrow Island. The WA loggerhead turtle population nests on mainland beaches from Carnarvon to the Ningaloo Marine Park and offshore islands from Shark Bay to the Muiron Islands (Limpus, 2009). In the event of an extended leak (over 365 days), modelling shows the potential for a maximum of 14.9 m^3 of crude to be stranded on the Ningaloo coast. A qualitative assessment of impacts to turtle nesting would be completed. This would involve a summary of all previous monitoring,

Scientific Monitoring Plan	Sensitivity	Suggested study approach
		literature and observations from the shoreline ecological surveys and analysis of sediment samples collected along impacted coastlines.
	Mangroves	The impacted shorelines are not considered to be a significant mangrove area. Isolated groups of mangroves are within the ZPI, particularly around Barrow Island and along the Ningaloo coastline. Data from aerial surveys and the SMP2 program would be used to determine the baseline health of the mangroves. This would be compared with additional aerial data (including Normalised Difference Vegetation Index (NDVI)) and onground Mangrove surveys to determine whether there has been any impact to mangrove health or distribution. Mangrove health results would be compared with the sediment data when assessing the cause and effect pathway.
SMP6	Water Quality	A gradient survey design would be used to define the area of potential impacts to water quality.
SMP7	Ancient Coastline at 125 m Depth Contour KEF Continental Slope demersal fish communities (CSDFC) KEF Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula KEF Commonwealth Waters Adjacent to Ningaloo Reef KEF	In the event of an extended leak (over 365 days), modelling shows the KEFs of the Ancient Coastline and the CSDFC were predicted to be contacted by total WAF exceeding 70 ppb. An M-BACI study design may also be used where there is suitable pre-impact data. Where impact is localised, a gradient study design may be considered for this SMP.

1.5 OMP and SMP Implementation

Table 1.6 details the contracts that ENI have in place to implement each OSMP program, along with the timeframes to implement from mobilisation.

Table 1.6: OSMP monitoring programs contracts and capability / resourcing requirements

Study	Study Title	Contracts	Timeframes	Required personnel capability / resourcing requirements
OMP1	Monitoring of Surface Hydrocarbon Distribution at Sea and Marine Megafauna Observations	AMOSC Participating Member Contract MoU for access to National Plan resources through AMSA OSRL Associate Member Contract Eni HQ The Environment Panel Contracts may be used to supplement the capability of AMSA, AMOSC and OSRL to provide materials to assist with opportunistic Marine Fauna Observations. KSAT - satellite monitoring TOLL ([redacted]) – vessels Babcock Offshore Services Australia ([redacted]) and FCM Travel Solutions ([redacted]) – aviation APASA, via AMOSC – Oil Spill Modelling	24 hours (AMOSC, OSRL personnel) 24 hours (KSAT) Visual observations from chartered vessels occur within 72 hours of mobilisation. Visual observation – from vessels of opportunity occur within 24 hours of mobilisation. Visual observation – from aircraft/ helicopter within 24 hours of mobilisation. Best endeavours for access to AUV glider via OSRL	Given the small area with any surface expression of floating oil, a single aircraft and observer are considered appropriate for mapping the floating oil distribution. Opportunistic observations of Marine Megafauna would be recorded during each aerial survey. The monitoring team would be required to consist of at least: • 1 x trained observer • 1 x person with oil spill assessment training • Vessel and aircraft operators Additional shoreline assessment teams would be mobilised as required.
OMP2	Monitoring of Hydrocarbons: Weathering and Behaviour in Marine Waters	OSRL Associate Member Contract Intertek laboratory TOLL ([redacted]) – vessels	24 hours (ORSL personnel) Best endeavours basis for access to single monitoring unit (AUV) Typically 48 hours – 5 days (Intertek access) Vessels within 24 hours of mobilisation.	A single monitoring unit (Autonomous Underwater Vehicle (AUV) equipped with fluorometer or towed fluorometry unit) is considered suitable to monitor the progressing spill front. The AUV monitoring team would be required to consist of at least: • 1 x AUV engineer to operate the AUV and support data integration into a response (the engineer would be sourced from the AUV provider); and • 1 x vessel and crew for AUV deployment. OR • 1 x OSRL personnel to operate the OSRL fluorometry unit; and • 1 x vessel and crew for towing the fluorometry unit. Additional water quality analysis equipment may be sourced from ENI's laboratory services provider, Intertek. For further information refer to Section 5.9 (Logistics). Vessels and Aircraft are accessed as per Section 3.
OMP3	Shoreline Assessment Surveys	AMOSC Participating Member Contract MoU for access to National Plan resources through AMSA OSRL Associate Member Contract TOLL ([redacted]) – vessels	Onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact). Best endeavours basis for access to single monitoring unit (UAV)	A single response team may cover approximately 2km per day. Initial team would consist of: • 1 x shoreline assessment team lead / shoreline clean-up specialist; and • 2 x shoreline surveyors. Additional shoreline assessment teams would be mobilised as required, by the control agency. Specifics and further details on the personnel resource requirements are detailed in Section 6.9

Study	Study Title	Contracts	Timeframes	Required personnel capability / resourcing requirements
		Babcock Offshore Services Australia ([redacted]) and FCM Travel Solutions ([redacted]) – aviation	Vessels and aircrafts within 24 hours of mobilisation.	For further information on equipment requirements refer to Section 6.7 Refer to Section 6.8 for logistic required for this OMP. Vessels and Aircraft are accessed as per Section 3.
SMP1	Wildlife Impact Monitoring and Sampling	Environmental Panel Contracts and ability to contract third party specialists TOLL ([redacted]) – vessels Babcock Offshore Services Australia ([redacted]) and FCM Travel Solutions ([redacted]) – aviation	N/A. Contracting timeframe as per Section 1.5.2 Vessels and aircrafts within 24 hours of mobilisation.	Given the nature and scale of a spill, one wildlife monitoring team (2 x MFOs) would be mobilised to conduct daily marine fauna observations for a period of at least one month. A vet would also be contracted to complete post mortems and respond to reports of Marine Fauna fatalities. The MFOs may be aboard the response vessel/s or aircraft/s. Specifics and further details on the personnel resource requirements are detailed in Section 7.9 For further information on equipment requirements refer to Section 7.7 Refer to Section 7.8 for logistic required for this SMP. Vessels and Aircraft are accessed as per Section 3.
SMP2	Shoreline Ecological Assessment Aerial Surveys	Environmental Panel Contracts and ability to contract third party specialists OSRL Associate Member Contract Babcock Offshore Services Australia ([redacted]) and FCM Travel Solutions ([redacted]) – aviation	N/A. Contracting timeframe as per Section 1.5.2 Aircrafts within 24 hours of mobilisation. Best endeavours basis for access to Drone / AUV through OSRL.	Initial shoreline monitoring team would be required consisting of: • 1 x Drone operator (where the drone is soured through the Environmental Panel Contracts); • 1 x Environmental Consultant for fieldwork; • 1 x Environmental Consultant for reporting; and • 1 X GIS specialist. • 1 x subject matter expert selected from Table 1.8 or other suitable provider. Additional shoreline monitoring teams would be mobilised as required, by the control agency. The OSRL unmanned aerial vehicle (UAV) team would consist of the following additional personnel • 1 x experienced UAV pilot; • 1 x Sensor operator; and • 1 x OSRL response specialist. Specifics and further details on the personnel resource requirements are detailed in Section 8.9 For further information on equipment requirements refer to Section 8.7 Refer to Section 8.8 for logistic required for this SMP. Aircraft are accessed as per Section 3.
SMP3	Assessment of fish for the presence of hydrocarbons	Environmental Panel Contracts and ability to contract third party specialists Intertek laboratory TOLL ([redacted]) – vessels	N/A. Contracting timeframe as per Section 1.5.2 Typically 48 hours – 5 days (Intertek access) Vessels within 24 hours of mobilisation.	The team for SMP3 would consist of the following personnel. The field team would require experience in the handling of samples for analysis of environmental impacts: • 2 x Environmental Consultants for fieldwork • 1 x Environmental Consultant for reporting • 1 x laboratory for analysis • 1 x subject matter expert selected from Table 1.8 or other suitable provider Specifics and further details on the personnel resource requirements are detailed in Section 9.8. For further information on equipment requirements refer to Section 9.7 Refer to Section 3 for logistic required for this SMP and vessel access.

Study	Study Title	Contracts	Timeframes	Required personnel capability / resourcing requirements
SMP4	Fisheries Assessment	Environmental Panel Contracts and ability to contract third party specialists Intertek laboratory TOLL ([redacted]) – vessels	N/A. Contracting timeframe as per Section 1.5.2 Typically 48 hours – 5 days (Intertek access) Vessels within 24 hours of mobilisation.	The team for SMP4 would consist of the following personnel: • 2 x Environmental Consultants for fieldwork • 1 x Environmental Consultant for reporting • 1 x Vessel and trawl equipment • 1 x laboratory for analysis • 1 x subject matter expert selected from Table 1.8 or other suitable provider. Specifics and further details on the personnel resource requirements are detailed in Section 10.9. For further information on equipment requirements refer to Section 10.7. Refer to Section 10.8 for logistic required for this SMP. Vessels are accessed as per Section 3.
SMP5	Shoreline Ecological Surveys	Environmental Panel Contracts and ability to contract third party specialists TOLL ([redacted]) – vessels Thamarrurr Rangers	N/A. Contracting timeframe as per Section 1.5.2 Vessels within 24 hours of mobilisation. Best endeavours basis for participation of Traditional Owners	Given the scale of shoreline contact, one shoreline monitoring team would be required consisting of: • 2 x Environmental Consultants for fieldwork • 1 x Environmental Consultant for reporting • 1 x small vessel for shoreline access • 2 x Traditional Owners to facilitate site access (depending on impact area, consultation and availability). • 1 x subject matter expert selected from Table 1.8 Specifics and further details on the personnel resource requirements are detailed in Section 11.9 For further information on equipment requirements refer to Section 11.7 Refer to Section 11.8 for logistic required for this SMP. Vessels are accessed as per Section 3.
SMP6	Hydrocarbon Fate and Effects Assessment	OSRL Associate Member Contract Environment Panel Contracts TOLL ([redacted]) – vessels	N/A. Contracting timeframe as per Section 1.5.2 Vessels within 24 hours of mobilisation.	The team completing the scope of works for OMP2 would continue to monitor water quality using a sea glider or fluorometry unit. The team would consist of: • 1 x AUV engineer to operate the AUV and support data integration into a response (the engineer would be sourced from the AUV provider); and • 1 x vessel and crew for AUV deployment. OR • 1 x OSRL personnel to operate the OSRL fluorometry unit; and • 1 x vessel and crew for towing the fluorometry unit Specifics and further details on the personnel resource requirements are detailed in Section 12.9.11.9 For further information on equipment requirements refer to Section 12.7. Refer to Section 12.8 for logistic required for this SMP. Vessels are accessed as per Section 3.
SMP7	Subtidal habitat assessment	Environmental Panel Contracts and ability to contract third party specialists	N/A. Contracting timeframe as per Section 1.5.2 Vessels within 24 hours of mobilisation.	A single team is considered appropriate to implement a gradient monitoring design assessing potential impacts to the submerged features of the KEFs. The team would consist of: • 2 x Environmental Consultants for fieldwork

Study	Study Title	Contracts	Timeframes	Required personnel capability / resourcing requirements
		TOLL ([redacted]) and ability to contract third party providers – vessels, ROV, divers	Best endeavours for ROV, divers and other ancillary services.	• 1 x Environmental consultant for reporting • 1 x vessel with ROV and operators • 1 x commercially qualified diver team (if required) • 2 x towed/drop camera unit • 2 x sediment grabs • 1 x subject matter expert selected from Table 1.8 Specifics and further details on the personnel resource requirements are detailed in Section 13.10. For further information on equipment requirements refer to Section 13.8. Refer to Section 13.9 for logistic required for this SMP. Vessels are accessed as per Section 3.

1.5.1 Environmental Panel Capability

The ENI Environmental and Social Impact Consultancy Services Panel ([redacted]) provides an existing framework for immediate engagement of an Environmental Service Provider.

ENI will ensure they have an agreed contract with an Environmental Service Provider capable of supplying personnel to support the OSMP throughout the life of the EP. The number of panel contract providers and capability may vary over the five years of the EP but as a minimum the contract will include access to the capability outlined Table 1.6.

The total required number of personnel to implement this OSMP will be dependent on the nature and scale of the spill, however to implement all scientific monitoring plans concurrently, eleven field personnel would be required, based on the total personnel detailed in Table 1.6. Maintaining a panel with the minimum requirements outlined in Table 1.7 ensures access to at least two senior environmental professionals to develop the SAPs required to implement the SMPs and to manage the implementation of the SMPs. Maintaining access to at least eleven environmental professionals across the panel ensures access to enough consultants to complete the initial field programs required to be implemented by ENIs panel contractors.

Additional support to manage and assist with the implementation of each SMP may be contracted as required depending on the nature and scale of the spill. If additional resources are required, ENI would either contract these directly or request additional resources through the Environmental Panel Contract.

Table 1.7: Environmental Panel Capability

Minimum Requirements	Ability to deliver or contract the following services
Access to a Marine Sciences team with demonstrated experience of conducting marine environmental surveys including: • Marine sediment sampling surveys • Water quality surveys • Mangrove monitoring surveys • Project management of large marine sciences scopes The combined Marine Sciences team has at least eleven (11) Environmental professionals in Australia with an Environmental-based degree, plus at least one GIS professional. Has at least 2 Senior personnel with an Environmental based degree and 12+ years' experience, with demonstrated	Access to a marine sciences team that has the ability to deliver/manage/subcontract the following services: • Fisheries assessments • Shorebird surveys • Turtle monitoring programs • Shoreline ecological assessments • Subtidal habitat assessment

Minimum Requirements	Ability to deliver or contract the following services
environmental study design and implementation experience.	
SMP1 – Wildlife Impact Monitoring and Sampling	
• 2 x MFOs	• 1 x vet • Relevant subject matter experts
SMP2 – Shoreline Ecological Assessment Aerial Surveys SMP5 - Shoreline Ecological Surveys	
• 2 x Environmental Consultant for fieldwork; • 1 x Environmental Consultant for reporting; and • 1 X GIS specialist.	• 1 x subject matter expert
SMP3 - Assessment of fish for the presence of hydrocarbons SMP4 - Fisheries Assessment	
• 2 x Environmental Consultants for fieldwork • 1 x Environmental Consultant for reporting	• 1 x laboratory for analysis • 1 x subject matter expert
SMP6 - Hydrocarbon Fate and Effects Assessment	
• 1 x Environmental Consultant for fieldwork / reporting	• Field monitoring equipment and additional consultants
SMP7 - Subtidal habitat assessment	
• 2 x Environmental Consultants for fieldwork • 1 x Environmental consultant for reporting	• Field monitoring equipment, including towed/drop camera units, sediment grabs • 1 x subject matter expert

1. AUV, UAV and operators are available through OSRL master service agreement held by Eni
2. Traditional Owner involvement will be facilitated by Eni
3. Vessels, ROV and divers are available through Eni logistics contracts.

An annual audit of ENI's environmental panel contract capability will be completed against the capability listed in Table 1.7 to ensure capability is maintained over the period of the EP.

1.5.2 Contract timeframes

ENI have OSRL and AMOSC contracts in place with guaranteed response timeframes and availability for OMP1 and OMP 3.

The environmental panel will be available and engaged based on 'best endeavours' and typical contracting/procurement timeframes. Typically ENI are able to raise a Purchase Order within the environmental panel within 2-3 days. In emergency situations, the turnaround time for a Purchase Order can be within 1 day. Once a PO is raised mobilisation of the resource is likely to be within 2-3 days.

In the event of a well blowout or diesel release, shoreline impact is not anticipated. In the event of a well leak, shoreline accumulation is a gradual process due to the nature of a slow leak, with low level hydrocarbons accumulating over time. Given the spill size, a large scale response is not required. The contract times detailed above are not considered limiting to the response endeavours.

ENI have the ability to contract third party scientific monitoring specialists, through the environmental panel contractors. Subcontracts through the environmental panel will be executed on a best endeavours basis. Typically a PO can be raised by an environmental panel contractor within one week when an existing contract exists with the third party contractor.

ENI or the environmental panel would contract third party scientific monitoring specialists as identified in Section 1.5.3.

1.5.3 Third party scientific monitoring support

ENI have also identified third party scientific monitoring specialists, as identified in Table 1.8. Where required, ENI may engage them directly or through an Environmental Service Provider.

Table 1.8: Third party scientific monitoring specialists

Study	Study Title	Supplementary capability	Company and Contact Details	Names of specialists and Demonstrated Experience
SMP1	Wildlife Impact Monitoring and Sampling	Marine Fauna Observation Studies and studies into the death of marine fauna	[redacted]	[redacted]
SMP2	Shoreline Ecological Assessment Aerial Surveys	Drone providers capable of surveying, including NDVI assessments	[redacted]	[redacted]
SMP3	Assessment of fish for the presence of hydrocarbons	Analysis to determine the presence of hydrocarbons in fish, including species caught by commercial and	[redacted]	[redacted]

Study	Study Title	Supplementary capability	Company and Contact Details	Names of specialists and Demonstrated Experience
		subsistence fishermen. This will include in-field collection of fish species and lab analysis of the fish caught	[redacted]	[redacted]
SMP4	Fisheries Assessment	Subject matter experts to collect data to assess the effects on fish and fisheries arising from the hydrocarbon spill. This will involve desktop and in-field studies.	[redacted]	[redacted]
SMP5	Shoreline Ecological Surveys	**Capability available within environmental panel.** Additional providers identified to provide supplementary expertise and personnel where required.	[redacted]	[redacted]

Study	Study Title	Supplementary capability	Company and Contact Details	Names of specialists and Demonstrated Experience
SMP6	Hydrocarbon Fate and Effects Assessment	The study will obtain data to better understand the physical and chemical weathering of the hydrocarbon. This will be used to understand and inform the assessment of impacts on the environment and will follow on from OMP2.	[redacted]	[redacted]
SMP7	Assessment of subtidal benthic communities	**Capability available within environmental panel.** Additional providers identified to provide supplementary expertise and personnel where required.	[redacted]	[redacted]

2. RISK ASSESSMENT AND DATA MANAGEMENT

Risk assessment, data management and quality assurance and control must be considered for **ALL** operational and scientific monitoring programs.

These considerations are described below.

2.1 Risk Assessment, Occupational Health and Safety Considerations

It is essential that the appropriate personal protective equipment (PPE) always be worn during a response. The PPE requirements may vary with work location and the type of survey work undertaken. A minimum requirement will be the use of appropriate sun protection (including head gear) and long sleeves and pants.

2.1.1 Vessel Surveys

Vessel fieldwork must consider health and safety risks associated with marine activities. ENI's safety management processes should be followed in a spill response situation, including aspects of:

- risk management (permit to work, Job Safety Analysis [JSA]);
- marine safety;
- occupational hygiene (PPE).

All personnel should be aware of the limitations and safe operating procedures of all equipment used in the response operation. This should, where necessary, involve a risk assessment and the development of a site-specific health and safety plan, including details for induction and briefing procedures. Examples of hazards to be considered are:

- access, e.g. to and from location;
- exposure, e.g. ingestion of hydrocarbons;
- inhalation of toxic components;
- heat stress;
- manual handling;
- ignition sources and fuel source;
- skin contact with oil and other chemicals – resulting in a possible degreasing effect on skin tissue and inflammation of skin. Prolonged or repeated skin contact may result in dermatitis as well as increased body uptake of some crude oil components. Increased sensitivity to oils can also occur as a result of repeated exposures.

2.1.2 Aerial Surveys

Aerial survey work must consider health and safety risks associated with monitoring activities. ENI's safety management processes should be followed in a spill response situation, including aspects of:

- risk management (permit to work, JSA);

- aerial safety;
- occupational hygiene (Material Safety Data Sheet [MSDS], PPE).

All personnel should be aware of the limitations and safe operating procedures of all equipment used in the response operation. This should, where necessary, involve a risk assessment and the development of a site-specific health and safety plan, including details for induction and briefing procedures. Examples of hazards to be considered are:

- access, e.g. weather forecast;
- heat stress;
- manual handling.

2.2 Data Management and QA/QC

Monitoring is likely to result in data generated from a number of sources in a number of different formats:

- logs and forms;
- photographs and video recordings (digital);
- annotated maps;
- portable GPS/GIS units.

Management of the generated data requires extensive data storage, analysis, backup and archiving. Samples should be treated as legal evidence and secured against loss or tampering. Data records and results of analysis should be delivered to [redacted] and [redacted]. Copies of data sheets and analysis should be archived by ENI Document Control ([redacted]).

3. LOGISTICS

3.1 Vessel Mobilisation

The IMT Leader has authorisation to request the mobilisation of AMSA and AMOSC resources, including vessels and aircraft.

ENI may also engage vessel operators and owners in WA to charter suitable vessels through TOLL.

The vessel specifications should allow for the coverage of the required sampling area, safe access to water for sampling and sufficient deck space for storage of field equipment and samples.

Table 3.1: Vessel contracts contact details

Company	Function	Contact Details
TOLL	ISS emergency response	[redacted]
	Reception	[redacted]
	Logistics – Support	[redacted]

3.2 Aircraft Mobilisation

The IMT Leader has authorisation to request the mobilisation of AMSA and AMOSC resources, including vessels and aircraft.

ENI also has contracts in place to charter helicopters from Babcock and aircraft from Air North via FCM Travel Solutions. Contact details are listed in Table 3.2. Aerial surveillance can be mobilised within 24 hours.

Table 3.2: Aerial contracts contact details

Company	Contact Details
Babcock Offshore Services Australia Mungalalu/Truscott Airfield WA (Contract in place)	[redacted]
FCM Travel Solutions	[redacted]

3.3 Permit requirements

OSMP field sampling and monitoring activities may be undertaken in Commonwealth waters (>3NM from shore) and WA state waters (<3NM from WA coast).

Permits that may be required for field monitoring activities are outlined in Table 3.3.

Table 3.3: Commonwealth and state permit requirements for field monitoring activities

Permit	Relevance	Legislation and Agency	Remarks
Commonwealth			
General Permit Application for: • Threatened species and ecological communities • Migratory species • Whales and dolphins • Listed marine species	Required for scientific sampling of matters listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	EPBC Act Department of the Environment and Energy	It would also be beneficial to apply for an exemption from Part 13 permitting requirements under section 303A of the EPBC Act. The Minister would then consider whether it is in the national interest to grant an exemption. The EPBC Act provides that certain actions are not offences and, therefore, would not require a permit. However, the survey(s) (i.e. 'the action') would need to satisfy one of the criteria set out at section 197 and it is not immediately apparent that it would do so. If it did, there would still be a requirement to notify the Secretary if the action was taken.
Access to Biological Resources in a Commonwealth Area for Non-commercial Purposes	An applicant must obtain written permission from each Access Provider. The Access Provider must state permission for the applicant to: • enter the Commonwealth area • take samples from the biological resources of the area • remove samples from the area.		

Permit	Relevance	Legislation and Agency	Remarks
Western Australia			
Application for an exemption to collect aquatic organisms (alive or dead) for commercial purposes, including: • the eggs, spat, spawn, seeds, spores, fry, larvae or other source of reproduction or offspring of an aquatic organism (including plants and algae), and • a part only of an aquatic organism, including the shell or tail. Exclusions from permit requirements include aquatic mammals, aquatic reptiles, aquatic birds, amphibians or (except in relation to Part 3 and Division 1 of Part 11) pearl oysters	Exemption under Section 7(2)(b) of the Fish Resources Management Act 1994	Fish Resources Management Act 1994 Department of Primary Industries and Regional Development (DPIRD)	Required anywhere in WA State waters and out to 200 nautical miles (NM). In the event that OSMP sampling was required within WA state waters, DPIRD may either consider expediting the application process or providing a ministerial exemption
• Application for a licence to take (i.e. capture, collect, disturb or study) fauna for scientific purposes (Regulation 17), and/or	Fauna means: • any animal indigenous to any State or Territory of the Commonwealth or the territorial waters of the Commonwealth	Wildlife Conservation Act 1950	Required in WA State waters to three nm, and for collection of biological resources in Commonwealth waters requiring transit through WA state waters. Permits require nomination of a person in charge who must be on site during sampling. Due to the potential for shift rotations during the permitted period, it is recommended that

Permit	Relevance	Legislation and Agency	Remarks
• application form for a Scientific or Other Prescribed Purposes Licence to take protected flora from Crown Land for noncommercial purposes (CLM59)	• any animal that periodically migrates to and lives in any State or Territory of the Commonwealth or the territorial waters of the Commonwealth. The Act specifically refers to licensing the taking of protected fauna. However, it is recommended to have this in place for collection of any fauna should any protected fauna be inadvertently collected	Department of Biodiversity, Conservation and Attraction (DBCA)	separate permits be obtained for party chiefs/Field leads involved (where multiple names cannot be included in a single permit). In the event that OSMP sampling was required within WA state waters, DBCA may either consider expediting the application process or providing a ministerial exemption
Entry Permits for access to Aboriginal Land, and requirements for disturbance or relocation of Aboriginal Heritage sites	Legally required for transit through an Aboriginal Reserve, under Part II of the Aboriginal Affairs Planning Authority Act 1972 Natural Heritage Listed places are protected under the EPBC Act. Assessment under this Act may be required for any disturbance to the values for which these areas were listed (e.g. Aboriginal Heritage). Removal, relocation or	• Aboriginal Affairs Planning Authority Act 1972 • EPBC Act • Aboriginal Heritage Act 1972 Department of Planning, Lands and Heritage (DPLH)	A Section 18 permit may take in excess of 18 months to obtain under normal conditions

Permit	Relevance	Legislation and Agency	Remarks
	interference with Aboriginal Heritage objects or sites requires Ministerial approval under Section 18 of the Aboriginal Heritage Act 1972 (via DPLH) The DPLH maintains a register of Aboriginal sites, which can be accessed via the enquiry system at www.daa.wa.gov.au		
Equipment-specific exemptions (all states and Commonwealth waters)			
Fisheries exemption for use of sub-legal mesh sizes	For demersal fish populations studies (including juveniles) as part of scientific monitoring	Local regulations (e.g. the Fisheries Management (South East Trawl Fishery) Regulations) made under the Fisheries Management Act 1991 Relevant Fisheries Departments	

4. OMP1 – MONITORING OF SURFACE HYDROCARBON DISTRIBUTION AT SEA AND VISUAL OBSERVATION OF MEGAFAUNA

4.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if it is determined that the spill is Level 1, Level 2 or Level 3 (as defined in Table 3.1 of the OPEP)*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency)*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

4.2 Monitoring Rationale

The spatial and temporal extent of hydrocarbon distribution in the marine environment will be determined after a hydrocarbon spill. Information on the distribution of hydrocarbons provides the details necessary to assist in selecting appropriate response strategies and determining resource requirements. Additionally, wildlife present in the area will be determined to assess what species are likely to be affected during a spill. The distribution of hydrocarbons simulated in models can further assist with the selection of appropriate response strategies and the required resources through predicting the spill trajectory pathway.

The purpose of OMP1 is to locate and confirm a reported hydrocarbon spill and record any opportunistic observations of marine mammals, large cartilaginous fish or marine reptiles. Monitoring during the operations phase will focus on identifying and qualifying the marine wildlife at risk and identify if strategies to manage and mitigate this risk are required. If confirmed, monitoring should focus on the movement of the spill to determine what resources/receptors are likely to be affected (at risk) and may require protection or clean-up, and to guide response and recovery operations. This will be achieved by assessing hydrocarbon spill trajectory using modelling tools and rapidly collecting data to verify the actual distribution of the hydrocarbon spill (size and movement) in real time, including satellite imagery, vessel and aerial based surveys where appropriate.

4.2.1 Objectives

The objectives of this OMP are to:

- evaluate the spatial extent of a hydrocarbon spill (spatially and temporally) via satellite imagery;
- track the movement of the hydrocarbon spill;
- if necessary, identify areas of potential shoreline contact and sensitive resources/ environmental receptors at risk to enable timely prioritisation of protection priorities to guide the management and execution of hydrocarbon spill response operations.
- record any observations of marine mammals, large cartilaginous fish or marine reptiles.

4.3 Resources Available

See Table 4.1 for available resources. Provider mobilisation is summarised in Section 1.5.

The IMT Leader has authorisation to request the mobilisation of AMSA, AMOSC or OSRL resources if required or requested by the Control Agency.

Environmental service providers from ENIs Environmental Panel Contracts (Section 1.5.1) may also be mobilised to support the identification of environmental resources at risk during an ongoing response.

Visual observation will be sought from vessels of opportunity within 24 hours of mobilisation.

Table 4.1: Resources available for OMP1

Resource	Provider	Timeframe
OSTM	APASA, via AMOSC – Oil Spill Modelling Eni HQ OSRL	24 hours (available 24/7)
	National Plan resources through AMSA	As per National Plan
Satellite monitoring	KSAT AMOSC OSRL Eni HQ	24 hours (available 24/7)
Unmanned aerial vehicle (UAV)	Various UAV providers via OSRL	Best endeavours
Vessels	TOLL ([redacted])	Visual observations from chartered vessels occur within 72 hours of mobilisation.
Aircraft	Babcock Offshore Services Australia [redacted] FCM Travel Solutions [redacted]	Visual observation – from aircraft/ helicopter within 24 hours of mobilisation.
Aerial surveillance trained observer	AMOSC OSRL	24 hours (personnel)
	National Plan resources through AMSA	As per National Plan

4.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when the following are met:

- The source of the spill is contained, i.e. no more hydrocarbons entering the environment.
- Oil is no longer observed (as described by the Bonn Agreement Oil Appearance Code-BAOAC) at rainbow or metallic sheen or discontinuous or continuous true oil colour. Hydrocarbon thicknesses below these thresholds indicate that the thickness is less than 0.3 microns and poses little threat of harm to environmental receptors.
- OSTM indicates entrained hydrocarbons are below the 100 ppb threshold and that sensitive receptors are not under threat.
- Relevant stakeholders (e.g. WA DoT) agree that no further impacts to shorelines or marine megafauna are likely to be observed.

4.5 Predictive Modelling to Assess Resources at Risk

Accurate and timely detection of hydrocarbon impacts will depend on a good understanding of the actual and predicted slick trajectory and fate estimates (weathering) of the hydrocarbon.

Data input on the various parameters in the model are to assume a 'worst-case' so as to overestimate the possible locations of the hydrocarbon spill. Spill trajectories can be updated and re-analysed with Metocean forecasts.

Manual input data to be provided for modelling includes:

1. spill release point (latitude and longitude or easting and northing)
2. spill start date and time
3. manual wind speed/direction and sea temperature
4. hydrocarbon type and grade (hydrocarbon name; American Petroleum Institute [API]; specific gravity; pour point; wax content; sulfur content) – this information is available in the EP
5. estimated spill release rate and volume (instantaneous or total; continuous release).

Geo-referenced surveillance information and observations from the spill scene should be used to update the model daily. This will include details from satellite imagery on the spatial extent and forecast meteorological data.

4.5.1 Metocean Data

Information on weather conditions – i.e. prevailing winds and currents from Metocean office; relevant tidal and current station data; sea state; temperature;

visibility/precipitation, etc. – will be provided to ENI's modelling contractor and can be obtained from:

- Metocean data
  - http://imos.aodn.org.au/imos/.
- real-time meteorological data:
  - www.bom.gov.au/wa/observation
  - www.eldersweather.com.au/wa
  - www.transport.wa.gov.au/imarine/19138.asp.

4.5.2 Mobilisation of Predictive Modelling

OSTM will be undertaken on an initial and daily basis through AMOSC by a third-party contractor (i.e. APASA). ENI Headquarters in Milan, Italy, also has capability to undertake oil spill trajectory modelling.

Oil weathering modelling can be undertaken using the Automated Data Inquiry for Oil Spills (ADIOS) model developed by the US National Oceanographic and Atmospheric Administration. ADIOS can be operated by ENI's Environmental Advisor. To run the model, inputs are required about oil type, volume, weather conditions, water properties and release type (e.g. instantaneous or continuous). Further information on ADIOS can be found at:

<http://response.restoration.noaa.gov/oil-and-chemical-spills/oilspills/responsetools/adios.html>

4.6 Satellite Monitoring to Detect Resources at Risk

ENI has contracted KSAT to provide satellite monitoring for its operations.

KSAT provide high fidelity photographs using different spectrums to identify the trajectory of the oil. In case of a spill reported to KSAT by Eni, KSAT will activate its Emergency Response Team that is targeted to be assembled within 24 hours. Contact details are outlined in Table 4.2.

Table 4.2: Satellite monitoring contact details

Company	Contact Details
KSAT	[redacted]

4.7 Vessel Survey

Prior to the arrival of aircraft for aerial surveillance, vessels at the scene or vessels of opportunity will be used to provide initial observational data.

If required, the IMT Leader has authorisation to request the mobilisation of AMSA resources, including vessels. A vessel will be deployed within 72 hours. Refer to Section 3 for deployment of vessels.

Vessels will be instructed to follow the leading edge of the hydrocarbon slick.

4.8 Unmanned Aerial Vehicle (UAV)

UAVs can utilise multiple sensors including Visual (HD), Infrared, and Ultraviolet to support a response and can provide real-time monitoring of the spill.

UAVs can be mobilised through contacting OSRL and are available on a best endeavours basis and dependent upon obtaining permission to fly and availability of the UAV suppliers to respond.

4.9 Aerial Survey

Aerial reconnaissance surveys will use either a rotary or fixed wing aircraft to track and monitor the spill movement. ENI has contracts in place to charter helicopters. Contact details are outlined in Section 3. Aerial surveillance will be mobilised within 24 hours.

Flight paths will be confirmed prior to each flight and will be planned to start and finish within daylight hours for clear observation of the sea surface. A flight plan will be prepared in advance and agreed with the pilot and relevant authorities and take account of any information that will reduce the search area (i.e. last known sighting and expected trajectory of the oil). The search altitude is likely to be determined by the prevailing visibility, but as a guide from ITOPF (2011):

- clear conditions over the open ocean should set altitude at 300–450 m;
- clear conditions close to shore, 120–150 m assuming no restrictions.

The surveys will continue until the termination criteria are reached. The control agencies IMT will be responsible for flight timetabling and flight paths.

Trained aerial observers can be mobilised through AMOSC. A trained AMOSC aerial observer should:

- confirm the location of the spill using ladder or spiral search paths (see Figure 4.1);
- quantify the amount of oil on the water and verify the results from modelling.

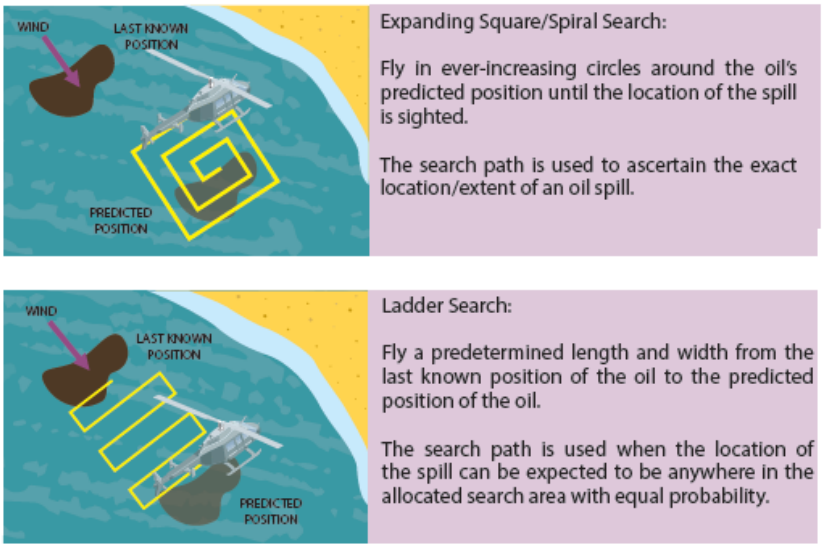

Figure 4.1: Flight search patterns (OSRL, 2011)

Photographs or video should be taken during the aerial survey to record the hydrocarbon spill. Where possible, features such as ships and the coastline should be included to provide an estimate of scale. The photographer should follow these guidelines:

- take photograph as vertically as possible (53°);
- use the shortest exposure time (1/250 or faster);
- overlap photographs by about 20%;
- use a polarised filter to reduce the brilliance of the surface of the water.

Figure 4.2 provides a visual representation of the spill quantification procedures.

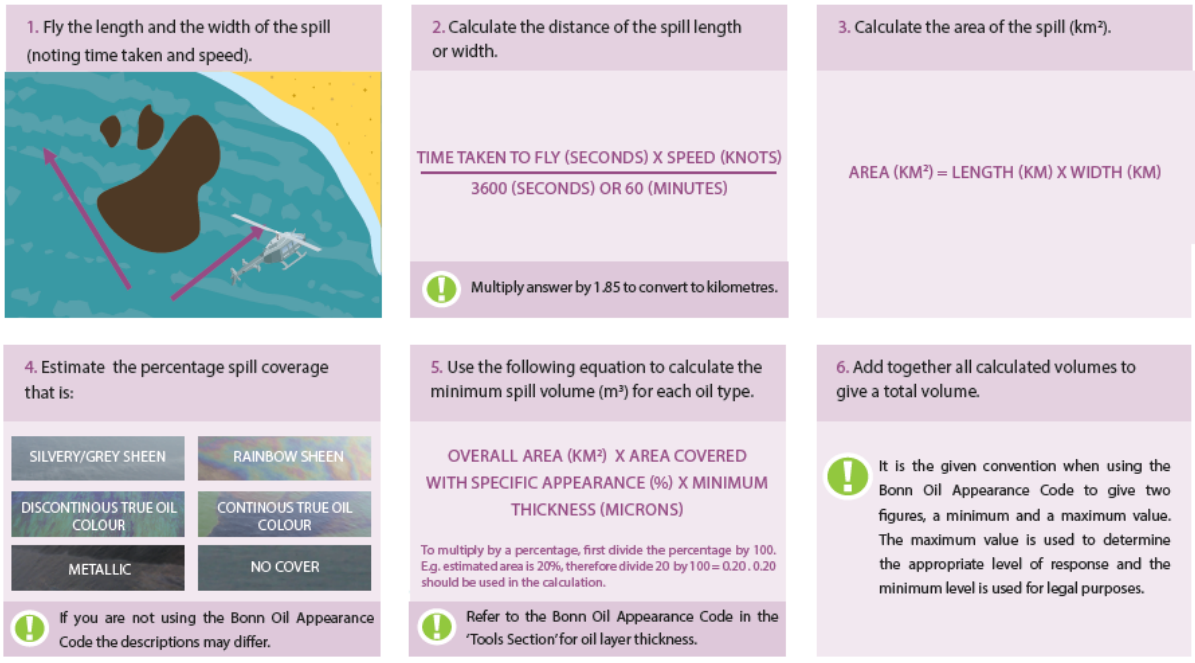

Figure 4.2: Spill quantification procedure (OSRL, 2016)

Observations will be recorded via a standard aerial surveillance observer log (Figure 4.3) and include:

- day, time, observer name, altitude, visibility;
- location and extent, latitude and longitude using a global positioning system (GPS) for location;
- colour of oil slick or sheen: using Bonn Agreement Oil Appearance Code (see Figure 4.4);
- character: i.e. windrow, slick, patch, streak (use consistent descriptive phrases throughout);
- features, e.g. leading edge;
- coverage, percent coverage description (see Figure 4.5).

REPORTING AUTHORITY	AIRCRAFT REG	MISSION No	CAPTAIN	CO PILOT	OPERATOR	OBSERVER	DAY	DATE	MONTH	YEAR

FLIGHT TYPE	ROUTE / AREA				TIME OVER THE SEA DAY		TIME OVER THE SEA NIGHT		TOTAL TIME OVER THE SEA	
					hrs	mins	hrs	mins	hrs	mins

No	AREA CODE	TIME UTC	POSITION		DIMENSIONS		AREA COVER	OILED AREA	OIL APPEARANCE COVERAGE (PERCENTAGE - %)						MINIMUM VOLUME	MAXIMUM VOLUME	COMBAT
			LATITUDE 'NORTH'	LONGITUDE 'EAST/WEST'	LENGTH Km	WIDTH Km	%	Km^2	1	2	3	4	5	Oth	m^3	m^3	Y / N

No	POLL TYPE	DETECTION						PHOTO	VIDEO	FLIR	WEATHER					REMARKS
		SLAR	IR	UV	VIS	MW	LF	Y / N	Y / N	Y / N	WIND	CLOUD	VIS	SEA	Wx	
											°	FT				
											°	FT				
											°	FT				
											°	FT				
											°	FT				

No	REMARKS	OIL APPEARANCE TABLE			
		No	OIL APPEARANCE DESCRIPTION	MINIMUM VOLUME m^3 / km^2	MAXIMUM VOLUME m^3 / km^2
		1	SHEEN	0.04	0.30
		2	RAINBOW	0.30	5.00
		3	METALLIC	5.00	50.0
		4	DISCONTINUOUS TRUE COLOUR	50.0	200
		5	TRUE COLOUR	200	>200

Figure 4.3: Standard pollution observation/detection log example (OSRL, 2017)

Code	Description/ Appearance	Layer Thicknesss Interval (Microns)	Litres per km²	Typical Appearance
1	Sheen (silver/grey)	0.04 - 0.30	40 - 300	
2	Rainbow	0.30 - 5.0	300 - 5000	
3	Metallic	5.0 - 50	5000 - 50.000	
4	Discontinuous True Oil Colour	50 - 200	50.000 - 200.000	
5	ContinuousTrue Oil Colour	>200	>200.000	

Figure 4.4: The BAOAC for categorising slick thickness and colour (OSRL, 2018)

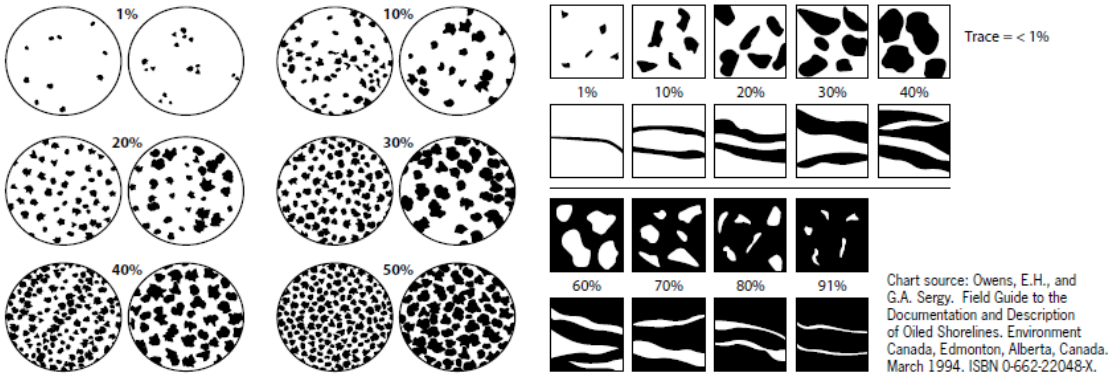

Figure 4.5: Percent coverage chart (AMSA, 2016)

4.10 Visual Observation of Megafauna

The purpose of this survey is to record and collate observations of any marine megafauna during the implementation of OMP1 Given the low precision of data/knowledge on the distribution and abundances of most marine fauna in the area, quantification of abundance is unlikely. Qualitative data on numbers of marine fauna recorded, presence and any behavioural impacts will be recorded. Methods are principally designed to collect information on presence/absence, mortality and the status of those individuals encountered (i.e. behaviour, oiling, etc.).

Aerial Survey

Aerial surveillance for marine fauna should ideally be undertaken daily in conjunction with the aerial survey for hydrocarbon. The megafauna ariel survey will only detect visible animals without confidence of estimates of abundance. Visual and photographic/video data should be collected and information on sea state and flight path as outlined below. Ideally the following should apply if possible:

- Information is to be recorded about sea state (using Beaufort Sea state scale), cloud cover (in octaves), glare (strength and area affected) and overall sighting conditions (good; moderate; poor) at the beginning of each survey and when conditions change.
- Line-transect, extending 400 m either side of the flight path, for a flight time of approximately ten minutes are to be completed with observers recording numbers and identification to the lowest taxonomic level possible (see AMSA 2016).
- Flight paths should be confirmed prior to each flight, but strip transects should be based on a grid or ladder approach to capture both the area affected by the slick, and the unaffected area immediately around the slick.
- All sightings are to be marked with location coordinates (GPS).
- Data is to be collected in standardised observation logbook records. For each cetacean sighting, data collated should include: location; species; group size; group composition (adults and calves); behaviour (directional swimming; non-directional swimming; feeding; resting), cue (underwater; body at surface; splash; blow); swimming direction and reaction to the survey craft.
- Video (high definition) and photographic (still image) data is to be collected to provide a permanent record (if possible).
- 500 ft is the preferred flight height for identification purposes but will be dependent on the flight height utilised for the aerial surveys.

Vessel Surveys

A vessel-based survey for presence of marine fauna is likely to occur opportunistically. If required, the IMT leader has authorisation to request additional vessel resources. Refer to Section 3 for vessel mobilisation.

Gathering observational data on any marine fauna in close proximity to the surface slicks and documenting any unusual behaviour or ill health will be undertaken in addition to details on species, location, etc.

Standardised survey methods can however still be applied by a trained observer and include the following:

- Position the observer at the highest accessible point.
- At the beginning and end of each observation period record time, ship's location, course and speed. Record information on sea state (using Beaufort Sea state scale), cloud cover (in octaves), glare (strength and area affected) and overall sighting conditions (good, moderate, poor) at the beginning of each survey and when conditions change.

- Collect effort data every 30 minutes, or more frequently if there are marked changes in ship course or speed, or sighting conditions change.

4.11 Personnel Resource Requirements

Given the small area with any surface expression of floating oil, a single aircraft and observer are considered appropriate for mapping the floating oil distribution. Opportunistic observations of marine megafauna would be recorded during the hydrocarbon surveys.

The monitoring team would be required to consist of at least:

- 1 x trained observer
- 1 x person with oil spill assessment training
- Vessel and aircraft operators

Additional teams would be mobilised as required.

5. OMP2 – MONITORING OF HYDROCARBONS: WEATHERING AND BEHAVIOUR IN MARINE WATERS

5.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if it is determined that the spill is Level 1, Level 2 or Level 3 (as defined in Table 3.1 of the OPEP)*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency)*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

5.2 Monitoring Rationale

Each spill will have unique physical and chemical properties and behaviours when released to the environment. This will be dependent on the type of oil, sea temperatures and weather conditions as well as how the oil is released (e.g. a subsurface or surface release). Hence it is necessary to establish a fingerprint of the freshly released oil. Once hydrocarbons have been released to the environment, weathering and/or attenuation processes such as evaporation, dispersion, dissolution and sedimentation will lead to the degradation or removal of hydrocarbons from the water column, while emulsification can result in its persistence. The speed and importance of these processes will depend on the components within the hydrocarbon involved in the spill and the oceanographic conditions present at the time of the spill. Therefore, the fate (where it goes) and its persistence (how long it remains in the system) can vary considerably in time and space. While laboratory analysis has been undertaken to determine the chemical and physical properties of Woollybutt crude, monitoring the changes to the oil properties during a spill is still required to verify the laboratory results and to feed back into the current and planned spill response operations. Various spill response actions will depend on the physical properties of oil (e.g. viscosity can affect skimming operations) and the information will inform what strategies will be most effective.

Sampling of hydrocarbons in the water column will provide data on the behaviour of the hydrocarbon, its dispersal, and the chemical properties and toxicity of compounds as it weathers (which will be used to predict effects on the identified resources and receptors at risk).

5.2.1 Objectives

The objectives of this OMP are to:

- provide field-based information on the presence, type, quantity, properties, behaviour and weathering of the spilled oil to assist in spill response operations;
- provide information on the temporal and spatial extent of the hydrocarbon plume
- determine the distribution and concentrations of hydrocarbons in the water column during the spill event

The information collected under this OMP will be used to feedback into OMP1 for input into the forecast modelling and verification of the surveillance observations.

5.3 Resources Available

See Table 5.1 for available resources. Provider mobilisation is summarised in Section 1.5.

ENI through OSRL have access to an Autonomous Underwater Vehicle (AUV). OSRL have partnered with Blue Ocean Monitoring Limited and an agreement provides OSRL access to Blue Oceans Riptide and Slocum Glider for preparedness and response operations. The AUV capability is provided on a best endeavours basis.

ENI also have access to Turner C3 Fluorometers through OSRL which can be attached to the AUV or deployed separately in a towed configuration. To monitor for the presence/absence of hydrocarbons in the water column, water samples would be analysed under an existing agreement with Intertek laboratory.

Table 5.1: Resources available for OMP2

Resource	Provider	Timeframe
1 x Turner C3 Fluorometer (submersible) 1 x OSRL fluorometry unit operator	OSRL	24 hours (OSRL personnel)
1 x Autonomous underwater vehicle (AUV) with fluorometry sensor 1 x AUV engineer	Blue Ocean Marine (BOM) via OSRL	Best endeavours basis
Vessels	TOLL [redacted]	Vessels within 24 hours of mobilisation.
Laboratory analysis services and sample containers	Intertek laboratory	Typically 48 hours – 5 days to raise a PO

5.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when:

- it can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of this OMP;
- physical response options are no longer being considered and/or implemented;
- it is determined that there is no risk of shoreline impacts from the spill;
- Monitoring objectives have been met.

5.5 Survey Methodology

Sampling design will be confirmed with the ENI IMT prior to mobilisation of the vessel to the spill location. Sample design will be depend on the location of the spill (surface/subsurface).

It has been estimated that in a first strike response a field team using a single vessel will be capable of covering 27 nm / day per (12 hour) day during towed sampling activities. This figure is calculated with the following equation;

Max sample speed = 2 knots = 2.3 nm/h

12 hour day x 2.3 nm = 27.6 nm a day / vessel

This sampling range is considered appropriate to cover an advancing spill front in the early phases of a response.

5.5.1 Water sampling

Water samples will be collected as part of this program to verify chemical, hydrocarbon and nutrient concentrations. Water samples would be collected during fluorometry tows.

5.5.2 Laboratory Analytical Methods

Water samples will be analysed by Intertek laboratory for the following analytes:

- Total recoverable hydrocarbons (TRHs);
- Polycyclic Aromatic Hydrocarbons (PAHs); and
- BTEX.

Water sampling laboratory analyses, in particular TRH, will be used to better interpret field fluorescence data. ENI has a contract with Intertek for laboratory services, including the above analysis. Unless otherwise advised by ENIs IMT Leader, samples will be sent to Intertek's laboratory for analysis.

5.6 Equipment

Several specialised pieces of equipment will be used to undertake OMP2 in the event of a spill. The equipment is specified below:

- ***fluorometers*** and backscatter sensors to detect hydrocarbon presence and estimate oil concentrations in the marine environment.
- ***water sampler*** to undertake water sampling alongside the fluorometry tows to allow for the potential to calibrate the fluorometry unit.

5.7 Data and Information Requirements

This OMP will rely on the outputs from the OMP1 and on the extent of the oil spill from both the predictions of the oil spill distribution and oil spill surveillance.

Table 5.2: Data and information requirements for OMP2

Information	Details
OMP1	Distribution of oil.
Metocean data	Integrated Marine Observing System (IMOS): http://imos.aodn.org.au/imos/
Real-time meteorological data	www.bom.gov.au/wa/observation
	www.eldersweather.com.au/wa
	www.transport.wa.gov.au/imarine/19138.asp
Satellite imagery	https://asset.joubeh.com/

5.8 Logistics

Monitoring equipment will be sourced locally where available, otherwise typically transported by commercial flight.

Blue Ocean Marine (BOM) personnel and AUV (through OSRL) are based in Perth and BOM will organise transport via commercial flight. The AUV will be mobilised to the spill location by vessel and deployed into the water by a davit arm or crane.

Implementation of this OMP will require a field deployment vessel. The vessel specifications should allow for;

- covering the required sampling area
- vessel class and service category
- safe access to water for sampling; and
- davit arm or crane for AUV deployment, if required.

It is expected to be no larger than the vessels used for the Petroleum Activities Program.

Table 5.3: Logistics for OMP2

	Location	Mobilisation/deployment
Sampling and analysis equipment	WA and interstate	Mobilisation by commercial flight Deployment to spill location by vessel (Eni)
OSRL fluorometer	Singapore	
AUV	Perth	Mobilisation to by commercial flight (organised by BOM) Deployment to spill location by vessel (Eni) and into water by davit arm or crane
Charter vessels	WA (regional)	Mobilise and arrive at spill location within 72 hours.

Refer to Section 3 for deployment of vessels and aircraft.

5.9 Personnel Resource Requirements

A single monitoring unit (the AUV) equipped with fluorometer or towed fluorometry unit) is considered suitable to monitor the progressing spill front.

The monitoring team would be required to consist of at least:

- 1 x AUV engineer to operate the AUV and support data integration into a response (the engineer would be sourced from the AUV provider); and
- 1 x vessel and crew for AUV deployment.

OR

- 1 x OSRL personnel to operate the OSRL fluorometry unit; and
- 1 x vessel and crew for towing the fluorometry unit.

6. OMP3 – SHORELINE ASSESSMENT SURVEYS

6.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if OSTM and/or surveillance indicate that Australian shorelines (e.g. reefs, coastlines) will be impacted by the hydrocarbon spill*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency) in response to a Level 2 or Level 3 spill (as defined in Table 3.1 of the OPEP)*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

6.2 Monitoring Rationale and Objectives

Understanding the extent and nature of shoreline predicted to be, or actually contacted by a hydrocarbon spill, is critical to developing an effective spill response. The collection of data on the shoreline condition should be undertaken in a rapid and systematic way, taking account of spill conditions and hydrocarbon type.

The scope of OMP3 is to provide a rapid assessment of shoreline areas to determine the scale of hydrocarbon contamination and to inform treatment/cleanup response options, constraints or limitations. Geographical and spatial results of the shoreline and/or oiling conditions will be used by the IMT for response planning. Information obtained in OMP3 may also inform long-term scientific monitoring of shoreline habitats under SMP2 and SMP5.

6.2.1 Objectives

The objectives of this OMP are to:

- undertake a preliminary assessment of the shoreline and coastal habitats to assist in making decisions on appropriate management and response actions and inform scientific monitoring;
- provide a high-level determination of potential effects on shoreline communities in order to inform clean up; and
- identify post-spill physical characteristics of the shoreline in terms of access constraints and substrate.

The priority for gathering rapid shoreline data is for enabling the operational response. Consideration should be given to scientific data needs but not at the expense of the operational requirement for rapid access to data to inform the planning of an appropriate response.

6.3 Resources Available

See Table 6.1 for available resources. Provider mobilisation is summarised in Section 1.5.

The IMT Leader has authorisation to request the mobilisation of OSRL, AMSA or AMOSC resources if required or requested by the Control Agency.

Table 6.1: Resources available for OMP3

Resource	Provider	Timeframes
Shoreline assessment team Shoreline surveyors	AMOSC National Plan resources through AMSA OSRL	Onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact).
Unmanned aerial vehicle (UAV)	Various UAV providers via OSRL	Best endeavours
Vessels	TOLL [redacted]	Visual observations from chartered vessels occur within 72 hours of mobilisation.
Aircraft	Babcock Offshore Services Australia [redacted] FCM Travel Solutions [redacted]	Visual observation – from aircraft/ helicopter within 24 hours of mobilisation.

6.3.1 Shoreline Assessment Teams

Shoreline Assessment Teams will be deployed initially with the specialist skills to make an assessment of the actual and potential impact to the shoreline sensitivities and the resources that are required to implement a clean-up operation.

Shoreline assessment team onsite within 5 days, or 24 hours prior to shoreline contact (if prolonged time to shoreline contact). Initial assessment of shoreline areas predicted for impact would take initially 1-2 days post spill.

6.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when:

- it can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of this OMP;
- physical response options are no longer being considered and/or implemented;
- it is determined that there is no risk of shoreline impacts from the spill;
- Monitoring objectives have been met.

6.5 Survey Methodology

The shoreline assessment is intended to document and quantify hydrocarbon spill extent at the shoreline to determine condition and to assess potential impact. This information will be used by the IMT to determine the most appropriate response. Execution of sampling and communication of results are required quickly, with initial information typically necessary for approval to implement response activities by regulatory agencies.

Following a hydrocarbon spill, a judgment must be made about whether monitoring is "necessary", and whether the scope of the monitoring is "reasonable", to reach appropriate spill response decisions in an appropriate time frame, and with an acceptable level of accuracy. This OMP outlines a range of methods to allow flexibility for planning a monitoring program that will account for individual spill conditions, the nature of the hydrocarbon released, and the emergency response implemented.

The approach outlined includes elements of published guidelines for a Shoreline Clean-up Assessment Technique termed SCAT (e.g. NOAA 2000, Maritime and Coastguard Agency 2007) to collect data on shoreline oiling conditions and support decision-making for shoreline cleanup. The SCAT process continues past the initial assessment to verify clean-up effectiveness and conduct final evaluations.

Detailed methods have been divided into the following components:

1. Pre-survey Planning.
2. Field Survey.
3. Monitoring Design.
4. Reporting.

Table 6.2 identifies the processes, rationale and monitoring methods that will be applied to pre-survey planning and field surveys in OMP3.

Table 6.2: Objectives, rationale and monitoring methods that will be applied to pre-survey planning and field surveys in OMP3. Guideline refers to those listed in AMSA (2016)

Primary Objective	Rationale	Secondary Objectives	Monitoring Method
Shoreline Assessment	Geographical distribution influences monitoring design	Collect qualitative information on the presence/absence of environmental receptors at affected shorelines. Verify aerial surveys and existing data.	Video/photographic records
			Determine sector segment boundaries
			Characterise substrate
			Determine beach profile
			Determine surface oil
			Determine subsurface oil
			Field detection of petroleum hydrocarbons

6.5.1 Pre-survey Planning

A rapid review of the extent and condition of habitat types will be conducted on impacted and at risk of being impacted shorelines as determined by the monitoring of hydrocarbon distribution (OMP1) and the fate and effects of hydrocarbons (OMP2). The shorelines will be assessed with regards to their sensitivity to impacts from the hydrocarbon spill and accessibility for clean-up operations. Pre-survey planning includes:

- identification of shoreline segments;
- determination of the survey requirements; and
- preparation for field survey.

A guideline for designing a monitoring program is provided (see AMSA 2016). This guideline forms the basis of the following pre-survey planning considerations.

Identification of Shoreline Segments

A guideline for selecting shoreline segments is provided (see AMSA 2016). Shoreline segments will be defined using the following considerations:

- Likelihood of hydrocarbon contact on shorelines as determined by OMP1.
- Homogeneity of habitats, physical features and sediment type to define shoreline segments and assign location identifier.
- Determine segment length considering resolution needs to detail the distribution of hydrocarbon. As a guide, segments should be in the range of 0.2–2 km in length.
- Practical aspects that can be used by the IMT for deployment of response (i.e. access and staging locations).

Determination of Survey Requirements

The scale of the spill will determine the level of effort required for the shoreline assessment study. Planning of the survey method should take into account the following questions to specify if the proposed survey is "reasonable" and "appropriate" in scope, design and subsequent cost:

- Are results of significant value in the design, execution or assessment of response actions?
- Is the scope of the programme, and speed of obtaining results, the minimum necessary to fulfil the stated objectives?

To execute the OMP, decisions are required by the IMT for each of the four monitoring components which include:

- Ground Surveys: Scale will the information be collected:
  - Broad-scale: Information required over multiple segments which would include combined aerial and/or remote sensing surveys with ground surveys.
  - Medium-scale: A small number of segments required for sampling using broad scale ground survey methods.
  - Fine-scale: Data required from targeted segments.
- Develop clean-up guidelines

Preparation for Field Survey

The IMT will need to plan for shoreline assessments prior to mobilising the field team. A typical field plan may incorporate the following considerations:

- Identify and acquire shoreline assessment survey equipment, create checklist before mobilising to field.
- Identify requirement for aircraft, vessels, or special vehicles for remote locations.
- Development of the types of communications needed (e.g. radios, cellular phones) between field team and IMT.
- For each shoreline type, identify clean-up methods that will not be suitable for the habitat. This will limit the field evaluation to only those methods which may be approved.
- Identify other OMPs which may operate simultaneously with the rapid shoreline assessment study.

6.5.2 Field Survey

Aerial Surveillance

A guideline for undertaking aerial surveillance of shorelines is provided (see AMSA 2016). Aerial surveillance provides a reliable and rapid method for defining the overall extent of a spill area, and identifying oiled shorelines and those at threat from the spill. A guideline for identifying extent and distribution of oiled shorelines is provided (see AMSA 2016). Photos, video, mapping and verbal feedback all provide basic information that can be used to define information needs and response priorities. Helicopters can be useful in combining aerial surveillance with ground surveys.

Ground Surveys

Ground surveys allow more detailed observations of shoreline conditions including the physical structure, ecological character, and human use of shorelines. This monitoring approach can provide comprehensive detail on the resources and activities likely to be affected by a spill, the potential extent of oiling and logistical considerations for different response methods.

Rapid shoreline survey methods will be agreed by the IMT to ensure the priorities relating to the spill response activities are the primary objective of the ground survey. Ground surveys for operational monitoring will target potentially impact areas.

Physical Monitoring

Physical monitoring will determine how oil will behave over time, how the shoreline can most effectively be cleaned and the likelihood that it can be damaged by oil and clean-up activities. The physical character of the shoreline segment will be described in terms of:

- Verification of the extent of shoreline habitat and segment boundaries.
- Surface and sub-surface oil observations (see AMSA 2016).
- Substrate type (see AMSA 2016).
- Form: geomorphological type, dimensions, profile or gradient (see AMSA 2016).
- Energy: winds, waves (see AMSA 2016)

- Provide photographic evidence and observation of access restrictions.

6.5.3 Reporting

Shoreline assessment should be entered into established forms and communicated to the shoreline assessment coordinator on a daily basis. Communications will include recommended clean-up methods, with consideration of NEBA to inform response strategies (Efroymson et al. 2003; IPIECA 2000). Shoreline clean-up methods must:

- specify generic and site-specific constraints for clean-up activities;
- determine the need for follow-up surveys if sensitive resource values are present;
- establish clean-up priorities for shoreline resources; and
- identify safety concerns for clean-up operations.

A final report for OMP3 will be prepared post the rapid shoreline assessment study. It is essential survey reports include detailed information on the methods used and the level of search effort adopted. This includes who was involved, what work was done, where the work took place, when the survey occurred and how the survey was carried out. The final report should follow the standard aims, methods, results and discussion format common to all scientific research.

6.6 Data and Information Requirements

Information on the hydrocarbon distribution (OMP1 and OMP2) will be essential for development of an appropriate assessment design and to define the overall scope of this OMP. In addition, the following existing data and information will be reviewed as part of OMP3:

- mapping of sensitive resources and key receptors;
- review available previous shoreline survey data;
- review ongoing monitoring data of shorelines; and
- knowledge of current survey designs implemented for other OMP activities, and if available any proposed designs for SMP activities.

Key data related to the above categories can initially be acquired from the Australian Ocean Data Network (AODN), which is a publicly funded data repository.

6.7 Field Equipment

Typical monitoring equipment:

- tide tables;
- clipboards and data sheets;
- radio;
- compass;
- ruler;
- tape measure;

- flags and stakes (to mark the location of buried oil);
- camera and video equipment; and
- GPS.

6.8 Logistics

Implementation of this OMP will require a field deployment vessel or aircraft. The vessel or aircraft specifications should allow for covering the required sampling area and safe access to water for sampling. The vessel that would be used is expected to be no larger than the vessels used for the Petroleum Activities Program.

Shoreline assessment teams will be deployed from Perth (AMOSC) and Singapore (OSRL).

Refer to Section 3 for deployment of vessels.

6.9 Personnel Resource Requirements

Shoreline impact is only predicted in the event of an extended spill (365 days), which would result in low shoreline loadings at a number of coastlines. A single response team with (1 x shoreline assessment team lead and 2 x shoreline surveyors) may cover approximately 2km per day. Additional shoreline assessment teams would be mobilised as required

Field teams will use individuals who are trained in techniques, procedures, and terminology of shoreline assessment. Team members are required to have a thorough understanding of the response goals and objectives and will consider safety concerns in cleanup recommendations. Shoreline assessments should be carried out by teams assigned to individual, pre-defined coastline segments. It is recommended that an assessment team comprises of individuals with the following skills:

- Hydrocarbon spill experience and SCAT training – to identify and document hydrocarbon distribution (from air or ground).
- Emergency response representative – to identify logistical and other feasibility issues and evaluate likely resources required and level of effort where cleanup/treatment is required.

Where more than one survey team is deployed, a Shoreline Assessment Coordinator experienced in hydrocarbon spill assessment and coordination may be required and will act as a communication point between the field teams and the IMT. This coordinator will be providing the following information to the IMT:

- prioritisation of shoreline segments;
- consideration of access and staging issues;
- potential clean up options; and
- report and map-generation.

Support staff includes office-based personnel, vessel aircraft crews and IMT communications support will be required to support rapid shoreline assessment field teams.

7. SMP1 – WILDLIFE IMPACT MONITORING AND SAMPLING

7.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan in response to a Level 2 or Level 3 spill (as defined in Table 3.1 of the OPEP) if impacts to wildlife are observed in the Oiled Wildlife Response or during the implementation of OMP1, OMP2 or OMP3*	The IMT Leader will activate this plan if requested by AMSA (Control Agency) in response to a Level 2 or Level 3 spill (as defined in Table 3.1 of the OPEP) if impacts to wildlife are observed in the Oiled Wildlife Response or during the implementation of OMP1, OMP2 or OMP3*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

7.2 Monitoring Rationale

During the operational phase of the response data would be collected as part of the Oiled Wildlife Response (Section 8.4 of the Woollybutt OPEP). Following the cessation of the oiled wildlife response this program would be mobilised to assess and quantify impacts and to provide ongoing support should oiled wildlife be observed that were not detected as part of the Oiled Wildlife Response.

In the event of a hydrocarbon spill a number of OMPs will be initiated. Monitoring of wildlife will be continued throughout the response activities, including opportunistic observations from aircraft, vessels and the shoreline during the implementation of OMP1, OMP2 and OMP3. This data would be used when assessing the impact to wildlife.

7.2.1 Resources at Risk

The key sensitive receptors that may be affected from an accidental oil spill including that will be assessed under SMP1 are:

- marine mammals;
- marine reptiles;
- fish and sharks;
- avifauna.

7.2.2 Objectives

The objectives of this SMP are to:

- Undertake wildlife impact monitoring and sampling to determine the cause of death for wildlife carcasses (i.e. tissue analysis) following the cessation of the oiled wildlife response.
- Determine the potential impact to wildlife populations.

7.3 Resources Available

See Table 7.1 for available resources. Provider mobilisation is summarised in Section 1.5.

Table 7.1: Resources available for OMP1

Resources	Provider	Timeframes
Wildlife monitoring team (2 x MFOs)	Environmental Panel Contracts and ability to contract third party specialists as detailed in Table 1.8	N/A. Contracting timeframe as per Section 1.5.2
Vessels	TOLL [redacted]	Visual observations from chartered vessels occur within 72 hours of mobilisation.
Aircraft	Babcock Offshore Services Australia [redacted] FCM Travel Solutions [redacted]	Visual observation – from aircraft/ helicopter within 24 hours of mobilisation.

During the operational response phase impacts to wildlife would be recorded as part of the Oiled Wildlife Response. Following the cessation of this response SMP1 would be mobilised to determine whether any wildlife deaths may be attributable to the spill through tissue analysis.

As this response would be mobilised following the operational phase of the response, sufficient time would be available to contract the require resources for this program, which may include:

- Marine megafauna observers
- Marine avifauna specialists
- Vets for the collection of tissue samples following the death of wildlife
- Aircraft to complete marine megafauna and avifauna surveys
- Laboratory to complete tissue analysis

ENI also maintains an Environmental and Social Impact Consultancy Services Panel. The panel includes Marine Scientists and Consultants with the ability to assess the data from the operational and post response phase and assess the impacts to wildlife. ENI Headquarters also may provide specialists to assist.

7.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when the following are met:

- Measures have been taken to assess the effects or impact of the spill on marine wildlife.
- Restoration of key biological processes (e.g. abundance, distribution, breeding) necessary to ensure post-impact recovery is demonstrated and/or can be predicted.

- Spill impacts on marine wildlife are no longer detectable.
- Consultation with relevant stakeholders has determined that no further monitoring is required.
- Monitoring objectives have been met.

7.5 Survey Methodology

Vessel and Aerial reconnaissance surveys may be used to record and collate observations of any marine mammals within the area of interest using reconnaissance aerial or boat based surveys. Rapid and systematic identification is required using standardised survey protocols. Given the low precision of data/knowledge on the distribution and abundances of most marine fauna, quantification of abundance is unlikely. Qualitative assessment, and assessment of numbers, presence and any impacts to individuals, where observed, is however possible. Methods are principally designed to collect information on presence/absence; mortality and the status of those individuals encountered (i.e. behaviour, oiling etc.).

Methods have been divided into the following components:

- pre-survey planning (see Section 7.5.1); and
- field survey assessment (see Section 7.5.2).

It is important to note that the priority of resources and receptors and the sites themselves will change under different spill or weather conditions, the seasonal presence of key species, or the life stage of the species present. It is likely that a judgment will need to be made at the time of the survey about the relative value of different sites and sampling design.

A degree of flexibility is therefore required in the implementation of the SMP. Details of methods provided below outline a number of potential approaches to the collection of the necessary information. The actual methods to be used should be selected at the time of the survey.

7.5.1 Pre-survey Planning

Given the impracticalities of monitoring all potential receptors under the marine megafauna grouping, the use of indicator species will be used to provide a method to track the potential impact.

Depending on location of the spill and its predicted extent, potential indicator species for assessing impact to marine mammals have been identified. The selection of indicator species has been based on:

- currently available information/data on abundance/distribution/migration patterns within the region;
- ability to observe/detect and correctly identify the species;
- likelihood of exposure to hydrocarbons;
- sensitivity to hydrocarbon spills;
- regulatory protection status (i.e. EPBC listed species).

7.5.2 Field Survey Assessment

Aircraft can survey large areas and inaccessible areas in a short space of time. Aerial surveys also reduce the risk of double counting that can potentially occur from boat-based surveys. This platform works well for larger marine mammals and where waters have good light penetration and visibility. Aerial survey methods however do not provide robust counts for inshore dolphin populations where shallow waters are turbid. Visual assessments using this approach will include the potential for under-reporting. In such instances where the ZPI includes shallow coastal waters, vessel based surveys are likely to be more suitable (taking into account safety considerations). Consideration of the environmental conditions at the time of survey will influence what survey platform is most appropriate.

Aerial Survey

Aerial surveillance for marine fauna should ideally be undertaken weekly. The survey will only detect visible animals without confidence of estimates of abundance. Visual and photographic/video data should be collected and information on sea state and flight path as outlined below. Ideally the following should apply if possible:

- Record information on sea state (using Beaufort Sea state scale); cloud cover (in octaves); glare (strength and area affected) and overall sighting conditions (good; moderate; poor) at the beginning of each survey and when conditions change.
- Line-transect, extending 400 m either side of the flight path, for a flight time of approximately 10 minutes are completed with observers recording numbers and identification to the lowest taxonomic level possible (see AMSA 2016).
- Flight paths should be confirmed prior to each flight, but strip transects should be based on a grid or ladder approach to capture both the area affected by the slick, and the unaffected area immediately around the slick.
- All sightings to be marked with location coordinates (GPS).
- Data to be collected in standardised observation logbook records. For each cetacean sighting, data collated should include: location; species; group size; group composition (adults and calves); behaviour (directional swimming; non-directional swimming; feeding; resting), cue (underwater; body at surface; splash; blow); swimming direction and reaction to the survey craft.
- Video (high definition) and photographic (still image) data is collected to provide a permanent record (if possible).
- 500 ft is the preferred flight height for identification purposes.

Vessel Surveys

A vessel-based survey for presence of marine mammals is likely to be required if the slick has contacted nearshore environments with high turbidity. Gathering observational data on any marine mammals in close proximity to the surface slicks and documenting any unusual behaviour or ill health will be undertaken in addition to details on species, location etc.

Standardised survey methods can however still be applied by a trained observer and include the following:

- Observer should be positioned at the highest accessible point.
- At the beginning and end of each observation period record time; ship's location, course and speed. Record information on sea state (using Beaufort Sea state scale); cloud cover (in octaves); glare (strength and area affected) and overall sighting conditions (good; moderate; poor) at the beginning of each survey and when conditions change.
- Collection of effort data each 30 minutes, or more frequently if there are marked changes in ship course or speed, or sighting conditions change.

An example data record sheet is shown in Table 7.2. This provides an example of the type of information that should be recorded during the survey.

Table 7.2 Example marine fauna data record sheet

Resource	Type/Species	Number	Location	Behaviour/Comment
Turtles	Species Age/size	Adult _____ Juvenile _____	Lat _____ Long _____	Nesting activity. Proximity of oil to nests. (surface and subsurface). Observed oiling of turtles. Observed behaviour/fitness of turtles if present. Carcases.
Dolphins	Age/size	Adult _____ Juvenile _____ Calf _____	Lat _____ Long _____	Proximity of oil. Observed oiling of dolphins. Observed behaviour/fitness. Carcases.
Sea snakes	Species Size		Lat _____ Long _____	Breeding or other activity. Observed oiling of snakes. Observed behaviour/fitness of snakes. Carcases.
Birds	Species Age/size	Nesting Roosting	Lat _____ Long _____	Proximity to oil to nests and roosting areas. Location of roosting/ nesting activity Observed oiling. Observed behaviour/fitness of birds. Presence of oil on eggs (if present). Carcases. Hatching or fledging rates.

Other Details for each Observation Location			
Ambient Conditions at Each Location	Date:	**Photographic/ Video Record**	Date and Time of Each:
	Time:		Video/Photo Clip Number:
	Weather Conditions:		Brief Description:
	Visibility:		GPS Link:

7.5.3 Live Stranding and Carcass Recording

Any live strandings or carcass recordings within the area affected by the spill should be recorded as follows. Trained professionals will need to be involved in the handling of any marine mammal strandings encountered. In Western Australia, Wildcare (08 9474 9055) is the lead stranding network organisation.

During the operational phase, recording of strandings information will be required. Where carcasses are observed physical details (species, length, sex, condition, etc.) will be documented and photographs taken.

It may be appropriate to collect tissue samples which will be analysed. The state of decomposition of any carcasses will need to be evaluated to determine the viability of the collection of samples for specific analysis, with some analysis unlikely on severely decomposed carcasses.

Standardised protocols are available for carcass handling with the following to be adopted:

- DoEE 2006, *Standardised protocols for the collection of biological samples from stranded cetaceans*, Department of Environmental and Heritage. View at <https://www.environment.gov.au/resource/standardised-protocols-collection-biological-samples-stranded-cetacean>.
- Eros C, Marsh H, Bonde R, O'Shea T, Beck C, Recchia C, Dobbs K, Turner M, Lemm S, Pears R and Bowater R, 2007, *Procedures for the Salvage and Necropsy of the Dugong* (*Dugong dugon*). Second Edition. Great Barrier Reef Marine Park Authority. View at <http://elibrary.gbrmpa.gov.au/jspui/bitstream/11017/403/1/Procedures-for-the-salvage-and-necropsy-of-the-Dugong-Dugong-Dugon.pdf>.
- Flint M, Patterson-Kane JC, Mills PC, Limpus CJ, 2009, *A veterinarian's guide for sea turtle post mortem examination and histological investigation*. View at <https://veterinary-science.uq.edu.au/filething/get/4226/pm-guide-msf.pdf>.

In most instances the cause of death will not be determined until tissue is analysed.

Trained professionals will need to be involved in handling any strandings encountered. Where carcasses are observed, physical details (species, length, sex, condition, etc.) will be documented and photographs taken. There will also be a need to collect basic biological information and where appropriate tissue samples for laboratory analysis. Where appropriate, a necropsy should be undertaken by a pathologist to determine cause of death. Careful and consistent documentation of strandings is needed and clinical pathology is required to determine whether the cause of the mortality can be attributed to the oil spill event.

Table 7.3: Wildlife data capture for every individual captured

Date and time of capture:		
Location of capture:		
Species:		
Degree of oiling: %	Cover of oil:	Oil distribution on body:
Condition of animal:		
Any field treatments:		

7.5.4 Laboratory

Carcasses of oil-affected wildlife should be retained and tested to determine their cause of death, including tissue sampling and/or external examination. The samples will be analysed for an agreed set of parameters which may include determining the concentrations of:

- polynuclear aromatic hydrocarbons (PAH) and the standard EPA list of 16 priority pollutants via normal phase silica chromatography and gas chromatography mass spectrometry (GCMS);
- saturated hydrocarbons in the C_{10} to C_{36} range via by flame ionisation gas chromatography (GC);
- volatile hydrocarbons via purge and trap into a GCMS.

As well as reporting on tissue levels of hydrocarbons, other diagnostic chemical characteristics relevant to the spilled oil (such as various ratios) will be screened to confirm contaminant source.

7.6 Data and Information Requirements

The information in Table 7.4 will be used to assist in collecting data for SMP1.

Table 7.4: Data and information requirements for SMP1

Information	Details
Standard Forms for Field Survey	See section 7.5.
Sensitive Resources and Receptors	i.e. Draft EIAs, EPs existing environment, etc.
OMP1, OMP2 and OM3	Observations and findings.

7.7 Field Equipment

The following list is not exhaustive, but includes common items that may be used:

- survey platform: marine vessels;
- hand-held video camera;
- digital camera (with GPS where possible);

- GPS;
- a pair of binoculars;
- nautical charts;
- log book/observation sheets (see section 7.5).

7.8 Logistics

Implementation of this SMP may require aircraft or vessels. The vessel specifications should allow for storage of field equipment and samples.

A field vessel will be deployed within 72 hours. Refer to Section 3 for deployment of vessels.

7.9 Personnel Resource Requirements

See Table 1.6 for the capability / personnel resourcing requirements for this program.

Table 7.5: Resources available for OMP1

Personnel	Duration	Required skills
2 x Marine Fauna Observers (MFOs)	Minimum one month	Marine mammal expert knowledge and field skills to identify and quantify abundance (essential). Experience in marine mammal surveys from aerial surveys (desirable).
1 x vet	As required	Veterinary and pathology expertise on call for diagnosis of cause of death with experience in record keeping (chain-of command procedures), and advising on diagnosis of death.

8. SMP2 – SHORELINE ECOLOGICAL ASSESSMENT AERIAL SURVEYS

8.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if OMP1 and/or OMP3 indicate shorelines have been impacted by hydrocarbons*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency), if OMP1 and/or OMP3 indicate shorelines have been impacted by hydrocarbons*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

8.2 Monitoring Rationale

SMP 2 helps to provide qualitative information on the presence/absence of species along the potentially affected shorelines. This study considers the seasonality of some species and habitats present on the shorelines, including:

- Turtle Nesting
- Shorebirds
- Mangroves

The study would be used to inform the design of the shoreline ecological surveys (SMP5) which aim to quantify any potential impacts. Data from the aerial surveys may also be used when defining impact and reference locations.

8.2.1 Objectives

The objectives of this SMP are to:

- identify the presence and extent of environmental receptors pre-impact, including any existing damage;
- understand the spatial extent of the impact from the hydrocarbon spill on the environmental receptors;
- provide data to identify suitable impact and reference sites.

8.3 Resources Available

See Table 8.1 for available resources. Provider mobilisation is summarised in Section 1.5.

Data from OMP1 may be used to determine areas that are likely to have been impacted and data collected (aerial observation imagery overlapping shorelines, satellite imagery overlapping shorelines) may be used to support the targeted aerial surveys completed as part of the SMP2 program.

This monitoring program would be completed following shoreline contact from hydrocarbons and completion of the response. ENI maintains an Environmental and Social Impact Consultancy Services Panel (Section 1.5). The panel includes Marine Scientists and Consultants with the ability to assess the data from the operational and

post response phase for the presence/absence of receptors and to identify suitable impact and reference sites for the study design.

Table 8.1: Resources available for SMP2

Resources	Provider	Timeframes
Shoreline Ecological Assessment Team – fieldwork, reporting and GIS	Environmental Panel Contracts and ability to contract third party specialists as detailed in Table 1.8	N/A. Contracting timeframe as per Section 1.5.2
Unmanned Aerial Vehicle (UAV) drone and operators	OSRL Environmental Panel Contracts and ability to contract third party specialists as detailed in Table 1.8	Best endeavours
Aircraft	Babcock Offshore Services Australia [redacted] FCM Travel Solutions [redacted]	Visual observation – from aircraft/ helicopter within 24 hours of mobilisation.

8.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when the following are met:

- it can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of this SMP;
- physical response options are no longer being considered and/or implemented;
- it is determined that there is no risk of shoreline impacts from the spill;
- Monitoring objectives have been met.

8.5 Survey Methodology

Georeferenced aerial imagery would be collected as part of OMP1. Data collected as part of OMP3 may also be used to supplement the data collected during OMP1.

Data would be interpreted in the IMT to determine whether the following is present/absent along the potentially affected shorelines:

- Turtle activity including nesting
- Aggregations of shorebirds at potentially contacted shorelines
- Mangrove stands and the inferred health of any mangroves from the aerial imagery.

8.5.1 Pre-survey Planning

It should be noted that SMP2 would not be used to assess impact, but that information collected as part of this program would be used to assist with planning more detailed quantitative assessments of shoreline impact as part of SMP5. Flight paths would be determined based on the shorelines that are potentially impacted/impacted by hydrocarbons.

8.5.2 Field Survey

Georeferenced imagery should be collected along the shorelines that may be impacted. The imagery should be of sufficient resolution to determine the presence/absence of hydrocarbons, shorebirds and evidence of turtle nesting activity (tracks).

The use of infra-red and false colour aerial surveillance techniques may be used to monitor environmental receptors, such as mangroves. Other remote sensing options may be explored depending on the environmental receptors impacted by the hydrocarbon spill.

Records of aerial photography and video footage can be used to aid scientists in determining the impact to shorelines from the spill and the rate of recovery post spill clean-up.

Aerial observations will be made concurrent with vessel and/or ground-based surveillance where required (see SMP5). Observations will be recorded using a data record sheet, for example the information listed in Table 8.2 and georeferenced imagery will be sent to the IMT for further analysis.

Table 8.2: Example aerial data record sheet

Resource	Form	Location	Description
Seagrass	Species Intertidal Emergent Subtidal	Start and stop: Lat _____ Long _____	Length along shore Distance from shore to seaward edge Percentage cover Percentage dead/discoloured (location if isolated)
Corals	Form Emergent Subtidal	Start and stop: Lat _____ Long _____	Length along shore Distance from shore to seaward edge Percentage cover Percentage dead/bleached (location if isolated)
Mangroves (wetlands)	Species Form	Start and stop: Lat _____ Long _____	Length along shore Distance from seaward edge to inner edge. Zonation if evident Percentage cover Percentage dead/discoloured (location if isolated)

Other Details for each Observation Location			
Ambient Conditions at Each Location	Date:	**Photographic/ Video Record**	Date and Time of Each:
	Time:		Video/Photo Clip Number:
	Weather Conditions:		Brief Description:
	Visibility:		GPS Link:

8.6 Data and Information Requirements

The following existing data and information will be reviewed as part of the SMP2 and used to assist in the assessment of the presence/absence of receptors.

Table 8.3: Data and information requirements for SMP2

Information	Details
Standard Forms for Field Survey	See Table 8.2.
Sensitive Resources and Receptors	i.e. Draft EIAs, EPs existing environment etc.
OMP1	Georeferenced imagery

8.7 Field Equipment

The following list is not exhaustive, but includes common items that may be used:

- tide tables;
- clipboards and data sheets;
- radio;
- compass;
- camera and video equipment; and
- GPS.

8.8 Logistics

Implementation of this SMP will require suitable aircraft and aerial observers as required under OMP1.

8.9 Personnel Resource Requirements

Field teams will use aerial observers as outlined in OMP1. An Environmental Scientist (e.g. from the Environmental and Social Impact Consultancy Services Panel) will be used to interpret the aerial imagery data and provide an assessment on the presence/absence of environmental receptors.

Shoreline impact is only predicted in the event of an extended spill (365 days), which would result in low shoreline loadings at a number of coastlines. The initial shoreline monitoring team would be required consisting of:

- 1 x Drone operator (where the drone is soured through the Environmental Panel Contracts);
- 1 x Environmental Consultant for fieldwork;
- 1 x Environmental Consultant for reporting; and
- 1 X GIS specialist.
- 1 x subject matter expert selected from Table 1.10 or other suitable provider

Additional shoreline assessment teams would be mobilised as required

The OSRL unmanned aerial vehicle (UAV) team would consist of the following additional personnel

- 1 x experienced UAV pilot;
- 1 x Sensor operator; and
- 1 x OSRL response specialist.

9. SMP3 – ASSESSMENT OF FISH FOR THE PRESENCE OF HYDROCARBONS

9.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if: 1. It has been confirmed or it is suspected (e.g. through public reports) that significant levels of hydrocarbons have contaminated commercial or subsistence fishing areas. 2. Fishing vessels fish stocks, fishing equipment and/or by-catch have been exposed to hydrocarbons*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency) in response to a Level 2 or Level 3 spill, as defined in Table 3.1 of the OPEP*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

9.2 Monitoring Rationale

The Operational Area is located approximately 40 km west of Barrow Island. Commercial fisheries that operate in the waters of the NWS are centred in Onslow, 65 km to the south of the field; Exmouth, 120 km to the southwest, and Dampier, approximately 180 km to the east. This study focuses on the potential impacts to fish health.

9.2.1 Objective

The objective of this SMP is to monitor for any hydrocarbons in representative commercial and recreational fish species to assess impacts and recovery.

9.3 Resources Available

See Table 9.1 for available resources. Provider mobilisation is summarised in Section 1.5.

Personnel will use the recommended methods to collect, store and transport tissue and organ samples for analysis at NATA-accredited laboratories.

ENI can commission Lab analysis through Intertek. ENI has also identified alternative providers in Table 1.8.

Table 9.1: Resources available for SMP3

Resource	Provider	Timeframe
Fish assessment team and subject matter experts	Environmental Panel Contracts and ability to contract third party specialists as detailed in Table 1.8	N/A. Contracting timeframe as per Section 1.5.2

Resource	Provider	Timeframe
Laboratory analysis services	Intertek	Typically 48 hours – 5 days (Intertek access)
Vessels	TOLL [redacted] – vessels	Vessels within 24 hours of mobilisation.

9.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when the following are met:

- Physiological and biochemical parameters in the studied fish species are comparable with fish sampled from reference sites unaffected by the spill.
- Contamination in the edible portion or in the stomach/intestinal contents of fish attributable to the spill is no longer detected.
- Monitoring objectives have been met

9.5 Survey Methodology

9.5.1 Field Sampling

Fish will be collected using long-lines from within a vessel at both impacted and control sites. The number of sites within each area will be determined at the time of the spill in accordance to the scale and nature of the spill.

Upon capture all fish will be identified, observed for any outwardly visible signs of abnormality or physical stress, and measured. The sex and reproductive stage will also be recorded. Approximately 100g of muscle tissue will be taken per sample for hydrocarbon analysis. The remaining muscle tissue will be kept for later taste or olfactory testing analysis if required. Two gut samples per species from each site will be kept for hydrocarbon analysis.

Water samples will be collected at each site using a weighted 1 L glass bottle which will be suspended 1 m below the sea surface. Each sample will be collected from an area ahead of the vessel (i.e. not disturbed by the passage of the hull). Two 1 L samples and one smaller 40 ml sample will be collected from each site. One 1 L sample will be immediately frozen, while the other 1 L and 40 ml sample will be refrigerated.

9.5.2 Sampling Protocol

To avoid hydrocarbon contamination from other sources, fish samples will be collected using the following protocol:

- Fish for analysis will be placed on a clean oil-free surface for examination and dissection. These surfaces will be cleaned with methanol prior to fish contact.
- All instruments will be cleaned with detergent and water and then rinsed with methanol.

- Tissues for hydrocarbon analysis will be placed in glass jars with Teflon-lined lids. A replicate sample will be wrapped in methanol-treated aluminium foil, then placed in a zip lock plastic bag.
- The jars and plastic bags will be labelled with all relevant information including: species, location, identification number and date.
- The sample number will be related to a record containing species name, size, type of tissue, handling details, capture location, capture depth and all observations of health, presence of visible oil, etc.
- All samples will be immediately placed in a freezer and transported frozen. The shipping container will have a "chain of custody tag" attached. This ensures samples can be tracked to ensure validity until they reach the analytical lab.

9.5.3 Laboratory Chemical Analysis

Fish samples will be defrosted and then prepared in a mechanical blender. Hydrocarbons will be extracted with dichloromethane. Internal standards will be added to extracts to track recovery. Extracts will then have interfering lipids removed by gel permeation chromatography. Half of the extract will be further cleaned by normal phase silica chromatography and analysed by selected ion monitoring for PAH by GC/MS. Samples will be analysed for the standard EPA list of 16 priority pollutants. A high ratio of phenanthrene to pyrene in samples would indicate unburned oil content.

The other half of the extract will be cleaned by acidified silica gel chromatography (Muijs and Jonker 2009) and analysed for saturated hydrocarbons in the C10 to C36 range by flame ionization GC.

Volatile hydrocarbons (C6 to C9) will be analysed by purge and trap into a GC/MS. An aliquot of methanol will be added to a water filled Purge & Trap vial and analysed by Purge & Trap GC/MS. This method is suitable for the determination of BTEX and hydrocarbons in the TPH C6 to C9 range.

The analysis will be done using GC/MS set to SIM/SCAN mode. All chromatograms will be checked for trace PAHs down to the detection limit i.e. the LOR is 0.01 mg/kg which equates to approximately 0.003 mg/kg detection limit. The GC/MS will also set up to analyse selected oil markers (tetramethyl naphthalenes and dibenzothiophene, SIM mode) which are good indicators (if used).

ENI has a contract with Intertek for laboratory services, including the above analysis. Unless otherwise advised, samples will be sent to an Intertek laboratory for analysis.

9.6 Data and Information Requirements

The information in Table 9.2 will be used to assist in collecting data for SMP3.

Table 9.2: Data and information requirements for SMP3

Information	Details
Sensitive Resources and Receptors	i.e. Draft EIAs, EPs existing environment, etc.
Fisheries Data	Effort and catch rate data from fisheries, location and number of fishing vessels, etc.
OMP1 and OMP2	Results and findings.
Knowledge of current survey designs implemented for other SMP activities	-

9.7 Field Equipment

The following list is not exhaustive, but includes common items that may be used for sampling:

- survey platform: marine vessels
- digital camera (with GPS where possible)
- GPS
- a pair of binoculars
- nautical charts
- fishing equipment (long-line rods, knives)
- dissection kits, whirlpaks for fish samples
- freezer and refrigerator space
- water quality testing equipment (1 litre bottles, 40 ml vials, niskin bottle).

Implementation of this SMP will require a field vessel. The vessel specifications should allow for storage of field equipment and samples. It is expected to be similar in size and no larger than the vessels used for Petroleum Activities Program.

Refer to Section 3 for deployment of vessels.

9.8 Personnel Resource Requirements

The team for SMP3 would consist of the following personnel. The field team would require experience in the handling of samples for analysis of environmental impacts:

- 2 x Environmental Consultants for fieldwork
- 1 x Environmental Consultant for reporting
- 1 x laboratory for analysis
- 1 x subject matter expert selected from Table 1.10 or other suitable provider.

Specific skill sets required to complete the SMP:

- Experience in the catching of fish (local knowledge of their habitats).

- Experience in the correct dissection of fishes for analysis, including correct storage and transfer of samples.

10. SMP4 – FISHERIES ASSESSMENT

10.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if: 1. It has been confirmed or it is suspected (e.g. through public reports) that significant levels of hydrocarbons have contaminated commercial or subsistence fishing areas. 2. Fishing vessels fish stocks, fishing equipment and/or by-catch have been exposed to hydrocarbons*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency) in response to a Level 2 or Level 3 spill, as defined in Table 3.1 of the OPEP*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

10.2 Monitoring Rationale

A hydrocarbon spill has the potential to impact on commercial fisheries and other limited recreational fishery areas.

10.2.1 Objective

The objective of this SMP is to:

- Collect relevant data to assess the short-term and/or long-term effects on fish and fisheries from the hydrocarbon spill.
- Understand the geographic extent of exposure of fish to hydrocarbons from the spill.
- Assessing the impacts to fish health, including reproductive health associated with hydrocarbons from the spill.

10.3 Resources Available

See Table 10.1 for available resources. Provider mobilisation is summarised in Section 1.5.

ENI maintains blanket contracts with a panel of HSE consultants with the capabilities in designing and implementing fish surveys using both dedicated and opportunistic vessels, including working with recreational and commercial fishers.

Table 10.1: Resources available for SMP4

Resources	Provider	Timeframes
Fisheries Assessment Team and subject matter experts	Environmental Panel Contracts and ability to contract third party specialists as detailed in Table 1.8	Contracting timeframe as per Section 1.5.2

Resources	Provider	Timeframes
Vessels	TOLL (Contract: 5000011500) – vessels	Vessels within 24 hours of mobilisation.
Laboratory analytical services	Intertek	Typically 48 hours – 5 days
	Environmental Panel Contracts and ability to contract third party specialists as detailed in Table 1.8	Contracting timeframe as per Section 1.5.2

10.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when the following are met:

- Evidence that catch rates, species composition, community abundance, distribution and age structure of commercial fisheries and their by-catches have returned to pre-spill levels; and
- Agreement with relevant stakeholders (e.g. fishing organisations, Government authorities) that fish stocks are no longer impacted or damaged as a result of the spill.
- Monitoring objectives have been met

10.5 Survey Methodology

The focus will be analysing the levels of biomarkers in the target species.

The study will collect commercial and subsistence fish and prawn species from impacted and non-impacted (i.e. control sites), in consultation with relevant stakeholders.

The target species will be determined prior to mobilisation based on the hydrocarbon spill characteristics. The samples collected from the control sites will be used to comparison purposes—i.e. the impacted specimens against the non-impacted specimens.

The following biomarkers will be measured in fish:

- Liver detoxification enzymes: The hydrocarbons absorbed by the fish are metabolised by the liver using detoxification enzymes. These are quantified in the liver.
- PAH Biliary Metabolites: Hydrocarbon compounds are directed to the bile for elimination out of the body. Biliary metabolites of petroleum compounds represent the most sensitive biomarker of exposure to crude oil, and can inform on the temporal and geographical extent of the exposure to very low levels.
- DNA Damage: Several contaminants, including petroleum compounds, can alter the integrity of the DNA molecule. This biomarker evaluates the damage done to the DNA molecules.

- Serum sorbitol dehydrogenase (SDH): Serum SDH provides an understanding of the liver integrity and liver functions, which might be affected if exposure to hydrocarbons is high.
- Other physiological biomarkers such as condition factor, liver somatic index and gonado-somatic index will be determined along with total weight, length, condition, parasites, egg development, testes development, etc. All abnormalities, if any, will be photographed.

Biomarkers to be measured in prawns, include:

- DNA Damage: Several contaminants, including petroleum compounds, can alter the integrity of the DNA molecule. This biomarker evaluates the damage done to the DNA molecules.
- Lipid ratios: amphipods exposed to the water-accommodated fraction of hydrocarbons have altered lipid ratios (Olsen et al. 2007). These changes may affect the health of the exposed benthic invertebrates but also the benthic invertebrates may not as good a food item for higher trophic level organisms.
- Other physiological biomarkers such as parasites, total weight, length and condition will be determined. All abnormalities, if any, will be photographed.

Fecundity, time between molts, embryo development, hatching rates and larval survival may also be investigated to understand the impacts to prawns.

All reports of dead prawns, e.g. found washed up on beaches, will be investigated. Amphipods, filter-feeding bivalves and urchins are thought to be among the most sensitive organisms to oil contamination in subtidal communities. Thus the abundance of amphipods has been found to be a good indicator of oil exposure and recovery in soft-bottom subtidal communities (Gomez Gesteria and Dauvin 2005).

Recovery phase monitoring will therefore include quantifying abundance in the environment or through measuring catch volumes.

10.5.1 Field Sampling

Prawns will be collected using trawl at both impacted and control sites. The number of sites within each area will be determined at the time of the spill in accordance to the scale and nature of the spill. The fishing industry will be consulted during planning and field sampling.

Trawling will be conducted in accordance with the *Marine sampling Field Manual for Benthic Sleds and Bottom Trawls* (Przeslawski 2018). Sample collection and handling will be done in accordance with the Australian code for the care and use of animals for scientific purposes (NHMRC 2013).The fish/prawns captured at each site will be kept alive in live tanks equipped with flow through, as biopsies need to be collected on freshly scarified animals. Each specimen will be initially measured for length (using a mm scale ruler) and for weight using an electronic spring balance. Each specimen will be examined for external abnormalities including lesions or damage.

Fish captured for biopsy collection (approximately 20 of each target species from each site) will be sacrificed by iki jimi (spike through the brain) and a vacuutainer and needle

were used to collect blood from the caudal vein. These blood samples will be allowed to coagulate at 4°C for up to 20 minutes and then centrifuged at 2400 x *g* for 10 mins and the serum supernatant divided into two samples: one of which is frozen at –20°C and the other placed in liquid nitrogen. The fish will be then dissected along the ventral line and inspected internally.

The following biopsies will be collected:

1. Serum samples (see above);
2. Bile will be collected from the gall bladder using a 1 ml syringe and frozen at – 20°C;
3. The liver will be removed, weighed and subsamples frozen in liquid nitrogen for analysis;
4. The gonads will be removed and weighed. Where available the gonads of 10 male and 10 female fish of each species from the impacted area and reference area were preserved in glutaraldehyde for histology;
5. Carcass (body less viscera) was weighed using the electronic spring balance.

Stomach and intestinal contents will also be collected from 10 of each species at each location where available.

10.5.2 Laboratory Analysis

Laboratory analysis will be undertaken by a NATA-approved Laboratory for the following analyses:

- Fish
  - liver detoxification enzymes (EROD activity);
  - biliary metabolites;
  - SDH activity;
  - oxidative DNA damage; and
  - gonad histology.
- Prawns
  - oxidative DNA damage; and
  - lipid ratios.

Biomarker analyses will be undertaken at government or academic laboratories with experience in the area.

Statistical analyses of these results will then be undertaken to assess the differences (if any) between the impacted and control site species.

10.5.3 Recovery monitoring

Recovery phase monitoring will include quantifying abundance in the environment or through measuring catch volumes. This will be undertaken by trawling, in consultation with and likely with assistance from the fishing industry.

In addition, indices of community health and resilience may also be considered in monitoring recovery, such as the index of biological integrity (King and Richardson 2003) and community structure analysis to quantify abundance, diversity and condition of different taxonomic groups in the area. Community structure analysis involves surveying the abundance of different organisms, recording the age, size class, sex and condition of organisms. It is recommended that this surveying be done to the level of species or taxa, to identify any changes in the community structure (e.g. .disappearance of sensitive taxa and or increase in hydrocarbon-degrading bacteria and fungi).

10.6 Data and Information Requirements

The information in Table 10.2 will be used to assist in collecting data for SMP3.

Table 10.2: Data and information requirements for SMP3

Information	Details
Sensitive Resources and Receptors	i.e. Draft EIAs, EPs existing environment, etc.
Fisheries Data	Effort and catch rate data from fisheries, location and number of fishing vessels, etc.
OMP1 and OMP2	Results and findings.
Knowledge of current survey designs implemented for other SMP activities	-

10.7 Field Equipment

The following list is not exhaustive, but includes common items that may be used for sampling:

- survey platform: marine vessels
- trawl with spare(s)
- trawl box(es)
- digital camera (with GPS where possible)
- GPS
- a pair of binoculars
- nautical charts
- dissection kits, whirlpaks for samples
- 1 L and 10 L buckets with lids
- Sample labels, pre-printed on waterproof paper

- freezer and refrigerator space

10.8 Logistics

Implementation of this SMP will require a field vessel. The vessel specifications should allow for storage of field equipment and samples. It is expected to be similar in size and no larger than the vessels used for the Petroleum Activities Program.

Refer to Section 3 for mobilisation of vessels.

10.9 Personnel Resource Requirements

The team for SMP4 would consist of the following personnel:

- 2 x Environmental Consultants for fieldwork
- 1 x Environmental Consultant for reporting
- 1 x laboratory for analysis
- 1 x subject matter expert selected from Table 1.10 or other suitable provider.

Specific skill sets required to complete the SMP:

- Experience in the catching of fish (local knowledge of their habitats).
- Experience in the correct dissection of fishes for analysis, including correct storage and transfer of samples.

11. SMP5 – SHORELINE ECOLOGICAL SURVEYS

11.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if it has been observed or is predicted (e.g. through the SMP2 program) that shorelines will be impacted by the hydrocarbon spill and sensitive receptors are present at the affected shorelines*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency) in response to a Level 2 or Level 3 spill (as defined in Table 3.1 of the OPEP)*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

11.2 Monitoring Rationale

This study will aim to quantify impacts to receptors observed to be potentially impacted during SMP2.

11.2.1 Resources at Risk

SMP2 summarises the key sensitive receptors that may be affected from an accidental oil spill including:

1. turtle nesting beaches
2. mangroves

11.2.2 Objectives

The objectives of this SMP are:

- Quantify the impacts to shorelines species.
- Quantifying, where possible, exposure of environmental receptors to the hydrocarbon.
- Assessing the recovery of environmental receptors.

11.3 Resources Available

See Table 11.1 for available resources. Provider mobilisation is summarised in Section 1.5.

ENI maintains blanket contracts with a panel of HSE consultants that would be used to complete the surveys for SMP5.

Table 11.1: Resources available for SMP5

Resources	Provider	Timeframes
Shoreline Ecological Survey team and subject matter experts	Environmental Panel Contracts and ability to contract third	N/A. Contracting timeframe as per Section 1.5.2

Resources	Provider	Timeframes
	party specialists as detailed in Table 1.8	
Traditional Owner support, indigenous knowledge	tbc	Best endeavours
Vessels	TOLL [redacted] – vessels	Vessels within 24 hours of mobilisation.

11.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when the following are met:

- Monitoring objectives have been met.
- Biological monitoring demonstrates that the ecological components of the shoreline environment are returned to pre-spill state (as determined from baseline data and/or control sites).

11.5 Survey Methodology

11.5.1 Mangrove Monitoring

A guideline for monitoring the potential impact on coastal flora are provided (see AMSA 2016; Table 11.2). Methods suggested include combining remote sensing and ground surveys using quadrats or transects. Sub-lethal effects such as foliage density, chlorosis (bleaching), canopy height can be detected using ground surveys. Much of this information can be collected without much additional effort and provides valuable baseline data of the health of the ecosystem and is useful for the scientific program design. Suitable coastal flora found within shoreline habitats of the ZPI that may be used as bio-indicators may include mangroves, and microalgae on tidal flats, and macroalgae species on intertidal flats and rocky shores.

Table 11.2: Example of coastal flora data parameters and methods (AMSA 2016)

Resource	Form	Comments
Number of abundance of plants	% cover of the sediment	Ground and aerial survey (large areas only) (see SMP2).
	Numbers	May occur in days/weeks.
	Biomass: mass of plants per m^2	Intrusive. Detailed study based on sampling in affected and control sites.
Distribution of plants or damage	Tidal zone/elevation	Ground survey - using transects or beach gradient.
Distribution of oil on plant mat	% of plant area oiled	Ground survey – suitable for algaes and seagrasses.
Distribution of oil on plant	Maximum and minimum height of oil	Ground survey – suitable for macrophytes such as mangroves.
	% cover of whole plant	
	% cover of foliage	

Resource	Form	Comments
	Position on plant	Ground survey – roots, leaves and truck.
Mortality	Number or area of dead plants	Ground surveys - using quadrats or transects.
	Area or %loss	Aerial survey (see SMP2).
Other possible effects	Chlorosis	Ground surveys – leaves or fronds go yellow, lose colour.
	Black/curled leaves (dead)	Ground surveys – sometimes called 'burning'.
	Leaf/frond loss	Ground surveys – may occur within days, weeks or even months in the case of mangroves.
	Loss of plants	Ground surveys – may occur within days/weeks.
	Changes in level of fungal or insect damage	Ground surveys – may occur with weeks/months.

Epifauna Sampling

A guideline for monitoring the potential impact on invertebrate shoreline fauna are provided (Table 11.3). The suitable method suggested is ground surveys using quadrats or transects. Invertebrate fauna species found on the littoral fringe and upper eulittoral, the zone of highest impact, should be used as target indicators. Suitable indicator intertidal invertebrate epifauna for monitoring may include molluscs, barnacles and chitons on rocky shores, and burrowing crabs in tidal flats and mangrove and depositional shorelines.

Table 11.3: Example of invertebrate beach fauna data parameters and methods

Parameter		Comments
Number of organisms	% cover of the sediment	This can be done as an estimate (similar to oil cover). Photo documentation.
	Number of individuals per m^2	Use of quadrat frames. Count or photo-documentation to speed up field work.
Position of organisms		Record distance along a transect or height on rock.
Oil cover/impact on organisms	% of oil organisms	Use of quadrates or transects.
	% of area oiled	Suitable alternative to number of oiled/unoiled organisms.
Damage to 'sheet'. E.g. shellfish, barnacles, polychaetes	% are of sheet that is covered by dead animals/bare 'holes'	Indicated by presence of unattached individuals or holes in the sheet, particularly mussels and oysters. Damage to the sheet can result in additional future damage by wave action.
Mortality	Number/mass/area of dead organisms	Data from impacted sites needs to be checked against control areas. Seasonal mortalities occur with some species.
	Number/mass/area of live organisms	

Chemical Monitoring

Chemical monitoring provides a greater level of accuracy for determining the presence and concentration of hydrocarbons. If seafloor communities are to be monitored it is advisable to simultaneously monitor water and sediment contaminant levels. In this way any relationships between contaminant levels and biological effects can be examined. Chemical fingerprinting of surface oils conducted in OMP2 form an important initial step for identifying the difference between natural and anthropogenic oil sources. Usually, operational monitoring will require information to be collected and processed rapidly with a low level of sampling and accuracy.

Water and Sediment Sampling

Sampling of water are described in OMP2. Chemical monitoring of water will include:

- In-situ tests conducted to validate of the presence hydrocarbons in water
- In-situ methods for determining the concentration of oil in water (e.g. fluorometer readings, hydrocarbon sensors on water quality units, see OMP2 for more detail).
- Physico-chemical sampling of the water using multi-parameter water quality instruments (see OMP2 for more detail).
- Obtaining a limited selection of water and sediment samples to be sent to the laboratory for chemical analysis (see OMP2 for methods for collection of water samples).

Biological chemical testing of indicator shoreline flora and fauna species may also be implemented if time permits.

Turtle Nesting Beaches and Avifauna

The shoreline monitoring of turtle nesting beaches and avifauna that may be potentially present during a hydrocarbon spill will include:

- Monitoring of damage to coastal birds including, number of individuals, type present, oil distribution on birds, activity of oil birds (see AMSA 2016).
- Monitoring of damage to coastal reptiles including, numbers of individuals, species present, oil distribution on organisms, mortality rates (see AMSA 2016).

11.6 Data and Information Requirements

This SMP will rely on the outputs from OMP1 and OMP3 on the extent of the oil spill from both the predictions of the oil spill distribution, oil spill surveillance and observational data from the field.

Table 11.4: Data and information requirements for SMP5

Information	Details
Standard Forms for Field Survey	See Table 11.2 and Table 11.3.
Sensitive Resources and Receptors	i.e. Draft EIS, EPs existing environment etc.
OMP3 and SMP2	Results and findings.

Information	Details
Knowledge of current survey designs implemented for other SMP activities	-

11.7 Field Equipment

The following list is not exhaustive, but includes common items that may be used:

- survey platform: vessel to reach remote shoreline areas;
- tide tables;
- clipboards and data sheets;
- radio;
- compass;
- ruler;
- quadrant frames;
- sampling bags;
- sieves;
- spade;
- tape measure;
- flags and stakes (to mark the location of buried oil);
- camera and video equipment; and
- GPS.

11.8 Logistics

Implementation of this SMP will require a field vessel. The vessel specifications should allow for storage of field equipment and samples. It is expected to be similar in size and no larger than the vessels used for the Petroleum Activities Program.

Access to shoreline areas may require Indigenous Land Access Permits and permission from the relevant Traditional Owner and/or Traditional Owner participation.

Refer to Section 3 for deployment of vessels.

11.9 Personnel Resource Requirements

Specific skill sets required to complete the SMP are:

- Capable of conducting sampling (including quadrats, transects),
- Assessment of mangrove health
- Assessment of changes to turtle nesting over time

It is also recommended team members have experience in:

- Conducting field surveys in remote environments

- Understanding of field techniques for impact assessment

Given the potential scale of shoreline contact, one shoreline monitoring team would be required consisting of:

- 2 x Environmental Consultants for fieldwork
- 1 x Environmental Consultant for reporting
- 1 x small vessel for shoreline access
- 2 x Traditional Owners to facilitate site access (depending on impact area, consultation and availability).
- 1 x subject matter expert selected from Table 1.10

11.9.1 Coordination of field teams

Field teams will use individuals who are trained in techniques, procedures, and terminology of shoreline assessment. Team members are required to have a thorough understanding of the response goals and objectives and will consider safety concerns in cleanup recommendations. Shoreline assessments should be carried out by teams assigned to individual, pre-defined coastline segments.

Where more than one survey team are deployed, a Shoreline Assessment Coordinator experienced in hydrocarbon spill assessment and coordination may be required and will act as a communication point between the field teams and the IMT. This coordinator will be providing the following information to the IMT:

- Prioritisation of shoreline segments;
- Consideration of access and staging issues;
- Potential clean up options; and
- Report and map-generation.

Support staff includes office-based personnel, vessel aircraft crews and IMT communications support will be required to support rapid shoreline assessment field.

12. SMP6 – HYDROCARBON FATE AND EFFECTS ASSESSMENT

12.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan in response to a Level 2 or Level 3 spill, as defined in Table 3.1 of the OPEP, or if OMP1, OMP2 or OMP3 indicates there are: • persistent hydrocarbons on or in the water at the end of the response • persistent hydrocarbons in sediments at the end of the response, or • actual or potential impacts on environmental receptors due to the hydrocarbon spill*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency) in response to a Level 2 or Level 3 spill, as defined in Table 3.1 of the OPEP*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

12.2 Monitoring Rationale

This SMP describes the level and type of hydrocarbon of exposure to sensitive receptors at risk as a function of time. This allows a relationship between hydrocarbon exposure and other values to be derived as part of long-term monitoring of the effects of hydrocarbon exposure.

Monitoring requires consistent repeat-measures to determine trends over time. The current SMP is reliant on baseline data; either from existing regional studies or monitoring programs for hydrocarbons in the environment, or from post-spill, pre-impact sampling conducted as part of OMP2. The data collected in response to the incident should be directly comparable to baseline data that results from monitoring results that have been collected as part of OMP2.

In particular, sampling and analysis methods should be consistent to ensure the post incident results are comparable.

12.2.1 Objective

Monitoring objectives are to:

- Understand the distribution and fate of hydrocarbons attributable to the spill through time on the surface, water column and sediments
- Determine the physical properties of the hydrocarbon as it weathers on the sea, on shorelines and in marine sediments
- Determine the chemical properties of the hydrocarbon as it weathers at sea, on shorelines and in marine sediments
- Assess water and sediment quality against accepted guidelines
- Verify the source of identified hydrocarbons and attribute them to the spill, natural, pyrogenic or petrogenic sources.

12.3 Resources Available

See Section 5 OMP2 for resources available to conduct water quality monitoring. Provider mobilisation is summarised in Section 1.5.

12.4 Termination of this Plan

This plan can be terminated by the Control Agency (refer to Table 3.1 of the OPEP) when the following are met:

- Monitoring objectives have been met.
- Consultation with relevant stakeholders has determined that no further monitoring is required.

12.5 Survey Methodology

12.5.1 Hydrocarbon Properties

The extent of the sampling will be dependent on the scale and nature of the hydrocarbon spill. Samples will be taken from on the surface, water column and sediments (shoreline sediments will be collected under SMP5) so that the full geographic extent of the spill is captured.

Water Samples

- Water quality sampling is further detailed in OMP2 (Section 5).

Sediment Samples (shoreline sediments will be taken under SMP5)

- A number of samples should be collected (using a corer/grab) in impacted areas and reference sites.
- The collection of samples in impacted areas can be based on the outcomes of OMP2 and the modelling undertaken in OMP1.

12.5.2 Distribution and Fate of Hydrocarbons

To understand the spatial and temporal distribution of hydrocarbons on and in the sediments and in the water column samples will be collected either along a gradient from the source and/or randomly within target areas. If hydrocarbons are detected on the initial survey, samples will be collected on an ongoing basis to understand temporal extent of hydrocarbons on/in sediments and the water column. The geographic extent of sampling will be dependent on oil distribution and predicted movement (OMP1) and measured hydrocarbons in sediment and within the water column as determined through OMP2.

If specific natural resources are identified to be at risk and the individual scientific monitoring plan is triggered additional sampling locations will be added at relevant impact and reference sites to provide water quality and marine sediment data to assist in determining impacts for those resources.

Sediment Sampling Design

Two types of experimental design will be considered for sediment sampling:

1. Gradient approach.

2. Random sampling with in a target area.

The gradient approach will involve monitoring radially from around the source of the spill and collecting sediment samples along these transects. The exact number and length of transects will be determined based on spatial extent of spill. Samples will be collected on an ongoing basis (if detected during the initial survey and attributable to the spill) until the termination triggers are reached. The frequency will be dependent on the results from the initial survey and the extent and duration of the spill. Subsequent sampling, if required, will occur at fixed sampling sites.

The targeted sampling approach incorporates a BACI design (Before-After-Control-Impact). Outputs from OMP1 will identify potential impact areas which can be sampled which will allow sampling of sediment prior to impact (post-spill) under OMP2. These samples will allow an assessment of hydrocarbon presence and concentration and PSD prior to impact. Impact areas will be based on locations where there is a likelihood of hydrocarbons sinking and becoming entrained in sediments. These areas include:

1. Areas underlying burned or sinking hydrocarbons.

2. Areas which have high levels suspended sediments (generally nearshore areas).

3. Areas underlying convergence zones were hydrocarbons on water can potentially become concentrated.

Within these identified areas sediment samples will be collected from random sites, the number of sites sampled within each area will be dependent on the size of the area. Samples will also be taken from reference sites both prior to the impact (under OMP2) and post the spill response. Samples will be collected on an ongoing basis (if detected during the initial survey and attributable to the spill) until the termination triggers are reached. The frequency will be dependent on the results from the initial survey and the extent and duration of the spill. Subsequent sampling, if required, will occur at fixed sampling sites.

Sediment samples taken using a corer/grab either from a vessel or using an ROV.

Water Quality Sampling Design

Monitoring will be based on a gradient approach to determine both the spatial and temporal distribution of hydrocarbons on the water and entrained within the water column. The geographic extent of the area to be monitored will be based upon the oil distribution and predicted movement of the hydrocarbon spill as determined through OMP1 and measured hydrocarbons in sediment and within the water column as determined through OMP2.

The gradient approach will involve monitoring radially from around the source of the spill and collecting water samples along transects. The exact number and length of transects will be determined based on spatial extent of spill. Samples will be collected on an ongoing basis (if detected during the initial survey and attributable to the spill) until the termination triggers are reached. The frequency will be dependent on the results from the initial survey and the extent and duration of the spill. Subsequent sampling, if required, will occur at fixed sampling sites. Water quality sampling is further detailed in OMP2 (Section 5).

Marine Sediment Sampling

- Marine sediments can be sampled using a corer or grab
- Containers should to be as full as possible so there is no air to minimize volatilization of hydrocarbons
- Appropriate CoC must be maintained and samples secured.

12.6 Data and Information Requirements

This SMP will rely on the outputs from OMP1 on the extent of the oil spill from both the predictions of the oil spill distribution, oil spill surveillance and observational data from the field. Information required includes:

- spill type;
- spill volume and duration;
- spatial extent of the spill and movements; and
- all data collected during OMP2.

Baseline Information

In order to understand the changes in hydrocarbon content on the water, in the water column and within sediments it is necessary to understand the sediment and water quality in the predicted impact areas (and reference areas) prior to the spill event. However as the nature of the Woollybutt crude is that there are few persistence components it is likely that no significant volumes of hydrocarbons will remain within the water column once this SMP is triggered and it unlikely to reach the sediments. Baseline data will be largely comprise of pre-impact/post-spill monitoring or identification of suitable reference sites.

12.7 Field Equipment

Refer to Section 5.6.

12.8 Logistics

Implementation of this SMP will require a field vessel. The vessel specifications should allow for storage of field equipment and samples. It is expected to be similar in size and no larger than the no larger than the vessels used for the Petroleum Activities Program.

See Section 5 OMP2 for logistics related to deployment of water quality monitoring equipment.

Refer to Section 3 for deployment of vessels.

12.9 Personnel Resource Requirements

See Section 5 OMP2 for capability / personnel resourcing requirements related to water quality monitoring.

13. SMP7 – INTERTIDAL AND SUBTIDAL BENTHIC HABITATS

13.1 Activation of this Plan

Well release	Vessel spill
The IMT Leader will activate this plan if it has been observed or is predicted (e.g. through the SMP2 program) that shorelines will be impacted by the hydrocarbon spill and sensitive receptors are present at the affected shorelines*	The IMT Leader will activate this plan if requested by AMSA (the Control Agency) in response to a Level 2 or Level 3 spill (as defined in Table 3.1 of the OPEP)*

* In the event of a Level 2/3 spill entering State waters, DoT is the Control Agency for that portion of the response activity that occurs within State waters.

13.2 Monitoring Rationale

This SMP is designed to monitor the potential impacts to subtidal benthic communities. The purpose is to determine whether any impacts observed at subtidal benthic habitats are attributable to hydrocarbons or whether they may be attributable to natural fluctuations in the physical environment.

13.2.1 Objective

Monitoring objectives are to:

- Collect quantitative data on subtidal habitats that have been exposed to hydrocarbons from the spill as determined by OMP 2
- Monitor recovery to baseline or reference levels.

13.3 Resources Available

See Table 13.1 for available resources. Provider mobilisation is summarised in Section 1.5.

ENI maintains blanket contracts with a panel of HSE consultants that would be used to complete the surveys for SMP7. Consultants on ENI's Environment Panel have demonstrated capability of completing surveys off the West Coast of Australia including dive surveys, drop and towed camera surveys to assess the health of benthic communities.

Specifics and further details on the personnel resource requirements are detailed in Section 13.10.

Table 13.1: Resources available for SMP7

Resources	Provider	Timeframes
Subtidal habitat assessment team	Environmental Panel Contracts and ability to contract third party specialists as detailed in Table 1.8	Contracting timeframe as per Section 1.5.2

Resources	Provider	Timeframes
Vessels	TOLL [redacted]	Visual observations from chartered vessels occur within 72 hours of mobilisation.
ROV Divers	Ability to contract third party providers via TOLL [redacted]	Best endeavours

13.4 Activation of this Plan

The IMT Leader will activate this plan if requested by the Control Agency in response to a Level 2 or Level 3 spill, as defined in Table 3.1 of the OPEP, or if OMP1 shows that submerged benthic communities have been contacted by the spill.

13.5 Termination of this Plan

This plan can be terminated by the Control Agency(refer to Table 3.1 of the OPEP) when the following are met:

- Monitoring objectives have been met.

13.6 Survey Methodology

Survey methodology will be determined dependent on the receptor(s) contacted/potentially contacted. Where enough existing data is available a BACI study design may be considered. A BACI design may also be considered when there is enough time to collect baseline data prior to contact. Where there is no existing data/there isn't time to collect baseline data prior to contact control or reference sites may be used to infer pre-contact health of benthic communities.

Data of subtidal habitats would be collected using one of the below methods:

- ROV data
- Towed/drop camera data
- Diver surveys

Prior to mobilisation the survey design would be agreed in a sampling and analysis plan.

13.7 Data and Information Requirements

This SMP will rely on the outputs from OMP1 on the extent of the oil spill from both the predictions of the oil spill distribution, oil spill surveillance and observational data from the field to inform the survey design.

13.8 Field Equipment

The following list is not exhaustive, but includes common items that may be used:

- Vessel with A-Frame and Winch

- clipboards and data sheets;
- ROV, drop/towed camera system;
- GPS.

13.9 Logistics

Implementation of this SMP will require a field vessel. The vessel specifications should allow for safe deployment of field equipment, including ROV if required. It is expected to be similar in size and no larger than the vessels used for the Petroleum Activities Program.

Refer to Section 3 for deployment of vessels.

13.10 Personnel Resource Requirement

A single team is considered appropriate to implement a gradient monitoring design assessing potential impacts to intertidal and subtidal benthic habitats. The team would consisting of:

- 2 x Environmental consultants for fieldwork;
- 1 x Environmental consultant for reporting;
- 1 x vessel with ROV and operators;
- 1 x commercially qualified diver team (if required);
- 2 x towed/drop camera unit;
- 2 x sediment grabs;
- 1 x subject matter expert selected from Table 1.8.

A team lead/party chief would be required on each vessel with experience in the assessment of subtidal habitats and the deployment of subsea video systems.

14. REFERENCES

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