Table of contents

Page

Part One: Operational Response 6

OPEP Structure 6

1.0 Level response structure 7

2.0 Diesel spill from vessel within petroleum safety zone 8

2.1 Response flow chart 8

2.2 Notification requirements 9

2.3 Surveillance and monitoring 9

2.3.1 Vessel surveillance 9

2.3.2 Aerial surveillance 10

2.3.3 Oil spill trajectory modelling 11

2.4 Operational and scientific monitoring program 12

2.5 Wildlife response 12

2.6 Overall response termination criteria 13

3.0 Crude oil spill from well 14

3.1 Response flow chart 14

3.2 Notification requirements 17

3.3 Source control 17

3.4 Surveillance and monitoring 18

3.4.1 Vessel surveillance 18

3.4.2 Aerial surveillance 19

3.4.3 Oil spill trajectory modelling 20

3.4.4 Satellite imagery 21

3.4.5 Surface slick tracking 21

3.4.6 Airborne remote sensing 21

3.5 Operational and scientific monitoring program 22

3.6 Chemical dispersant 22

3.6.1 Decision making process 22

3.6.2 Surface dispersant application 24

3.7 Containment and recovery 26

3.7.1 Offshore 26

3.7.2 Nearshore 27

3.8 Shoreline protection and clean-up 29

3.8.1 Shoreline assessment and treatment recommendations 30

3.8.2 Shoreline clean-up and monitoring 33

3.9 Wildlife response 34

3.10 Overall response termination criteria 35

4.0 Waste management 37

5.0 Operational and scientific monitoring program 38

Part Two: Planning and preparedness 45

6.0 Introduction 46

6.1 Purpose 46

6.2 Scope 46

6.2.1 Petroleum activity 46

6.2.2 Geographic area 47

6.2.3 Health and safety 48

6.3 Interface with other plans 49

7.0 Spill response framework 50

7.1 Legislative context 50

7.2 Equinor spill response structure 50

7.3 Authorities and control agencies 51

7.3.1 AMSA 51

7.3.2 South Australia 51

7.3.3 Victoria 52

7.3.4 Tasmania 52

7.3.5 Western Australia 52

7.3.6 New South Wales 52

7.3.7 Multi-jurisdictional response 53

7.4 Consultation 53

8.0 Spill scenarios and response options 54

8.1 Types of and characteristics of hydrocarbons 54

8.2 Fate and trajectory of spilled oil 55

8.2.1 Diesel spill from offshore vessel 55
8.2.2 Loss of well control 55
8.3 Risk EMBA 66
8.4 NEBA 66
8.5 Assessment of spill response options for subsea release 68
9.0 Spill response priorities 69
10.0 Spill capability 72
10.1 Tiered response resources 72
10.2 AMOSC 73
10.3 AMSA 73
10.4 State agencies 73
10.4.1 Western Australia 73
10.4.2 South Australia 73
10.4.3 Victoria 73
10.4.4 Tasmania 73
10.4.5 New South Wales 74
10.5 OSRL 74
10.6 Wild Well Control 74
11.0 Training and exercises 75
11.1 Training and competency 75
11.2 Exercises, testing and drills 75
12.0 OPEP Review 77
13.0 Abbreviations 78
14.0 References 79
Appendix 1 Contacts directory 80
Appendix 2 Spill resources inventory 82
Appendix 3 POLREP 110
Appendix 4 Aerial observer log 111

Appendix 5 Bonn agreement oil appearance code 112

Appendix 6 RPS OSTM request Form 113

Appendix 7 Dispersant requirements and availability 114

Appendix 8 Dispersant application log 116

Appendix 9 NEBA information 117

Appendix 10 Surface oil sampling checklist 121

Appendix 11 Shoreline assessment information 122

Tables

Page

Table 1-1 Spill level and response definitions 7

Table 5-1 Operational monitoring program objectives and activation and termination criteria 39

Table 5-2 Scientific monitoring programs objectives and activation and termination criteria 41

Table 6-1 Stromlo-1 location information 46

Table 7-1 Equinor spill response tiers and teams 50

Table 7-2 Summary of relevant statutory agencies/jurisdictional authorities and control agencies 51

Table 8-1 Hydrocarbon properties 54

Table 8-2 Fractional composition of hydrocarbons 54

Table 8-3 Fate of spilled hydrocarbons 54

Table 8-4 Summary of weathered oil contact to shorelines for unmitigated $WCCD_{102d}$ stochastic modelling 58

Table 8-5 Summary of spill scenarios modelled 64

Table 8-6 Thresholds used to define the risk EMBA 66

Table 8-7 Spill response options assessed 68

Table 9-1 Response priorities 69

Table 11-1 Equinor training and competency requirements 75

Table 11-2 Exercises, testing and drills 76

Figures

Page

Figure 2-1 Response flowchart for diesel spill from vessel within PSZ 8

Figure 3-1 Response flowchart for crude oil spill from well 15

Figure 3-2 Source control response team 16

Figure 3-3 Surface dispersant application decision-making process 23

Figure 5-1 OSMP data flow during and after spill response 38

Figure 6-1 Stromlo-1 location, Equinor title and historic exploration wells 47

Figure 6-2 Risk EMBA 48

Figure 6-3 Interaction of this OPEP with Equinor, contractor and Australian agency plans 49

Figure 7-1 Equinor response structure 50

Figure 8-1 Unmitigated stochastic analysis of oil exposure on the sea surface in $WCCD_{102d}$ 57

Figure 8-2 Unmitigated stochastic analysis of shoreline loading from weathered oil in $WCCD_{102d}$ 57

Figure 8-3 Unmitigated deterministic simulation of oil exposure on the sea surface for “fastest time to shore” run from $WCCD_{102d}$ 59

Figure 8-4 Unmitigated deterministic simulation of shoreline loading for “fastest time to shore” run from $WCCD_{102d}$ 60

Figure 8-5 Mitigated (dispersants only) deterministic simulation of oil exposure on the sea surface for “fastest time to shore” 61

Figure 8-6 Mitigated (dispersants and capping stack) deterministic simulation of oil exposure on the sea surface for “fastest time to shore” 61

Figure 8-7 Mitigated (dispersants and BOP intervention) deterministic simulation of oil exposure on the sea surface for “fastest time to shore” 62

Figure 8-8 Mitigated (dispersants only) deterministic simulation of maximum potential shoreline loading for “fastest time to shore” 63

Figure 8-9 Mitigated (dispersants and capping stack) deterministic simulation of maximum potential shoreline loading for “fastest time to shore” 63

Figure 8-10 Mitigated (dispersants and BOP intervention) deterministic simulation of maximum potential shoreline loading for “fastest time to shore” 64

Figure 8-11 NEBA process 67

Figure 9-1 Shoreline and wildlife response timeframes 71

Figure 10-1 Tiered response capability 72

Part One: Operational Response

OPEP Structure

This document has been divided into two distinctive parts to fulfil its operational purpose and meet mandatory legislative requirements:

i. Part One: Operational Response (Sections 1.0 to 5.0)

This is the operational part of the Stromlo-1 Exploration Drilling Program Oil Pollution Emergency Plan (OPEP) and outlines how personnel will respond to an oil spill. The information provided clearly outlines the required actions that will be undertaken by spill responders.

ii. Part Two: Planning and Preparation (Sections 6.0 to 12.0)

This is the non-operational part of the OPEP. The sections provide information related to spill response planning requirements. Detailed preparedness assessments are provided in the EP; therefore, these sections only contain enough information to enable responders to quickly understand the context behind the spill response actions outlined in the operational section of the OPEP.

1.0 Level response structure

The incident classification for an oil spill, including criteria for escalation and de-escalation is provided in Table 1-1.

Table 1-1 Spill level and response definitions

Level	Range of spill volumes and resources required	Escalation criteria	De-escalation criteria
1	0 to 10 m^3 0 to 70 bbl 0 to 10 t Local response resources required (Mobile Offshore Drilling Unit (MODU)/Vessel)	Escalation required if: • evolving nature of release means that spill volume is likely to exceed 10 m^3/70 bbl/10 t • insufficient local resources likely to be available at the well location • potential for exposure of sensitive environmental and/or socioeconomic receptors requires direct escalation to a Level 2 response for prompt mobilisation of additional resources.	NA.
2	10 to 1,000 m^3 70 to 7,000 bbl 10 to 1,000 t Regional to national response resources required (e.g. Australian Marine Oil Spill Centre (AMOSC), states)	Escalation required if: • evolving nature of release means that spill volume is likely to exceed 1,000 m^3/7,000 bbl/1,000 t • insufficient resources are likely to be available on site, regionally or at a national scale • potential for exposure of sensitive environmental and/or socioeconomic receptors requires direct escalation to a Level 3 response for prompt mobilisation of additional resources.	De-escalation when: • spill volume reduced to >10 m^3/70 bbl/10 t • resources are more than that required for spill response (with source controlled and subsequent escalation is unlikely). • no further risk of exposure to sensitive environmental and/or socioeconomic receptors to the spill.
3	>1,000 m^3 >7,000 bbl >1,000 t International response resources required (e.g. Oil Spill Response Limited (OSRL) and Equinor's Global Incident Management Assist Team (GIMAT))	NA.	• spill volume reduced to >1,000 m^3/7,000 bbl/1,000 t • resources are more than that required for spill response (with source controlled and subsequent escalation is unlikely) • no further risk of exposure to sensitive environmental and/or socioeconomic receptors to the spill.

2.0 Diesel spill from vessel within petroleum safety zone

This section describes the actions required for a diesel spill from a vessel that occurs within the petroleum safety zone (PSZ).

2.1 Response flow chart

The flowchart in Figure 2-1 outlines the response options and if they are conducted in parallel or sequential to another option.

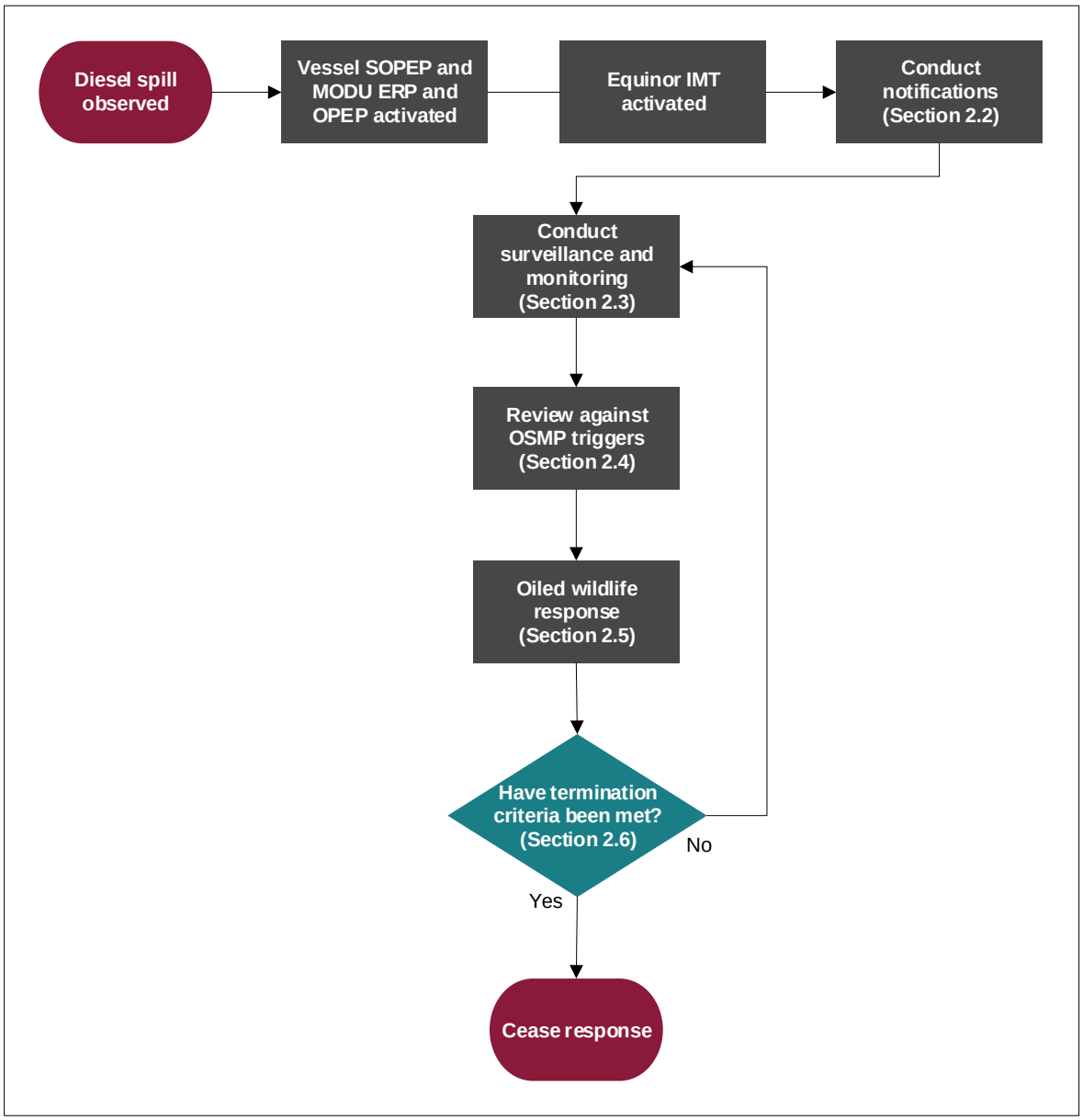


Figure 2-1 Response flowchart for diesel spill from vessel within PSZ

2.2 Notification requirements

Organisation to notify		Who makes contact?	Who to contact?	Communication form	Timeframe to contact
Vessel Company		Vessel Master	Offshore Installation Manager (OIM)	Verbal	As soon as practicable (ASAP)
Equinor		OIM	Drilling Superintendent	Verbal	ASAP
Equinor		Drilling Superintendent	Incident Commander (IC)	Verbal	ASAP
				Written – marine pollution report (POLREP, Appendix 3)	ASAP
Australian Maritime Safety Authority (AMSA)		Vessel Master/IC	+61 2 6230 6811	Online/verbal	ASAP
			http://www.amsa.gov.au/contact-us/	Written – POLREP (Appendix 3)	Post verbal notification
National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)	(if >80L)	IC	+61 8 6461 7090	Verbal	2 hours
			submissions@nopsema.gov.au	Written – POLREP (Appendix 3)	3 days
	(if <80L)	Drilling Superintendent	submissions@nopsema.gov.au	Written – monthly report	No later than 15 days from end of month

2.3 Surveillance and monitoring

2.3.1 Vessel surveillance

Task	Who?
Immediately activate vessel SOPEP and notify OIM and vessel company.	Vessel Master
Immediately activate MODU Emergency Response Plan (ERP) and this OPEP and notify Drilling Superintendent.	OIM
Activate Equinor Incident Management Team (IMT).	Drilling Superintendent.
Determine level of spill and action response flowcharts in this OPEP.	IC
Request any available vessel in close proximity to monitor spill.	IC
Ensure notifications are undertaken in accordance with the table in Section 2.2.	IC
Provide OIM information on spill such as trajectory, appearance and area of coverage.	Vessel Master
Continue to monitor spill through vessel surveillance until: • slick is no longer visible • aerial surveillance has commenced.	

2.3.2 Aerial surveillance

Task	Who?
Contact aviation provider to request aerial surveillance.	Logistics Section Chief
Organise for a trained aerial observer to attend airport (locations and response times are in Appendix 2): • Primary – Equinor • Secondary – AMOSC.	Logistics Section Chief
Supply a copy of the Aerial Observer Log (Appendix 4).	Air Operations Branch Director
Prepare and provide to the aviation contractor a pre-flight information pack containing: **Safety considerations:** • identify and obtain the appropriate personal protective equipment (PPE), aviation lifejackets should be worn in aircraft • identify risks and necessary controls • communicate the risks and controls in place through a pre-operation safety brief. Communications plan that documents: • specific contacts and names of assets deployed • methods of communication with personnel (including the crew of aircraft/vessels) • call signs and radio communication frequencies.	Air Operations Branch Director
Conduct pre-flight briefing, which should include: • location of the area of operation • radio frequencies used in the area and on the response • call signs of other aircraft operating in the vicinity • locations of any temporary or permanent exclusion zones.	Air Operations Branch Director
Use a global positioning system (GPS) to track aerial surveillance operations.	Aerial observer
Conduct localised search: • use the predicted spill location as a starting point and conduct a localised search to determine the exact position of the spill • the aerial observer should sit directly behind the pilot, so the same perspective is shared, making it easier to direct the aircraft to the oil spill • observers will have different perspectives. Ensure a comprehensive hand over brief is given to maintain consistency of approach • fly the length and width of the spill (noting time taken and speed) • record and report observations of wildlife that are present in the area.	Aviation provider and aerial observer
Record aerial surveillance using: • annotated maps or charts • photographs (preferably geo-referenced) • aerial surveillance logs.	Aerial observer

Task	Who?
Undertake calculations (on the return journey or when the aircraft has landed): • calculate distance of spill length or width $$Distance\ of\ slick\ length\ or\ width\ (nm) = \frac{time\ taken\ to\ fly\ (seconds) \times speed\ (knots)}{3600\ (or\ 60\ if\ time\ taken\ to\ fly\ is\ in\ minutes)}$$ • divide answer by 1.85 to convert to km • calculate spill area $$Spill\ area\ (km^2) = length\ (km) \times width\ (km).$$	Aerial observer
Calculate spill volume: • use the Bonn Agreement Oil Appearance Code (BAOAC) (Appendix 5) to estimate the percentage spill coverage • divide the spill into percentage areas based on its appearance (e.g. 10% sheen, 40% rainbow and 50% metallic) • use the following equation to calculate the minimum and maximum spill volume for each oil type: $$Minimum\ spill\ volume\ (km^3) \times area\ covered\ with\ specific\ appearance\ (\%) \times layer\ thickness\ (max\ or\ min)(microns)$$ • add together all the calculated volumes to calculate a total volume.	Aerial observer
Upon completion, provide the following to the logistics section chief: • aerial surveillance logs • location of oil identified (e.g. shown on a map or chart, waypoints on GPS or geo-referenced photo) • quantity of oil observed and calculations • other relevant information on the aerial surveillance operations (e.g. pilot operational hours, fuel logs, maintenance issues, logistical requirements, aerial simultaneous operations (SIMOPS) issues, etc.).	Aviation provider and aerial observer
Continue routine aerial observations daily during daylight hours until: • no slick can be observed.	

2.3.3 Oil spill trajectory modelling

2.3.3.1 Computer modelling

Task	Who?
Complete the RPS oil spill trajectory modelling (OSTM) Request Form (Appendix 6).	Planning Section Chief
Contact the RPS duty officer and email the completed form.	Planning Section Chief
Repeat modelling as required until the response is terminated by the IMT.	

2.3.3.2 Manual calculation

Task	Who?
If computer modelling is not yet available for a specific trajectory calculation, then a manual calculation can be completed.	
Using vectors, draw the resulting distance of 3% of wind speed and 100% of current from the initial spill location for a 1-hour duration.	Planning Section Chief

Task	Who?
Repeat this process for each hour using the new location and predicted wind/current.	Planning Section Chief
Repeat manual calculations as required until other oil spill modelling methods are available to provide the information required.	

2.4 Operational and scientific monitoring program

Task	Who?
Review data from surveillance and monitoring methods and compare against OSMP activation criteria (Section 5.0). Activate OSMP if activation criteria have been met.	Planning Section Chief
Mobilise relevant OSMP resources and commence monitoring in accordance with the requirements of the OSMP.	Planning Section Chief
Continually review OSMP activation criteria and mobilise resources as necessary.	Planning Section Chief
Review OMP termination criteria until termination of spill response phase.	Environmental Unit Leader
Continue SMP activities until termination criteria have been met as per Section 5.0.	

2.5 Wildlife response

<table>
<tr><th colspan="3">Task</th><th>Who?</th></tr>
<tr><td colspan="3">Notify the relevant party when injured/oiled wildlife is confirmed or could potentially occur in Commonwealth or state jurisdiction.
<table><tr><th colspan="2">Location of Wildlife</th><th>Who to contact</th></tr><tr><td colspan="2">Commonwealth Waters</td><td>AMSA</td></tr><tr><td rowspan="5">State Waters</td><td>Western Australia</td><td>Department of Biodiversity Conservation and Attractions</td></tr><tr><td>South Australia</td><td>Department of the Environment, Water and Natural Resources</td></tr><tr><td>Victoria</td><td>Department of Environment, Land, Water and Planning</td></tr><tr><td>Tasmania</td><td>Department of Primary Industries, Parks, Water and Environment</td></tr><tr><td>New South Wales</td><td>Department of Primary Industries</td></tr></table>Note: each state will act as the control agency for their corresponding regions</td><td>IC</td></tr>
<tr><td colspan="3">Provide additional support to the control agency as requested including logistics, equipment, personnel and training.</td><td>IC</td></tr>
<tr><td colspan="3">Activate the relevant SMP depending on species impacted. SMPs can be activated even if activation triggers have not been met.</td><td>Environmental Unit Leader</td></tr>
<tr><td colspan="3">Continue supporting the control agency in oiled wildlife response until:
all injured/oiled wildlife have been treated
control agency have ceased a response under their relevant plans.</td><td></td></tr>
</table>

2.6 Overall response termination criteria

The overall response will terminate once all the following criteria have been met:

- the source of the spill has been controlled such that no further hydrocarbons will be released
- all termination criteria are met for:
  - Section 2.3.1 Vessel surveillance
  - Section 2.3.2 Aerial surveillance
  - Section 2.3.3 Oil spill trajectory modelling
  - Section 2.5 Wildlife response
- it has been identified (e.g. via health and safety assessment or net environmental benefit analysis (NEBA)) that the response strategy is likely to result in an increased risk to human health, or environmental and socioeconomic receptors (hence the response can no longer be defined as being as low as reasonably practicable (ALARP) and acceptable)
- the relevant Commonwealth regulators, government departments involved and AMSA have agreed that response termination criteria have been met.

Equinor will appoint an investigation team following termination of a spill response. This team will be responsible for undertaking:

- an investigation into the cause of the spill. Feedback will be sought from stakeholders as part of the investigation and evaluation of response success (perceived or measured, e.g. through the OSMP)
- an after-action review of both the emergency and spill response actions
- close out of all IMT and emergency response personnel actions
- implementation of a lessons learned assessment process, which will form the basis of a post-incident improvement action plan
- liaison with all involved external agencies to support their post-incident investigations and close-out activities.

3.0 Crude oil spill from well

This section describes the actions required for a spill of crude oil from the well.

3.1 Response flow chart

Figure 3-1 outlines the response options and if they are conducted in parallel or sequential to another option. Figure 3-2 shows the Equinor source control response team that responds to well control events.

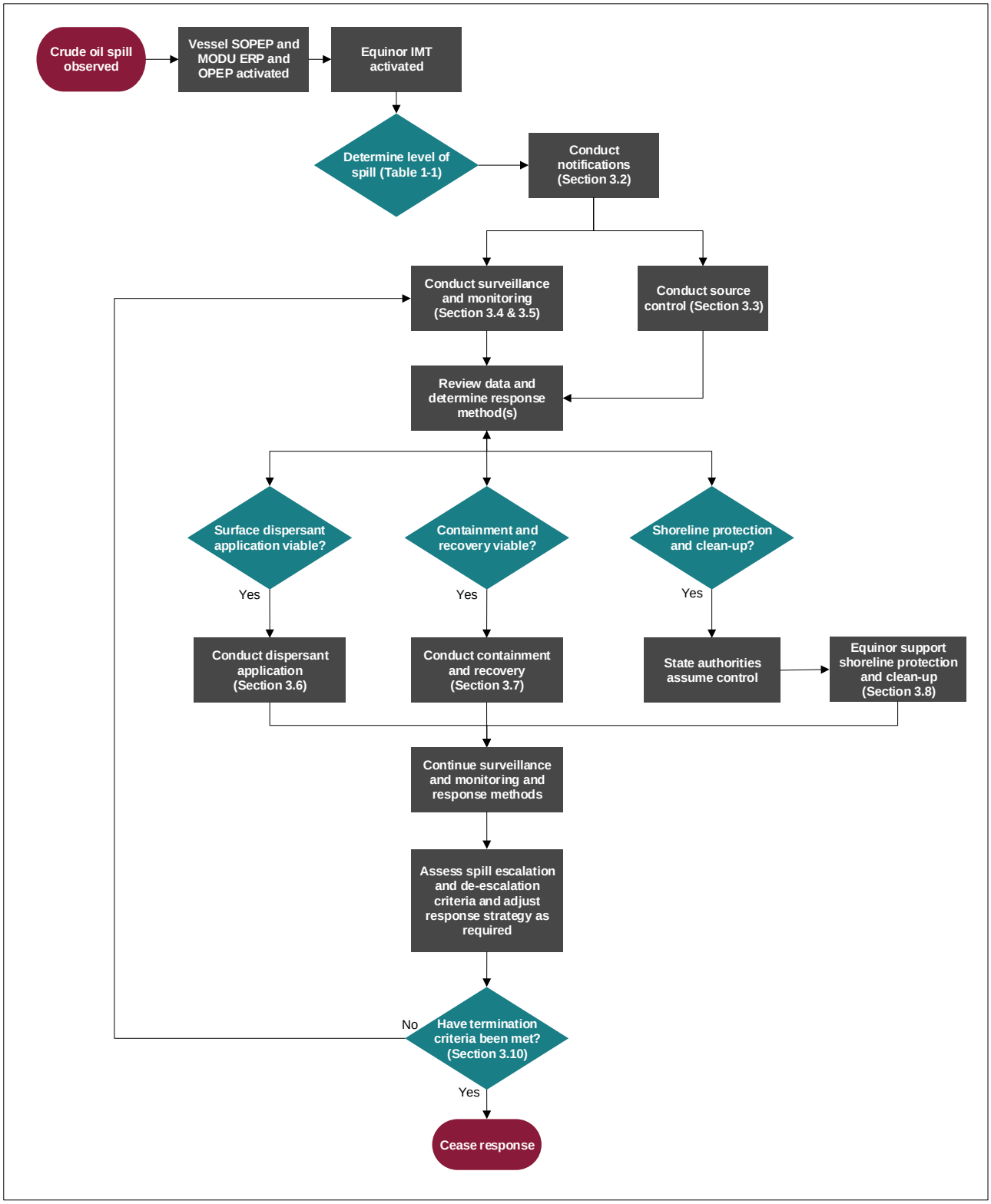


Figure 3-1 Response flowchart for crude oil spill from well

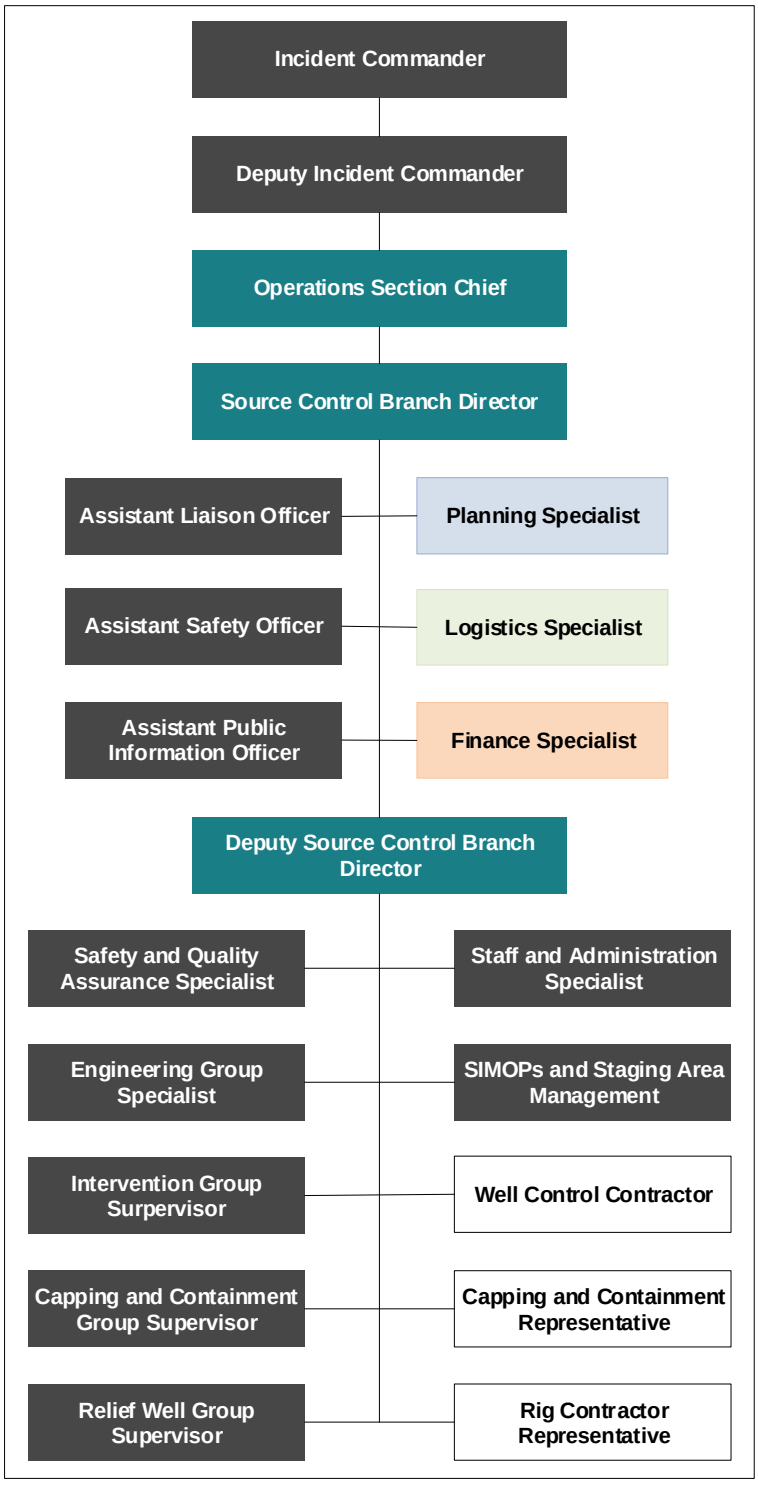


Figure 3-2 Source control response team

3.2 Notification requirements

Organisation		Who makes contact?	Who to contact?	Communication form	Timeframe to contact
Equinor		OIM	Drilling Superintendent	Verbal	ASAP
Equinor		Drilling Superintendent	IC	Verbal	ASAP
				Written – POLREP (Appendix 3)	ASAP
NOPSEMA	If >80 L	IC	Pollution Hotline – +61 8 6461 7090	Verbal	2 hours
			submissions@nopsema.gov.au	Written – POLREP (Appendix 3)	3 days
	If <80 L	Drilling Superintendent	submissions@nopsema.gov.au	Written – Monthly Report	No later than 15 days from end of month
If spill has potential to impact state waters (<3 NM)	SA DPTI[1]	IC	(08) 8248 3505	Verbal	ASAP if spill potentially impacts state waters
	VIC DEDJTR[1]	IC	Portland region: +61 3 5525 0900 (24 hrs) Port Phillip region: +61 3 9644 9777 (24 hrs) Western Port region: +61 428 549 235 (24 hrs) Gippsland region: +61 3 5150 0500 (24 hrs)	Verbal	
	WA DoT[1]	IC	+61 8 9480 9924	Verbal	
	TAS EPA[1]	IC	Control Officer (SOPCA): +61 1800 005 171 Whale Hotline (spill of any size): +61 427 942 537	Verbal	
	Maritime NSW[1]	IC	+61 13 12 36	Verbal	

Note 1: State agency acronyms are as follows: South Australian Department Planning, Transport and Infrastructure (SA DPTI); Victorian Department of Economic Development, Jobs, Transport and Resources (VIC DEDJTR); Western Australian Department of Transport (WA DoT); Tasmanian Environment Protection Authority (TAS EPA); Maritime New South Wales (Maritime NSW).

3.3 Source control

Source control operations will be conducted in accordance with the Stromlo-1 Well Operations Management Plan (WOMP) and the Stromlo-1 Source Control Plan (within the WOMP). The table below provides a high-level overview of the actions that will be undertaken.

Task	Who?
Immediately activate MODU ERP and this OPEP and notify Drilling Superintendent.	OIM
Activate Equinor IMT including additional resources required for source control response (Source Control Response Team).	Drilling Superintendent.
Determine level of spill and action the response flowcharts in this OPEP.	IC
Conduct notifications in accordance with the table in Section 3.2.	IC

Task	Who?
Identify and request the required source control capability and commence mobilisation within 24 hours: • BOP intervention • sea bed debris clearing (if it is required) • well capping stack • subsea dispersant injection (SSDI) • rig for relief well drilling.	Operations Section Chief
Whilst mobilising resources, immediately attempt blowout preventer (BOP) closure. If first attempt is unsuccessful continue to attempt BOP closure/BOP intervention until successful or until capping stack arrives at the well location.	Operations Section Chief
Throughout source control operations conduct practical barrier checks, self-verification and oversight of operations in accordance with the MODU Safety Case (if MODU is not compromised).	Operations Section Chief
Conduct ROV debris clearance around the wellhead/BOP.	Operations Section Chief
As soon as SSDI equipment arrives at the well location, deploy and commence injection of dispersants.	Operations Section Chief
As soon as capping stack is available at the well location, deploy and attempt successful installation. If first attempt of capping stack installation is unsuccessful, continue attempts to install whilst drilling rig is mobilised to the well location.	Operations Section Chief
Spudding of a relief well may be commenced by either the MODU (if operational) or a rig that may be in closer proximity and able to commence drilling, until the relief well rig arrives. As soon as relief well drilling rig reaches well location, spud the well (if not already undertaken) and commence drilling of relief well to intercept and kill the well. Drilling the relief well may be commenced while attempts are still being made to install the capping stack	Operations Section Chief
Conduct drill fluid and cementing in accordance with the Stromlo-1 WOMP and Source Control Plan.	Operations Section Chief
Commence dynamic kill immediately upon penetration of the target wellbore and continue pumping until the blowout is dead.	Operations Section Chief
Provide IMT with the following records: • bridge logs verify source control procedures were followed • daily incident monitoring reports verify that surveillance and monitoring has been undertaken • daily drilling reports • IMT log • self-verification and audit records.	Operations Section Chief

3.4 Surveillance and monitoring

3.4.1 Vessel surveillance

Task	Who?
Request any available vessel in close proximity to monitor spill.	OIM
Provide OIM information on spill such as trajectory, appearance and area of coverage.	Vessel Master
Continue to monitor spill through vessel surveillance until: • oil is no longer visible • aerial surveillance has commenced.	

3.4.2 Aerial surveillance

Task	Who?
Contact aviation provider to request aerial surveillance.	Logistics Section Chief
Organise for trained aerial observers to attend airport (locations and response times are in Appendix 2): • Primary – Equinor • Secondary – AMOSC.	Logistics Section Chief
Supply copies of the Aerial Observer Log (Appendix 4) to aerial observers.	Logistics Section Chief
Prepare and provide to the aviation contractor a pre-flight information pack containing: **Safety considerations:** • identify and obtain the appropriate PPE, aviation lifejackets should be worn in aircraft • identify risks and necessary controls • communicate the risks and controls in place through a pre-operation safety brief. **Communications plan that documents:** • specific contacts and names of assets deployed • methods of communication with personnel (including the crew of aircraft/vessels) • call signs and radio communication frequencies.	Logistics Section Chief
Conduct pre-flight briefing, which should include: • location of the area of operation • radio frequencies used in the area and on the response • call signs of other aircraft operating in the vicinity • locations of any temporary or permanent exclusion zones.	Logistics Section Chief
Use a GPS tracking system to track aerial surveillance operations.	Aerial observer
Conduct localised search: • use the predicted spill location as a starting point and conduct a localised search to determine the exact position of the spill. • the aerial observer should sit directly behind the pilot, so the same perspective is shared, making it easier to direct the aircraft to the oil spill. • observers will have different perspectives. Ensure a comprehensive hand over brief is given to maintain consistency of approach. • fly the length and width of the spill (noting time taken and speed). • record and report observations of for wildlife that are present in the area.	Aviation provider and aerial observer
Record aerial surveillance observations using: • annotated maps or charts • photographs (preferably geo-referenced) • aerial surveillance logs.	Aerial observer

Task	Who?
Undertake calculations (on the return journey or when the aircraft has landed): • calculate distance of spill length or width $$Distance\ of\ slick\ length\ or\ width\ (nm) = \frac{time\ taken\ to\ fly\ (seconds) \times speed\ (knots)}{3600\ (or\ 60\ if\ time\ taken\ to\ fly\ is\ in\ minutes)}$$ • divide answer by 1.85 to convert to km • calculate spill area $$Spill\ area\ (km^2) = length\ (km) \times width\ (km).$$	Aerial observer
Calculate spill volume: • use the BAOAC (Appendix 5) to estimate the percentage spill coverage • divide the spill into percentage areas based on its appearance (e.g. 10% sheen, 40% rainbow and 50% metallic) • use the following equation to calculate the minimum and maximum spill volume for each oil type: $$Minimum\ spill\ volume\ (km^3) \times area\ covered\ with\ specific\ appearance\ (\%) \times layer\ thickness\ (max\ or\ min)(microns)$$ • add together all the calculated volumes to calculate a total volume.	Aerial observer
Upon completion, provide the following to the logistics section chief: • aerial observer logs • location of oil identified (e.g. shown on a map or chart, waypoints on GPS or geo-referenced photo) • quantity of oil observed and calculations • other relevant information on the aerial surveillance operations (e.g. pilot operational hours, fuel logs, maintenance issues, logistical requirements, aerial SIMOPS issues, etc.).	Aviation provider and aerial observer
Continue routine aerial observations during daylight hours until: • no slick can be observed.	

3.4.3 Oil spill trajectory modelling

3.4.3.1 Computer modelling

Task	Who?
Complete the RPS OSTM Request Form (Appendix 6).	Planning Section Chief
Contact the RPS duty officer and email the completed form.	Planning Section Chief
Repeat modelling as required until the response is terminated by the IMT and/or state control agency(s).	

3.4.3.2 Manual calculation

Task	Who?
If computer modelling is not yet available for a specific trajectory calculation, then a manual calculation can be completed.	
Using vectors, draw the resulting distance of 3% of wind speed and 100% of current from the initial spill location for a 1-hour duration.	Planning Section Chief

Task	Who?
Repeat this process for each hour using the new location and predicted wind/current.	Planning Section Chief
Repeat manual calculations as required until other oil spill modelling methods are available to provide the information required.	

3.4.4 Satellite imagery

Task	Who?
Contact satellite imagery provider (locations and response times are in Appendix 2): • Primary –Kongsberg Satellite Services (KSAT). • Secondary – Maxar Technologies Limited (via OSRL).	Logistics Section Officer
Setup a forward/routine schedule for satellite imagery capture.	Planning Section Chief
Continue to receive and assess satellite imagery until the response is terminated by the IMT and/or state control agency(s).	

3.4.5 Surface slick tracking

Task	Who?
Request tracking buoys (locations and response times are in Appendix 2): • Initial response – units stored on support vessel • Primary supplier – AMOSC • Secondary supplier – OSRL.	Logistics Section Officer
Organise for tracking buoys to be deployed from a vessel at spill extremities.	Logistics Section Chief
Monitor movement of tracking buoys and deploy additional buoys if required.	Operations Section Chief
Analyse information from tracking buoys in conjunction with data from other surveillance and monitoring methods.	Planning Section Chief
Repeat review process until: • subsea flow has ceased • no observations of oil at sea for ten days.	

3.4.6 Airborne remote sensing

Task	Who?
Activate surveillance aircraft with airborne remote sensing capability for initial survey: • ultra violet images – small slicks. • Side-Looking Airborne Rader – large slicks (image resolution 20 m^2).	Logistics Section Officer
Mobilise and execute routine airborne remote sensing.	Logistics Section Officer
Analyse information from remote sensing in conjunction with data from other surveillance and monitoring methods.	Planning Section Chief

Task	Who?
Continue routine airborne remote sensing as required until: • subsea flow has ceased • no observations of oil at sea for ten days.	

3.5 Operational and scientific monitoring program

Task	Who?
Review data from surveillance and monitoring methods and compare against OSMP activation criteria (Section 5.0). Activate OSMP if activation criteria have been met.	Planning Section Chief
Mobilise OSMP resources and commence monitoring in accordance with the requirements of the OSMP.	Logistics Section Officer
Continually review OSMP activation criteria and mobilise resources as necessary.	Planning Section Chief
Review OMP termination criteria until termination of response.	Environmental Unit Leader
Continue SMP activities until termination criteria have been met as per Section 5.0.	

3.6 Chemical dispersant

3.6.1 Decision making process

Determine if the surface application of chemical dispersant is viable using the process in Figure 3-3.

If viable, dispersants approved under the National Plan and listed in the Register of Oil Spill Control Agents (OSCA Register) will be used (Dasic Slickgone and Total Finasol). Dispersants with transitional acceptance would only be considered in the unlikely event that a shortfall in supply were to occur.

Daily dispersant requirements were estimated based on the use of surface dispersant application from day one of a response and SSDI from day nine, until well kill on day 102. This information was compared with the predicted volumes of dispersants available within Australia and internationally from AMSA, AMOSC, OSRL and mutual aid. The results are provided in Appendix 7.

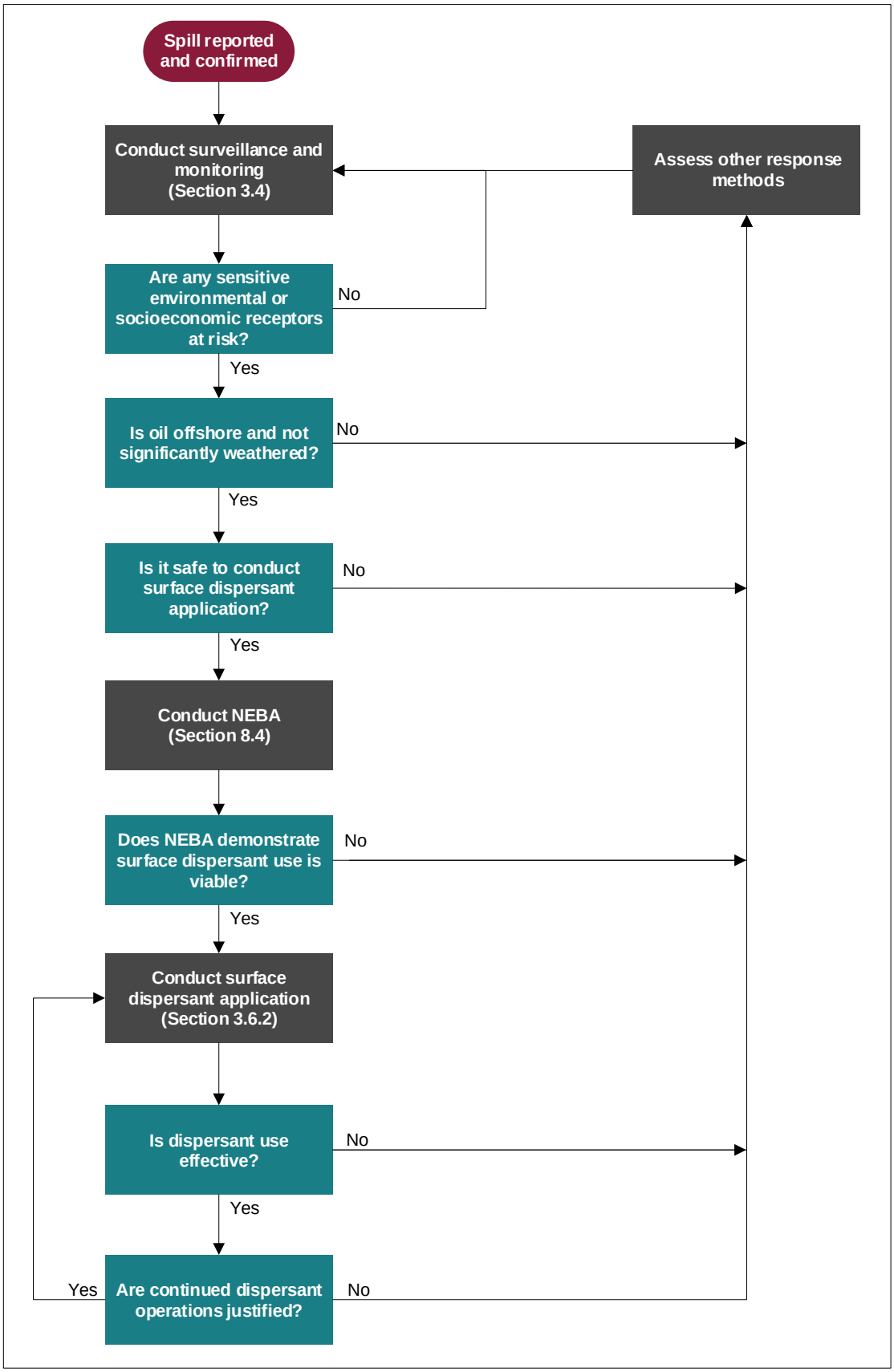


Figure 3-3 Surface dispersant application decision-making process

3.6.2 Surface dispersant application

Ensure surface dispersant application is undertaken in accordance with the Surface Dispersant Tactical Response Plan (TRP) and the Equinor Aviation Operations Plan (for aerial dispersant application).

Task	Who?
Direct PSVs with dispersant capability to mobilise dispersant stored at marine supply base in Adelaide to well location.	Logistics Section Chief
Contact aviation providers to request aerial dispersant aircraft and mobilise/prepare any additional support (locations and response times are in Appendix 2): • Primary – AMSA (Aerotech 1st Response) • Secondary – OSRL.	Logistics Section Chief
Contact dispersant suppliers and mobilise required volumes of dispersants (locations and response times are in Appendix 2): • Primary – AMOSC • Secondary – OSRL • Tertiary – international manufacturers.	Logistics Section Chief
At the same time mobilisation is occurring, plan surface dispersant operations taking into consideration: • the estimated volume of dispersant required, based on surveillance and monitoring information • availability of dispersants and dispersant supply chain to airports • field testing of dispersant efficacy • aerial application methods (e.g. ladder or zig-zag patterns) • requirement to engage additional aircraft and personnel if necessary to ensure continuous operations (as pilots will be restricted in their operational flight and duty times for health and safety reasons) • the potential longevity of the response • potential down-time for aircraft maintenance • the location of operational aircraft (i.e. Ceduna for Aerotech or Adelaide for OSRL) • limitations of aircraft operating from Ceduna (e.g. capacity of the airport, safety planning for aerial SIMOPS) • any approval requirements (if slick has potential to travel into state waters).	Logistics Section Chief
If it is decided that vessels will apply dispersant, direct vessels to the areas with the highest concentrations of oil. Vessels will only be active during daylight hours.	Operations Section Chief
Prepare and provide to the aviation contractor a pre-flight information pack containing: **Safety considerations:** • identify and obtain the appropriate PPE, aviation lifejackets should be worn in aircraft • identify risks and necessary controls • communicate the risks and controls in place through a pre-operation safety brief. **Communications plan that documents:** • specific contacts and names of assets deployed • methods of communication with personnel (including the crew of aircraft/vessels) • call signs and radio communication frequencies.	Air Operations Branch Director
Supply a copy of the dispersant application log (Appendix 8) to aviation contractor personnel.	Logistics Section Chief

Task	Who?
Conduct pre-flight briefing, which should include: • location of the area of operation • radio frequencies used in the area and on the response • call signs of other aircraft operating in the vicinity • locations of any temporary or permanent exclusion zones.	Air Operations Branch Director
Disseminate aerial flight plans to personnel.	Air Operations Branch Director
Aircraft to mobilise according to flight plans via the defined flight corridors to the dispersant spray zone under “freelance control”.	Air Operations Branch Director
Air Operations Branch Director will issue any path corrections and “directions to spray” to the dispersant aircraft.	Air Operations Branch Director
The Air Operations Branch Director will direct the tactical operation of aircraft onto a spraying area and shall maintain radio contact with the large and small dispersant aircraft as they approach the spray zones.	Air Operations Branch Director
Aircraft to queue up on approach and Air Operations Branch Director will direct them to spray one after another according to the chosen application pattern.	Air Operations Branch Director
Vessel and aircraft personnel to monitor for wildlife that may be present in the area and report sightings to the IMT.	Vessel and aircraft observers
Conduct visual observations to determine dispersant effectiveness noting the following: • yellow, coffee or grey coloured slick (exact colour will vary depending on the original colour of the spill) • if the oil spill surface area has reduced • if oil is rapidly disappearing from the surface • if oil in some areas is being dispersed, leaving only a sheen on the surface. Note: The colour change may not be seen immediately, time should be given to permit the dispersion process to take place. This is particularly important for more viscous oils.	Vessel and aircraft observers
Supplement visual observations with a small-scale test spray to determine dispersant efficacy before continued, large scale spray operations.	Vessel Master
Aircraft to use separate site egress back to their respective airports under “freelance” control during ‘change-overs’.	Aviation provider
Record and report the following to the IMT: • amounts and locations of dispersant sprayed • location of oil treated (either on map/chart, waypoints on GPS or georeferenced photo on mapping software) • method of dispersant application • time at which dispersant was applied • weather and sea state • visual observations of effectiveness • fluorometry measurements • degree of weathering and thickness of oil prior to dispersant application • any receptors that have been or may be impacted by the oil or dispersant application (e.g. marine mammals, seabirds, etc.).	Logistics Section Chief, Operations Section Chief, Planning Section Chief, Environmental Unit Leader

Task	Who?
Execute surface dispersant operations until the following termination criteria are reached: • dispersant is ineffective (based on in-field testing) or no longer effective (due to weathering) • NEBA assessment identifies that continued operations are likely to increase environmental/socio-economic risk • monitoring indicates negative impacts of surface dispersant application to environmental/socio-economic sensitivities • surface hydrocarbons are discontinuous/patchy or at a thickness considered insufficient for effective dispersant use • the cost of continued surface dispersant application is grossly disproportionate to the potential environmental/socio-economic benefit gained.	

3.7 Containment and recovery

Ensure containment and recovery operations are undertaken in accordance with the Containment and Recovery TRP.

3.7.1 Offshore

Task	Who?
Mobilise PSVs with containment and recovery capability to well location.	Logistics Section Chief
Contact providers of containment and recovery equipment and personnel and request mobilisation to marine supply base in Adelaide (locations and response times are in Appendix 2): • Primary – AMOSC/AMSA • Secondary – OSRL.	Logistics Section Chief
Prepare a Communications Plan that documents: • specific contacts and names of assets deployed • methods of communication with personnel (including the crew of aircraft/vessels) • call signs and radio communication frequencies • communicate this information to personnel.	Planning Section Chief
Determine containment and recovery zones of response and operations daily, considering the following: • weather and sea state • health, safety and operational limitations (e.g. exclusion from aerial dispersant zone) • equipment variations (personnel training, availability of equipment) • minimal personnel numbers and any necessary adjustments.	Operations Section Chief
Conduct necessary toolbox talks.	Recovery Branch Director
Conduct Safety Job Analyses (SJAs).	Safety Officer
Prepare heavy duty offshore single-vessel containment and recovery system that includes skimmer on deck of vessel then deploy using boom vane single vessel configuration.	Operations Section Chief
Set up and secure temporary storage.	Logistics Section Chief

Task	Who?
Prior to deployment ensure that equipment is correctly connected. Do not proceed with deployment until certain that all equipment is secured.	Operations Section Chief/ Recovery Branch Director
Conduct containment operations to corral floating oil.	Operations Section Chief/ Recovery Branch Director
Prepare and launch skimmer from vessel into heavy duty offshore single-vessel containment and recovery system to recover contained oil.	Operations Section Chief/ Recovery Branch Director
Recover oil and transfer to temporary storage until temporary storage capacity is reached.	Operations Section Chief/ Recovery Branch Director
Coordinate safe transfer and offload of stored oil to tanker or waste treatment facility prior to redeployment.	Operations Section Chief/ Recovery Branch Director
Ensure that all vessels involved in the operations adhere to the agreed communications protocols during deployment.	Operations Section Chief/ Recovery Branch Director
Report sightings of sensitive receptors or oiled wildlife via direct communications (VHF, satellite phone or mobile phone) to the IC.	Operations Section Chief/ Recovery Branch Director
Record and report field observations to the IMT.	Operations Section Chief
Manage waste in accordance with the Stromlo-1 Waste Management Plan.	Logistics Section Chief/ Operations Section Chief
Provide the following records to the IMT: • daily log of containment and recovery operations/individual logs • toolbox talk and SJA checklists • operational constraints checklists • vessel surveillance records • records of sightings of sensitive receptors or oiled wildlife • records for types and quantities of oil recovered (this can be calculated on the aerial surveillance log) • records of final storage locations of recovered oil.	Logistics Section Chief/ Operations Section Chief
Execute offshore containment and recovery operations until the following termination criteria are reached: • encounter rate of oil is not large enough to effectively capture • NEBA assessment identifies that continued operations are likely to increase environmental/socio-economic risk • The cost of continued operations is grossly disproportionate to the potential environmental/socio-economic benefit gained.	

3.7.2 Nearshore

Within state waters (<3 NM) the states are the control agencies and Equinor will take direction from them on how nearshore containment and response will be conducted and the resources required.

Task	Who?
Liaise with relevant state control agencies to determine support requirements	IC/Planning Section Chief/ Logistics Section Chief

Task	Who?
If within state waters, nearshore response will be directed and managed by the state control agency. The actions below are examples of tasks that may be undertaken at the direction of the state control agency. The corresponding Equinor IMT role is identified.	
Contact providers of containment and recovery equipment, including Vessels of Opportunity (VoOs) and request mobilisation to marine supply base in Adelaide (locations and response times are in Appendix 2): • VoOs – regional providers • equipment – AMSA and/or AMOSC.	State control agency (supported by Logistics Section Chief)
Prepare a Communications Plan that documents: • specific contacts and names of assets deployed • methods of communication with personnel (including the crew of aircraft/vessels) • call signs and radio communication frequencies • communicate this information to personnel.	State control agency (supported by Planning Section Chief)
Determine containment and recovery zones of response and operations daily, considering the following: • weather and sea state • operational limitations • equipment variations (personnel training, availability of equipment) • minimal personnel numbers and any necessary adjustments.	State control agency (supported by Operations Section Chief)
Conduct necessary toolbox talks.	State control agency (supported by Operations Section Chief)
Conduct SJAs.	State control agency (supported by Safety Officer)
Set up and secure temporary storage.	State control agency (supported by Logistics Section Chief/ Recovery Branch Director)
Prepare single-vessel containment and recovery systems on vessels and deploy. Prior to deployment ensure that equipment is correctly connected. Do not proceed with deployment until certain that all equipment is secured.	State control agency (supported by Recovery Branch Director)
Conduct containment operations to corral floating oil.	State control agency (supported by Recovery Branch Director)
Prepare and launch skimmers from vessels to recover contained oil.	State control agency (supported by Recovery Branch Director)
Recover oil and transfer to temporary storage until temporary storage capacity is reached.	State control agency (supported by Recovery Branch Director)
Coordinate safe transfer and offload of stored oil to barge prior to redeployment.	State control agency (supported by Recovery Branch Director)
Ensure that all vessels involved in the operations adhere to the agreed communications protocols during deployment.	State control agency (supported by Recovery Branch Director)
Report sightings of sensitive receptors or oiled wildlife via direct communications (VHF, satellite phone or mobile phone) to the IC.	State control agency (supported by Recovery Branch Director)

Task	Who?
Recovery Branch Director to record and report sightings to Operations Section Chief who will report to IMT.	State control agency (supported by Recovery Branch Director)
Manage waste in accordance with the Stromlo-1 Waste Management Plan.	State control agency (supported by Logistics Section Chief/Operations Section Chief)
Provide the following records to the IMTs: • Daily log of containment and recovery operations / Individual logs • Toolbox talk and SJA checklists • Operational constraints checklists • Records of sightings of sensitive receptors or oiled wildlife. • Records for types and quantities of oil recovered (this can be calculated on the aerial surveillance log) • Records of final storage locations of recovered oil.	State control agency (supported by Recovery Branch Director)
Execute nearshore containment and recovery operations until the following termination criteria are reached: • encounter rate of oil is not large enough to effectively capture • NEBA assessment identifies that continued operations are likely to increase environmental/socio-economic risk • the cost of continued containment and recovery operations is grossly disproportionate to the potential environmental/socio-economic benefit gained • state control agency terminates response.	

3.8 Shoreline protection and clean-up

Shoreline protection and clean-up will be directed by the relevant state control agency(s). Equinor will provide support to the state control agency which could include providing equipment, trained personnel, technical specialists and 'just-in-time' training for unskilled personnel. There is an existing draft Shoreline Protection and Deflection TRP that can be updated and implemented (if directed by the control agency).

3.8.1 Shoreline assessment and treatment recommendations

Task	Who?
Liaise with and assist relevant control agency to determine potentially impacted environmental sensitivities and rank priority for protection/clean-up.	Environmental Unit Leader
If within state waters, shoreline response will be directed and managed by the state control agency. The actions below are examples of tasks that may be undertaken at the direction of the state control agency. The corresponding Equinor IMT role is identified.	
Update existing site-specific TRPs or develop site-specific TRPs for new areas as needed. New sites identified according to the primary, secondary or tertiary criteria. Shoreline TRPs will contain: **Primary impacted sites:** • TRP reference – sector, segment(s), coordinates • site details – site location image, site description, site access, site constraints, main sensitivities and facilities/services • response information – response tasks, rationale, site reference and response checklist • site setup – schematic illustrating site zoning, control, waste and decontamination • concept of operations – guide to response deployment including boom placement, anchoring and oil recovery (where appropriate) • tactical assignments – response tasking and considerations, response personnel and communications • resources – inventory of personnel, oil spill equipment, vehicles/vessels, and site support resources required • personnel and emergency information – to be populated prior to implementation. **Secondary impacted sites:** • TRP reference – sector, segment(s), coordinates • site details – site location image, site description, site access, main sensitivities and facilities/services • site reference – site reference image • response – site response justification, response initiation tasks, actions required, site assessment checklist and local information. **Tertiary impacted sites:** • TRP reference – sector, segment(s), coordinates • site details – site location image, site description, site access, site constraints, main sensitivities and facilities/services.	State control agency (supported by Planning Section Chief/ AMOSC)
Prepare a Communications Plan that documents: • specific contacts and names of assets, personnel, equipment deployed • methods of communication with personnel (including the crew of vessels, shoreline personnel, aircraft conducting surveillance) • call signs and radio communication frequencies • communicate this information to personnel.	State control agency (supported by Logistics Section Chief)

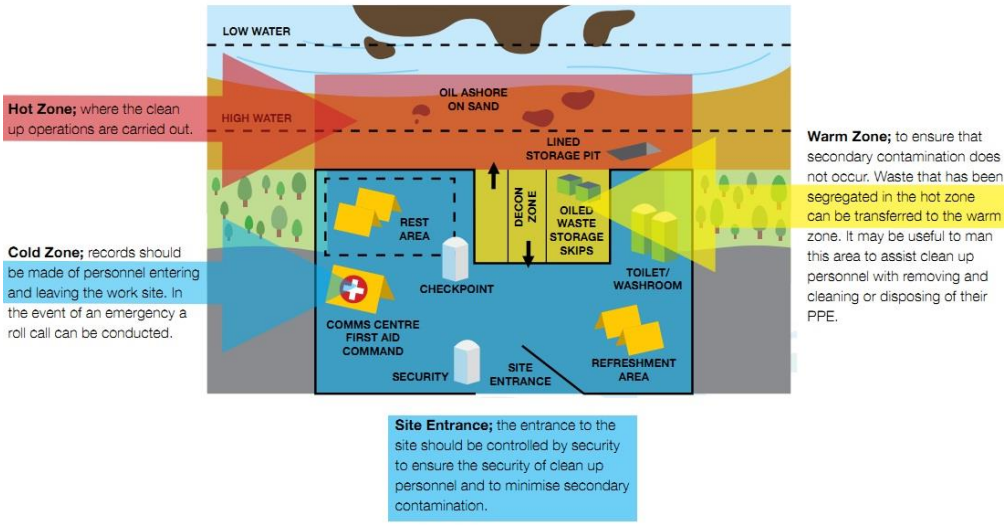
Task	Who?
Prepare the following: • report/log forms • method of communications (e.g. mobile, satellite phones, VHF radio) • handheld GPS and spare batteries • digital camera and spare batteries • compass • ruler for scale when taking photos • tape measure • flags or stakes (to mark the location of buried oil).	State control agency (supported by Logistics Section Chief)
Use oil spill modelling to determine potential extent of shoreline oiling and communicate to IMT and state control agency when results are available.	State control agency (supported by Environmental Unit Leader)
Where requested by state control agencies, form shoreline assessment field teams that should include: • representatives from Equinor, State authorities and relevant land managers • representatives trained in the shoreline clean-up and assessment technique (SCAT) • technical experts on the environmental and socioeconomic sensitivities that have been or may be impacted • representatives with designated responsibility for the environmental and socioeconomic sensitivities that may be impacted.	State control agency (supported by Environmental Unit Leader)
Using the SCAT, divide the shoreline into segments. Segments are defined geographic areas of similar physical features and sediment types. Subsegments can be used if the extent of oiling varies significantly between a given segment.	State control agency (supported by Environmental Unit Leader)

<table>
<tr><th>Task</th><th>Who?</th></tr>
<tr><td>Identify shoreline ranking by assigning an Environmental Sensitivity Index (ESI) rank from 1-10 (where 10 is most sensitive). Use information from the following sources:
over flights
aerial photography
remotely sensed data
ground truthing
existing maps and data.
<table>
<tr><th>NOAA ESI Value</th><th>Shoreline Type</th></tr>
<tr><td>1</td><td>Exposed rocky shore</td></tr>
<tr><td>2</td><td>Exposed rocky platforms</td></tr>
<tr><td>3</td><td>Fine grained sand beaches</td></tr>
<tr><td>4</td><td>Coarse grained sand beaches</td></tr>
<tr><td>5</td><td>Mixed sand and gravel beaches</td></tr>
<tr><td>6a</td><td>Gravel beaches</td></tr>
<tr><td>6b</td><td>Riprap structures</td></tr>
<tr><td>7</td><td>Exposed tidal flats</td></tr>
<tr><td>8a</td><td>Sheltered rocky shores</td></tr>
<tr><td>8b</td><td>Sheltered artificial structures</td></tr>
<tr><td>9</td><td>Sheltered tidal flats</td></tr>
<tr><td>10a</td><td>Salt to brackish marshes</td></tr>
<tr><td>10b</td><td>Freshwater marshes</td></tr>
<tr><td>10c</td><td>Swamps</td></tr>
<tr><td>10d</td><td>Mangroves</td></tr>
</table></td><td>State control agency (supported by Environmental Unit Leader)</td></tr>
<tr><td>Agree standardised descriptions for the oil that will be observed during shoreline surveys.</td><td>State control agency (supported by Environmental Unit Leader)</td></tr>
<tr><td>Assess shoreline segments:
utilising the SCAT, visit each segment of shoreline, initially focusing on those segments most likely to be impacted.
assess the nature and the degree of oiling, sensitivity of the shoreline and any specific constraints (e.g. logistical, environmental, and cultural) that might affect clean-up operations.</td><td>State control agency (supported by Environmental Unit Leader)</td></tr>
<tr><td>Identify the shoreline clean-up methods that will be used based on the type of shoreline and the level of oiling. A key consideration when selecting clean-up methods is minimising the risk of further damage to habitats and resources from the clean-up activities themselves.</td><td>State control agency (supported by Environmental Unit Leader)</td></tr>
<tr><td>Develop recommendations for clean-up. The shoreline assessment teams will develop shoreline treatment recommendations (STRs) for each segment of shoreline. Clean-up of shorelines should be undertaken in a phased manner by first removing primary/bulk oil, before secondary and “fine cleaning” is undertaken.</td><td>State control agency (supported by Environmental Unit Leader)</td></tr>
</table>

<table>
<tr><th>Task</th><th>Who?</th></tr>
<tr><td>Establish clean-up termination criteria with state agencies. Identifying these early enables clean-up methods are selected to meet the end points.
<table>
<tr><th>Termination criteria</th><th>Description</th></tr>
<tr><td>No visible oil</td><td>Often used for sand beaches where oil removal can be effective without delaying resource recovery.</td></tr>
<tr><td>No more than background oil</td><td>Often applied where there is significant background rate of tar ball deposition on the shoreline.</td></tr>
<tr><td>No longer releases sheen that will affect sensitive areas, wildlife or human health</td><td>Used where sheening persists after clean-up efforts become ineffective or on sensitive habitats where further clean-up efforts will cause more harm than natural removal. Residual sheening should persist over a relatively short time period.</td></tr>
<tr><td>No longer rubs off on contact</td><td>Defined as removal to a stain or coat or weathering to a point where it is no longer sticky. This is appropriate for hard substrates.</td></tr>
<tr><td>Oil removal to allow recovery without causing more harm than natural removal of oil residues</td><td>Used where further oil removal will result in excessive habitat disruption or high biota mortality.</td></tr>
</table></td><td>State control agency (supported by Environmental Unit Leader)</td></tr>
<tr><td>Communicate STRs and endpoints to the IMT.</td><td>State control agency (supported by Environmental Unit Leader)</td></tr>
<tr><td>Consult with other agencies and stakeholders on the STRs and termination criteria.
When agreement is reached between stakeholders (or when directed by the control agency), recommendations to be approved for implementation.</td><td>State control agency</td></tr>
</table>

3.8.2 Shoreline clean-up and monitoring

Task	Who?
Liaise with and assist relevant control agency to determine clean-up/monitoring activity requirements including additional support	Environmental Unit Leader
The state control agency will direct and manage shoreline response operations. The actions below are examples of tasks that may be undertaken under the direction of the state control agency. The corresponding Equinor IMT role is identified.	
Using shoreline resource tables in the appendices of the Shoreline Protection and Deflection TRP (or similar) determine the type, quantity and location of: • nearshore and shoreline boom required • ancillaries to establish those boom sets • skimming systems or vacuum trucks • decontamination equipment • personnel (specialised and unskilled).	State control agency (supported by Environmental Unit Leader)
Mobilise identified resources to specific Forward Operating Bases laydown areas/deployment sites.	State control agency (supported by Logistics Section Chief)

Task	Who?
Plan the onshore site set-up to minimise the potential for secondary contamination and ensure site security. Identify cold, warm and hot zones for each site. 	State control agency (supported by Operations Section Chief)
Issue and execute field orders for clean-up of oil.	State control agency (supported by Operations Section Chief)
Identify when pre-agreed termination criteria have been reached, conduct survey to confirm this and produce a shoreline inspection report (SIR). Review the SIR to confirm: • the clean-up has met its intended goals • if recommendations for further work have been made, or alternatively, if shoreline segment conditions acceptable and may be signed-off.	State control agency (supported by Environmental Unit Leader)
IMT to be provided with: • shoreline assessment records (maps, photos, logs) • records of STRs, end points, any relevant approvals obtained, stakeholders involved in agreement • shoreline assessments and treatment recommendations • records of field orders executed • SIRs and approval/sign off response completion.	State control agency (supported by Environmental Unit Leader)

3.9 Wildlife response

Wildlife protection and response operations will be directed by the relevant state control agency(s). Equinor will provide support to the state control agency which could include providing equipment, trained personnel, technical specialists and training for unskilled personnel.

<table>
<tr><th>Task</th><th>Who?</th></tr>
<tr><td>Notify the relevant party when injured/oiled wildlife is confirmed or could potentially occur.
<table>
<tr><th colspan="2">Location of wildlife</th><th>Who to contact</th></tr>
<tr><td colspan="2">Commonwealth Waters</td><td>AMSA</td></tr>
<tr><td rowspan="5">State Waters</td><td>Western Australia</td><td>Department of Biodiversity, Conservation and Attractions</td></tr>
<tr><td>South Australia</td><td>Department of the Environment, Water and Natural Resources</td></tr>
<tr><td>Victoria</td><td>Department of Environment, Land, Water and Planning</td></tr>
<tr><td>Tasmania</td><td>Department of Primary Industries, Parks, Water and Environment</td></tr>
<tr><td>New South Wales</td><td>Department of Primary Industries</td></tr>
</table>
Note: each state will act as the control agency for their corresponding regions</td><td>IC</td></tr>
<tr><td colspan="2">The state control agency will direct and manage wildlife response operations in their jurisdiction, and AMSA in Commonwealth waters. The actions below are examples of tasks that may be undertaken under the direction of the control agency. The corresponding Equinor IMT role is identified.</td></tr>
<tr><td>Obtain any licences required from the relevant state wildlife licencing authority, at the time of any incident and prior to undertaking any exclusion, hazing or fauna handling activities such as pre-emptive capture.</td><td>State control agency (supported by Planning Section Chief)</td></tr>
<tr><td>Provide additional support to control agency as requested including logistics, equipment, personnel and training.</td><td>IC</td></tr>
<tr><td>Activate the relevant scientific monitoring program depending on species impacted.</td><td>Environmental Unit Leader</td></tr>
<tr><td>Continue oiled wildlife response until:
all injured/oiled wildlife have been treated
control agency have ceased a response under their relevant plans.</td><td></td></tr>
</table>

3.10 Overall response termination criteria

The overall response will terminate once all the following criteria has been met:

- the source of the spill has been controlled such that no further hydrocarbons will be released
- all termination criteria are met for:
  - Section 3.3 Source control
  - Section 3.4.1 Vessel surveillance
  - Section 3.4.2 Aerial surveillance
  - Section 3.4.3 Oil spill trajectory modelling
  - Section 3.4.4 Satellite imagery
  - Section 3.4.5 Surface slick tracking
  - Section 3.4.6 Airborne remote sensing
  - Section 3.6.2 Surface dispersant application
  - Section 3.7 Containment and recovery
  - Section 3.9 Wildlife response
- all relevant state agencies have ceased shoreline assessment and clean-up operations within their jurisdictions as per Section 3.8

- it has been identified (e.g. via a health and safety assessment or NEBA) that the response strategy is likely to result in an increased risk to human health, or environmental and socioeconomic receptors (and hence the response can no longer be defined as being ALARP and acceptable)
- the relevant Commonwealth regulators, government departments involved and AMSA have agreed that response termination criteria have been met
- all state control agency related response activities have been terminated.

Equinor will appoint an investigation team following termination of a spill response. This team will be responsible for undertaking:

- an investigation into the cause of the spill. Feedback will be sought from stakeholders as part of the investigation and evaluation of response success (perceived or measured, e.g. through the OSMP)
- an after-action review of both the emergency and spill response actions
- close out of all IMT, CMT and emergency response personnel actions
- implementation of a lessons learned assessment process, which will form the basis of a post-incident improvement action plan
- liaison with all involved external agencies to support their post-incident investigations and close-out activities.

4.0 Waste management

The following types of oily materials and waste may be generated during an oil spill event:

- oil (pure or near pure petroleum)
- oily material (oily sorbents, PPE, as well as liquid mixed with debris, soil, water, or other material)
- oily sediment (shoreline material mixed with oil)
- oily water (large amount water with some oil, with possible small amounts of debris).

Waste management requirements are detailed in the Stromlo-1 Waste Management Plan (WMP) which will be adhered to during a spill response. All waste generated from oil spill response strategies will be stored, transported, removed, reused, recycled or disposed of in accordance with the WMP. The WMP also covers requirements for determining the types, classification, segregation and tracking quantities of spill response wastes. There are also legislative recording and reporting requirements outlined in the WMP that will be met for waste generated from oil spill response operations.

The spill resources inventory in Appendix 2 of this OPEP contains a list of waste providers, available equipment, locations and response times.

5.0 Operational and scientific monitoring program

The Equinor OSMP comprises the following:

- Operational Monitoring Programs (OMPs) that are 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) outline the process for conduction scientific assessment of spill impacts and the recovery of environmental and socio-economic receptors following a spill. The SMPs also cover post-release 'pre-exposure' baseline data collection to collect data on the baseline condition of selected locations.
- an Implementation Plan.

The implementation of OMPs and SMPs will be performed by Equinor, under the direction of the combat agency. The objectives of each OMP and SMP are summarised in Table 5-1 (OMPs) and Table 5-2 (SMPs). Evidence fed back to the IMT from the OSMP will be used to manage and modify the response strategy and will support communication with stakeholders (Figure 5-1).

Following spill response operations, when the IMT has been demobilised, Equinor will continue to implement the SMPs and the data will be disseminated to agencies and other organisations involved in implementing the SMPs (Figure 5-1).

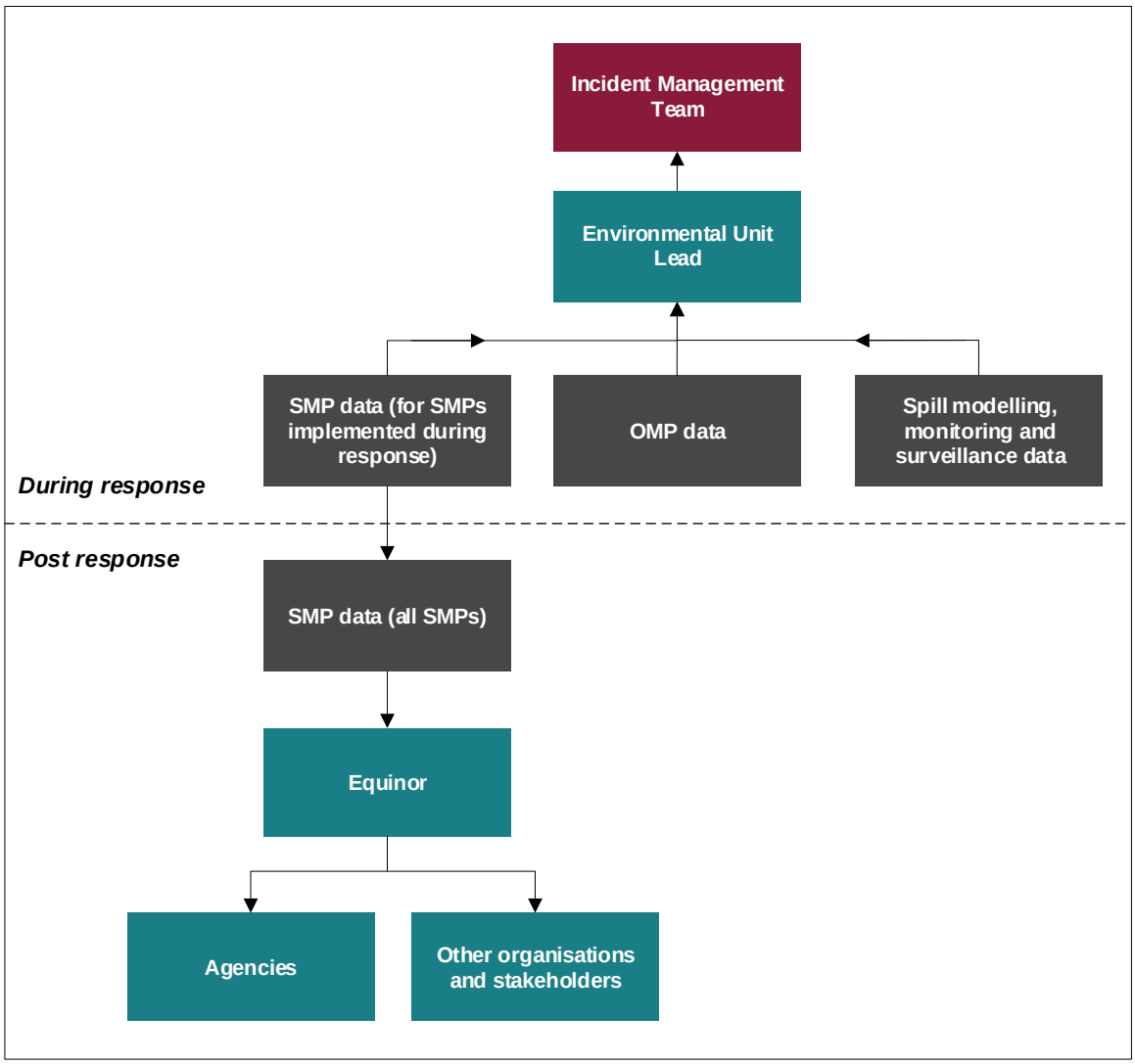


Figure 5-1 OSMP data flow during and after spill response

Table 5-1 Operational monitoring program objectives and activation and termination criteria

Key objectives of the OMP are to:

- provide situational awareness to the IMT
- allow effective ongoing planning and management of spill response activities
- define the spatial extent of the spill for comparison with the pre-defined oil spill risk EMBA
- identify sensitive receptor locations at risk
- identify any significant changes in risk
- provide information to allow the assessment of the efficacy and potential impacts (positive and negative) of spill response strategies and tactics
- provide information required to determine whether implementation of individual SMPs has been triggered
- provide information to support development and implementation of post-release/pre-exposure baseline data collection and SMPs.

Note that the information presented in this table was correct at the time of preparation of this OPEP. To fulfil the recommendations of both the Borthwick enquiry and NOPSEMA guidance (e.g. document no. N-04700-IP1349), and as part of ongoing improvement (including e.g. industry best practice and lessons learned), the OSMP may be amended over time. Therefore, the most current version of the OSMP will be referenced for up-to-date information.

OMP#	Title	Plan objectives	Activation triggers*	Termination triggers
OMP1	Oil Spill Modelling	Predict the trajectory and area swept by a hydrocarbon release based on the nature and scale of the release incident Predict (based on the actual nature and scale of the incident): • the spatial extent of the hydrocarbon release • the oil spill risk EMBA • weathering of released hydrocarbons • time to contact at pre-defined sensitive receptor locations (defined in the EP) • resources at risk • the potential accumulation of hydrocarbons on shorelines based on the nature and scale of the release. Provide information to: • support the planning and implementation of spill response activities, other activated Operational and Scientific Monitoring Plans, and post-release pre-exposure baseline data collection • support the determination of the oil spill risk EMBA • inform other operational and scientific monitoring plans. And where dispersants are being considered for use: • Provide situational awareness of the efficacy and potential effects of dispersed hydrocarbons.	Level 2 or 3 hydrocarbon release Activated by Equinor IMT/control agency to support Situation Awareness	It can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of OMP1 AND/OR Notification of termination of the spill response phase

OMP#	Title	Plan objectives	Activation triggers*	Termination triggers
OMP2	Surveillance and Tracking	Confirm the trajectory of hydrocarbons released throughout the incident. Confirm and monitor: • the spatial extent of the hydrocarbon release • weathering of released hydrocarbons • time to contact at pre-defined sensitive receptor locations (refer to the activity-specific EP) • the potential accumulation of hydrocarbons on shorelines based on the nature and scale of the release incident. Provide information to: • support the planning and implementation of spill response activities and other activated OMPs and SMPs • support the determination of the oil spill risk EMBA • inform other operational and scientific monitoring plans. And where dispersants are being considered for use: • Provide situational awareness of the efficacy and potential effects of dispersed hydrocarbons.	Level 2 or 3 hydrocarbon release Activated by Equinor IMT and/or control agency to support situational awareness	It can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of OMP2 AND/OR Notification of termination of the spill response phase
OMP3	Monitoring of Hydrocarbons: Weathering and Behaviour in Marine Waters	Predict the trajectory and area swept by a hydrocarbon release based on the nature and scale of the release incident. Predict (based on the actual nature and scale of the incident): • the spatial extent of the hydrocarbon release • the oil spill risk EMBA • weathering of the hydrocarbon • time to contact at pre-defined sensitive receptor locations (refer to the EP). Provide information to support the planning and implementation of other activated OMPs and SMPs. And where dispersants are being considered for use: • Predict the spatial distribution of dispersed hydrocarbons.	Level 2 or 3 hydrocarbon release	It can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of OMP3 AND/OR Notification of termination of the spill response phase Note: The resources required for this OMP are likely to re-tasked to begin implementation of e.g. SMP1 following termination.
OMP4	Monitoring of Dispersants and Chemical Control Agents	Provide situational awareness of the efficacy of dispersants and chemical control agents to support continuous assessment of spill response activities (e.g. NEBA/ALARP assessment). Provide information on potential impacts of dispersants and chemical control agents on sensitive receptors. Provide information to support the planning and implementation of other activated OMPs and SMPs.	Level 2 or 3 hydrocarbon release AND Dispersant and/or chemical control agents have been applied during the response	It can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of OMP4 AND/OR Notification of termination of the spill response phase Note: The resources required for this OMP are likely to be re-tasked to begin implementation of e.g. SMP1 following termination.
OMP5	Shoreline Assessment	Ground-truth spill hydrocarbons on shorelines, predicted by OMP1 or identified by OMP2. Identify the oiling status (distribution of surface and sub-surface occurrence) of shorelines. Characterise the hydrocarbons found along and across the shoreline (e.g. accumulated oily patches or streaks, coating of substrates, waxy flakes, tar balls). Identify oiling of intertidal and supra-littoral biota. Identify risk to shoreline areas of importance to shorebirds, seabirds (including penguins) and/or pinnipeds (e.g. roosting areas/colonies, feeding areas, haul-out zones).	Level 2 or 3 hydrocarbon release AND Spill modelling and/or surveillance indicate that shorelines/intertidal habitat have been (or are at probable risk of being) exposed to spill hydrocarbons OR Monitoring, spill modelling and/or surveillance indicate that shorelines/intertidal habitat have been (or are at probable risk of being) exposed to dispersants, dispersed hydrocarbons and/or chemical control agents	It can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of OMP5 AND/OR Notification of termination of the spill response phase OR The rapid categorical assessment of shorelines/intertidal habitats has been completed for all potential locations at risk* Note: The resources required for this OMP are likely to be re-tasked to begin implementation of SMP3 following termination.

OMP#	Title	Plan objectives	Activation triggers*	Termination triggers
OMP6	Identification of Impacts to Benthic and Demersal Biota	Identify potential impacts of the hydrocarbon release on benthic biota/habitats. Identify potential impacts of the hydrocarbon release on demersal biota. Identify the types of impacts observed (e.g. behavioural, mortality). Identify potential cumulative impacts of the hydrocarbon release and spill response strategies. Provide information to support the planning and implementation of other activated OMPs and SMPs.	Level 2 or 3 hydrocarbon release AND Monitoring, spill modelling and/or surveillance Indicate that sensitive benthic habitats and/or areas known to be important for demersal biota have been (or are at probable risk of being) exposed to spill hydrocarbons OR Monitoring, spill modelling and/or surveillance indicate that shorelines/intertidal habitat have been (or are at probable risk of being) exposed to dispersants, dispersed hydrocarbons and/or chemical control agents	It can be demonstrated that no further environmental improvement outcomes can be achieved through continued implementation of OMP6 AND/OR Notification of termination of the spill response phase Note: The resources required for this OMP are likely to be re-tasked to begin implementation of SMP4 following termination.

Table 5-2 Scientific monitoring programs objectives and activation and termination criteria

Key objectives of the SMPs are to:

- determine the extent, level (= severity) and persistence of environmental impacts from a hydrocarbon release
- quantify exposure and potential persistence of hydrocarbons (and dispersants/chemical agents, if relevant) to specific environmental and socio-economic sensitivities (as defined in each SMP)
- quantify short- and long-term impacts of the hydrocarbon release and response activities to specific receptors
- where feasible, allow potential assessment of the short- and long-term impacts of spill response strategies and tactics to specific receptors
- allow consideration of temporal variability (e.g. seasonality and inter-annual variability) on specific receptors
- allow consideration of spatial variability (“patchiness”) on specific receptors
- identify the likely cause(s) of identified impacts at survey locations (e.g. spill hydrocarbons, spill plus response strategies, cumulative impacts with other anthropogenic/natural sources of impact, other anthropogenic/natural sources of impact, etc.)
- identify, quantify and qualify recovery of specific receptors following termination of the response
- support post-release/pre-exposure baseline data collection where feasible.

Note: If undertaken during the response phase, an additional objective is to provide situational awareness to the IMT, to allow effective ongoing planning and management of spill response activities and identify any significant changes in risk.

The information presented in this table was correct at the time of preparation of this OPEP. To fulfil the recommendations of both the Borthwick enquiry and NOPSEMA guidance (e.g. N-04700-IP1349), and as part of ongoing improvement (including industry best practice and lessons learned), the OSMP may be amended over time. Therefore, the most current version of the OSMP will be referred to for up-to-date information.

SMP#	Title	Plan objectives	Activation triggers	Termination triggers
SMP1	Assessment of Water Quality	• Quantify the magnitude of exposure via assessment of the spatial and temporal distribution of hydrocarbons in marine waters within and outside of the predicted/observed AMBA against relevant guidelines (e.g. ANZECC/ARMCANZ (2000) Water and sediment quality guidelines). • Determine the weathering, dispersion and persistence of hydrocarbons in marine waters. • Determine differences in hydrocarbon distributions and characteristics in marine waters to understand the potential effects and efficacy of spill response activities. • Determine the likely persistence and potential for toxicity. • Identify the spatial distribution of potential impacts and recovery of infaunal communities over time.	Level 2 or 3 hydrocarbon release AND Results of operational monitoring studies show likelihood of hydrocarbons at the surface at > 10 g/m2, in the water column at ≥ 10 ppb or where modelling indicates the likelihood of dissolved aromatic hydrocarbons at concentrations of ≥ 6 ppb OR Dispersants and/or chemical control agents were applied during the spill response	Sufficiently robust scientific data has been collected to demonstrate that SMP1 is able to achieve its objectives AND Monitoring outcomes have demonstrated consistent compliance with ANZECC/ARMCANZ (2000) water quality objectives for the protection of aquatic ecosystems across the re-modelled risk EMBA (derived from OMP1) (except for sites of known or identified natural hydrocarbon seeps) AND There are no detectable levels of dispersants and/or chemical control agents

SMP#	Title	Plan objectives	Activation triggers	Termination triggers
SMP2	Assessment of Impacts and Recovery of Benthic Sediments and Infauna	• Quantify hydrocarbons in surficial subtidal benthic sediments within and outside of the predicted/observed oil spill risk EMBA. • Determine the spatial distribution of hydrocarbon accumulation. • Characterise hydrocarbons in sediments to understand the effects of weathering and spill response activities. • Determine the likely persistence and potential for toxicity. • Identify the spatial distribution of potential impacts and recovery of infaunal communities over time.	Level 2 or 3 hydrocarbon release AND Results of monitoring studies show likelihood of hydrocarbons at the surface at > 10 g/m2, ≥ 10 ppb for entrained hydrocarbons or where modelling indicates the likelihood of dissolved aromatic hydrocarbons at concentrations of ≥ 6 ppb OR Where modelling indicates exposure of benthic sediments to dispersed hydrocarbons	Sufficiently robust scientific data has been collected to demonstrate that SMP2 is able to achieve its objectives AND Hydrocarbons are no longer detectable in marine sediments at levels greater than Revised Sediment Quality Guidelines (Simpson et al., 2013) AND Impact and recovery to benthic infaunal communities and assemblages have been quantified across the identified exposure zone, with no further significant recovery of impacted locations (either in comparison with control locations or from comparison between surveys)
SMP3	Assessment of Impacts and Recovery of Intertidal Habitats	• Quantify hydrocarbons in surficial subtidal benthic sediments within and outside of the predicted/observed oil spill risk EMBA. • Determine the spatial distribution of hydrocarbon accumulation in intertidal habitats. • Characterise hydrocarbons in intertidal habitats to understand the effects of weathering and spill response activities. • Determine the likely persistence and potential for toxicity. • Identify the spatial distribution of potential impacts and recovery of intertidal habitats over time.	Level 2 or 3 hydrocarbon release AND Monitoring studies have identified potential exposure or exposure of hydrocarbons to sensitive intertidal habitats (> 10 g/m2 on shore, where sediment hydrocarbons (from OMP5) exceed revised ANZECC/ ARMCANZ Sediment Quality Guidelines, ≥ 10 ppb for entrained hydrocarbons or where modelling indicates the likelihood of dissolved aromatic hydrocarbons at concentrations of ≥ 6 ppb) OR Where dispersants/chemical control agents were applied on or near sensitive intertidal habitats	Sufficiently robust scientific data has been collected to demonstrate that SMP3 is able to achieve its objectives AND Hydrocarbons are no longer detectable in intertidal sediments at levels greater than Revised ANZECC/ARMCANZ Sediment Quality Guidelines (Simpson et al., 2013) AND Impact and recovery to intertidal habitats have been quantified, with no further significant recovery of impacted locations (in comparison with control locations and/or from comparison between surveys) AND Restoration or resumption of key biological processes necessary for post-impact recovery (e.g. reproduction and recruitment) have been demonstrated for key receptors (e.g. macroalgae, plants)
SMP4	Assessment of Impacts and Recovery of Marine Benthic Habitats and Demersal Biota	• Quantify potential impacts of the hydrocarbon release on benthic habitats and subsequent recovery. • Quantify potential impacts of the hydrocarbon release on demersal biota and subsequent recovery. • Define the types of impacts observed (e.g. behavioural, population structure/community composition, mortality). • Determine the potential impacts of the hydrocarbon release and spill response strategies within the context of natural spatial and temporal variability. • Determine the spatial distribution of potential impacts and recovery of habitats and communities over time.	Level 2 or 3 hydrocarbon release AND Monitoring studies have identified potential exposure or exposure of hydrocarbons to sensitive benthic habitats (> 10 g/m2 on shore, where sediment hydrocarbons (i.e. from SMP2) exceed Revised ANZECC/ ARMCANZ Sediment Quality Guidelines, ≥ 10 ppb for entrained hydrocarbons or where modelling indicates the likelihood of dissolved aromatic hydrocarbons at concentrations of ≥ 6 ppb) OR OMP6 identifies potential impacts to marine benthic habitats and demersal biota OR Where modelling indicates exposure of benthic habitats to dispersed hydrocarbons	Sufficiently robust scientific data has been collected to demonstrate that SMP4 is able to achieve its objectives AND Impact and recovery to benthic infaunal communities and assemblages have been quantified, with no further significant recovery of impacted locations (in comparison with control locations and/or from comparison between surveys) AND Restoration or resumption of key biological processes necessary for post-impact recovery (e.g. reproduction and recruitment) have been demonstrated for key receptors (e.g. macroalgae, seagrass, fish communities)
SMP5	Assessment of Impacts and Recovery of Seabirds and Shorebirds	• Quantify the status of seabird and shorebird populations within and outside of the predicted/observed oil spill risk EMBA. • Determine if impacts to health and/or mortalities are due to hydrocarbon exposure. • Identify and characterise subsequent recovery from hydrocarbon exposure.	Level 2 or 3 hydrocarbon release AND Spill modelling and/or operational monitoring have indicated potential for exposure of hydrocarbons/ dispersants to seabirds/ shorebirds, or a sensitive resource or location (e.g. for foraging, breeding or nesting)	Sufficiently robust scientific data has been collected to demonstrate that SMP5 is able to achieve its objectives AND Hydrocarbon pollution/oiling impacts to protected seabird and shorebird species are no longer detectable AND The impacts to key seabird and shorebird behaviour, breeding activities and colonies/populations and subsequent recovery (where applicable) been quantified at locations exposed to hydrocarbons and/or spill response activities AND The environment and important natural resources at key seabird and shorebird locations (feeding, roosting or breeding locations) are comparable to baseline or control locations

SMP#	Title	Plan objectives	Activation triggers	Termination triggers
SMP6	Assessment of Impacts and Recovery of Marine Megafauna	• Quantify the status of marine megafauna populations within and outside of the predicted/observed oil spill risk EMBA. • Determine if impacts to health and/or mortalities are due to hydrocarbon exposure. • Identify and characterise subsequent recovery from hydrocarbon exposure.	Level 2 or 3 hydrocarbon release AND Spill modelling and/or monitoring have indicated exposure of hydrocarbons/dispersants to marine megafauna OR Monitoring or field observations have identified an impact to marine megafauna because of the spill or associated response activities	Sufficiently robust scientific data has been collected to demonstrate that SMP6 is able to achieve its objectives AND Hydrocarbon pollution/oiling impacts to protected megafaunal species are no longer detectable AND Restoration of key biological processes required for the recovery of megafaunal populations (e.g. reproduction) has been demonstrated
SMP7	Assessment of Impacts and Recovery of Plankton	• Characterise plankton communities throughout the year within and outside of the predicted/observed oil spill risk EMBA. • Identify the spatial distribution of potential impacts and recovery of plankton communities over time.	Level 2 or 3 hydrocarbon release AND Results of monitoring studies show likelihood of hydrocarbons at the surface at > 10 g/m2, in the water column at ≥ 10 ppb or where modelling indicates the likelihood of dissolved aromatic hydrocarbons at concentrations of ≥ 6 ppb AND Dispersants and/or chemical control agents were applied during the spill response	Sufficiently robust scientific data has been collected to demonstrate that SMP7 is able to achieve its objectives AND Impact and recovery to plankton have been quantified, with no further significant recovery identified (in comparison with control locations and/or from comparison between surveys) AND Restoration of key biological processes required for the recovery of populations and communities (e.g. reproduction; including larval stages of benthic and pelagic macrobiota) has been demonstrated
SMP8	Assessment of Impacts and Recovery of Fisheries and Aquaculture	• Quantify hydrocarbon contamination in commercial fish and shellfish within and outside of the predicted/observed oil spill risk EMBA. • Determine the physiological impacts to commercial fish and shellfish species. • Determine impacts to seafood safety and quality. • Identify the spatial distribution of potential impacts and recovery of commercial fisheries and aquaculture over time.	Level 2 or 3 hydrocarbon release AND Results of monitoring studies show likelihood of hydrocarbons at the surface at > 10 g/m2, in the water column at ≥ 10 ppb, where modelling indicates the likelihood of dissolved aromatic hydrocarbons at concentrations of ≥ 6 ppb or where sediment hydrocarbons (i.e. from SMP2) exceed Revised ANZECC/ARMCANZ Sediment Quality Guidelines OR Dispersants and/or chemical control agents were applied in proximity to sensitive locations (e.g. feeding resources, roosting / breeding colonies) during the spill response OR Evidence of hydrocarbon contamination, tainting or significant mortality of fish or shellfish during the spill response OR Declines in species composition or abundance in catches from individual fisheries, or production of aquaculture operations following the spill OR There has been a government restriction, ban or closure of fisheries or aquaculture facilities	Sufficiently robust scientific data has been collected to demonstrate that SMP8 is able to achieve its objectives AND Fisheries and aquaculture products are identified as being safe for human consumption AND The physical / biochemical parameters indicating exposure to hydrocarbons and/or tissue hydrocarbon contamination attributable to the spill are no longer detectable AND Evidence has been collected that demonstrates that species composition and population structures of commercial fisheries (target and by-catch) have returned to baseline levels or are comparable with control locations AND Olfactory/organoleptic testing shows that there is no difference in fish/shellfish quality between the impact zone and control locations

SMP#	Title	Plan objectives	Activation triggers	Termination triggers
SMP9	Assessment of Impacts and Recovery of Areas of Particular Recreation, Tourism, Conservation, Heritage and Native Title Importance	• Identify and monitor the impacts on, and recovery of, areas of recreation, tourism, conservation, heritage or native title importance due to a hydrocarbon spill and/or response.	Level 2 or 3 hydrocarbon release AND Results of monitoring studies show likelihood of hydrocarbons at the surface at >10 g/m2, in the water column at ≥10 ppb, where modelling indicates the likelihood of dissolved aromatic hydrocarbons at concentrations of ≥6 ppb or where sediment hydrocarbons (i.e. from SMP2) exceed Revised ANZECC/ARMCANZ Sediment Quality Guidelines OR Where monitoring and/or modelling indicate that intertidal area(s) have had hydrocarbon exposure/ accumulation equivalent of >10 g/m2, tar balls or other spill or spill response impacts that affect visual amenity, heritage, conservation or Native Title sensitive receptors OR Dispersants and/or chemical control agents were applied in proximity to sensitive or protected locations during the spill response OR Where hydrocarbon exposure at or near sensitive areas has been credibly reported AND/OR Where relevant stakeholders (i.e. government/management authorities) require monitoring to be initiated	Sufficiently robust scientific data has been collected to demonstrate that SMP9 is able to achieve its objectives AND Hydrocarbon pollution/oiling impacts to areas of recreation, tourism, conservation, heritage and native title importance are no longer detectable AND The important environment, heritage, native title and natural resources at areas of importance are comparable to baseline or control locations

Part Two: Planning and preparedness

6.0 Introduction

6.1 Purpose

The purpose of this OPEP is to describe the systems and processes that will be used by Equinor Australia (Equinor) and relevant subcontractors to mount a safe, rapid and effective response to oil pollution that may occur within the defined scope of the petroleum activity (hereafter referred to as 'the activity'), and for ongoing maintenance of the response capability.

This OPEP, and the EP that this document supports have been developed to meet the requirements of the following key legislation:

- Offshore Petroleum and Greenhouse Gas Storage Act 2006 (OPGGS Act)
- Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS(E) Regulations).

6.2 Scope

6.2.1 Petroleum activity

This OPEP details the preparation and response for maritime pollution incidents relating to the petroleum activity described in Section 2 of the EP for the Stromlo-1 Exploration Drilling Program.

The Stromlo-1 well in the EPP 39 Permit Area will be drilled using a semisubmersible MODU to a planned total depth of 5,200 to 5,700 m. The MODU will be supported by three PSVs and helicopters. A 500 m PSZ will be gazetted around the MODU after it reaches location. The MODU is conducting a "petroleum activity" from the time the MODU arrives at the well location until the time the MODU demobilises from the well location. All oil spill response activities that would be undertaken within and outside of the PSZ resulting from an incident occurring in the PSZ are covered by this OPEP. However, this OPEP does not cover planned ("day-to-day") activities performed by the support vessels while outside the PSZ, such as the general supply route or transit of support vessels between the PSZ and Port Adelaide.

The drilling activity is scheduled to be undertaken during the summer period 1 October to 31 May (Q4 to Q1), with a target to start drilling in either Q4 2019 or Q4 2020. The well is anticipated to be drilled in approximately 60 days.

Details of the drilling campaign are provided in Table 6-1 and the location of the petroleum activity is shown in Figure 6-1.

Table 6-1 Stromlo-1 location information

Territorial waters	Australian Commonwealth Waters	
Location	**Latitude**	**Longitude**
	34° 56' 21.47" S	130° 39' 44.61" E
Nearest ports/points of land	**Location**	**Distance**
	Closest point on mainland (unnamed)	201 NM (372 km)
	Head of Bight, SA	208 NM (385 km)
	Eyre Peninsula, SA	221 NM (410 km)
	Ceduna, SA	216 NM (400 km)
	Kangaroo Island, SA	297 NM (550 km)
	Israelite Bay, WA	348 NM (645 km)
	Adelaide, SA	395 NM (730 km)

Territorial waters	Australian Commonwealth Waters
Distance to Commonwealth / state waters boundary	Approx. 198 NM (367 km)
Distance to nearest coastline	Approx. 201 NM (372 km)
Water depth at well location	2239 m
Supply base	Port Adelaide
Sailing time (supply base to well location)	~40 hrs
Project helicopter fleet base	Ceduna, SA
Flight time – Adelaide to Ceduna	Fixed wing: 1.5 hrs
Flight time – Ceduna to MODU	Helicopter: 2 hrs

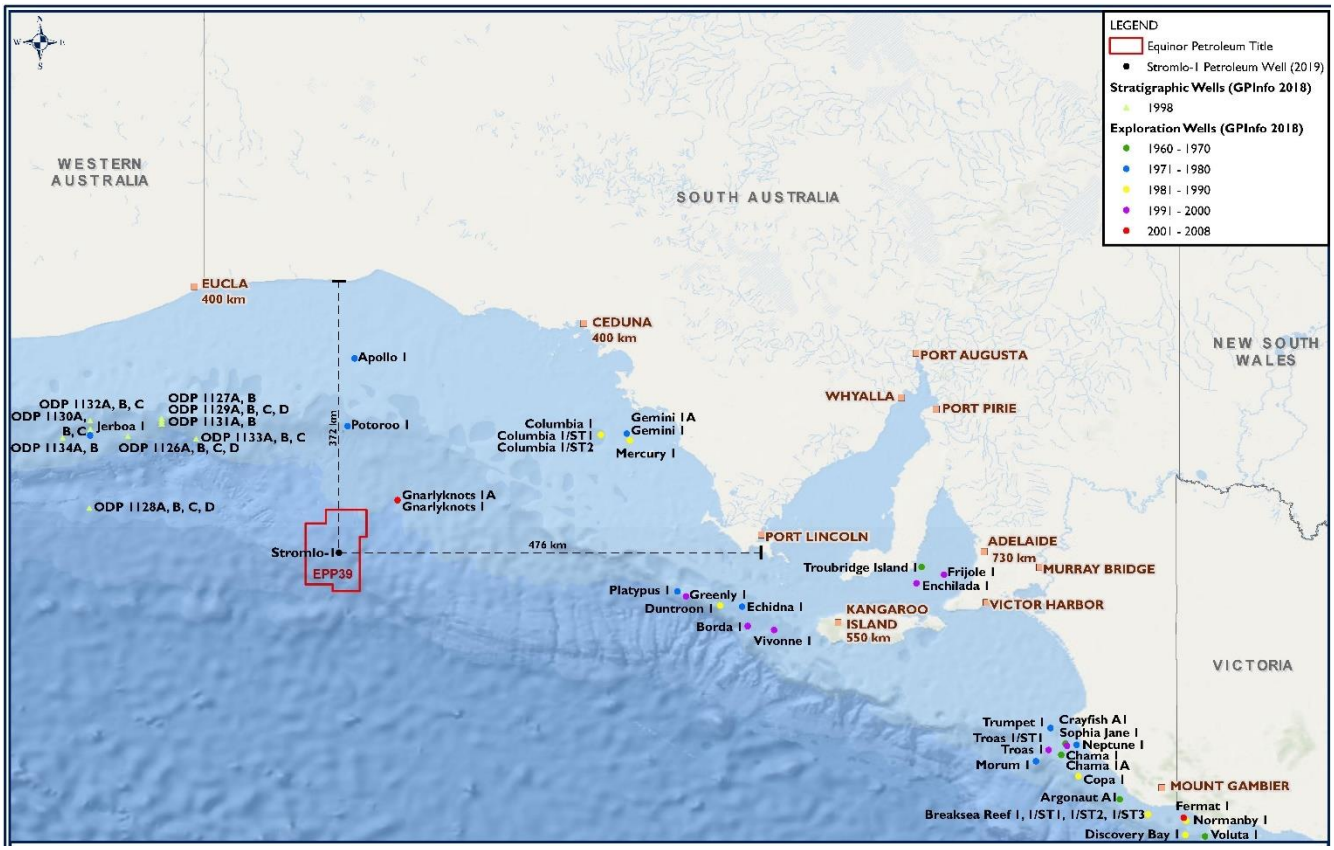


Figure 6-1 Stromlo-1 location, Equinor title and historic exploration wells

6.2.2 Geographic area

The geographic area that could theoretically be affected by an oil spill was determined from the oil spill trajectory modelling detailed in Appendix 7-2 of the EP. Stochastic modelling of the worst-case discharge (WCD) scenario was conducted for a loss of well control and subsea oil release over the time estimated to mobilise a second rig and drill a relief well.

The greatest extent of the defined thresholds for the surface oil, dissolved oil and entrained oil components were identified to derive the area at risk of impacts from an oil spill. This area is hereafter referred to as the 'risk EMBA' (Figure 6-2). The risk EMBA set the geographic extent for identifying the environmental and socio-

economic sensitivities, for stakeholder consultation and spill response planning. The risk EMBA extends from the southern coast of Western Australia to New South Wales and includes Tasmania.

No single spill could possibly cover the entire risk EMBA since it is defined from modelling of 100 spills. This ensures that whichever direction a spill may move following a release, the area that may be affected has been considered during the planning phase.

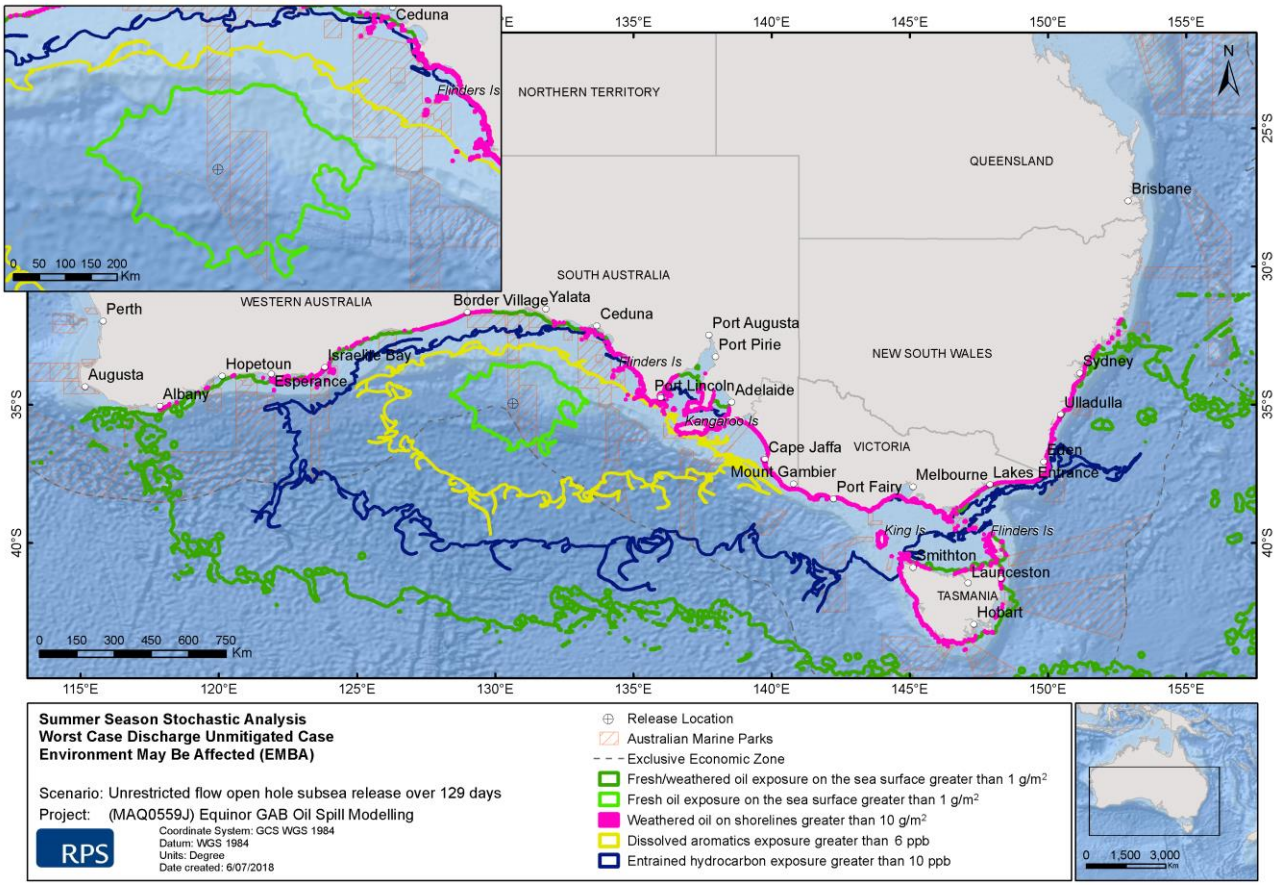


Figure 6-2 Risk EMBA

Note: This is based on stochastic modelling results of 100 simulated 8943 m^3/day subsea releases of crude oil over 129 days (tracked for 189 days).

6.2.3 Health and safety

Equinor considers the health and safety of spill responders of paramount importance and if conditions during a response are not safe then personnel will not respond until the situation has been resolved. Equinor will align with the recommendations in the National Plan Marine Oil Spill Response Health and Safety Guidance (NP-GUI-026). In addition, under the Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009 Equinor will have an accepted safety case in place for the MODU and for drilling rigs used to drill a relief well in the event of a well blowout. Shipboard oil pollution emergency plans (SOPEPs) will be onboard vessels that are required to have them under Australian legislation. Safety cases and SOPEPs identify the health and safety controls in place for potential marine pollution events. A continuous safety review would also be undertaken following an unplanned release. Therefore, this OPEP does not cover health and safety requirements associated with potential oil spills in detail.

6.3 Interface with other plans

This OPEP is part of the Equinor integrated Crisis and Emergency Management System, is consistent with the other Equinor plans and to be used in conjunction with the following documents:

- The Equinor Book
- Safety and security (FR10)
- Preparedness and response (SF700)
- Business continuity management (SF801)
- Equinor Incident Management Handbook.

The Equinor Incident Management Handbook response framework, emergency response plans and procedures are intended to deliver an integrated approach between existing company emergency management plans and spill contingency plans specific to exploration and drilling campaigns. Figure 6-3 shows the main interfaces between this OPEP, Equinor internal and external plans, contractor plans and key Australian agency response plans.

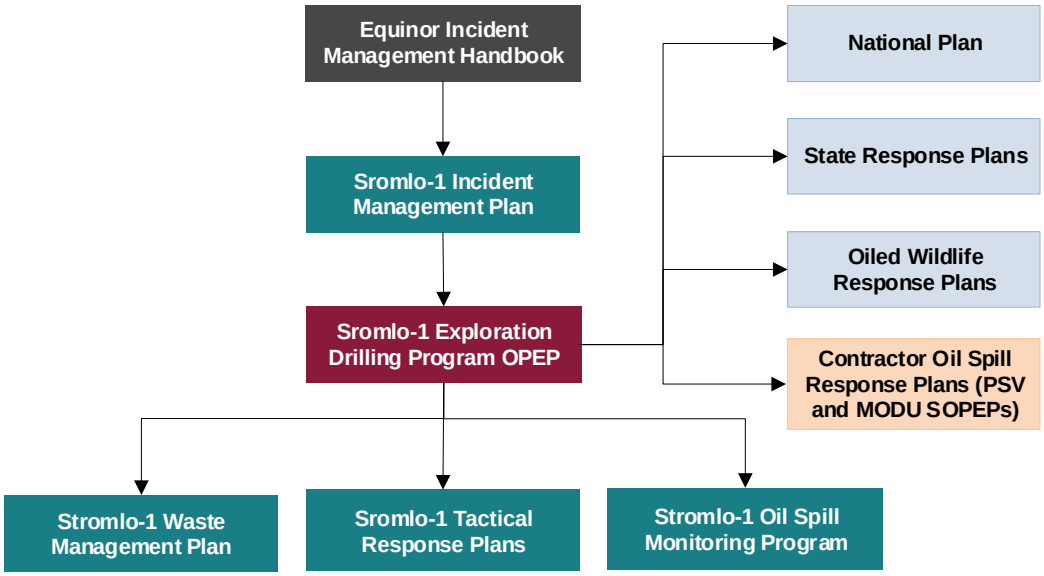


Figure 6-3 Interaction of this OPEP with Equinor, contractor and Australian agency plans

7.0 Spill response framework

7.1 Legislative context

The legislation that is relevant to oil spill incidents and response in both commonwealth and state waters is covered in Section 1 of the EP. This information has not been duplicated in this OPEP.

7.2 Equinor spill response structure

The Equinor emergency response framework consists of three lines of response that correspond to the levels of oil spill response (Table 7-1). The overall response structure is shown in Figure 7-1.

Equinor also has a Global Incident Management Assist Team (GIMAT), which consists of more than 145 trained personnel throughout Equinor's global operations. GIMAT personnel will be mobilised to support scaling of the Line 2 IMT depending on the nature and scale of the response.

Table 7-1 Equinor spill response tiers and teams

Line	Team name	Respond to oil spill level	Type of response
1	Emergency Response Team (MODU/vessel)	Levels 1, 2 and 3	Combating and rescue
2	Equinor IMT	Levels 2 and 3	Tactical guidance and support
3	Equinor Crisis Management Team	Level 3	Strategic support

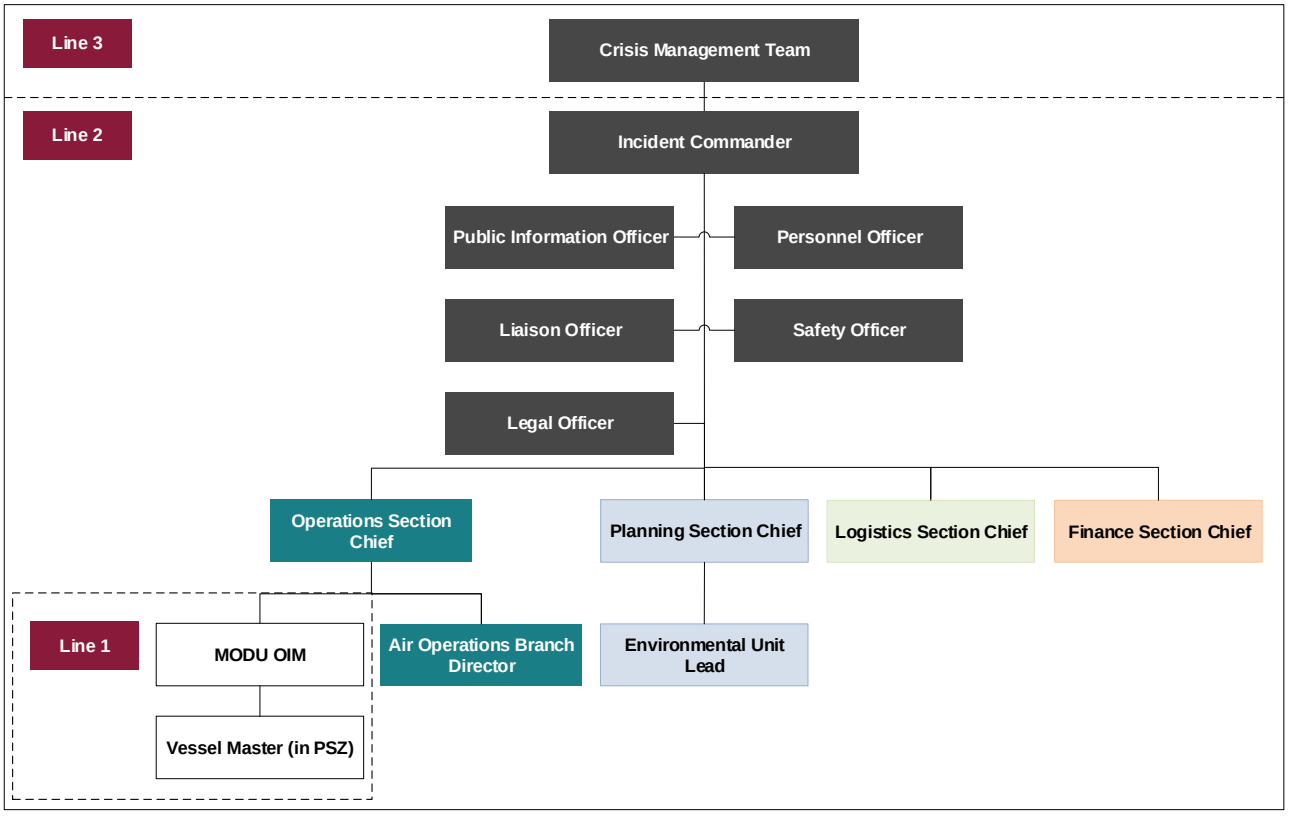


Figure 7-1 Equinor response structure

7.3 Authorities and control agencies

Table 7-2 provides a summary of the designated statutory agencies/jurisdictional authorities and control agencies relevant to this OPEP at different level and sources of spill.

Table 7-2 Summary of relevant statutory agencies/jurisdictional authorities and control agencies

Location	Source of spill	Statutory agency/ jurisdictional authority	Control agency	
			Level 1 spill	Level 2 or 3 spill
Commonwealth waters	MODU	NOPSEMA	Equinor	Equinor
	Support vessel	AMSA	Vessel owner	AMSA
Western Australia state waters	MODU or vessel entering state waters	Marine Safety General Manager, WA DoT		WA DoT
South Australia state waters	MODU or vessel entering state waters	Department of State Development (DSD)		DPTI Oiled wildlife response – Department of the Environment, Water and Natural Resources (DEWNR)
Victorian state waters	MODU or vessel entering state waters	Department of Economic Development, Jobs, Transport and Resources (DEDJTR)		DEDJTR
Tasmanian state waters	MODU or vessel entering state waters	Department of Primary Industries, Parks, Water and Environment (DPIPWE)		Tasmanian Environment Protection Authority (EPA) Tasmanian Marine Pollution Controller (TMPC)
New South Wales state waters	MODU or vessel entering state waters	Maritime NSW (Roads and Maritime Services)		Maritime NSW

7.3.1 AMSA

The overall responsibility for administration of the National Plan for Maritime Environmental Emergencies (National Plan) lies with the AMSA. The National Plan defines national arrangements, principles and policies for responding to maritime emergencies. The Plan (and supporting documents) identifies how the Commonwealth, state, territory and industry organisational response capability framework integrates in an emergency.

In the event of an unplanned vessel release in Commonwealth waters (but not within the PSZ), AMSA will be the control agency. Equinor will support the response if directed to by AMSA.

7.3.2 South Australia

The SA DPTI will be the control agency for oil spills in SA marine and inland waters. DPTI will assume overall direction of emergency management activities in the event of an oil spill that enters SA waters or is at risk of

contacting the SA shoreline. Oil spill response in SA will be guided by the SA Marine Spill Contingency Action Plan that can be accessed on the Parliament of South Australia website (https://www.parliament.sa.gov.au/).

As for all state control agencies, Equinor will provide support capability as directed by the SA DPTI, which may include the update or development of TRPs, providing equipment, access to operational bases, logistics support and trained personnel and technical specialists.

7.3.3 Victoria

The DEDJTR has primary responsibility for the control of oil spills in Victorian state waters and for spills that are at risk of contacting the Victorian shoreline. The Victorian Plan for Maritime Environmental Emergencies (VICPLAN) is administered by the DEDJTR and provides for personnel and liaison between various regional authorities responsible for dealing with aspects of marine oil pollution. The VICPLAN can be obtained via email request to marine.pollution@ecodev.vic.gov.au.

As for all state control agencies, Equinor will provide support capability as directed by the Victorian government, which may include the update or development of TRPs, providing equipment, access to operational bases, logistics support and trained personnel and technical specialists.

7.3.4 Tasmania

The Tasmanian Government has primary responsibility for the control of oil spills within Tasmanian State waters which either originate in Tasmanian waters or have the potential to impact on Tasmanian waters or shorelines. Within port waters the Tasmanian Ports Corporation (Tasports) will be the control agency. Outside of port waters the Tasmanian EPA is the control agency and Tasports will assist under Memorandum of Understanding (MOU) arrangements.

Tasmanian Marine Oil Spill Contingency Plan (TasPlan) is administered by the Tasmanian EPA and is available on the Tasmanian EPA website at http://epa.tas.gov.au/Documents/TasPlan.pdf. TasPlan is integrated with the National Plan, the Tasports Oil Spill Contingency Plan, the Tasmanian Emergency Management Plan and the Tasmanian Oiled Wildlife Response Plan (WildPlan).

As for all state control agencies, Equinor will provide support capability as directed by Tasports and the Tasmanian EPA, which may include the update or development of TRPs, providing equipment, access to operational bases, logistics support and trained personnel and technical specialists.

7.3.5 Western Australia

The WA DoT will be the control agency for oil spills in WA marine and inland waters. The WA DoT will assume overall direction of emergency management activities in the event of an oil spill that enters WA waters or is at risk of contacting the WA shoreline. Equinor will provide support capability as directed by the WA DoT, which may include the update or development of TRPs, providing equipment, access to operational bases, logistics support and trained personnel and technical specialists.

Oil spill response in WA is guided by the State Emergency Management Plan for Marine Oil Pollution (WestPlan MOP) and the WA Oil Spill Contingency Plan (and supporting forms) that be accessed at https://www.transport.wa.gov.au/imarine/oil-spill-contingency-plans.asp.

7.3.6 New South Wales

Maritime NSW is the control agency for marine pollution control incidents within state waters in accordance with the NSW State Emergency Management Plan (EMPLAN) and the NSW State Waters Marine Oil and Chemical Spill Contingency Plan which is a sub-plan of the EMPLAN. The NSW State Waters Marine Oil and Chemical Spill Contingency Plan can be accessed from the Emergency New South Wales website at https://www.emergency.nsw.gov.au/Pages/publications/plans/sub-plans/state-waters-marine-oil-and-chemical-spill-contingency-plan.aspx).

As for all state control agencies, Equinor will provide support capability as directed by Maritime NSW, which may include the update or development of TRPs, providing equipment, access to operational bases, logistics support and trained personnel and technical specialists.

7.3.7 Multi-jurisdictional response

[HOLD – consultation with state agencies in progress]

In the event of a major oil spill, a multi-jurisdictional response may be required if modelling data indicates that a spill could cross into the 3 NM zone of more than one. The Equinor IMT will engage with state agencies according the requirements in State Emergency Response Plans.

In addition, the management and coordination of cross-border incidents will follow the National Plan Coordination of Cross-border Incidents Guideline (NP-GUI-023). The guideline recommends the following steps:

Step 1: REVIEW the situation. Maintain situational awareness and evaluate situation information. Determine if another jurisdiction is likely to be exposed to an oil spill from the incident.

Step 2: NOTIFY adjacent jurisdictions at the earliest opportunity.

Step 3: ESTABLISH coordination arrangements (e.g. with State Marine Pollution Controllers) to establish and agree coordination arrangements and where necessary agree a “lead jurisdiction”. All decisions will be documented.

Step 4: PREPARE a formal coordination plan. The plan should be formally agreed by relevant Marine Pollution Controllers, and include:

- information on maintenance of the common operating picture
- agreed response priorities
- how resources will be allocated (including National Plan resources)
- strategy for the management of media and public information
- a government communications strategy
- agreed arrangements and triggers for transfer of control agency (which should consider recommendations in the National Plan Change of Control Agency Protocol (NP-GUI-022).

Step 5: IMPLEMENT the agreed plan.

7.4 Consultation

Equinor actively consulted with stakeholders relevant to the development of this OPEP to ensure alignment of the information in this document with Commonwealth and state agencies expectations and response partner capabilities. The following organisations were directly consulted during the development of this OPEP and will be included in future revisions:

- AMSA
- Department of Industry, Innovation and Science (DIIS)
- WA DoT
- SA DPTI
- SA DEWNR
- SA EPA
- SA Police
- Victorian DEDJTR
- Victorian Maritime Safety
- Tasmanian EPA
- Tasmanian DPIPWE
- Maritime NSW.

Details on the consultation methods and issues discussed with stakeholders are provided in Section 3 of the EP.

8.0 Spill scenarios and response options

8.1 Types of and characteristics of hydrocarbons

These sections provide a high-level summary of the oil spill modelling conducted during preparation of this OPEP. The full modelling report is available in Appendix 7-2 of the EP.

Marine diesel and crude oil are the two types of hydrocarbon that were identified as having potential to be spilled and were assessed for spill response planning. Marine diesel oil is a light petroleum distillate and given the environmental conditions at the Stromlo-1 location, it is predicted to undergo rapid entrainment and evaporative loss and consequently will degrade rapidly.

Since the exact properties of the Ceduna sub-basin reservoir oil are unknown, Equinor assessed the geology of the Stromlo-1 area and calculated the most likely oil type that may be encountered in this area would be of marine origin. Therefore, Statfjord-C blend crude oil was selected as being an appropriate analogue for assessment in the Stromlo-1 Exploration Drilling Program EP. Statfjord-C is a medium crude oil found in the North Sea. SINTEF (2001) studied the weathering of Statfjord-C oil and concluded that it evaporates and emulsifies relatively quickly.

The hydrocarbon properties for marine diesel and Statfjord-C blend crude oil are summarised in Table 8-1. Boiling point ranges are provided in Table 8-2 and weathering characteristics are presented in Table 8-3. Section 7 of the EP contains more detailed information on the properties of both marine diesel and Statfjord C crude oil and their dispersion and weathering characteristics.

Table 8-1 Hydrocarbon properties

Characteristic	Marine diesel	Statfjord-C blend crude
Density (kg/m^3)	829 at 15°C	830 at 15°C
API	37.6	38.8
Dynamic viscosity (cP)	4.0 at 25°C	4.51 at 20°C
Pour point (°C)	-14	-24
Oil category	Group II	Group II
Oil persistence classification	Light-persistence oil	Medium-persistence oil

Table 8-2 Fractional composition of hydrocarbons

Fraction	Boiling point (°C)	Persistence	DMA blend diesel	Statfjord-C blend crude oil
Volatiles (%)	<180	Non-persistent	6.0%	30.6%
Semi-volatiles (%)	180–265	Non-persistent	34.6%	15.3%
Low volatiles (%)	265–380	Persistent	54.4%	21.3%
Residual (%)	>380	Persistent	5%	32.9%

Table 8-3 Fate of spilled hydrocarbons

Fate process	Marine diesel	Statfjord-C blend crude
Spreading	Rapid	Rapid
Evaporation	High	Moderate

Fate process	Marine diesel	Statfjord-C blend crude
Dissolution	Slight	Slight
Dispersion	High	Moderate-High
Emulsification	Slight	Moderate
Sedimentation	Low	Little
Biodegradation	Not Important	Potentially important
Photo-oxidation	Little	Little

8.2 Fate and trajectory of spilled oil

8.2.1 Diesel spill from offshore vessel

In the marine environment diesel tends to spread rapidly in the direction of the prevailing wind and tidal currents. Evaporation is likely to be the dominant process contributing to the fate of diesel spilled at the sea surface; potentially accounting for >50% reduction in the hydrocarbon mass. Entrainment of floating hydrocarbons into surface waters, which will be driven by wind and wave action, will also result in a significant reduction in hydrocarbon mass on the sea surface. As diesel will spread quickly to form a thin surface layer, only relatively small amounts will become entrained over a relatively large area. These hydrocarbons will then be entrained and then diluted within a large volume of water (mainly the upper 10 m of the water column, though potentially down to 20 to 30 m water depth).

Equinor has identified that the largest volume of a single storage tank on an appropriately-sized PSV is likely to be around 150 m^3 (based on the largest tank of the Solstad Offshore ASA OSV Normand Installer). To adopt a conservative approach, because the vessels have not been selected yet, a volume of 250 m^3 was assessed.

ADIOS weathering assessment undertaken for a 250 m^3 diesel spill indicates with wind speeds at 40 km/h the entire surface expression will weather, evaporate or entrain in less than 15 hours. At a reduced wind speed of 20 km/h, the time taken for the spilled diesel to weather approximately doubles to just less than 30 hours.

Surface oil travels at approximately 3% of the wind speed, with surface currents adding up to an additional 22 km per day. This information was used to calculate the maximum linear distance travelled by the surface oil until it has completely weathered (evaporated or entrained), which was 45.5 km (24.6 NM). Given the minimum distance to state waters is 367 km (198 NM), a surface release within the PSZ would be completely weathered and is not predicted to reach state waters or the waters of the continental shelf.

8.2.2 Loss of well control

8.2.2.1 Stochastic modelling – unmitigated worst case discharge

Three-dimensional oil spill modelling was conducted to inform spill response preparedness and the detailed report is available in Appendix 7-2 of the EP. An overall summary of the oil spill scenarios modelled (unmitigated and mitigated) is provided in Table 8-5 in Section 8.2.2.5 below.

The worst case discharge scenario (WCD_{129d}), based on an open well bore, loss of well control event was modelled for the summer season during which drilling is planned (October to May). This was a stochastic model combining the areas at risk under 100 different spills, or “runs”; starting at different time points within the summer season, to allow for variability in metocean conditions. In this scenario, the oil was tracked for 60 days after the flow of oil was stopped by drilling a relief well, to assess its ongoing fate and trajectory once released to the environment.

The WCD_{129d} scenario, was based on early assumptions and calculations of the logistics and time required to mobilise a relief well MODU and successfully complete a relief well to kill the well. The initial logistics analysis estimated the relief well could be completed in 129 days. The assumptions behind this scenario were then

subjected to a comprehensive ALARP assessment of ways to reduce the response time. The ALARP process led to a reduction in the predicted maximum relief well completion time to 102 days.

The results of the WCD_{129d} stochastic modelling were used to set the outer geographic boundaries for the areas at risk of exposure to hydrocarbons from a spill (referred to as the 'risk EMBA' – see Section 6.2.2). The improved response scenario of 102 days was then modelled as described below.

8.2.2.2 Stochastic modelling – unmitigated worst case credible discharge

An ongoing flow from an open well bore is not considered a credible scenario because it has never happened in the industry. If the well bore and BOP were completely empty (drill string removed), then one of the other options available to close the BOP would be successful. However, loss of well control with the drill string in the bore has happened before in the industry and is considered more credible. This scenario is associated with a lower flow rate since the presence of the drill string limits the flow of oil to move through the annulus of the drill pipe. Therefore, this was selected as the worst credible case discharge (WCCD) loss of well control scenario and was used to assess the effectiveness of different mitigation options to inform spill response planning. The scenario was based on unrestricted annulus flow during the loss of well control, with an average subsea release rate of 6739 m^3/day until the well is killed on day 102 ($WCCD_{102}$).

Stochastic modelling of the unmitigated $WCCD_{102d}$ scenario was used to represent the potential oil exposure on the sea surface (Figure 8-1) and the maximum potential shoreline loading of weathered oil (Figure 8-2).

Figure 8-1 shows the area covered by the slick of fresh oil (prior to loss of more toxic volatile compounds through weathering) remains well offshore for all simulations. Beyond this zone would be a large sea surface area potentially affected by weathered oil, increasingly degraded with distance from the well. The drift of the slick generally extends to the east, indicating potentially high concentrations of surface oil near Port Lincoln, Kangaroo Island and Mount Gambier in South Australia (SA), Port Fairy in Victoria, and King Island north of Tasmania. Under some conditions oil extends into Western Australia (WA) but generally remains over 10 NM offshore, except for some low concentration oil contact with the shore near Esperance. The oil reaching the shore at the extremities of the slick, particularly in WA and New South Wales (NSW) will be highly weathered after 1-2 months at sea before shore impact. By the time it reaches the shore in these distal areas it is likely to be hardened into tar balls.

Figure 8-2 shows the maximum potential shoreline loading of weathered oil, which covers areas from Albany in WA to Port Macquarie in NSW, including Tasmania. In WA the areas with potentially higher loadings generally occur between Esperance and Israelite Bay. High shoreline loadings cover a greater area in SA and are generally concentrated from Flinders Island east to Kangaroo Island. Smaller isolated areas with potentially high shoreline loading occur near Border Village, Fowlers Bay, Ceduna, Cape Jaffa and Mount Gambier. In Victoria shoreline loadings are highest east of Port Fairy to Wilsons Promontory. Flinders Island, King Island and north west of Smithton are areas that could potentially receive the highest shoreline loadings for Tasmania. In NSW potentially high shoreline loadings are near Eden, Bateman and Newcastle north of Sydney.

There are some areas in Figure 8-1 where surface concentrations are very low (<1 g/m^2) in nearshore areas, and yet the potential shoreline loadings (in Figure 8-2) reach low to moderate levels (e.g. from Israelite Bay in WA to Border Village in SA). In these instances, there is the potential for oil films arriving onshore at less than <1 g/m^2 to accumulate over the course of a spill and result in shoreline loads that exceed the low threshold of 10 g/m^2.

Information on shoreline loadings, volumes, length of shoreline contacted and minimum time to contact that have been used for spill response planning are provided in Table 8-4. The minimum time to shoreline contact for each state is visually represented in Figure 9-1.

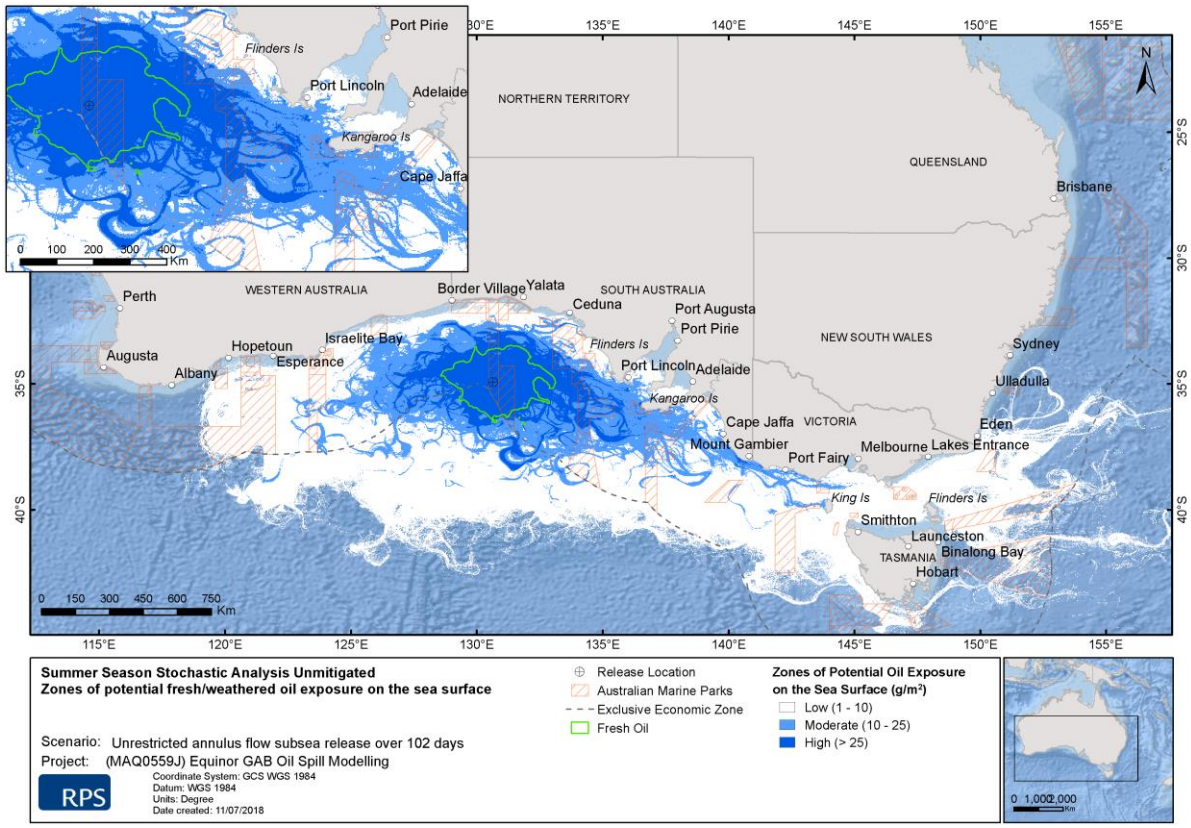


Figure 8-1 Unmitigated stochastic analysis of oil exposure on the sea surface in $WCCD_{102d}$

Note: Based on combining 100 spills of unrestricted annulus flow subsea over 102 days.

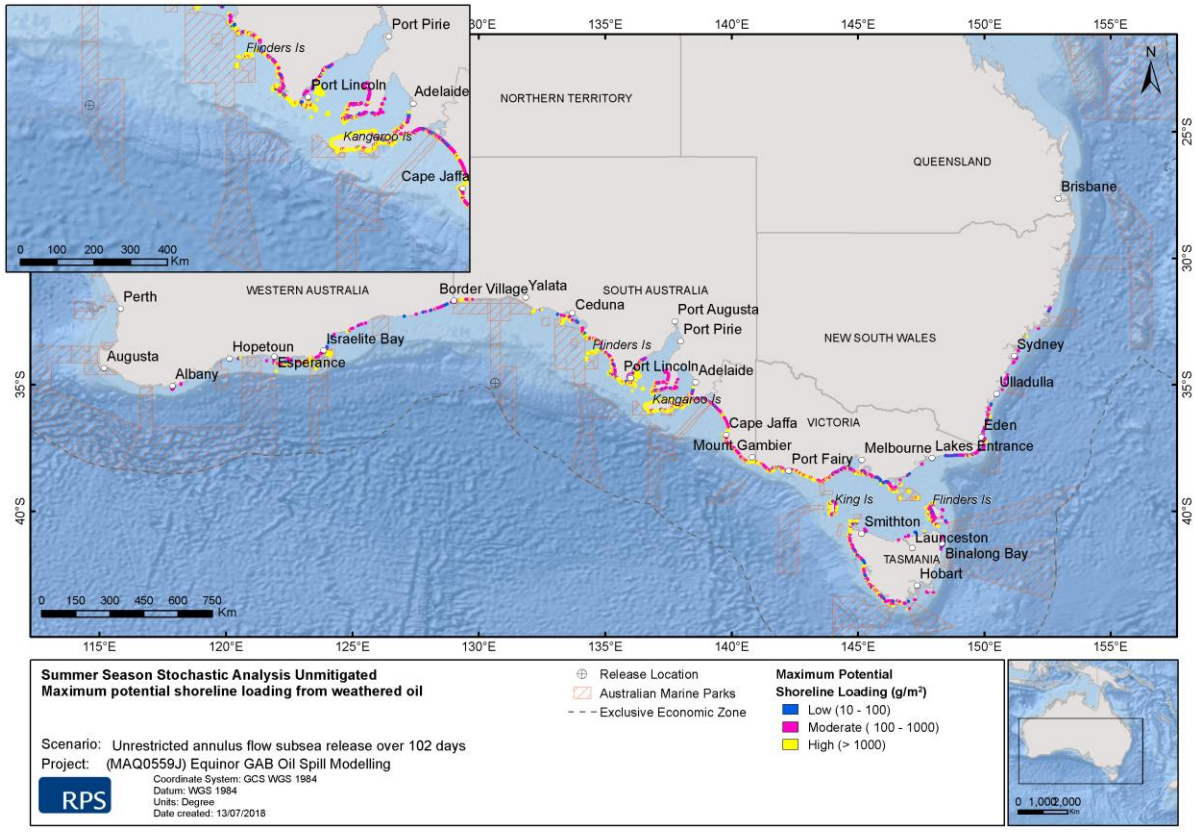


Figure 8-2 Unmitigated stochastic analysis of shoreline loading from weathered oil in $WCCD_{102d}$

Note: Based on combining 100 spills of unrestricted annulus flow subsea over 102 days.

Table 8-4 Summary of weathered oil contact to shorelines for unmitigated $WCCD_{102d}$ stochastic modelling

State	Probability of shoreline contact (%)			Minimum time before shoreline contact (days)			Shoreline loading (g/m^2)		Volume on shoreline (m^3)		Mean length of shoreline contacted (km)			Maximum length of shoreline contacted (km)		
	>10 g/m^2	>100 g/m^2	>1000 g/m^2	>10 g/m^2	>100 g/m^2	>1000 g/m^2	Mean	Peak	Mean	Peak	>10 g/m^2	>100 g/m^2	>1000 g/m^2	>10 g/m^2	>100 g/m^2	>1000 g/m^2
Western Australia	24	24	24	55.8	55.8	61.4	4776	147,853	1370	7054	74	70	50	240	220	150
South Australia	100	100	100	21.4	21.4	21.5	16,400	830,824	54,856	124,815	1097	1015	706	1812	1683	1163
Victoria	84	84	82	43.7	43.7	43.8	8610	869,536	13,612	34,690	448	388	233	830	739	517
Tasmania	72	72	68	54.7	54.7	54.9	5558	343,346	7916	38,480	357	329	217	887	832	617
New South Wales	31	30	22	110.1	110.1	129.2	1200	8867	19	87	12	11	4	75	68	11

8.2.2.3 Deterministic modelling – unmitigated WCCD for "fastest time to shore"

Of the 100 spills in the stochastic simulations, deterministic spill runs were selected to further investigate potential environmental impacts and the effects of identified mitigation strategies. The complete set of deterministic modelling runs for all states are available in the Oil Spill Modelling Study in Appendix 7-2 of the EP. The "fastest time to shore" runs for SA have been described in this OPEP as examples because they represent the closest shorelines where contact by weathered oil is predicted to occur first.

The unmitigated "fastest time to shore" run showing oil exposure on the sea surface is in Figure 8-3 and shoreline loading is in Figure 8-4. Figure 8-3 shows that sea surface oil concentrations are moderate to high (10 g/m^2 to >25 g/m^2) close to shore at Kangaroo Island, which indicates that oiled wildlife response capability would be needed. For the rest of SA surface oil concentrations close to the coastline are low (1-10 g/m^2) and below levels that would harm marine fauna.

No fresh oil reaches the SA shoreline. Oil will be highly weathered by the time it reaches the shoreline; however, it would accumulate over time. Weathered oil contacts first at the Eyre Peninsula and Talia after 21 days and Kangaroo Island after 31 days. Weathered oil does not contact the shoreline in other parts of SA for months. Figure 8-4 shows that potentially high shoreline loadings (>1000 g/m^2) are indicated from Flinders Island to the Yorke Peninsula and including Kangaroo Island, which indicates planning for shoreline and wildlife response capability would need to cover those areas.

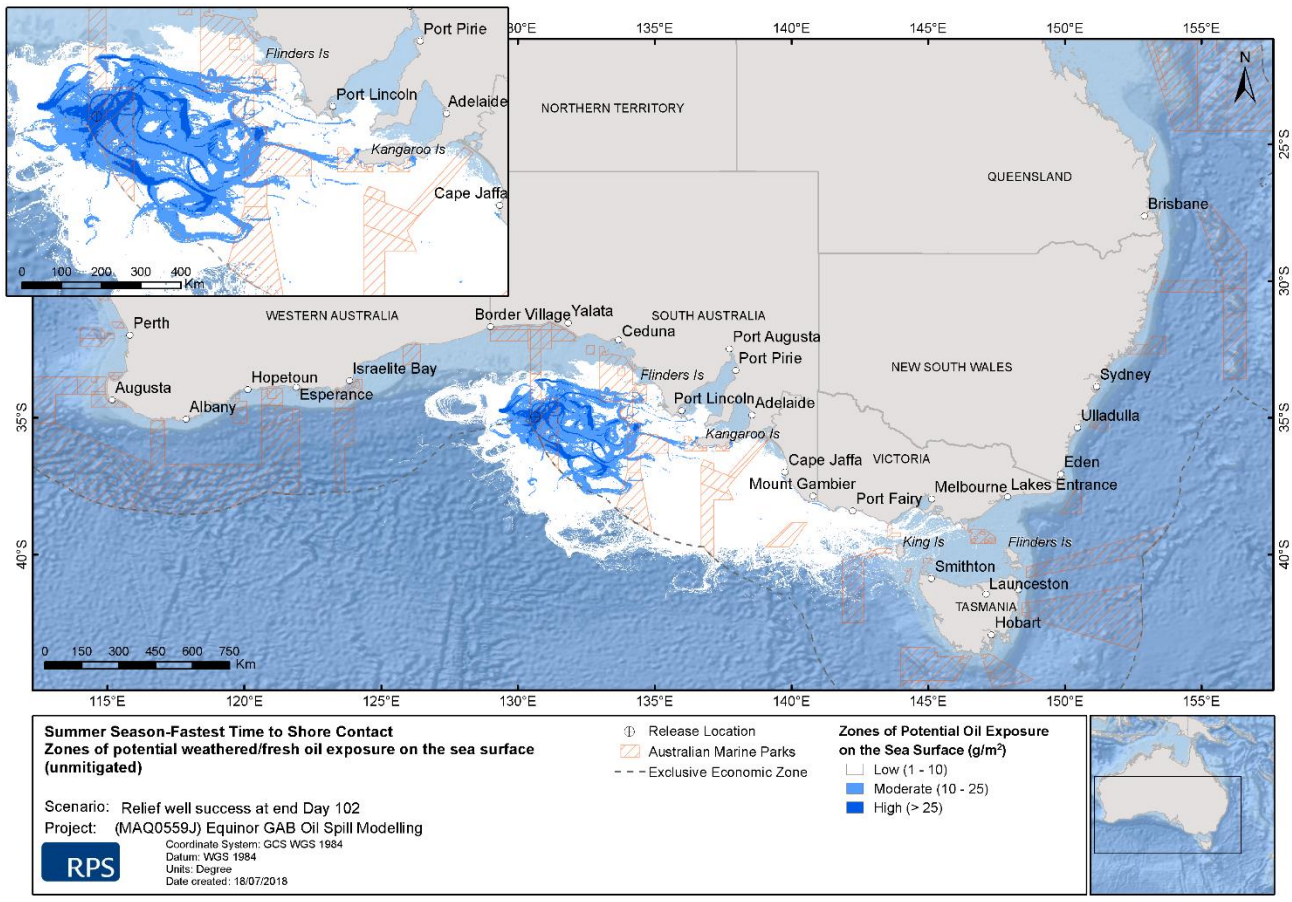


Figure 8-3 Unmitigated deterministic simulation of oil exposure on the sea surface for "fastest time to shore" run from WCCD$_{102d}$

Note: This is based on relief well success at end of day 102.

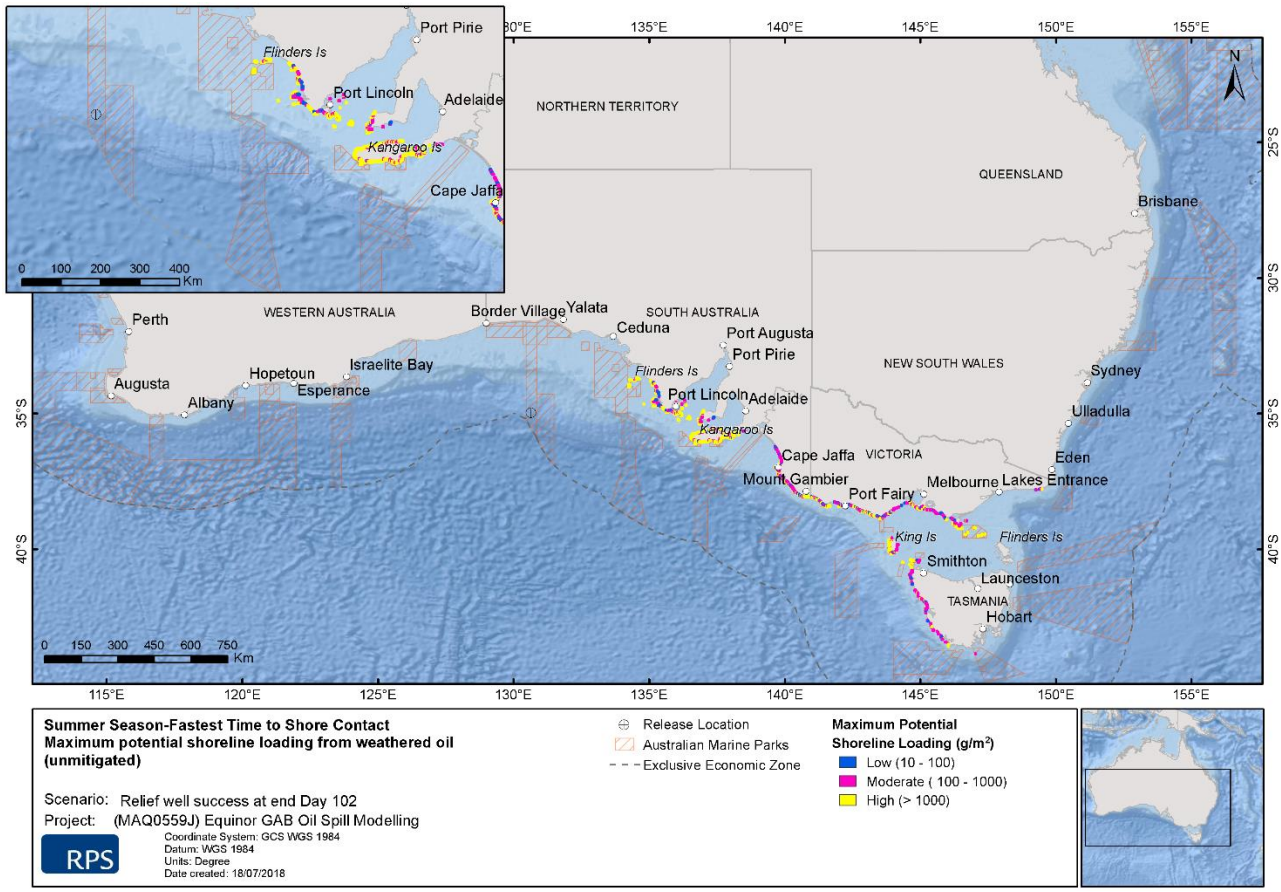


Figure 8-4 Unmitigated deterministic simulation of shoreline loading for "fastest time to shore" run from $WCCD_{102d}$

Note: This is based on relief well success at end of day 102.

8.2.2.4 Deterministic modelling – mitigated WCCD for "fastest time to shore"

The deterministic runs for the $WCCD_{102d}$ were also run with mitigation measures in place to test the effectiveness and impact of the measures. This involved incorporating the application of aerial and SSDI dispersants into the runs, along with the selected source control options (BOP, capping stack). Other response methods such as containment and recovery were not accounted for in the modelling but would further reduce potential impacts. The mitigated deterministic runs show that SSDI will be particularly effective in mitigating the impacts from a loss of well control event. This is consistent with the Deepwater Horizon experience. It is also notable that the "fastest time to shore" run represents the worst 1% of the modelled outcomes and that generally the risk will be lower.

Figure 8-5 shows the $WCCD_{102d}$ scenario with aerial and SSDI dispersants applied. The subsea dispersant causes most of the oil to stay entrained in the water-column and biodegrade faster than surface oil. This significantly reduces the oil that reaches the shore and surface oil concentrations are <10 g/m^3 in all areas adjacent the shoreline. The closest areas to shore with oil concentrations >10 g/m^3 are offshore of Port Lincoln and the Eyre Peninsula.

The outcomes of further mitigating the scenario above by successfully installing a capping stack at the end of day 15 is shown in Figure 8-6. Stopping the flow at day 15 limits surface oil to the coastal waters of SA only, with low concentrations (1-10 g/m^3) not extending beyond Cape Jaffa.

Successful BOP intervention will completely shut off the flow at seabed and obviously significantly reduce the amount of oil that reaches nearshore areas. As shown in Figure 8-7, moderate to high concentrations (>10 g/m^3) of surface oil will remain offshore near the well (>300 km offshore) and nowhere near the coastline.

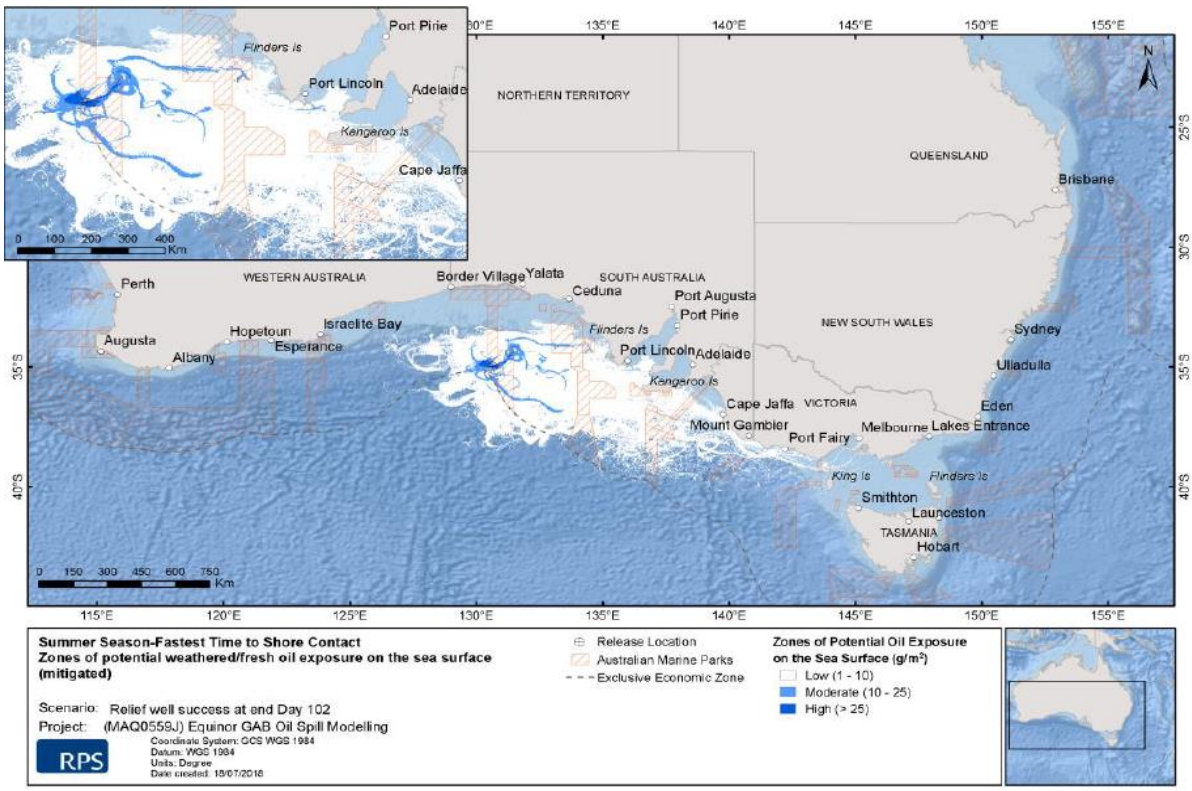


Figure 8-5 Mitigated (dispersants only) deterministic simulation of oil exposure on the sea surface for "fastest time to shore"

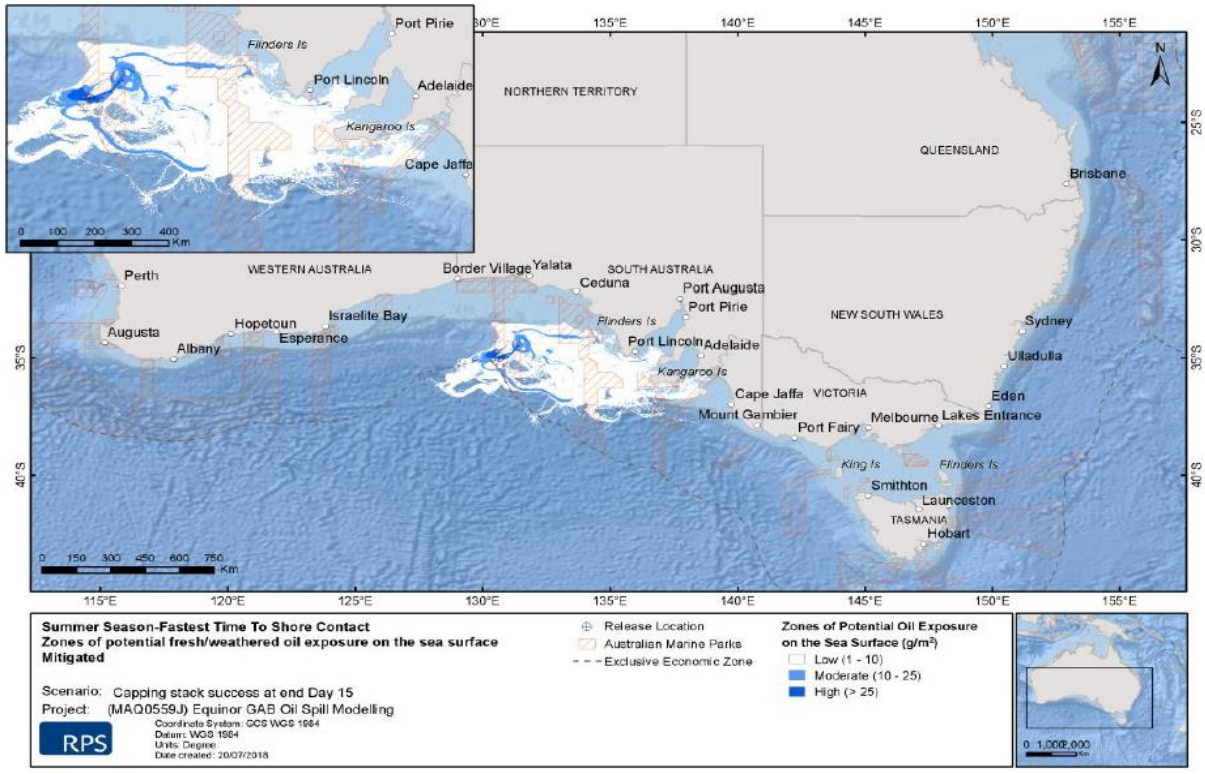


Figure 8-6 Mitigated (dispersants and capping stack) deterministic simulation of oil exposure on the sea surface for "fastest time to shore"

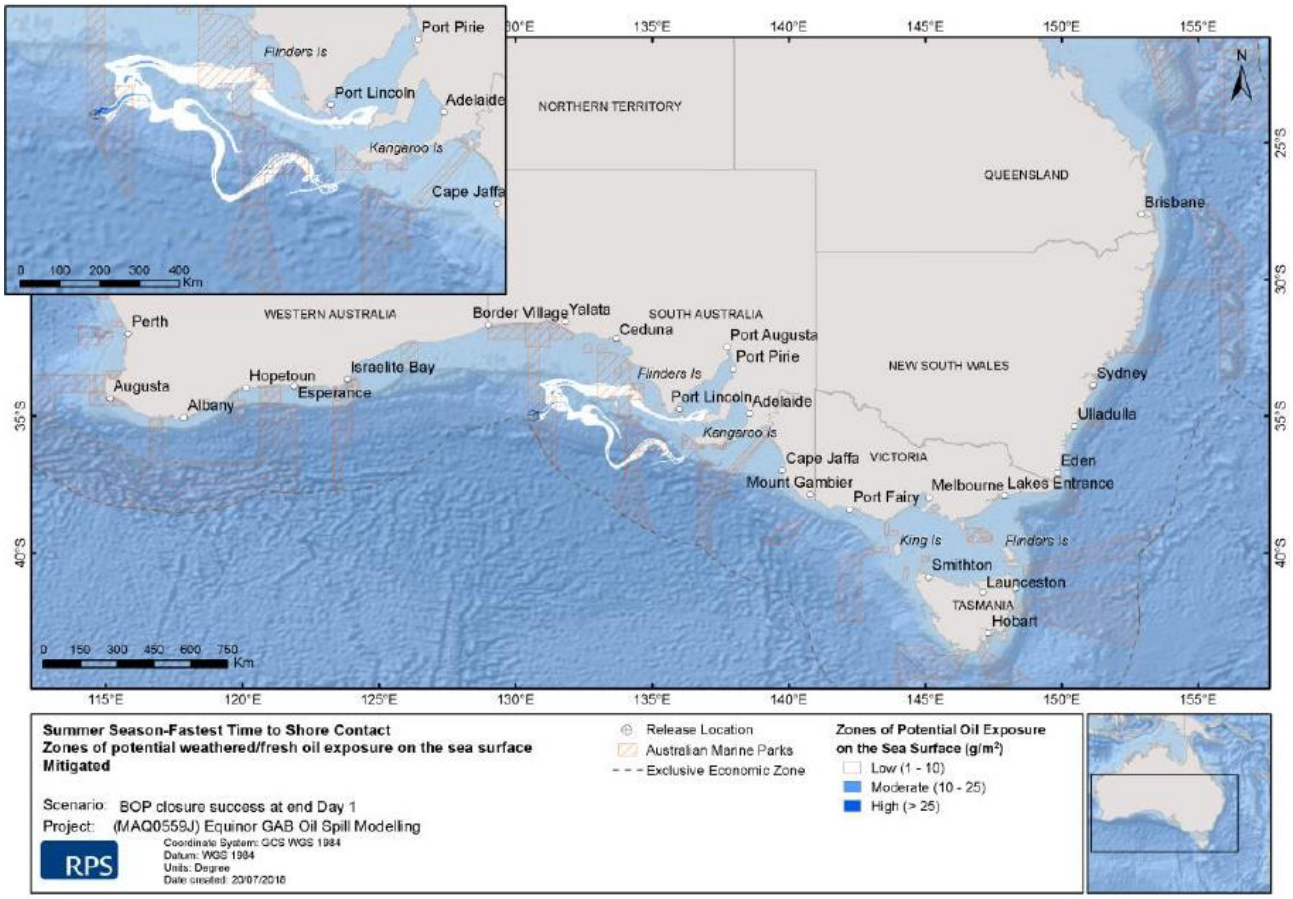


Figure 8-7 Mitigated (dispersants and BOP intervention) deterministic simulation of oil exposure on the sea surface for "fastest time to shore"

The maximum potential shoreline loadings for the $WCCD_{102d}$ scenario with aerial and SSDI dispersants applied is shown in Figure 8-8. The application of dispersants limits shoreline loading to areas within SA, Victoria and Tasmania. In SA, areas with high shoreline loadings (>1000 g/m^2) are Flinders Island, Port Lincoln, Yorke Peninsula, Kangaroo Island and near Tunkalilla. The unmitigated stochastic modelling runs (Section 8.2.2.2) indicated that Border Village, Yalata, Ceduna, Cape Jaffa and Mount Gambier would experience potentially high shoreline loadings, however the deterministic run for "fastest time to shore" with dispersant mitigation indicates that shoreline contact will either not occur at all in these areas, or that maximum potential shoreline loadings will be <10 g/m^2.

Figure 8-9 shows the maximum potential shoreline loadings for the $WCCD_{15d}$ scenario with dispersants and successful capping stack installation. High shoreline loadings still occur at Flinders Island, Port Lincoln, Yorke Peninsula, Kangaroo Island and Tunkalilla in SA; however, given the significantly reduced duration of the spill, such areas are far less concentrated than without successful installation of a capping stack.

With successful BOP intervention at the end of day one (Figure 8-10), shoreline loadings in general (>10 g/m^2) are restricted even further to Flinders Island, small islands off Coffin Bay and Port Lincoln and a small area on the Yorke Peninsula. In terms of shoreline response planning, based on the modelling conducted, these areas will be particularly important for ensuring that adequate capability is available. There is no longer shoreline contact at Kangaroo Island or Tunkalilla, and obviously no contact at any other areas along the SA coastline.

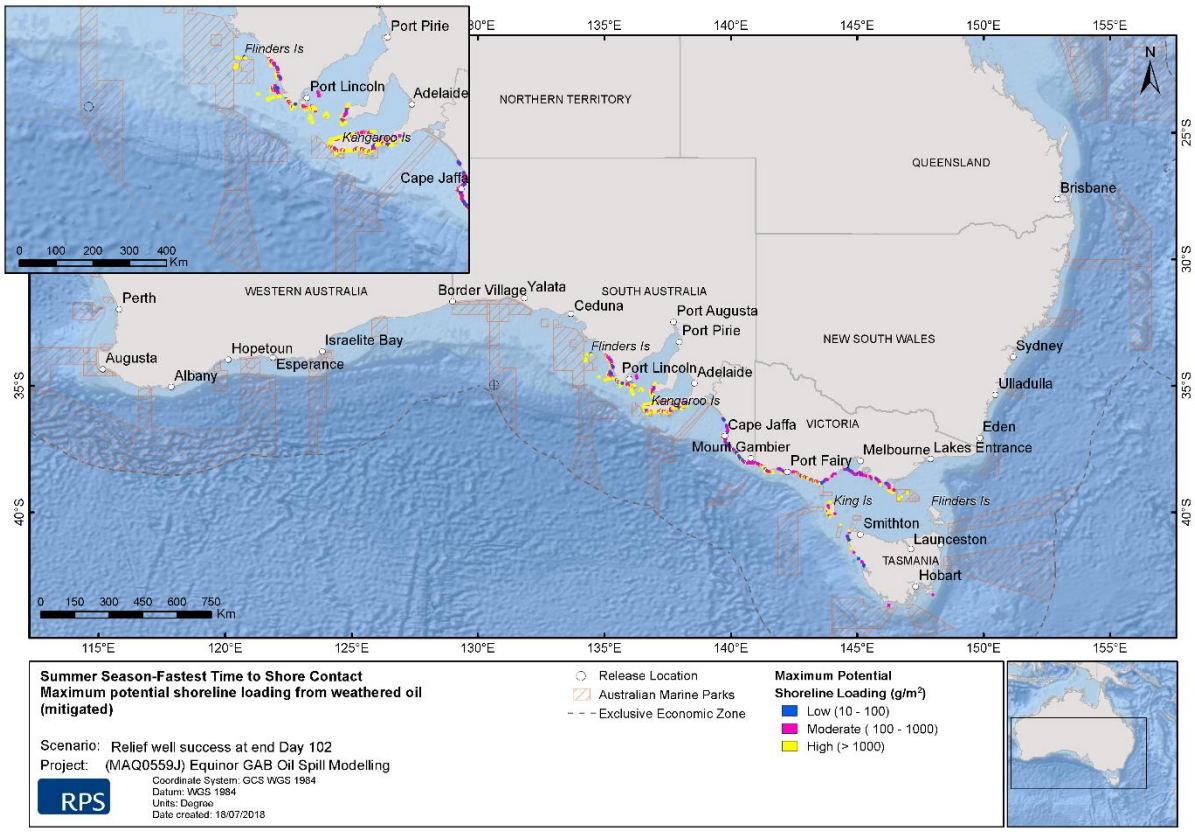


Figure 8-8 Mitigated (dispersants only) deterministic simulation of maximum potential shoreline loading for "fastest time to shore"

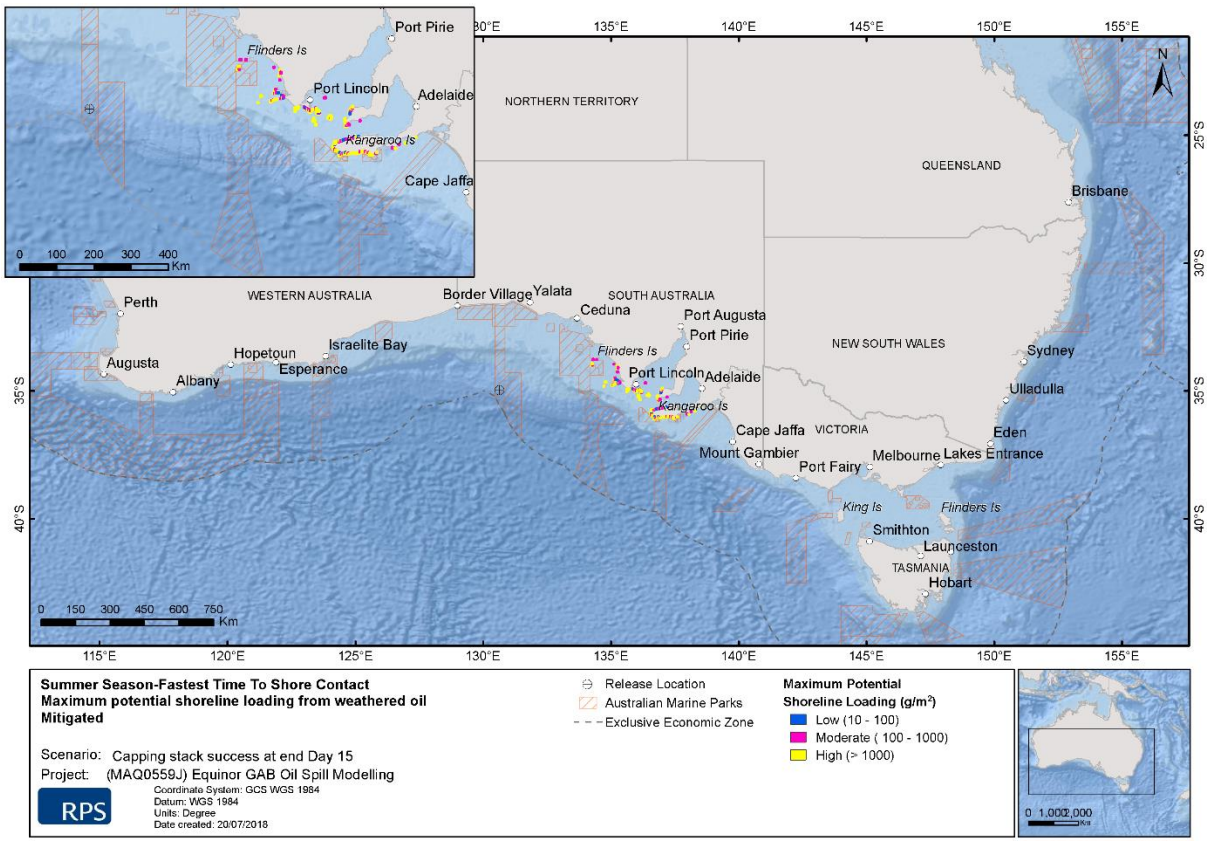


Figure 8-9 Mitigated (dispersants and capping stack) deterministic simulation of maximum potential shoreline loading for "fastest time to shore"

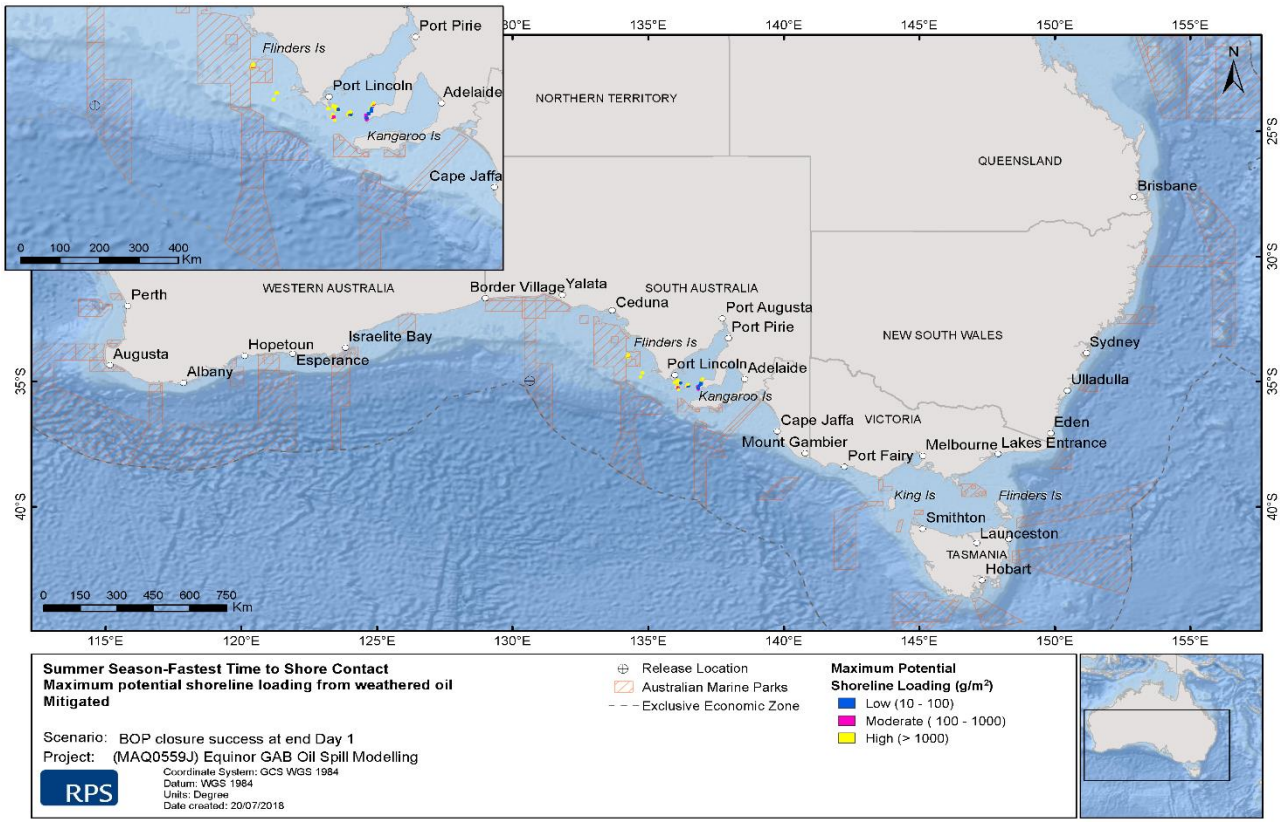


Figure 8-10 Mitigated (dispersants and BOP intervention) deterministic simulation of maximum potential shoreline loading for "fastest time to shore"

8.2.2.5 Modelling outcomes

A summary of the modelling results described in this OPEP is provided in Table 8-5 below. All modelling results are available in the Oil Spill Modelling Report in Appendix 7-2 of the EP.

Table 8-5 Summary of spill scenarios modelled

Scenario	Description	Purpose	Outcome
WCD_{129d} – stochastic **Unmitigated.**	WCD based on open-hole, unrestricted flow of oil for 129 days (original relief well plan). 100 spill runs combined to identify the theoretical maximum area at risk from an oil spill.	Set the theoretical geographic extent of the risk EMBA (Section 6.2.2).	Significant area affected for this theoretical scenario. Area extends from southern WA to NSW and includes Tasmania (Figure 6-2).
$WCCD_{102d}$ – stochastic **Unmitigated.**	WCCD based on subsea release with unrestricted annulus flow and no mitigation. It is assumed that the well is killed at the end of day 102. 100 spill runs combined to provide predictions of the distribution of hydrocarbons in the environment.	To identify the scale of response required based on worst credible rate.	Surface oil concentrations only reach high levels in SA, Victoria and King Island in Tasmania (Figure 8-1). Potential shoreline loading of weathered oil from southern WA to NSW, including Tasmania (Figure 8-2).

Scenario	Description	Purpose	Outcome
$WCCD_{102d}$ – deterministic **Unmitigated**	WCCD based on subsea release with unrestricted annulus flow and no mitigation. It is assumed that the well is killed at the end of day 102. The 'worst case' deterministic runs were selected from the stochastic modelling for assessment. The example in this OPEP is for the "fastest time to shore" run.	To identify the scale of response required and to allow comparison between unmitigated and mitigated deterministic modelling runs.	Surface oil only reaches moderate to high levels near Kangaroo Island (Figure 8-3). Weathered oil contacts the shore first at Eyre Peninsula in SA (21 days) (Figure 8-4). High shoreline loadings indicated in SA, parts of Victoria from east of Port Fairy to Wilsons Promontory, and King Island and north west of Smithton in Tasmania. No shoreline contact for WA and NSW.
$WCCD_{102d}$ – deterministic **Mitigated with dispersant only.**	After drilling well to Total Depth (TD) there is a subsea release with unrestricted annulus flow on top of the wellhead or BOP (outside drill pipe). Following unsuccessful BOP closure and failure to install a capping stack, the well is killed by drilling a relief well after 102 days. The 'worst case' deterministic runs were selected from the stochastic modelling for assessment. The example in this OPEP is for the "fastest time to shore" run.	To identify the scale of response required for this scenario and determine the effectiveness of aerial and subsea dispersant application.	Significant reduction in surface oil concentrations near the SA and Victorian coastline with almost all nearshore areas <10 g/m^2 (Figure 8-5). No longer any shoreline contact at Border Village, Yalata, Ceduna, Cape Jaffa and Mount Gambier in SA, and the islands between the Victorian mainland and Flinders Island (Figure 8-8). Minimal potential for oiled wildlife impacts given highly weathered state of oil reaching shore. No shoreline contact for WA and NSW.
$WCCD_{15d}$ – deterministic **Mitigated with dispersant and capping stack.**	After drilling well to TD there is a subsea release with unrestricted annulus flow on top of the wellhead or BOP (outside drill pipe). Following failure to close BOP, a capping stack is installed, and the flow stopped after 15 days. The 'worst case' deterministic runs were selected from the stochastic modelling for assessment. The example in this OPEP is for the "fastest time to shore" run.	To examine the further effectiveness of successful installation of a capping stack.	Shoreline contact is restricted to parts of South Australia and all surface oil concentrations in nearshore waters are <10 g/m^2 (Figure 8-6). Shoreline loadings restricted to Flinders Island, Port Lincoln, Yorke Peninsula, Kangaroo Island and Tunkalilla in SA (Figure 8-9). Minimal potential for oiled wildlife impacts given highly weathered state of oil reaching shore. No shoreline contact for all other states.
$WCCD_{1d}$ – deterministic **Mitigated with dispersant and BOP intervention.**	After drilling well to TD there is a subsea release with unrestricted annulus flow on top of the wellhead or BOP (outside the drill pipe). The fully open and empty BOP is closed by subsea ROV intervention and the flow stopped after 24 hours. The 'worst case' deterministic runs were selected from the stochastic modelling for assessment. The example in this OPEP is for the "fastest time to shore" run.	To examine the further effectiveness of successful BOP intervention.	Concentrations of surface oil >10 g/m^2 remain near the well location (>300 km offshore) (Figure 8-7). Shoreline loadings significantly reduced and contact only indicated at Flinders Island, small islands off Coffin Bay and Port Lincoln and a small area on the Yorke Peninsula (Figure 8-10). No contact for all other areas on the SA coastline. Minimal potential for oiled wildlife impacts given highly weathered state of oil reaching shore. No shoreline contact for all other states.

8.3 Risk EMBA

The risk EMBA represents the full geographic area that could be affected and was derived from stochastic modelling of 100 spill runs (refer to Section 8.2.2.1). A summary of the low thresholds applied to determine the extent of the risk EMBA is provided in Table 8-6.

The locations of environmental and socio-economic receptors that could be affected within the risk EMBA were identified, based on the existing environment description in Section 4 of the EP. A list of the receptors considered to be within the risk EMBA is provided in Appendix 9 of this OPEP. These receptors were incorporated into the NEBA tool.

Table 8-6 Thresholds used to define the risk EMBA

Description	Threshold
Visible fresh and weathered sea surface oil	1 g/m^2
Shoreline oil contact	10 g/m^2
Dissolved aromatics	6 ppb
Entrained hydrocarbons	10 ppb

8.4 NEBA

The NEBA process will be used to identify and assess the potential impacts (positive or negative) to sensitive environmental and socioeconomic receptors, associated with the implementation of spill response options. The NEBA process considers all response strategies and tactics against each other to allow appropriate comparative assessment. Equinor requires that the NEBA process comprise the following steps:

- compile and evaluate data
- predict the outcomes
- balance trade-offs
- select the best response options.

The NEBA process that will be followed during a spill response is provided in Figure 8-11.

During the preparation of this OPEP a NEBA assessment was conducted to identify response options and determine whether the impacts associated with each option were likely to result in a net benefit or disbenefit compared to a response with no control measures implemented. The assessment was conducted in a workshop that was attended by Equinor personnel and external subject matter experts with a range of technical areas and experiences. The outputs of the NEBA workshop conducted including the environmental and socio-economic receptors, and the assessment criteria are provided in Appendix 9 and were used to determine Equinor's spill response priorities (Section 9.0). The information in Appendix 9 is already built into the Equinor NEBA tool developed for the activity.

During a spill response, the NEBA process will be undertaken by a member of the IMT Environmental Unit using the Equinor NEBA tool. NEBAs will be undertaken as required throughout the response phase, to allow consideration of the evolving nature and scale of the incident, and to address any identified potential changes in risk. The NEBAs that have been completed will be checked every operational period and the NEBA output will be attached to the Incident Action Plan.

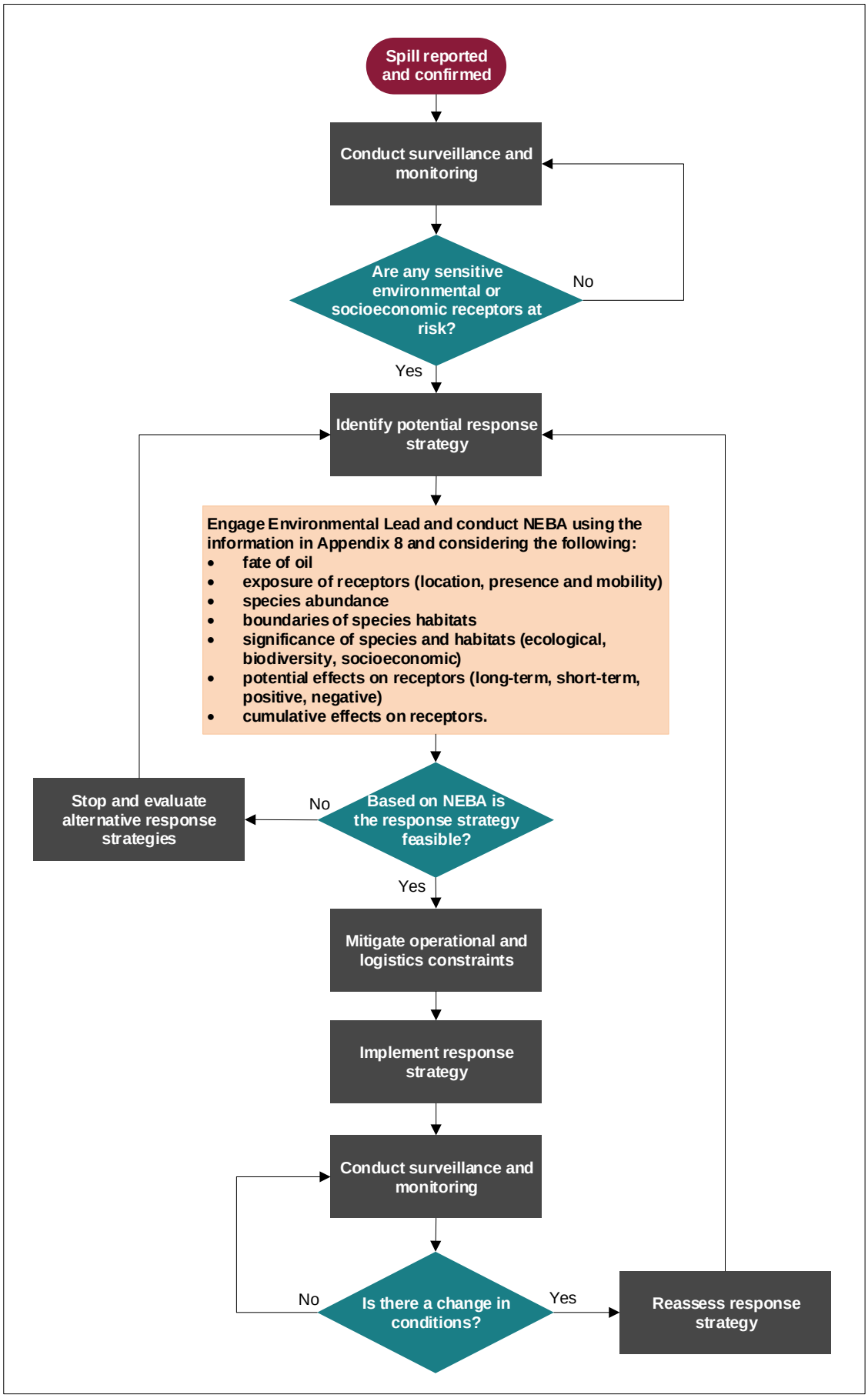


Figure 8-11 NEBA process

8.5 Assessment of spill response options for subsea release

Based on the environmental and socioeconomic sensitives identified, and the modelling analyses conducted, spill response options were assessed for feasibility, effectiveness and the potential to result in additional environmental impacts. Table 8-7 summarises the response options considered and whether they have been adopted. If they were not adopted, justification is provided. A detailed summary of the risk assessment conducted for these options is provided in Section 7 of the EP, and the ALARP and acceptability justification is provided in Appendix 5-1 of the EP.

Table 8-7 Spill response options assessed

Response option	Adopted / not adopted	Summary of justification
Source control	Adopted	Required.
Oil spill monitoring	Adopted	Required.
Aerial dispersant application	Adopted	Fast mobilisation and remote location.
Vessel dispersant application	Adopted	Shared resource available (vessel) however will depend on priorities.
SSDI	Adopted	Likely to be very effective method and is a more effective use of available dispersant stock than surface dispersant application.
In-situ burning	Not adopted	Light components of the oil will evaporate, which in conjunction with the operational uncertainties of concentrating the oil with booms to facilitate ignition, indicate a low likelihood of success. The operational safety hazards associated with in-situ burning are considered high risk, and in-situ burning has not been undertaken in Australia. Therefore, this option has not been adopted.
Offshore mechanical recovery	Adopted	Used in combination with other response methods to ensure the overall response strategy is robust (i.e. if subsea dispersant is less effective than anticipated).
Nearshore containment and recovery	Adopted[1]	To protect high value coastal areas and sensitive receptors.
Shoreline protection and clean-up	Adopted[1]	Required.
Oiled wildlife response	Adopted[1]	Required.

1. Note that the states will be the control agency within the 3 NM state waters boundary and therefore will direct spill response within that zone. Equinor will support the response, providing resources and assisting with execution of the response.

9.0 Spill response priorities

In responding to a hydrocarbon spill the following priorities will be observed:

1. Human life, health and personal safety
2. Stopping the pollution at the source
3. Preventing impacts environmental and socioeconomic receptors.

Equinor will implement one or more of the following response methods:

- surveillance and monitoring
- source control (BOP intervention, capping and drilling a relief well)
- vessel dispersant application
- aerial dispersant application
- subsea dispersant application
- offshore and nearshore containment and recovery.

The most important thing to note is that in the event of a well blow-out, source control will be the most effective response method and therefore prioritised. However, the resources required to support additional response methods listed above will be mobilised at the same time. Table 9-1 summarises the response priorities for the various methods.

The state agencies will be the control agencies for spills that move into state waters (within 3 NM of the coastline). Therefore, nearshore operations, shoreline protection and clean-up, and wildlife response operations within that zone will be under their direction. Equinor will support as directed by the states.

Table 9-1 Response priorities

Method	Description
Surveillance and monitoring	Prioritised and activated immediately. Combination of methods utilised to provide 24 hours capability: • visual observations: conducted during daylight hours initially by vessel and then also aircraft once mobilised • oil spill modelling: conducted and ground-truthed with in-field surveillance methods • satellite surveillance: obtained from KSAT to provide information on the location and coverage of the oil slick and location of sensitive receptors • oil spill tracking buoys: to provide real-time sea surface current and temperature data that can verify spill trajectory modelling • aerial surveillance: conducted at least twice during daylight hours using aircraft with aerial remote sensing capability and trained observers. For spills requiring additional aerial support, unmanned aerial vehicles may be used • OSMP: series of OMPs and SMPs triggered in the event of a Level 2 or 3 spill.
Source control	The most effective response method and therefore prioritised and activated immediately. • in the event of a well blowout BOP closure will be immediately actioned • at the same time, other subsea source control resources will be mobilised (i.e. capping stack, equipment needed for debris clearance, SSDI delivery system equipment and tooling and the relief well drilling rig).

Method	Description
Surface Dispersant Application	Mobilisation of aerial and vessel dispersant resources will be activated simultaneously with source control resources: • vessel dispersant application: capability to support the first few days of spill response. • aerial dispersant application: capability to support for longer period (~22 days [HOLD – check modelling input]). Once SSDI has been initiated aerial application will continue and be phased out when it is no longer effective. In the unlikely event there are limitations on the volumes of dispersant available, SSDI will be prioritised over aerial dispersant.
Containment and recovery	Mobilisation of containment and recovery resources will be activated simultaneously with source control resources. If SSDI has commenced and aerial dispersant application ceased, then mechanical containment and recovery will be used.
Shoreline protection, clean-up and wildlife response	Prioritised and activated immediately under the direction of state control agencies. Figure 9-1 shows the timeframes for oil contact with the shoreline for each state (based on WCCD modelling), which allow for the mobilisation of resources, update and development of TRPs, shoreline assessments and tactical operations to be conducted.

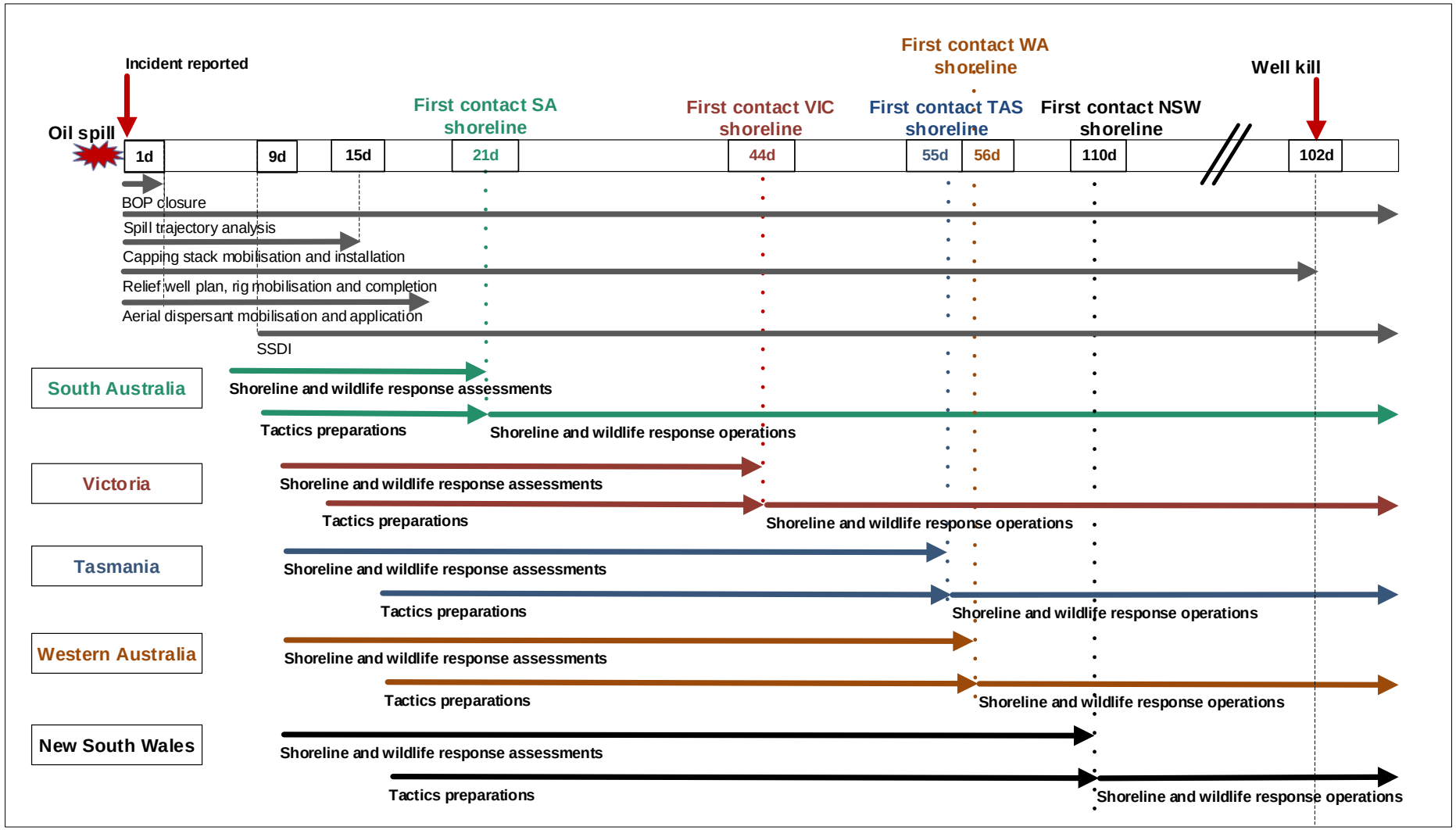


Figure 9-1 Shoreline and wildlife response timeframes

10.0 Spill capability

10.1 Tiered response resources

Equinor will have the required capability available to activate and implement spill response methods. A spill resources inventory with providers of equipment and personnel, and the locations and mobilisation times is in Appendix 2.

The tiered preparedness and response framework for the Stromlo-1 petroleum activity will ensure that capability is adequate and scalable, with response personnel, equipment and additional support on hand. The capability is held locally (Tier 1), regionally (Tier 2) and internationally (Tier 3) and the tier classification adopted for the Stromlo-1 petroleum activity is shown in Figure 10-1.

Equinor will have resources onboard the MODU and PSVs at the well location, and stockpiled resources stored at Ceduna airport, and in Adelaide. A contract with AMOSC and a MoU with AMSA are in place to enable access to their resources. Further resources are available from industry via mutual aid and Equinor have access to OSRL and WWC resources via memberships. Equinor has ensured that resource requirements beyond what is available via these arrangements have been identified and will be met through commercial companies and state agencies [HOLD – state agency consultation in progress].

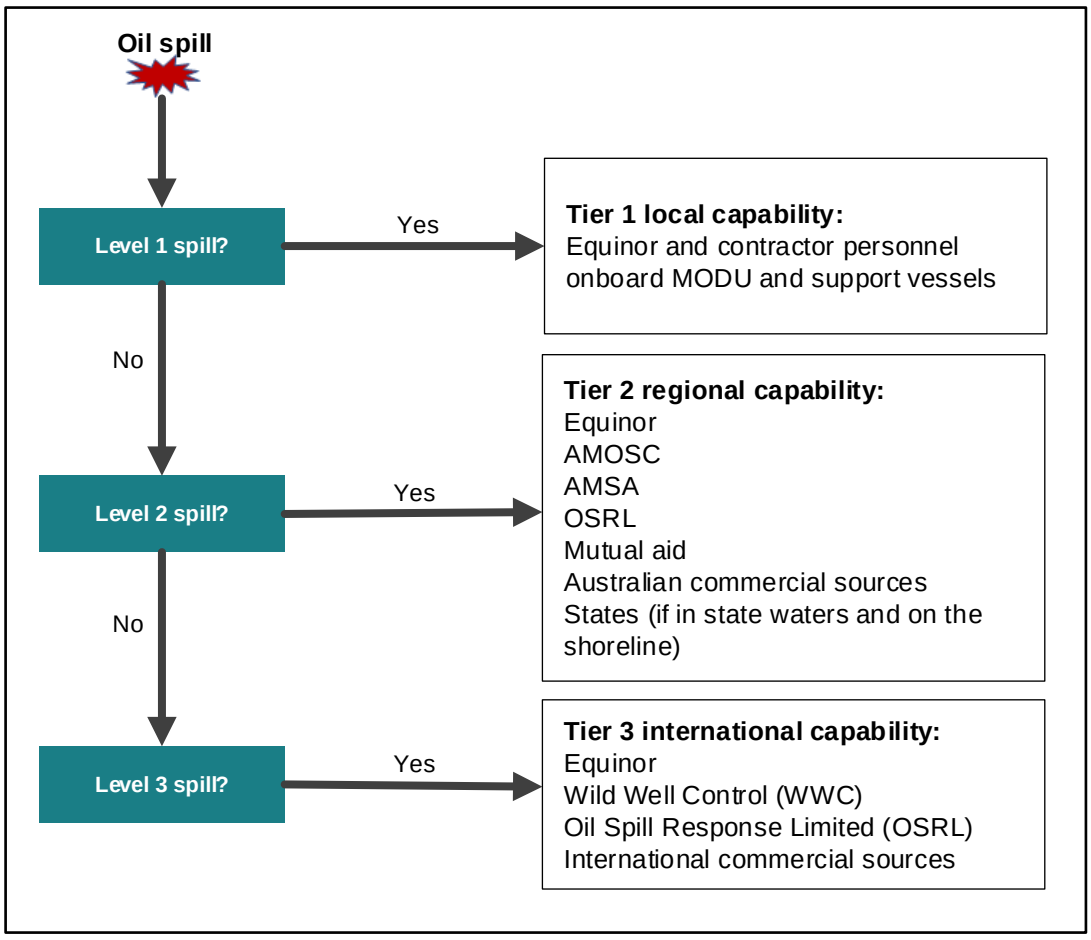


Figure 10-1 Tiered response capability

10.2 AMOSC

The AMOSC has offices in Geelong and Fremantle and maintains stockpiles of oil spill response and subsea intervention equipment at locations across Australia. A full inventory of AMOSC equipment is available from the AMOSC website (http://www.amosc.com.au/equipment.php).

Mobilisation time to Adelaide for the bulk of the equipment based in Geelong is approximately 14 hours. Additional equipment in Fremantle, Exmouth and Broome can be mobilised to the Equinor marine supply base, Port Adelaide in approximately 36, 51, 47 hours respectively. This includes an allowance of four hours for truck availability, sourcing and loading.

Thirteen permanent staff are available on a 24/7 basis, who may be supplemented by around 120 participating oil company personnel (the AMOSC Core Group), which are available through the National Plan. This group is trained above the levels normally undertaken as part of International Maritime Organisation (IMO) Level I-III format oil spill response courses accredited by the Nautical Institute.

Training records are kept valid through refresher courses undertaken every two years. AMOSC also undertakes marine oil spill training courses in Geelong and Fremantle. AMOSC will provide support via:

- contracts: oiled wildlife call-off contract with provider; trajectory mapping of spills with provider.
- agreements: air charter services with provider; land transport provider; National Plan – AMSA; alliance agreement with OSRL.
- national and international relationships: global response network (OSRL); International Petroleum Industry Environmental Conservation Association; subsea response and equipment providers Trendsetter, Oceaneering and Add Energy; and oiled wildlife provider in the USA; National Plan partners.

10.3 AMSA

Equinor have access to 50% of available AMSA equipment through AMOSC and under the National Plan. AMSA maintain stockpiles of equipment in Adelaide, Brisbane, Dampier, Darwin, Devonport, Fremantle, Melbourne, Sydney and Townsville. A full inventory of AMSA equipment is available from the AMSA website (www.amsa.gov.au).

10.4 State agencies

10.4.1 Western Australia

[HOLD – consultation in progress.]

10.4.2 South Australia

[HOLD – consultation in progress.]

10.4.3 Victoria

[HOLD – consultation in progress.]

10.4.4 Tasmania

[HOLD – consultation in progress.]

10.4.5 New South Wales

[HOLD – consultation in progress.]

10.5 OSRL

Equinor has access to the Global Response Network and Global Dispersant Stockpile via OSRL. OSRL resources that Equinor has identified for use are likely to come from Singapore or the United Kingdom. Mobilisation times from the Singapore base is 2-4 days, and from the United Kingdom to Adelaide is 3-5 days. Capability assessments are based on Equinor having access to 100% of the available Global Dispersant Stockpile (https://www.oilspillresponse.com/globalassets/services/member-response-services/global-dispersant-stockpile/tis-gds-2017-oct-27.pdf).

10.6 Wild Well Control

In the event of a well blowout the WellCONTAINED package from Singapore will be mobilised by air, which includes kits for debris removal, SSDI and capping. Wild Well Control personnel will be mobilised from the United States and Europe to support source control operations. The mobilisation time for equipment from Singapore is 2-4 days (as for OSRL).

11.0 Training and exercises

11.1 Training and competency

Equinor will maintain competent and trained response personnel to ensure that emergency management and response capability is maintained throughout the activity. Equinor IMT personnel are required to complete training in Incident Management and Incident Command System. Table 11-1 lists further training and competency requirements relevant to this OPEP.

The training specified is in line with the legal requirements for petroleum activities in Australia. Training and certification of individual personnel are tracked in SAP software.

Table 11-1 Equinor training and competency requirements

Nominated position	Training/competency
All drilling/project personnel	OPEP familiarisation training (to be included as part of the activity induction)
Equinor IC	Command, Control and Decision-Making Skills (IMOIII)
Equinor Operations Section Chief	Oil Spill Response Management (IMO II or equivalent)
Equinor Environmental Unit Leader	OSRL (or equivalent) tactical Environment Advisor and Oiled Wildlife Response Planning courses

11.2 Exercises, testing and drills

The exercises listed in Table 11-2 will be conducted for the activity. The schedule below aligns with requirements of Subregulation 14(8C) of the OPGGS(E) Regulations. In addition, response arrangements will be tested again no later than 12 months after the most recent test. If a new location is added to the EP for the activity, testing response arrangements will be tested as soon as practicable after it is added to the EP.

Testing response arrangements will include:

- clear statement of the objectives of testing
- mechanisms for evaluating the exercise against the agreed objectives
- mechanisms for addressing recommendations arising from the exercise.

Following each exercise, a debrief will be conducted and opportunities to improve will be identified, recorded and the plan or procedural updates recorded in Synergi. Personnel responsible for completing actions will be identified and a defined completion time specified.

Table 11-2 Exercises, testing and drills

Exercise	Description	Frequency
OPEP desktop exercise	An OPEP desktop exercise to test oil spill response plans for a Level 3 oil spill event. The objectives of the exercise are to test: • escalation and mobilisation processes from vessel/rig to Equinor • interfaces with commonwealth/state control agencies • interfaces with response partners/stakeholders • activation of the OSMP and associated implementation plan • logistical arrangements (i.e. availability and mobilisation times) through desktop application.	Prior to spud
Communications test	Test of all contact numbers including response partners, response stakeholders and control agencies.	Prior to spud
IMT desktop exercise	Equinor internal test of a Level 3 oil spill event response.	Prior to spud

12.0 OPEP Review

The OPEP will be reviewed for currency at a minimum of:

- every 12 months from the date of commencement of the drilling campaign
- upon any significant change in scope to the drilling campaign (including any addition of a new drilling location)
- where plan improvements have been identified from a “lessons learned” process following a spill event or training activity.

13.0 Abbreviations

[HOLD – to be completed prior to submission to NOPSEMA]

Abbreviation	Definition

14.0 References

[HOLD – to be completed prior to submission to NOPSEMA]

Appendix 1 Contacts directory

[HOLD – in progress, this is an example. It also includes contact details for providers]

Organisation	Phone	Email
Commonwealth		
National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)	+61 8 6461 7090	submissions@nopsema.gov.au
Australian Maritime Safety Authority (AMSA)	1800 641 792 (24 hours)	http://www.amsa.gov.au/contact-us/
National Offshore Petroleum Titles Administrator (NOPTA)	Titles Hotline: +61 6424 5317	titles@nopta.gov.au
Commonwealth Department of the Environment and Energy (DEE)	Switchboard: +61 2 6274 1111 Director of National Parks: +61 2 6274 2220	
Department of Industry, Innovation and Science (DIIS)	Switchboard: +61 2 6213 6000	
Western Australia		
Department of Transport (DoT) - Maritime Environmental Emergency Response	+61 8 9480 9924 (24 hours)	marine.pollution@transport.wa.gov.au
Department of Mines, Industry Regulation and Safety	Environmental Reporting: +61 419 960 621 (24 hours)	Environmental - petroleum.environment@dmirs.wa.gov.au
Department of Fisheries (DoF)	Perth Office: +61 8 6551 4444 Esperance District Office: +61 8 9071 1839	environment@fish.wa.gov.au
Department of Biodiversity, Conservation and Attractions - Parks and Wildlife	Marine emergencies: +61 8 9474 9055 Wildcare Helpline: +61 8 9474 9055 General enquiries: +61 8 9219 9000	enquiries@dbca.wa.gov.au
Esperance Port Authority	Emergencies: 0428 712 111 (24 hours) General enquiries: +61 8 9072 3333	enquiries.esperance@southernports.com.au
Department of Water and Environmental Regulation	1300 784 782 (24 hours)	pollutionwatch@dwer.wa.gov.au
South Australia		
Department of Planning, Transport and Infrastructure (DPTI)	+61 8 8248 3505 (24 hours)	
Department for Environment and Water (DEW)	Emergencies: refer to SA Police General enquiries: +61 8 8204 1910	NA
DEW Coast Protection Board	+61 8 8124 4928	DEWNRcoastprotectionboard@sa.gov.au
Environmental Protection Authority	+61 8 8204 2004 or 1800 623 445	epainfo@sa.gov.au

Organisation	Phone	Email
SA Police	Urgent: 000 (24 hours) Non-urgent: 131 444 (24 hours)	NA
Flinders Ports	08 8447 0611	flindersports@flindersports.com.au
Department of Primary Industries and Regions SA (PIRSA)	Fishwatch Hotline: 1800 065 522 (24 hours)	NA
Victoria		
Department of Economic Development, Jobs, Transport and Resources (DEDJTR)	13 61 86 or +61 3 5332 5000	customer.service@dpi.vic.gov.au
DEDJTR - West of Cape Otway – Portland Region	+61 3 5525 0900	
DEDJTR - East of Cape Otway – Port Philip Region	+61 3 9644 9777	
Maritime Safety Victoria	Emergencies: refer to VIC Police General enquiries: +61	information@transportsafety.vic.gov.au
Environmental Protection Authority (EPA)	1300 372 842 (24 hours)	contact@epa.vic.gov.au
Department of Environment, Land, Water and Planning	General enquiries: 13 61 86	
VIC Police	Urgent: 000 (24 hours) Water Police: 1800 135 729	
Emergency Management Victoria	State Control Centre: +61 3 9032 3600 Head Office: +61 3 8685 1355	
Tasmania		
Environmental Protection Authority (EPA)	Pollution Incidents: 1800 005 171 General enquiries: +61 3 6165 4599	enquiries@epa.tas.gov.au
Department of Primary Industries, Parks, Waters and Environment (DPIPWE)	Pollution Incidents: 1800 005 171	
New South Wales		
NSW Transport Roads and Maritime Services	Pollution incidents: 13 12 36	
NSW Police	Urgent: 000 (24 hours) Water Police: 1800 658 784 (24 hours)	

Appendix 2 Spill resources inventory

[HOLD – updates made before submission to NOPSEMA must be done in the Excel file and new tables pasted in. Additional tables required for Equinor owned and contracted resources and AMSA resources]

AMOSC Resources

Category	Product Name	Quantity	Metres	Location	Response Time
Boom	Beach Guardian Boom	4	100	Broome	47 hours
Boom	Zoom Boom	8	200	Broome	47 hours
Boom	200m HDB 1300 Boom on Hyd Reel	2	400	Broome	47 hours
Boom	200m Ro-Boom	2	400	Exmouth	51 hours
Boom	Beach Guardian Boom	20	500	Exmouth	51 hours
Boom	Zoom Boom	17	425	Exmouth	51 hours
Boom	200m Ro-Boom	6	1200	Fremantle	36 hours
Boom	Beach Guardian Boom	10	250	Fremantle	36 hours
Boom	Zoom Boom	16	400	Fremantle	36 hours
Boom	450mm Curtain Boom	18	540	Fremantle	36 hours
Boom	200m Ro-Boom	7	7	North Geelong	14 hours
Boom	36m Ro-Boom	1	1	North Geelong	14 hours
Boom	Beach Guardian Boom	51	51	North Geelong	14 hours
Boom	Zoom Boom	114	114	North Geelong	14 hours
Boom	450mm Curtain Boom	41	41	North Geelong	14 hours
Boom Accessories	Beach Guardian Deployment Kit	1		Broome	47 hours
Boom Accessories	Zoom Boom Anchor Kit	4		Broome	47 hours
Boom Accessories	Hydraulic Powered reel Winder	2		Exmouth	51 hours
Boom Accessories	Beach Guardian Deployment Kit	1		Exmouth	51 hours
Boom Accessories	Shoreline Boom Anchoring kit	1		Exmouth	51 hours

Category	Product Name	Quantity	Metres	Location	Response Time
Boom Accessories	Zoom Boom Anchor Kit	8		Exmouth	51 hours
Boom Accessories	Hydraulic Powered reel Winder	6		Fremantle	36 hours
Boom Accessories	Ro-Boom Anchoring System	1		Fremantle	36 hours
Boom Accessories	Zoom Boom Anchor Kit	28		Fremantle	36 hours
Boom Accessories	Hydraulic Powered reel Winder	8	8	North Geelong	14 hours
Boom Accessories	Beach Guardian Deployment Kit	3	3	North Geelong	14 hours
Boom Accessories	Ro-Boom Anchoring System	5	5	North Geelong	14 hours
Boom Accessories	Shoreline Boom Anchoring kit	4	4	North Geelong	14 hours
Boom Accessories	Zoom Boom Anchor Kit	10	10	North Geelong	14 hours
Communications	I SPHERE Satellite Drift Buoys	2		Broome	47 hours
Communications	I SPHERE Satellite Drift Buoys	7		Fremantle	36 hours
Communications	Spot Gen 3	2		Fremantle	36 hours
Communications	I SPHERE Satellite Drift Buoys	4	4	North Geelong	14 hours
Communications	Spot Gen 3	2	2	North Geelong	14 hours
Communications	TX/RX airband hand-held radio	1	1	North Geelong	14 hours
Communications	Garmin GPSMAP 78sc	4	4	North Geelong	14 hours
Decontamination	Oiled fauna kit	1		Broome	47 hours
Decontamination	Decontamination Kit	1		Broome	47 hours
Decontamination	Oiled fauna kit	1		Exmouth	51 hours
Decontamination	Decontamination Kit	1		Exmouth	51 hours
Decontamination	Decontamination Kit Locker	1		Fremantle	36 hours
Decontamination	Oiled fauna kit	2	2	North Geelong	14 hours
Decontamination	Decontamination Kit (First Strike Support)	2	2	North Geelong	14 hours
Decontamination	Decontamination Kit Locker	1	1	North Geelong	14 hours
Dispersant	Ardrox 6120	15		Broome	47 hours
Dispersant	Dasic Slickgone NS	75		Exmouth	51 hours
Dispersant	Dasic Slickgone NS	8		Fremantle	36 hours
Dispersant	Corexit 9500	27		Fremantle	36 hours

Category	Product Name	Quantity	Metres	Location	Response Time
Dispersant	Dasic slickgone NS	75	75	North Geelong	14 hours
Dispersant	Corexit 9500	62	62	North Geelong	14 hours
Dispersant	Dispersant Effectiveness Field Test Kit	1	1	North Geelong	14 hours
Dispersant Spray Equipment	Afedo Spray System 200-TS	2		Broome	47 hours
Dispersant Spray Equipment	Vikospray Spray Unit	1		Exmouth	51 hours
Dispersant Spray Equipment	Simplex Helicopter Bucket	1		Exmouth	51 hours
Dispersant Spray Equipment	Dispersant Transfer Pump	1		Exmouth	51 hours
Dispersant Spray Equipment	Afedo Spray System 50	4		Fremantle	36 hours
Dispersant Spray Equipment	Boom Mounted Dispersant Spray System	1	1	North Geelong	14 hours
Dispersant Spray Equipment	Vikospray Spray Unit	3	2	North Geelong	14 hours
Dispersant Spray Equipment	Simplex Helicopter Bucket	1	1	North Geelong	14 hours
Dispersant Spray Equipment	Dispersant Transfer Pump	1	1	North Geelong	14 hours
Dispersant Spray Equipment	Afedo Spray System 200 DFWE	3	3	North Geelong	14 hours
General	Shipping Container	3		Broome	47 hours
General	Response tool box	1		Broome	47 hours
General	Shipping Container	1		Exmouth	51 hours
General	Wheelbarrow	10		Exmouth	51 hours
General	2 Stroke Air Blower	10		Fremantle	36 hours
General	Hydraulic Air Blower	3		Fremantle	36 hours
General	Aluminium Storage Box	5		Fremantle	36 hours
General	Shipping Container	8		Fremantle	36 hours
General	Portable Generator	1		Fremantle	36 hours
General	Shoreline Support Kit	1		Fremantle	36 hours
General	Aerial Surveillance Kit	1		Fremantle	36 hours
General	Gas Alert Monitor (Microclip)	2		Fremantle	36 hours
General	Ancilliaries box 1	4		Fremantle	36 hours
General	Ancilliaries Box 2	4		Fremantle	36 hours
General	Oil sampling kit	2		Fremantle	36 hours

Category	Product Name	Quantity	Metres	Location	Response Time
General	2 Stroke Air Blower	2	2	North Geelong	14 hours
General	Hydraulic Air Blower	3	3	North Geelong	14 hours
General	Aluminium Storage Box	1	1	North Geelong	14 hours
General	Portable Generator	3	3	North Geelong	14 hours
General	Beach Wash Down Kit	1	1	North Geelong	14 hours
General	Response tool box	1	1	North Geelong	14 hours
General	Dispersant Agitator	1	1	North Geelong	14 hours
General	Phantom 4 Drone	1	1	North Geelong	14 hours
General	Aerial Surveillance Kit	1	1	North Geelong	14 hours
General	Gas Alert Monitor (Microclip)	5	5	North Geelong	14 hours
General	Oil sampling kit	1	1	North Geelong	14 hours
Miscellaneous	Air Quality Monitoring System	1		Fremantle	36 hours
Miscellaneous	Shipping Container	8	8	North Geelong	14 hours
Power Packs, Pumps & Accessories	Lamor Hydraulic Power Pack	1		Broome	47 hours
Power Packs, Pumps & Accessories	Ro-Boom Power Pack	1		Exmouth	51 hours
Power Packs, Pumps & Accessories	GTA 30 Oil Transfer Pump	1		Fremantle	36 hours
Power Packs, Pumps & Accessories	GX-160 Honda Water Pump	4		Fremantle	36 hours
Power Packs, Pumps & Accessories	Ro-Boom Power Pack	2		Fremantle	36 hours
Power Packs, Pumps & Accessories	Hydraulic Power Pack LPP 36	3		Fremantle	36 hours
Power Packs, Pumps & Accessories	Spare Control Stand for LPP36	1		Fremantle	36 hours
Power Packs, Pumps & Accessories	Shoreline Flushing Kit	1		Fremantle	36 hours
Power Packs, Pumps & Accessories	GTA 30 Oil Transfer Pump	1	1	North Geelong	14 hours
Power Packs, Pumps & Accessories	Ro-Boom Power Pack	2	2	North Geelong	14 hours
Power Packs, Pumps & Accessories	Hydraulic Power Pack LPP 36	3	3	North Geelong	14 hours
Power Packs, Pumps & Accessories	Hydraulic Power Pack LPP7	1	1	North Geelong	14 hours
Power Packs, Pumps & Accessories	Spare Control Stand for LPP36	1	1	North Geelong	14 hours
Power Packs, Pumps & Accessories	General Purpose Pump	3	3	North Geelong	14 hours
Power Packs, Pumps & Accessories	DOP 250 Pump	1	1	North Geelong	14 hours

Category	Product Name	Quantity	Metres	Location	Response Time
Power Packs, Pumps & Accessories	Shoreline Flushing Kit	1	1	North Geelong	14 hours
Skimmer	Minimax Brush Skimmer	1		Broome	47 hours
Skimmer	Komara 12K Skimmer	1		Exmouth	51 hours
Skimmer	Ro-Vac	1		Exmouth	51 hours
Skimmer	GT 185 Weir Skimmer	1		Exmouth	51 hours
Skimmer	Rope Mop 240 Oil Skimming Machine	1		Exmouth	51 hours
Skimmer	Komara 12K Skimmer	1		Fremantle	36 hours
Skimmer	Komara 20K Skimmer	1		Fremantle	36 hours
Skimmer	LWS500 Weir Skimmer	3		Fremantle	36 hours
Skimmer	Rope Mop 260 Oil Skimming Machine	1		Fremantle	36 hours
Skimmer	Komara 30K Skimmer	2	2	North Geelong	14 hours
Skimmer	Komara 12K Skimmer	2	2	North Geelong	14 hours
Skimmer	Ro-Vac	3	3	North Geelong	14 hours
Skimmer	GT 185 Weir Skimmer	1	1	North Geelong	14 hours
Skimmer	Desmi 250 Weir Skimmer	1	1	North Geelong	14 hours
Skimmer	LWS500 Weir Skimmer	3	3	North Geelong	14 hours
Skimmer	Ro-Skim Weir Boom System	2	2	North Geelong	14 hours
Skimmer	Canadyne Multi Head Skimmer	1	1	North Geelong	14 hours
Skimmer	Versatech Multi Head Skimmer	1	1	North Geelong	14 hours
Skimmer	Current Buster 2	1	1	North Geelong	14 hours
Skimmer	Speed Sweep	1	1	North Geelong	14 hours
Skimmer	Rope Mop 240 Oil Skimming Machine	1	1	North Geelong	14 hours
Skimmer	Rope Mop 260 Oil Skimming Machine	1	1	North Geelong	14 hours
Skimmer	Egmopol Barge	1	1	North Geelong	14 hours
Sorbents	Sorbent Squares	1		Broome	47 hours
Sorbents	Sorbent Boom	16		Broome	47 hours
Sorbents	Sorbent Squares	3		Broome	47 hours
Sorbents	Sorbent Boom	73	73	North Geelong	14 hours

Category	Product Name	Quantity	Metres	Location	Response Time
Sorbents	Sorbent Squares	40	40	North Geelong	14 hours
Sorbents	Viscous Oil Snares	96	96	North Geelong	14 hours
Sorbents	Sorbent Roll	12	12	North Geelong	14 hours
Sorbents	Spare Rope Mops	31	31	North Geelong	14 hours
Trailer	Trailer/Generator/Karcher Pressure Washer Unit	1		Exmouth	51 hours
Trailer	Tool Trailer	1		Fremantle	36 hours
Trailer	Galvanised Tandem Trailer	2		Fremantle	36 hours
Trailer	Vehicle Washdown Trailer	1		Fremantle	36 hours
Trailer	Trailer	2	2	North Geelong	14 hours
Trailer	General Support Trailer	3	3	North Geelong	14 hours
Trailer	Egmopol Trailer	1	1	North Geelong	14 hours
Trailer	Trailer/Generator/Karcher Pressure Washer Unit	1	1	North Geelong	14 hours
Trailer	Vehicle Washdown Trailer	1	1	North Geelong	14 hours
Vehicle	Forklift	2		Fremantle	36 hours
Vehicle	AMOSC Vehicle	1		Fremantle	36 hours
Vehicle	Heli 5 Tonne Forklift	1	1	North Geelong	14 hours
Vehicle	AMOSC Vehicle	3	2	North Geelong	14 hours
Vessel	Zodiac Pro 500	1	1	North Geelong	14 hours
Waste Storage	Vikotank 13000 litres	1		Broome	47 hours
Waste Storage	IBC	2		Broome	47 hours
Waste Storage	Fastank Temporary Storage	2		Exmouth	51 hours
Waste Storage	IBC	2		Exmouth	51 hours
Waste Storage	Fastank Temporary Storage	2		Fremantle	36 hours
Waste Storage	25 Cube Deck Storage Tanks	3		Fremantle	36 hours
Waste Storage	LCT 11.4 Collapsable Storage Tank	4		Fremantle	36 hours
Waste Storage	Fastank Temporary Storage	4	4	North Geelong	14 hours
Waste Storage	Vikotank 13000 litres	1	1	North Geelong	14 hours
Waste Storage	25000lt Lancer Storage Barge	3	3	North Geelong	14 hours

Category	Product Name	Quantity	Metres	Location	Response Time
Waste Storage	IBC	14	14	North Geelong	14 hours
Wildlife Support	Bird Scarer	1		Fremantle	36 hours
Wildlife Support	Wildlife washdown container	1		Fremantle	36 hours
Wildlife Support	Wildlife washdown container	1	1	North Geelong	14 hours

Mutual Aid Resources

Provider	Category	Product Name	Quantity	Location	Response Time	Notes
Quadrant	Absorbent, Boom	Boom, 3metre x 180mm	144 m	WA, Varanus Island		Andrew Best
Caltex	Absorbent, Boom	Rubberiser Boom	200 m	Lytton Refinery		Phil Walton/Jaco Eurasmus
ConocoPhillips	Absorbent, Boom	Absorbent, Boom	400m	Darwin LNG Facility		Mario Fazio
ConocoPhillips	Absorbent, Boom	Absorbent, Boom	400m	Curtis Island APLNG Facility		Mario Fazio
PTTEP	Absorbent, Boom	3M t270 Bags of Sorbent Boom 4x3m bags	4 units	Darwin Container 1		Glen Nicholson
PTTEP	Absorbent, Boom	3M t270 Bags of Sorbent Boom 4x3m bags	4 units	Darwin Container 2		Glen Nicholson
ROC Oil	Absorbent, Boom	8 x 3mtr x 2 containers of absorbent booms 48 m	2 Units	Port Denison, WA		Aaron Smith
PTTEP	Absorbent, Pad	HP156 Sorbent pads bag of 100	1 unit	Darwin Container 1		Glen Nicholson
PTTEP	Absorbent, Pad	HP156 Sorbent pads bag of 100	1 unit	Darwin Container 2		Glen Nicholson
Quadrant	Absorbent, Roll	Roll,40mx1.1m	280 m	WA, Varanus Island		Andrew Best
Quadrant	Boom, Nearshore	Zoom Boom	400 m	WA, Varanus Island		Andrew Best
Caltex	Boom, Nearshore	GP 800 Fence Boom	180 m	Lytton Refinery		Phil Walton/Jaco Eurasmus
Caltex	Boom, Nearshore	Zoom Boom	150m	Lytton Refinery		Phil Walton/Jaco Eurasmus
Esso	Boom, Nearshore	Expandi 3000 Harbour Boom	300m	LIP Jetty		Sean Hine
Esso	Boom, Nearshore	Expandi 3000 Harbour Boom	300m	BBMT		Sean Hine
Esso	Boom, Nearshore	Expandi 3000 Harbour Boom	300m	LIP Jetty		Sean Hine
Santos	Boom, Nearshore	Vikoma Shoreline (blowers and water pumps for deployment)	1000m	Port Bonython		Kate Dickson
Viva	Boom, Nearshore	Zoom Boom, 25 metres	200m	Victoria, Geelong		Jason Barry
Viva	Boom, Nearshore	Fence Boom, 600mm, 20 metres	160m	Victoria, Geelong		Jason Barry
Woodside	Boom, Nearshore	Fence Boom	150m	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Boom, Nearshore	Sea Sentinel, 25 metres	250m	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Boom, Nearshore	Curtain Boom, 30metre	300m	WA, Dampier		Zoe Beverley/Alan Crossland

Provider	Category	Product Name	Quantity	Location	Response Time	Notes
Woodside	Boom, Nearshore	Zoom Boom, 25 metres	150m	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Boom, Nearshore	Zoom Boom, 50 metres	125m	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Boom, Nearshore	Anchoring Systems	17 units	WA, Dampier		Zoe Beverley/Alan Crossland
Esso	Boom, Nearshore	Sea Sentinel (Can be used Offshore, ASTM connectors)	2000m	LIP		Sean Hine
Quadrant	Boom, Offshore	Sea Curtain Boom (Expandi – manual inflation) – 2 x reels	400 m	WA, Exmouth		Andrew Best
Quadrant	Boom, Offshore	Sea Curtain Boom (Kepner – self inflation) – 1 x reel	300 m	WA, Dampier		Andrew Best
Quadrant	Boom, Offshore	Sea Curtain Boom (Kepner – self inflation) – 1 x reel	200 m	WA, Varanus Island		Andrew Best
Quadrant	Boom, Offshore	Sea Curtain Boom (Expandi – self inflation) – 4 x vertical bundles, 1 x retrieval reel	800 m	WA, Varanus Island		Andrew Best
Quadrant	Boom, Offshore	Power Pack for Kepner Sea Curtain Boom	1 unit	WA, Dampier		Andrew Best
Quadrant	Boom, Offshore	Power Pack for Expandi Sea Curtain Boom	1 unit	WA, Exmouth		Andrew Best
Quadrant	Boom, Offshore	Power Pack for Kepner Sea Curtain Boom	1 unit	WA, Varanus Island		Andrew Best
Quadrant	Boom, Offshore	Roto Cassette Retrieval Reel for Expandi Self-Inflating Sea Curtain Boom	1 unit	WA, Varanus Island		Andrew Best
Quadrant	Boom, Offshore	Power Pack for Expandi Self-Inflating Sea Curtain Boom	1 unit	WA, Varanus Island		Andrew Best
PTTEP	Boom, Offshore	LAMOR heavy duty offshore boom 1200 (200m)	200m	Darwin Container 1		Glen Nicholson
PTTEP	Boom, Offshore	LAMOR heavy duty offshore boom 1200 (200m)	200m	Darwin Container 2		Glen Nicholson
Santos	Boom, Offshore	RoBoom and associated equipment for deployment	1800m	Port Bonython		Kate Dickson
Woodside	Boom, Offshore	Offshore Boom on reel 200m per reel	400m	WA, Dampier		Zoe Beverley/Alan Crossland
Quadrant	Boom, OnShore	Beach Guardian	100 m	WA, Varanus Island		Andrew Best
Quadrant	Boom, OnShore	Beach Guardian	100 m	WA, Varanus Island		Andrew Best
Quadrant	Boom, OnShore	Beach Guardian, Deployment Kit	2 unit	WA, Varanus Island		Andrew Best
BP	Boom, OnShore	Beach Boom, Shore Guardian 6 lengths	160m	Bulwer Island		Andrew Lynch
Caltex	Boom, OnShore	Beach guardian	7 units	Lytton Refinery		Phil Walton/Jaco Eurasmus
Caltex	Boom, OnShore	Anchor Kits	15 units	Lytton Refinery		Phil Walton/Jaco Eurasmus
Santos	Boom, OnShore	Beach Guardian (blowers and water pumps for deployment)	1000m	Port Bonython		Kate Dickson

Provider	Category	Product Name	Quantity	Location	Response Time	Notes
Viva	Boom, OnShore	Beach Guardian, 25 metres	50m	Victoria, Geelong		Jason Barry
Viva	Boom, OnShore	Beach Guardian, Deployment Kit	1 unit	Victoria, Geelong		Jason Barry
Woodside	Boom, Onshore	Shore Guardian, 20 metres	160m	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Boom, Onshore	Tidal Boom (Shore Guardian) 30 metre	240m	WA, Dampier		Zoe Beverley/Alan Crossland
BHP Billiton	Dispersant	Corexit 9527	1.2 m3	Pyrenees FPSO		Brian Starkey
BHP Billiton	Dispersant	Corexit 9527	1.2 m3	Exmouth		Brian Starkey
BHP Billiton	Dispersant	Ardrox 6120	2 m3	Dampier Supply Base		Brian Starkey
Esso	Dispersant	Corexit 9527	71 m3	BBMT		Sean Hine
Esso	Dispersant	Corexit 9527	38 m3	LIP		Sean Hine
Esso	Dispersant	Corexit 9500	30 m3	LIP		Sean Hine
Pttep	Dispersant	Dasic Slickgone NS	13 m3	Darwin, Truscott		Glen Nicholson
Santos	Dispersant	Slickgone NS	4 m3	Port Bonython		Kate Dickson
Woodside	Dispersant	Shell VDC	1 m3/vessel	sWA, Dampier/ Exmouth, Supply Vessels		Zoe Beverley/Alan Crossland
Woodside	Dispersant	Shell VDC	3 m3	WA, Exmouth		Zoe Beverley/Alan Crossland
Quadrant	Dispersant, Spray Systems	Single Arm Spray System	1 unit	WA, Exmouth		Andrew Best
Quadrant	Dispersant, Spray Systems	4 x Lance Head Spray System	1 unit	WA, Exmouth		Andrew Best
Quadrant	Dispersant, Spray Systems	Double Arm Spray System	1 unit	WA, Exmouth		Andrew Best
Quadrant	Dispersant, Spray Systems	Double AFEDO Head Spray System	1 unit	WA, Dampier		Andrew Best
Quadrant	Dispersant, Spray Systems	Double Arm Spray System	1 unit	WA, Dampier		Andrew Best
BHP Billiton	Dispersant, Spray Systems	Auspray Dispersant system ASDS	1	Pyrenees FPSO		Brian Starkey
BHP Billiton	Dispersant, Spray Systems	Auspray Dispersant system ASDS	1	Exmouth		Brian Starkey
Esso	Dispersant, Spray Systems	Ayles Fernie Boatspray 100-TS with AFEDO nozzle	x2	LIPx1, BBMTx1		Sean Hine

Provider	Category	Product Name	Quantity	Location	Response Time	Notes
Pttep	Dispersant, Spray Systems	AFEDO Dispersant spray system	1 unit	Darwin Container 1		Glen Nicholson
Santos	Dispersant, Spray Systems	Afedo Dispersant Spray System 100TS	1 unit	Port Bonython		Kate Dickson
ROC Oil	General	High Density landing Nets	6 units	Port Denison, WA		Aaron Smith
Pttep	Power Pack	Spate 75C Dispersant Transfer pump for FWAD	1 unit	Truscott		Glen Nicholson
Santos	Shoreline Cleanup	Trailer 8x5	1 unit	Port Bonython		Kate Dickson
Santos	Shoreline Cleanup	Trailer 6x4	1 unit	Port Bonython		Kate Dickson
Woodside	Shoreline Clean-up	Spades, Rakes, Some PPE etc.	multiple units	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Shoreline Clean-up	Decontamination Kit	1 unit	WA, Dampier		Zoe Beverley/Alan Crossland
Quadrant	Shoreline Clean-up Container	40ft Container (W/barrows, Shovels, Brooms, Squeegy, sorbents)	1 unit	WA, Varanus Island		Andrew Best
Caltex	Shoreline Cleanup equipment	Oil Spill shed	1 unit	Lytton Refinery		Phil Walton/Jaco Eurasmus
Woodside	Skimmer	Lamor Multi Skimmer	1 unit	WA, Dampier		Zoe Beverley/Alan Crossland
Esso	Skimmer, Brush	Aquaguard RB 5-05 brush skimmer	x1	BBMT		Sean Hine
Caltex	Skimmer, Multi Head	Versatech Multi Skimmer, Brush, drum, disc with all hydraulic hoses, oil transfer hose and diesel Hydraulic power pack deliver FIS	1 unit	Lytton Refinery		Phil Walton/Jaco Eurasmus
Quadrant	Skimmer, Oleophilic	Skimmer, Disc, 12k Komara	1 unit	WA, Varanus Island		Andrew Best
Quadrant	Skimmer, Oleophilic	Power Pack for Disc, 12k Komara	1 unit	WA, Varanus Island		Andrew Best
Pttep	Skimmer, Oleophilic	Brush Skimmer Minimax 12 W/S	1 unit	Darwin Container 1		Glen Nicholson
Pttep	Skimmer, Oleophilic	Brush Skimmer Minimax 12 W/S	1 unit	Darwin Container 2		Glen Nicholson
Santos	Skimmer, Oleophilic	Rope Mop OM 140	2 unit	Port Bonython		Kate Dickson
Santos	Skimmer, Oleophilic	Rope Mop OM260	1 unit	Port Bonython		Kate Dickson
Viva	Skimmer, Oleophilic	Disc, 12k Komara	1 unit	Victoria, Geelong		Jason Barry
Santos	Skimmer, Vacuum	Viko Vac Vacuum Unit	2 unit	Port Bonython		Kate Dickson
Viva	Skimmer, Vacuum	Manta Ray Head	1 unit	Victoria, Geelong		Jason Barry
Woodside	Skimmer, Vacuum	Delta Ray Head	2 units	WA, Dampier		Zoe Beverley/Alan Crossland
Quadrant	Skimmer, Weir	Skimmer, Weir, Global	1 unit	WA, Dampier		Andrew Best

Provider	Category	Product Name	Quantity	Location	Response Time	Notes
Quadrant	Skimmer, Weir	Power Pack for Weir, Global	1 unit	WA, Dampier		Andrew Best
Esso	Skimmer, Weir	RoSkim (Roulands)	1	LIP		Sean Hine
Esso	Skimmer, Weir	RoSkim (Roulands)	1	BBMT		Sean Hine
Esso	Skimmer, Weir	RoSkim (Roulands)	1	LIP		Sean Hine
Esso	Skimmer, Weir	RoSkim (Roulands)	1	BBMT		Sean Hine
Esso	Skimmer, Weir	GT-185 skimmer	x1	LIP (N.B. 3 at LIP but 2 are permanent)		Sean Hine
Pttep	Skimmer, Weir	LAMOR Weir skimmer LWS 500	1 unit	Darwin		Glen Nicholson
Woodside	Skimmer, Weir	Dragon Fly Weir Skimmer	1 unit	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Skimmer, Weir	Global 30m3/hr Weir Skimmer	1 unit	WA, Dampier		Zoe Beverley/Alan Crossland
Quadrant	Temporary Storage	CORT Bladder Tank	3 unit	WA, Varanus Island		Andrew Best
Esso	Temporary Storage	Aluminium Skips (3m x 2m x 600mm High)	12 unit	LIP		Sean Hine
Pttep	Temporary Storage	11-Tonne collapsible storage tank	1 unit	Darwin Container 1		Glen Nicholson
Pttep	Temporary Storage	50-Tonne Deck tank with 2.5" ball valve and 3" adapter	1 unit	Darwin Container 1		Glen Nicholson
Pttep	Temporary Storage	11-Tonne collapsible storage tank	1 unit	Darwin Container 2		Glen Nicholson
Pttep	Temporary Storage	50-Tonne Deck tank with 2.5" ball valve and 3" adapter	1 unit	Darwin Container 2		Glen Nicholson
Viva	Temporary Storage	10,000 Fastank	2 units	Victoria, Geelong		Jason Barry
Woodside	Temporary Storage	10,000 Fastank	2 units	WA, Dampier		Zoe Beverley/Alan Crossland
Woodside	Temporary Storage	Lamor storage tanks (like fast tanks) 7000L	2 units	WA, Dampier		Zoe Beverley/Alan Crossland
ROC Oil	Temporary Storage	IBC 1000 Litre IBC	4 Units	Port Denison, WA		Aaron Smith
Quadrant	Tracking Buoys	Isphere	4 unit	WA, Varanus Island		Andrew Best
Quadrant	Tracking Buoys	Isphere	2 unit	WA, Stag Platform		Andrew Best
Quadrant	Tracking Buoys	Isphere	2 unit	WA, Ningaloo Vision		Andrew Best
Quadrant	Tracking Buoys	Isphere	2 unit	WA, Dampier Store		Andrew Best
Quadrant	Tracking Buoys	Isphere	2 unit	WA, Rig 1 (or Dampier Store)		Andrew Best
Quadrant	Tracking Buoys	Isphere	2 unit	WA, Rig 2 (or Dampier Store)		Andrew Best

Provider	Category	Product Name	Quantity	Location	Response Time	Notes
ConocoPhillips	Tracking Buoys	Pathfinder Tracking Buoy	2 units	FSO Liberdade - Timor Sea		Mario Fazio
Pttep	Tracking Buoys	Tracking Buoy	1 unit	Darwin Container 1		Glen Nicholson
Pttep	Tracking Buoys	Tracking Buoy	1 unit	Darwin Container 2		Glen Nicholson
Esso	Trailer	Beach/shoreline clean-up trailers	x4	LIP x 2, BBMT x 1, Sale x 1		Sean Hine
Esso	Trailer	Decontamination Trailer	x1	LIP		Sean Hine
Quadrant	Vessel	28'Aluminium Response Vessel "Monte Belle"	1 unit	WA, Varanus Island		Andrew Best
BP	Vessel	5m Work punt	1 unit	Bulwer Island		Andrew Lynch
Caltex	Vessel	4.75 m Aluminium Runner about "Jabiru"	1 unit	Lytton Refinery		Phil Walton/Jaco Eurasmus
Caltex	Vessel	5.7 litre multicruiser "Mimi"	1 unit	Lytton Refinery		Phil Walton/Jaco Eurasmus
Caltex	Vessel	135hp Honda "Ocean Cruiser"	1 unit	Lytton Refinery		Phil Walton/Jaco Eurasmus
Caltex	Vessel	Seamac (Punt)	1 units	Lytton Refinery		Phil Walton/Jaco Eurasmus
Esso	Vessel	Sperm Whale for nearshore response.	1	BBMT		Sean Hine
Esso	Vessel	3.2m Dingy with 6hp engine	1	longford		Sean Hine
Esso	Vessel	3.2m Dingy with 6hp engine	1	LIP		Sean Hine
Esso	Vessel	Sperm Whale for nearshore response.	1	BBMT		Sean Hine
Esso	Vessel	3.2m Dingy with 6hp engine	1	longford		Sean Hine
Esso	Vessel	3.2m Dingy with 6hp engine	1	LIP		Sean Hine
Santos	Vessel	8 m Shark Cat "TREGALANA" with spray equipment	1 unit	Port Bonython		Kate Dickson
Santos	Vessel	6 Mtr Stabi Craft with 135 HP Outboard	1 unit	Port Bonython		Kate Dickson
Santos	Vessel	3.66 Mtr Clark Open Boat Aluminium Dinghy with 9hp Outboard	1 unit	Port Bonython		Kate Dickson
Santos	Vessel	4.08 Mtr Alocraft Sprint, Aluminium Open Boat 20hp Outboard	1 unit	Port Bonython		Kate Dickson

OSRL Resources

Category	Product Name	Quantity	Available	Location	Response Time
Active boom systems	Ro-skim system, tandem, 120tph skimmer, without power pack (can be used in conjunction with additional 200m boom on reel)	2		Singapore	8-12 hours
Active boom systems	Nofi Current Buster 2	2		Singapore	8-12 hours
Active boom systems	Nofi Current Buster 2	1		Bahrain	15 hours
Active boom systems	Ro-skim system, tandem, 120tph skimmer, without power pack (can be used in conjunction with additional 200m boom on reel)	2		United Kingdom	21-26 hours
Active boom systems	2 pump weir boom capacity (120 tph) - for use in conjunction with Roboom units excluding power systems	1		United Kingdom	21-26 hours
Active boom systems	Nofi Current Buster 2	2		United Kingdom	21-26 hours
Active boom systems	Nofi Current Buster 2	2		Fort Lauderdale, United States	63 hours
Aircraft	Hercules aircraft	1		Singapore	8-12 hours
Aircraft	Boeing 727	1		Doncaster, United Kingdom	21-26 hours
Aircraft systems	Underslung helicopter mounted spray system (150-240 gallons) (helicopter not included)*	2		Bahrain	15 hours
Aircraft systems	Underslung helicopter mounted spray system (150-240 gallons) (helicopter not included)*	2		United Kingdom	21-26 hours
Aircraft systems	Cargo Slave Pallet	2		Fort Lauderdale, United States	25 hours
Ancillaries (power packs and generators)	Generator - 1kW to 3kW	8		Singapore	8-12 hours
Ancillaries (power packs and generators)	Diesel Generator	1		Singapore	8-12 hours
Ancillaries (power packs and generators)	Lamor 25 power pack (23kW)	6		Singapore	8-12 hours
Ancillaries (power packs and generators)	Hatz power pack (25kW)	2		Singapore	8-12 hours
Ancillaries (power packs and generators)	Desmi power pack (50kW)	5		Singapore	8-12 hours
Ancillaries (power packs and generators)	Multi-purpose power pack (50kW) Winter version air fan / lighting	3		Singapore	8-12 hours

Category	Product Name	Quantity	Available	Location	Response Time
Ancillaries (power packs and generators)	Vikoma power pack (80kW)	1		Singapore	8-12 hours
Ancillaries (power packs and generators)	Grizzly power pack (98kW)	4		Singapore	8-12 hours
Ancillaries (power packs and generators)	Generator - 1kW to 3kW	6		Bahrain	15 hours
Ancillaries (power packs and generators)	Diesel Generator	1		Bahrain	15 hours
Ancillaries (power packs and generators)	GP30 power pack (21.9kW)	2		Bahrain	15 hours
Ancillaries (power packs and generators)	Multi-purpose (same) power pack (50kW)	2		Bahrain	15 hours
Ancillaries (power packs and generators)	Tiger power pack (84kW)	3		Bahrain	15 hours
Ancillaries (power packs and generators)	Vikoma power pack (80kW)	1		Bahrain	15 hours
Ancillaries (power packs and generators)	Generator - 1kW to 3kW	13		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	Diesel Generator	1		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	GP10 power pack (7.4kW)	1		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	GP30 power pack (21.9kW)	4		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	Lamor 25 power pack (23kW)	4		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	Desmi power pack (50kW)	3		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	Tiger power pack (84kW)	6		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	Vikoma power pack (80kW)	2		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	Grizzly power pack (98kW)	4		United Kingdom	21-26 hours
Ancillaries (power packs and generators)	Coleman Generator 3.5kW	9		Fort Lauderdale, United States	93 hours

Category	Product Name	Quantity	Available	Location	Response Time
Ancillaries (power packs and generators)	Diesel Generator	8		Fort Lauderdale, United States	94 hours
Ancillaries (power packs and generators)	Hatz power pack (25kW)	4		Fort Lauderdale, United States	95 hours
Ancillaries (safety and clean up)	Hydraulic Hose reels	4		Singapore	8-12 hours
Ancillaries (safety and clean up)	Hydraulic pressure washers (without power pack)	4		Singapore	8-12 hours
Ancillaries (safety and clean up)	Mobile diesel drive high pressure and temperature washer for sea water use (trailer mounted)	4		Singapore	8-12 hours
Ancillaries (safety and clean up)	Peli lights	2		Singapore	8-12 hours
Ancillaries (safety and clean up)	Area Gas Monitor (4 channel + PID)	3		Singapore	8-12 hours
Ancillaries (safety and clean up)	Multi RAE lite	5		Singapore	8-12 hours
Ancillaries (safety and clean up)	Personal (4 Channel) gas monitor	19		Singapore	8-12 hours
Ancillaries (safety and clean up)	Gas Monitor (Drager Chip Measurement System (CMS)	5		Singapore	8-12 hours
Ancillaries (safety and clean up)	Air Monitor Microdust Pro	1		Singapore	8-12 hours
Ancillaries (safety and clean up)	Hydraulic Hose reels	4		Bahrain	15 hours
Ancillaries (safety and clean up)	Hydraulic pressure washers (without power pack)	5		Bahrain	15 hours
Ancillaries (safety and clean up)	Mobile diesel drive high pressure and temperature washer for sea water use (trailer mounted)	1		Bahrain	15 hours
Ancillaries (safety and clean up)	Diesel drive high pressure and temperature washer for sea water use (skid mounted)	2		Bahrain	15 hours
Ancillaries (safety and clean up)	Powered floodlights	2		Bahrain	15 hours
Ancillaries (safety and clean up)	Peli lights	2		Bahrain	15 hours
Ancillaries (safety and clean up)	Area Gas Monitor (4 channel + PID)	3		Bahrain	15 hours
Ancillaries (safety and clean up)	Multi RAE lite	3		Bahrain	15 hours
Ancillaries (safety and clean up)	Personal (4 Channel) gas monitor	15		Bahrain	15 hours
Ancillaries (safety and clean up)	Hydraulic Hose reels	15		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Hydraulic pressure washers (without power pack)	5		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Mobile diesel drive high pressure and temperature washer for sea water use (trailer mounted)	4		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Crane unit	5		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Powered floodlights	4		United Kingdom	21-26 hours

Category	Product Name	Quantity	Available	Location	Response Time
Ancillaries (safety and clean up)	Peli lights	2		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Orimulsion Reflotation Device without power pack	1		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Area Gas Monitor (4 channel + PID)	3		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Multi RAE lite	5		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Multi RAE Plus gas monitor	3		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Personal (4 Channel) gas monitor	21		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Gas Detection Tubes	3		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Air Monitor Microdust Pro	3		United Kingdom	21-26 hours
Ancillaries (safety and clean up)	Diesel drive high pressure and temperature washer for freshwater use only	5		Fort Lauderdale, United States	96 hours
Ancillaries (safety and clean up)	Plug in halogen light stands	12		Fort Lauderdale, United States	97 hours
Ancillaries (safety and clean up)	Prism light c/w generator	6		Fort Lauderdale, United States	98 hours
Ancillaries (safety and clean up)	Multi RAE lite	2		Fort Lauderdale, United States	99 hours
Ancillaries (safety and clean up)	Personal (4 Channel) gas monitor	8		Fort Lauderdale, United States	100 hours
Ancillaries (transfer pumps)	Spate diaphragm pump 30m³	7		Singapore	8-12 hours
Ancillaries (transfer pumps)	Desmi DOP 160 pump without power pack	2		Singapore	8-12 hours
Ancillaries (transfer pumps)	Desmi DOP 250 pump without power pack	2		Singapore	8-12 hours
Ancillaries (transfer pumps)	Water injection flange for DOP pump	2		Singapore	8-12 hours
Ancillaries (transfer pumps)	Spate diaphragm pump 30m³	3		Bahrain	15 hours
Ancillaries (transfer pumps)	Desmi DOP 160 pump without power pack	2		Bahrain	15 hours
Ancillaries (transfer pumps)	Desmi DOP 250 pump without power pack	2		Bahrain	15 hours
Ancillaries (transfer pumps)	Water injection flange for DOP pump	4		Bahrain	15 hours
Ancillaries (transfer pumps)	Spate diaphragm pump 30m³	12		United Kingdom	21-26 hours
Ancillaries (transfer pumps)	Desmi DOP 160 pump without power pack	5		United Kingdom	21-26 hours
Ancillaries (transfer pumps)	Desmi DOP 250 pump without power pack	5		United Kingdom	21-26 hours
Ancillaries (transfer pumps)	Water injection flange for DOP pump	3		United Kingdom	21-26 hours

Category	Product Name	Quantity	Available	Location	Response Time
Ancillaries (transfer pumps)	Spate diaphragm pump 30m³	4		Fort Lauderdale, United States	85 hours
Ancillaries (transfer pumps)	Desmi DOP 250 pump without power pack	4		Fort Lauderdale, United States	86 hours
Ancillaries (transfer pumps)	Peristaltic pump	9		Fort Lauderdale, United States	87 hours
Ancillaries (transfer pumps)	Sala roll pump c/w power pack	2		Fort Lauderdale, United States	88 hours
Ancillaries (transfer pumps)	Fire / washdown pump 2.5"	5		Fort Lauderdale, United States	89 hours
Ancillaries (transfer pumps)	Washdown pump 2”	5		Fort Lauderdale, United States	90 hours
Ancillaries (transfer pumps)	Trash Pump, 6” HVLP flushing system	5		Fort Lauderdale, United States	91 hours
Ancillaries (transfer pumps)	Shoreline Deluge / flushing System	3		Fort Lauderdale, United States	92 hours
Capping Stack System (CSS)	SWIS Capping stack (10k PSI, max 3000 m depth)	1		Singapore	8-12 hours
Capping stack System (CSS)	SWIS Capping stack (10k PSI, max 3000 m depth)	1		South Africa	14 hours
Capping Stack System (CSS)	OSPRAG capping device	1		Aberdeen, United Kingdom	21-26 hours
Capping stack System (CSS)	SWIS Capping stack (15k PSI, max 3000 m depth)	1		Norway	20 hours
Capping stack System (CSS)	SWIS Capping stack (15k PSI, max 3000 m depth)	1		Brazil	18 hours
Communications	Single VHF handset	20		Singapore	8-12 hours
Communications	Handheld GPS	30		Singapore	8-12 hours
Communications	VHF Sky masts	1		Singapore	8-12 hours
Communications	Iridium satellite phone	4		Singapore	8-12 hours
Communications	BGAN Hughes Network Systems (HNS) 9201	2		Singapore	8-12 hours
Communications	BGAN Nera WorldPro 1010	3		Singapore	8-12 hours
Communications	Portable inflatable shelter	3		Singapore	8-12 hours
Communications	Handheld GPS	2		Bahrain	15 hours
Communications	VHF Base station	1		Bahrain	15 hours
Communications	Iridium satellite phone	1		Bahrain	15 hours

Category	Product Name	Quantity	Available	Location	Response Time
Communications	BGAN Hughes Network Systems (HNS) 9201	1		Bahrain	15 hours
Communications	BGAN Nera WorldPro 1010	1		Bahrain	15 hours
Communications	Portable inflatable shelter	1		Bahrain	15 hours
Communications	Single VHF handset	90		United Kingdom	21-26 hours
Communications	Handheld GPS	71		United Kingdom	21-26 hours
Communications	VHF Base station	5		United Kingdom	21-26 hours
Communications	VHF Base / Repeater Station	3		United Kingdom	21-26 hours
Communications	VHF Sky masts	6		United Kingdom	21-26 hours
Communications	Iridium satellite phone	4		United Kingdom	21-26 hours
Communications	BGAN Hughes Network Systems (HNS) 9201	1		United Kingdom	21-26 hours
Communications	BGAN Nera WorldPro 1010	3		United Kingdom	21-26 hours
Communications	Portable inflatable shelter	6		United Kingdom	21-26 hours
Communications	VHF Radio	10		Fort Lauderdale, United States	76 hours
Communications	Tactical comms-mobile radio for vehicle use	3		Fort Lauderdale, United States	77 hours
Communications	Ground to air comms	4		Fort Lauderdale, United States	78 hours
Communications	Mobile Base station	1		Fort Lauderdale, United States	79 hours
Communications	Iridium satellite phone	3		Fort Lauderdale, United States	80 hours
Communications	Inmarsat satellite phone	4		Fort Lauderdale, United States	81 hours
Communications	Inmarsat satellite phone for marine use	1		Fort Lauderdale, United States	82 hours
Communications	Thrane and Thrane Explorer 700 BGAN	3		Fort Lauderdale, United States	83 hours
Communications	Field Command Post (inflatable)	2		Fort Lauderdale, United States	84 hours
Dispersant	Dasic slickgone NS	350 m3	350 m3	Singapore	8-12 hours
Dispersant	Finasol OSR 52	350 m3	350 m3	Singapore	8-12 hours

Category	Product Name	Quantity	Available	Location	Response Time
Dispersant	Finasol OSR 52	800	800 m3	South Africa	14 hours
Dispersant	Dasic Slickgone NS	500	500 m3	Southampton, United Kingdom	21-26 hours
Dispersant	Finasol OSR 52	500	500 m3	Southampton, United Kingdom	21-26 hours
Dispersant	Finasol OSR 52	1500	1500 m3	Vatry, France	21 hours
Dispersant application	Neat Sweep dispersant boom system	2		Singapore	8-12 hours
Dispersant application	Boat Spray sets for use as vessel mounted Type 3 dispersant application system	10		Singapore	8-12 hours
Dispersant application	Fluorometer for dispersant application analysis (Spill Response Specialist required)	3		Singapore	8-12 hours
Dispersant application	Boat Spray sets for use as vessel mounted Type 3 dispersant application system	3		Bahrain	15 hours
Dispersant application	Neat Sweep dispersant boom system	1		United Kingdom	21-26 hours
Dispersant application	Boat Spray sets for use as vessel mounted Type 3 dispersant application system	10		United Kingdom	21-26 hours
Dispersant application	Fluorometer for dispersant application analysis (Spill Response Specialist required)	4		United Kingdom	21-26 hours
Dispersant application	Boat Spray sets for use as vessel mounted Type 3 dispersant application system	3		Fort Lauderdale, United States	21 hours
Dispersant application	Fluorometer for dispersant application analysis (Spill Response Specialist required)	1		Fort Lauderdale, United States	22 hours
Dispersant application	Dispersant Eductor spray system	1		Fort Lauderdale, United States	23 hours
Dispersant application	Dispersant transfer system (metered)	2		Fort Lauderdale, United States	24 hours
Fire boom	Elastec Hydro Fire Boom 150 metres - Offshore	1		Singapore	8-12 hours
Fire boom	Elastec Hydro Fire Boom 150 metres - Offshore	3		United Kingdom	21-26 hours
Fire boom	Elastec American Fire boom in 15-metre sections	30		Fort Lauderdale, United States	64 hours
Fire boom	Heli Torch	2		Fort Lauderdale, United States	65 hours
Heavy oil skimmers	Giant Octopus skimmer	1		Singapore	8-12 hours
Heavy oil skimmers	Komara Star including power pack	2		Singapore	8-12 hours
Heavy oil skimmers	WP 130 drum skimmer without power pack	1		Singapore	8-12 hours

Category	Product Name	Quantity	Available	Location	Response Time
Heavy oil skimmers	Sea Devil skimmer without power pack	1		Singapore	8-12 hours
Heavy oil skimmers	EARL vessel bow skimmer	1		Singapore	8-12 hours
Heavy oil skimmers	Scan Trawl System	2		Singapore	8-12 hours
Heavy oil skimmers	Komara Star including power pack	2		Bahrain	15 hours
Heavy oil skimmers	Helix Skimmer	1		Bahrain	15 hours
Heavy oil skimmers	Giant Octopus skimmer	1		United Kingdom	21-26 hours
Heavy oil skimmers	Komara Star including power pack	2		United Kingdom	21-26 hours
Heavy oil skimmers	WP 130 drum skimmer without power pack	1		United Kingdom	21-26 hours
Heavy oil skimmers	Rotodrum without power pack	2		United Kingdom	21-26 hours
Heavy oil skimmers	Sea Devil skimmer without power pack	3		United Kingdom	21-26 hours
Heavy oil skimmers	Helix Skimmer	1		United Kingdom	21-26 hours
Heavy oil skimmers	Scan Trawl System	1		United Kingdom	21-26 hours
Heavy oil skimmers	Helix Skimmer	2		Fort Lauderdale, United States	70 hours
Heavy oil skimmers	High viscosity oil pump conversion kit for Foilex TDS 200	1		Fort Lauderdale, United States	71 hours
Inshore boom	10 metres air/skirt for coastal areas	58		Singapore	8-12 hours
Inshore boom	Air/Skirt boom 20 metres air/skirt for coastal areas	86		Singapore	8-12 hours
Inshore boom	Air/Skirt boom 200 metres air/skirt for coastal areas	4		Singapore	8-12 hours
Inshore boom	Beach Sealing boom 10 metres	57		Singapore	8-12 hours
Inshore boom	Beach Sealing boom 20 metres	33		Singapore	8-12 hours
Inshore boom	Troil Boom GP 1100 (25 metres) (price per 25 metres)	22		Singapore	8-12 hours
Inshore boom	Supermax - Rigid boom in 25 metres sections	26		Singapore	8-12 hours
Inshore boom	Sea Curtain - Foam filled in 50 metres sections	12		Singapore	8-12 hours
Inshore boom	10 metres air/skirt for coastal areas	37		Bahrain	15 hours
Inshore boom	Air/Skirt boom 20 metres air/skirt for coastal areas	50		Bahrain	15 hours
Inshore boom	Beach Sealing boom 10 metres	54		Bahrain	15 hours
Inshore boom	Beach Sealing boom 20 metres	22		Bahrain	15 hours
Inshore boom	Troil Boom GP 750 (20 metres) (price per 20 metres)	4		Bahrain	15 hours

Category	Product Name	Quantity	Available	Location	Response Time
Inshore boom	Nearshore boom 24” Solid floatation in 30 metres sections	2		Bahrain	15 hours
Inshore boom	10 metres air/skirt for coastal areas	89		United Kingdom	21-26 hours
Inshore boom	Air/Skirt boom 20 metres air/skirt for coastal areas	216		United Kingdom	21-26 hours
Inshore boom	Beach Sealing boom 10 metres	42		United Kingdom	21-26 hours
Inshore boom	Beach Sealing boom 20 metres	91		United Kingdom	21-26 hours
Inshore boom	Troil Boom GP 750 (20 metres)	8		United Kingdom	21-26 hours
Inshore boom	River Boom 12” solid floatation in 15 metre sections	20		United Kingdom	21-26 hours
Inshore boom	Beach Sealing boom 10 metres	22		Fort Lauderdale, United States	26 hours
Inshore boom	Beach Sealing boom 15 metres	78		Fort Lauderdale, United States	27 hours
Inshore boom	Beach Sealing boom 20 metres	9		Fort Lauderdale, United States	28 hours
Inshore boom	River Boom 10” solid floatation in 10 metre sections	15		Fort Lauderdale, United States	29 hours
Inshore boom	River Boom 12” solid floatation in 15 metre sections	80		Fort Lauderdale, United States	30 hours
Inshore boom	Nearshore boom 18” Solid floatation in 30 metres sections	60		Fort Lauderdale, United States	31 hours
Inshore boom	Nearshore boom 20” Solid floatation in 15 metres sections	140		Fort Lauderdale, United States	32 hours
Inshore boom	Nearshore boom 24” Solid floatation in 30 metres sections	24		Fort Lauderdale, United States	33 hours
Inshore boom ancillaries	Air & water pump support box	20		Singapore	8-12 hours
Inshore boom ancillaries	Boom Vane Small - boom deployment unit	4		Singapore	8-12 hours
Inshore boom ancillaries	Air & water pump support box	10		Bahrain	15 hours
Inshore boom ancillaries	Air & water pump support box	31		United Kingdom	21-26 hours
Inshore boom ancillaries	Boom Vane Small - boom deployment unit	3		United Kingdom	21-26 hours
Inshore boom ancillaries	Boom Vane Medium - boom deployment unit	1		United Kingdom	21-26 hours
Inshore boom ancillaries	Air & water pump support box	4		Fort Lauderdale, United States	34 hours

Category	Product Name	Quantity	Available	Location	Response Time
Inshore boom ancillaries	Boom Vane Small - boom deployment unit	1		Fort Lauderdale, United States	35 hours
Inshore boom ancillaries	Boom Vane Medium - boom deployment unit	1		Fort Lauderdale, United States	36 hours
Inshore boom ancillaries	Boom Vane (Combination)	1		Fort Lauderdale, United States	37 hours
Inshore recovery skimmers	Diesel driven rope mop system OM 140 Capacity 3-5 tph	3		Singapore	8-12 hours
Inshore recovery skimmers	Komara 7k disc skimmer inc power pack	2		Singapore	8-12 hours
Inshore recovery skimmers	Elastec combi drum skimmer inc power pack	2		Singapore	8-12 hours
Inshore recovery skimmers	Vikoma Minivac vacuum system	3		Singapore	8-12 hours
Inshore recovery skimmers	Roclean Minivac vacuum system	4		Singapore	8-12 hours
Inshore recovery skimmers	Delta Skimmer - weir skimmer inc. Spate pump. Capacity 12 tph	3		Singapore	8-12 hours
Inshore recovery skimmers	Slickdisc MK-13 interchangeable skimmer brush / disc / weir c/w power pack	3		Singapore	8-12 hours
Inshore recovery skimmers	Diesel driven rope mop system OM 240 Capacity 6 tph	1		Bahrain	15 hours
Inshore recovery skimmers	Diesel driven rope mop system OM 140 Capacity 3-5 tph	2		Bahrain	15 hours
Inshore recovery skimmers	Cowen weir skimmer	1		Bahrain	15 hours
Inshore recovery skimmers	Komara 20k disc skimmer inc power pack	2		Bahrain	15 hours
Inshore recovery skimmers	Komara 12k disc skimmer inc power pack	2		Bahrain	15 hours
Inshore recovery skimmers	Komara 7k disc skimmer inc power pack	5		Bahrain	15 hours
Inshore recovery skimmers	Vikoma Minivac vacuum system	5		Bahrain	15 hours
Inshore recovery skimmers	Diesel driven rope mop system OM 240 Capacity 6 tph	1		United Kingdom	21-26 hours
Inshore recovery skimmers	Diesel driven rope mop system OM 140 Capacity 3-5 tph	4		United Kingdom	21-26 hours
Inshore recovery skimmers	Diesel driven rope mop system 9D Capacity 12 tph	2		United Kingdom	21-26 hours
Inshore recovery skimmers	Komara 20k disc skimmer inc power pack	3		United Kingdom	21-26 hours
Inshore recovery skimmers	Komara 12k disc skimmer inc power pack	4		United Kingdom	21-26 hours
Inshore recovery skimmers	Komara 7k disc skimmer inc power pack	11		United Kingdom	21-26 hours
Inshore recovery skimmers	Elastec combi drum skimmer inc power pack	2		United Kingdom	21-26 hours
Inshore recovery skimmers	Vikoma Minivac vacuum system	5		United Kingdom	21-26 hours
Inshore recovery skimmers	Roclean Minivac vacuum system	5		United Kingdom	21-26 hours

Category	Product Name	Quantity	Available	Location	Response Time
Inshore recovery skimmers	Egmolap belt skimmer inc power system (requires working platform)	1		United Kingdom	21-26 hours
Inshore recovery skimmers	Komara 20k disc skimmer inc power pack	2		Fort Lauderdale, United States	38 hours
Inshore recovery skimmers	Komara 12k disc skimmer inc power pack	1		Fort Lauderdale, United States	39 hours
Inshore recovery skimmers	Elastec combi drum skimmer inc power pack	2		Fort Lauderdale, United States	40 hours
Inshore recovery skimmers	Elastec Magnum 100 skimmer c/w power pack	3		Fort Lauderdale, United States	41 hours
Inshore recovery skimmers	Vikoma Minivac vacuum system	4		Fort Lauderdale, United States	42 hours
Inshore recovery skimmers	Delta Skimmer - weir skimmer inc. Spate pump. Capacity 12 tph	2		Fort Lauderdale, United States	43 hours
Inshore recovery skimmers	Aquaguard RBS-20 Drum/Brush Skimmer c/w power pack	1		Fort Lauderdale, United States	44 hours
Inshore recovery skimmers	Aquaguard RBS-5 Drum/Brush Skimmer c/w power pack	7		Fort Lauderdale, United States	45 hours
Inshore recovery skimmers	Desmi DBD5 Disc/Drum skimmer c/w power pack	3		Fort Lauderdale, United States	46 hours
Inshore recovery skimmers	Elastec TracVac system	1		Fort Lauderdale, United States	47 hours
Inshore recovery skimmers	Vikoma Duplex skimmer c/w power pack	1		Fort Lauderdale, United States	48 hours
Inshore recovery skimmers	Lamor LWS 70 skimmer with brush attachment c/w power pack	3		Fort Lauderdale, United States	49 hours
Inshore recovery skimmers	Minimax weir skimmer	5		Fort Lauderdale, United States	50 hours
Inshore recovery skimmers	Trailerised rope mop system	4		Fort Lauderdale, United States	51 hours
Inshore recovery skimmers	Skim Pak skimmer head	2		Fort Lauderdale, United States	52 hours
Inshore storage equipment	Ro-tank storage - capacity 10 m^3 / 2600 US gallons	6		Singapore	8-12 hours
Inshore storage equipment	Fastanks - capacity 9m^3 / 2400 US gallons	23		Singapore	8-12 hours
Inshore storage equipment	Fastanks - capacity 9m^3 / 2400 US gallons	7		Bahrain	15 hours
Inshore storage equipment	Fastank - capacity 2m^3 / 600 US gallons	10		Bahrain	15 hours

Category	Product Name	Quantity	Available	Location	Response Time
Inshore storage equipment	Fastanks - capacity 9m³ / 2400 US gallons	63		United Kingdom	21-26 hours
Inshore storage equipment	Fastank - capacity 2m³ / 600 US gallons	4		United Kingdom	21-26 hours
Inshore storage equipment	Decant tank Aluminium 1300 US gallons/4T	2		Fort Lauderdale, United States	53 hours
Inshore storage equipment	Fastanks - capacity 9m³ / 2400 US gallons	24		Fort Lauderdale, United States	54 hours
Inshore storage equipment	Canflex floating collar tank - capacity 3000 US gallons	12		Fort Lauderdale, United States	55 hours
Inshore storage equipment	Canflex floating collar tank - capacity 2000 US gallons	2		Fort Lauderdale, United States	56 hours
Inshore storage equipment	Canflex floating collar tank - capacity 1000 US gallons	2		Fort Lauderdale, United States	57 hours
Inshore storage equipment	Pit liner, 105000 US gallons, 398 T	3		Fort Lauderdale, United States	58 hours
Offshore boom	Roboom 200 metres Bay Boom, on reel without power pack	12		Singapore	8-12 hours
Offshore boom	Hi Sprint rapid boom with reel (300 metres long without power pack)	2		Singapore	8-12 hours
Offshore boom	Roboom 200 metres Bay Boom, on reel without power pack	4		Bahrain	15 hours
Offshore boom	Roboom 200 metres Bay Boom, on reel without power pack	13		United Kingdom	21-26 hours
Offshore boom	Hi Sprint rapid boom with reel (300 metres long without power pack)	1		United Kingdom	21-26 hours
Offshore boom	Roboom 200 metres Bay Boom, on reel without power pack	4		Fort Lauderdale, United States	60 hours
Offshore boom	Ocean Boom 43” inflation boom in 30-metre sections	100		Fort Lauderdale, United States	61 hours
Offshore boom	Ocean Boom 45” inflation boom in 30-metre sections	18		Fort Lauderdale, United States	62 hours
Offshore recovery skimmers	Komara 50k skimmer without power pack	2		Singapore	8-12 hours
Offshore recovery skimmers	GT 185 weir skimmer without power pack	1		Singapore	8-12 hours
Offshore recovery skimmers	Termite weir skimmer without power pack	4		Singapore	8-12 hours
Offshore recovery skimmers	Termite combi system brush / disc / weir without power pack	2		Singapore	8-12 hours
Offshore recovery skimmers	Terminator combi system brush / disc / weir skimmer without power pack	2		Singapore	8-12 hours
Offshore recovery skimmers	Marflex Sweep Arms - Large Volume skimming arms without power pack	2		Singapore	8-12 hours

Category	Product Name	Quantity	Available	Location	Response Time
Offshore recovery skimmers	Komara 50k skimmer without power pack	2		Bahrain	15 hours
Offshore recovery skimmers	Termite weir skimmer without power pack	2		Bahrain	15 hours
Offshore recovery skimmers	Terminator weir skimmer (with thrusters) without power pack	1		Bahrain	15 hours
Offshore recovery skimmers	Side Sweep Arms - Small Volume skimming arms without power pack	1		Bahrain	15 hours
Offshore recovery skimmers	Komara 50k skimmer without power pack	2		United Kingdom	21-26 hours
Offshore recovery skimmers	Desmi DS 250 skimmer without power pack	4		United Kingdom	21-26 hours
Offshore recovery skimmers	Ro-Disc attachment for DS250	2		United Kingdom	21-26 hours
Offshore recovery skimmers	GT 185 weir skimmer without power pack	4		United Kingdom	21-26 hours
Offshore recovery skimmers	Termite weir skimmer without power pack	4		United Kingdom	21-26 hours
Offshore recovery skimmers	Terminator weir skimmer (with thrusters) without power pack	1		United Kingdom	21-26 hours
Offshore recovery skimmers	Desmi Seamop c/w transfer pump	3		United Kingdom	21-26 hours
Offshore recovery skimmers	Termite weir skimmer without power pack	2		Fort Lauderdale, United States	66 hours
Offshore recovery skimmers	Lamor minimax 30BC brush Skimmer c/w power pack	2		Fort Lauderdale, United States	67 hours
Offshore recovery skimmers	Foilex Rapid Deployment System c/w power pack	2		Fort Lauderdale, United States	68 hours
Offshore recovery skimmers	Desmi Seamop c/w transfer pump	3		Fort Lauderdale, United States	69 hours
Offshore storage equipment	Storage Barge - 25m³	8		Singapore	8-12 hours
Offshore storage equipment	Storage Barge - 50m³	4		Singapore	8-12 hours
Offshore storage equipment	Waste Containment Tank 10m³ / 2600 US Gallons	9		Singapore	8-12 hours
Offshore storage equipment	Storage Barge - 25m³	4		Bahrain	15 hours
Offshore storage equipment	Storage Barge - 50m³	2		Bahrain	15 hours
Offshore storage equipment	Unitor oil bag - capacity 500 m³	1		Bahrain	15 hours
Offshore storage equipment	Unitor oil bag - capacity 200 m³	1		Bahrain	15 hours
Offshore storage equipment	Storage Barge - 25m³	7		United Kingdom	21-26 hours
Offshore storage equipment	Storage Barge - 50m³	8		United Kingdom	21-26 hours
Offshore storage equipment	Storage Barge - 25m³	4		Fort Lauderdale, United States	72 hours

Category	Product Name	Quantity	Available	Location	Response Time
Offshore storage equipment	Sea Slug -Capacity 5T	10		Fort Lauderdale, United States	73 hours
Offshore storage equipment	Sea Slug -Capacity 10T	11		Fort Lauderdale, United States	74 hours
Offshore storage equipment	Sea Slug -Capacity 50T	12		Fort Lauderdale, United States	75 hours
Oiled wildlife response package	Search and Rescue	1		Singapore	8-12 hours
Oiled wildlife response package	Cleaning and rehabilitation	1		Singapore	8-12 hours
Oiled wildlife response package	Search and Rescue	1		Bahrain	15 hours
Oiled wildlife response package	Cleaning and rehabilitation	1		Bahrain	15 hours
Oiled wildlife response package	Search and Rescue	1		United Kingdom	21-26 hours
Oiled wildlife response package	Intake and triage	1		United Kingdom	21-26 hours
Oiled wildlife response package	Cleaning and rehabilitation	2		United Kingdom	21-26 hours
Oiled wildlife response package	Wildlife Rehabilitation unit	1		Fort Lauderdale, United States	59 hours
Pre-loaded equipment	Load One - Shoreline boom and ancillaries	1		Bahrain	15 hours
Pre-loaded equipment	Load Two - Shoreline boom and ancillaries	1		Bahrain	15 hours
Pre-loaded equipment	Load Four - Offshore Containment and Recovery (Weir Boom)	1		United Kingdom	21-26 hours
Pre-loaded equipment	Load Five - Shoreline package standard	1		United Kingdom	21-26 hours
Pre-loaded equipment	Load Six - Offshore Containment and Recovery	1		United Kingdom	21-26 hours
Pre-loaded equipment	Load Seven - Egmopol Barge	1		United Kingdom	21-26 hours
Pre-loaded equipment	Load Eight - Shoreline package standard supplement	1		United Kingdom	21-26 hours
Pre-loaded equipment	Load Nine - Shoreline package heavy oil supplement	1		United Kingdom	21-26 hours
Pre-loaded equipment	Load Eleven - High volume recovery systems (offshore)	1		United Kingdom	21-26 hours
Spill tracking buoy	Oil Spill Tracking Buoy - I-Sphere	1		Singapore	8-12 hours
Spill tracking buoy	Oil Spill Tracking Buoy - ISMDB	2		Singapore	8-12 hours
Spill tracking buoy	Oil Spill Tracking Buoy - I-Sphere	1		Bahrain	15 hours
Spill tracking buoy	Oil Spill Tracking Buoy - ISMDB	1		Bahrain	15 hours
Spill tracking buoy	Oil Spill Tracking Buoy - I-Sphere	1		United Kingdom	21-26 hours
Spill tracking buoy	Oil Spill Tracking Buoy - ISMDB	2		United Kingdom	21-26 hours

Category	Product Name	Quantity	Available	Location	Response Time
Subsea Incident Response Toolkit (SIRT)	Subsea incident response toolkit	1		Norway	20 hours
Subsea Incident Response Toolkit (SIRT)	Subsea incident response toolkit	1		Brazil	18 hours

Appendix 3 POLREP

[HOLD – to be inserted prior to submission to NOPSEMA]

Appendix 4 Aerial observer log

Worksheet for estimating oil slick volume in accordance with the Bonn Agreement

Step 1. Total area: Estimate total size of the oil slick as a square or rectangle (in km²). [*E.g. 10 x 2 km = 20 km²*].

Step 2. Oil spill area: Assess the area affected by the slick in km² calculated as a % of the total area. [*E.g. the slick affects 90% of the total area, 90% of 20 km² = 18 km²*].

Step 3. Estimate slick area by colour: Estimate the area covered by each oil appearance colour as a % of the area affected in km². [*E.g. 60% silvery sheen: 0.60 x 18 = 10.8 km², 40% metallic: 0.40 x 18 = 7.2 km² respectively*].

Step 4. Calculate minimum and maximum oil quantity by colour: Multiply the area covered by each oil appearance colour by the minimum and maximum possible volumes to get the minimum and maximum estimates of oil quantity. [*E.g. silvery sheen; min: 10.8 km² x 0.04 = 0.432 m³/km², max: 10.8 km² x 0.3 = 3.24; metallic; min: 7.2 km² x 5 = 36, max: 7.2 km² x 50 = 360 m³/km²*].

Step 5. Total quantity: Add all the quantity by colour figures to get total estimated minimum and maximum quantities of oil in m³.

Step 6. Conversion: If necessary, covert m³ to tonnes by multiplying total quantity in m³ by the Specific Gravity of the spilt oil.

Average width (km)		**Average length (km)**	

STEP 1	**Total area (width x length) km²**	
STEP 2	**Oil spill area (estimated) km²**	

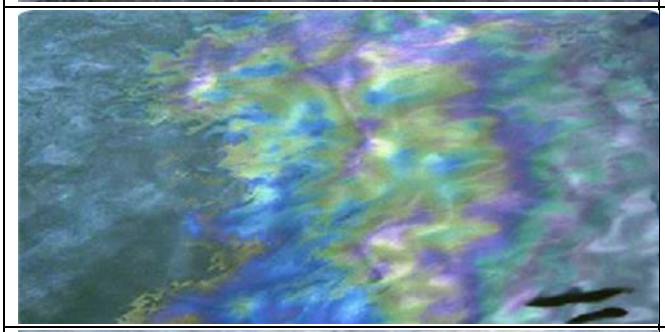
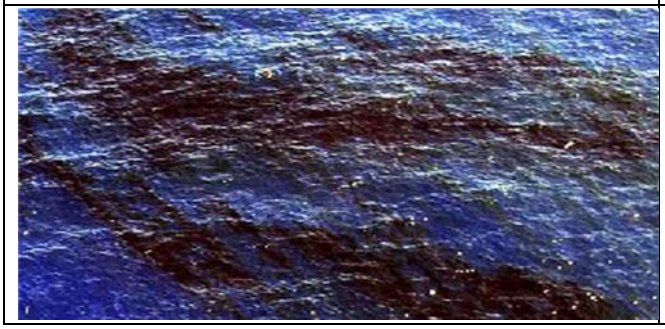
Colour	Code	Minimum (m³/km²)	Maximum (m³/km²)	STEP 3 % of area affected	STEP 3 Area covered (km²)
Silvery sheen	1	0.04	0.3		
Rainbow sheen	2	0.3	5.0		
Metallic	3	5.0	50		
Discontinuous true colour	4	50	200		
Continuous true colour	5	200	200		

Note: Calculation for Area Covered: Km² = Oil Spill Area / 100 x % of Area Covered.

Colour	STEP 3 Area covered (km²)	STEP 4 Min volume (m³)	STEP 4 Max volume (m³)
Silvery sheen			
Rainbow sheen			
Metallic			
Discontinuous true colour			
Continuous true colour			

STEP 5	**Total volume (m³)**		
STEP 6	**Total volume in tonnes (m³ x SG)**		

Appendix 5 Bonn agreement oil appearance code

Bonn Agreement Oil Appearance Code	
Image	**Description**
	**CODE 1 -** Oil Sheen Silvery (0.04 µm – 0.3 µm) Very thin films of oil reflect the incoming light better than the surrounding water and can be seen as a silvery or grey sheen. Above a certain height or angle of view the sheen may no longer be observed.
	**CODE 2 -** Oil Sheen Rainbow (0.3 µm – 5.0 µm) Rainbow oil appearance is caused by an optical effect that is independent of oil type. Depending on angle of view and layer thickness, the distinctive colours will be diffuse to very bright. Bad light conditions may cause the colours to appear duller. A consistent layer of oil in the rainbow region will show different colours across the slick because of the change in angle of view. Therefore, if rainbow is present, a range of colours will be visible.
	**CODE 3 -** Oil Sheen Metallic (5.0 µm – 50 µm) Although a range of colours can be observed (e.g. blue, purple, red and greenish) the colours will be distinctly different to a ”rainbow”. Metallic sheens will appear as a relatively homogeneous colour (blue, brown, purple or another colour). The ”metallic” appearance – caused by a mirror effect - is the common factor, with the colour dependent on light and sky conditions. For example, blue can be observed in clear, blue-sky conditions.
	**CODE 4 -** Discontinuous True Colour (50 µm – 200 µm) For oil slicks thicker than 50 µm, the true colour will gradually dominate. Brown oils will appear brown, black oils will appear black. Patchiness in colour due to thinner areas within the slick, results in a discontinuous appearance (though dominated by the true oil colour). The term “discontinuous” therefore should not be mistaken as necessarily describing the surface coverage of the oil.
	**CODE 5 -** Continuous True Colour (>200 µm) The true colour of the specific oil is the dominant effect in this category. A more homogenous colour can be observed with no discontinuity as described in Code 4. This category is strongly oil type dependent and colours may be more diffuse in overcast conditions.

Appendix 6 RPS OSTM request Form

Appendix 7 Dispersant requirements and availability

Table A7-1 Availability of OSCA Register dispersants

Dispersant	OSCA Register status	Available in <24 hrs (m^3)	Available in 24-96 hrs (Australia) (m^3)	Available >96 hrs (internationally) (m^3)	Total (m^3)
Dasic	Approved	75	83	850	1008
Finasol OSR 52	Approved	0	0	3150	3150
Ardrox 6120	Transitional[1]	100	15	0	115
Corexit 9500	Transitional[1]	62	27	1000	1089
Total approved		75	83	4000	**4158**
Total transitional		162	42	1000	**1204**
Overall total		**237**	**125**	**5000**	**5362**

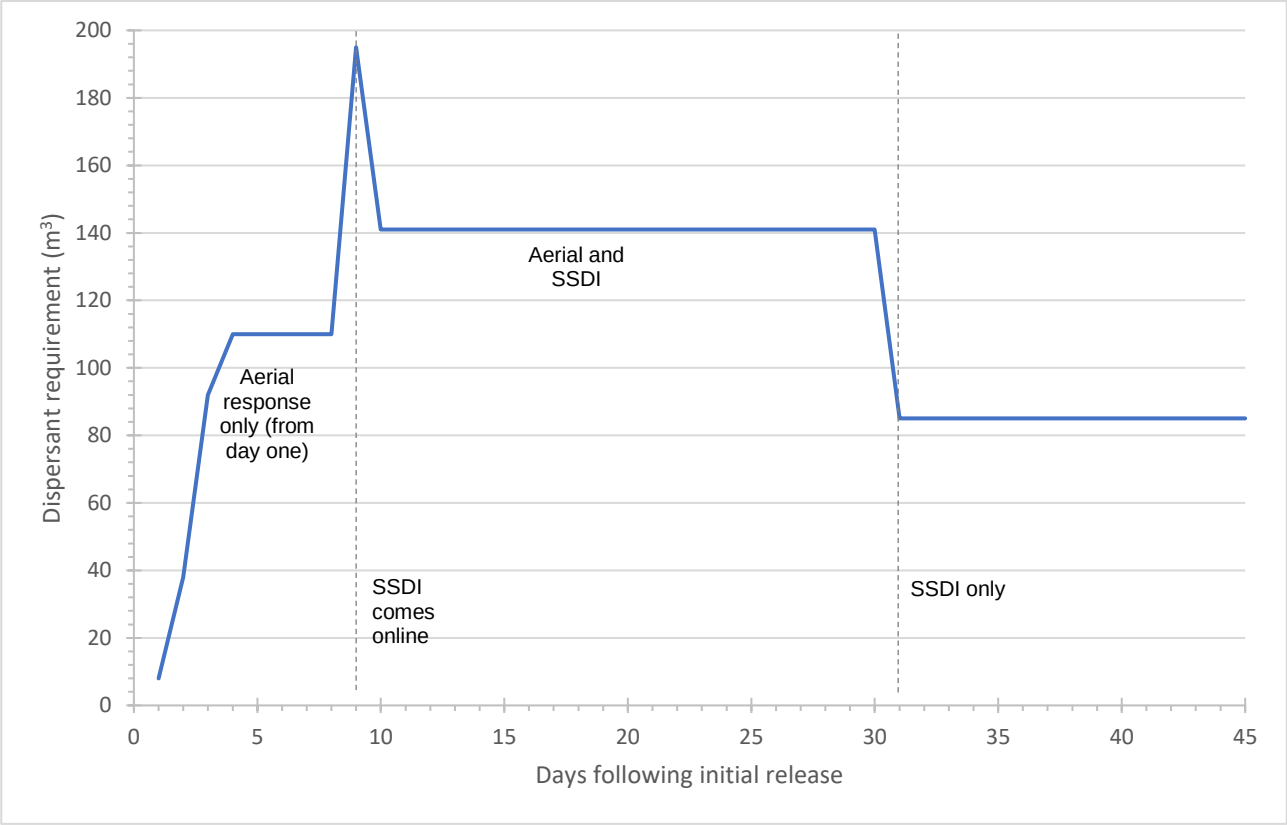


Figure A7-1 Predicted daily dispersant requirement (m^3)

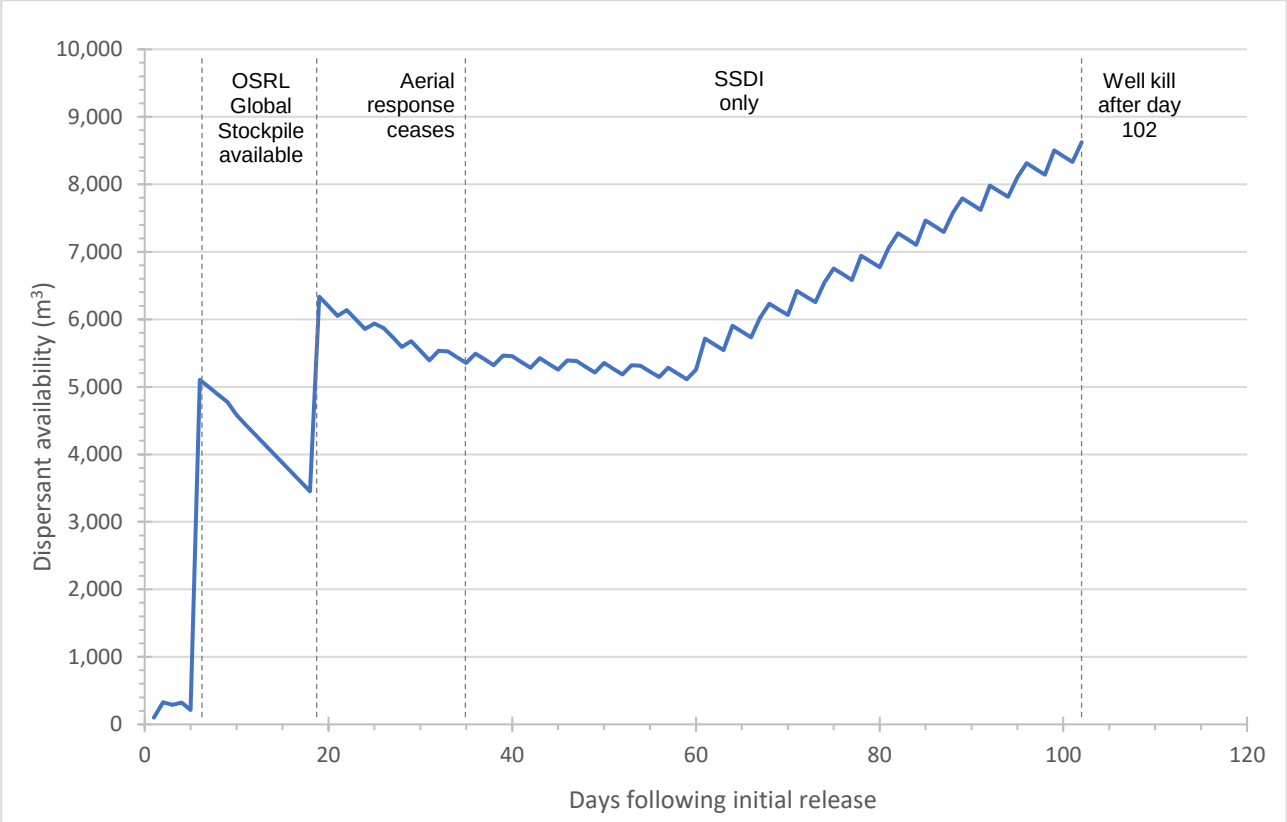


Figure A7-2 Predicted daily availability (m^3) of OSCA Register dispersants

Appendix 8 Dispersant application log

[HOLD – to be inserted prior to submission to NOPSEMA]

Appendix 9 NEBA information

Table A9-1 NEBA categories used for receptors

Category	Environmental and socio-economic receptors (values/assets)
Intertidal/coastal habitats	Mangroves
	Saltmarshes, wetlands and samphire
	Intertidal reefs
	Estuaries
	Embayments
	Lagoons
	Intertidal sand/mud flats
	Sandy Beaches
	Gravel beaches
	Rocky shores
	Boulder/cobble/pebble shores and riprap
	Cliffs
	Sand dunes
	Shorebirds
Benthic communities	Seagrass
	Macroalgae
	Giant kelp (*Macrocystis* spp.)
	Hard corals (including deep water corals)
	Subtidal reefs, shoals and banks
	Benthic mixed algal/sessile epibiota communities (shallow)
	Benthic filter-feeding communities (deep water)
	Benthic infaunal communities
Pelagic/demersal	Plankton (including pelagic larval stages)
	Pelagic fish
	Demersal fish
	Sharks and rays
	Prawns
	Rock lobster, lobster and giant crab
	Abalone

Category	Environmental and socio-economic receptors (values/assets)
	Scallops
	Other shellfish
	Species with an extremely limited distribution (e.g. handfish, live-bearing sea star, cuttlefish, Maugean skate)
	Fish/cuttlefish aggregation area
	Threatened fish
Marine megafauna and seabirds	Shark BIAs
	Baleen whale BIAs
	Sperm whale (toothed whales) BIA
	Other cetaceans
	Marine reptiles
	Pinnipeds
	Australian Sealion BIA
	Seabirds
	Seabird/shorebird BIA
	Threatened seabirds/shorebirds
	Little penguins
Fisheries and aquaculture	Aquaculture (fin fish, including tuna ranching)
	Aquaculture (shellfish)
	Prawn fisheries
	Rock lobster, lobster and giant crab fisheries
	Scallop fisheries
	Abalone fisheries
	Other commercial fisheries
	Recreational fisheries
Other socio-economic values	Protected areas
	Coastal saltmarsh TEC
	Giant kelp TEC
	Posidonia TEC
	Shore-based heritage sites (including Native Title)
	Sub-tidal heritage sites
	Ports
	Other coastal infrastructure and coastal settlements

Category	Environmental and socio-economic receptors (values/assets)
	Shipping
	Petroleum exploration and production
	Tourism and recreation
	Defence

Table A9-2 NEBA impact scoring criteria

Category	Type of impact	Level of impact	Spatial scale of impact	Duration of impact
+3	Major positive impact	Likely to prevent mortality/loss of value/assets	Likely to reduce spill impacts significant at National/ International scales	Likely to reduce spill impacts by >5 years or prevent permanent loss
+2	Moderate positive impact	Likely to prevent chronic/acute impacts of value/assets	Likely to reduce spill impacts at regional scales	Likely to reduce spill impacts by 1-5 years
+1	Minor positive impact	Likely to prevent behavioural impacts of value/assets	Likely to reduce spill impacts at local scales	Likely to reduce spill impacts by <1 year
0	**No difference to an unmitigated spill impact**			
-1	Minor negative impact	Likely to cause additional behavioural impacts of value/assets	Likely to cause additional spill impacts at local scales	Likely to cause an additional increase of spill impacts for <1 year
-2	Moderate negative impact	Likely to cause additional chronic/acute impacts of value/assets	Likely to cause additional spill impacts at regional scales	Likely to cause an additional increase of spill impacts for 1-5 years
-3	Major negative impact	Likely to cause additional cumulative/causal impacts resulting in additional mortality/loss of value/assets	Likely to cause additional increased spill impacts, significant at National/ International scales	Likely to cause an additional increase of spill impacts for >5 years or result in permanent loss

Stromlo-1 NEBA workshop, 31 May 2018 L = spill Level L2 = 300 m^3 surface diese release from a vessel collision L3 = 1,153,634 m^3 of crude oil

Value / Attribute		Value/ Attribute Ranking	Monitor and evaluate			Oiled Wildlife Response			Containment and recovery - offshore			Containment and recovery - nearshore			Chemical dispersion – aerial application			Chemical dispersion – subsurface application			Chemical dispersion - vessels			Protection and deflection			Shoreline clean -up		
			L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Intertidal Habitats	Mangroves	14	0	0	0			-1		0	+1			+1			0			+2		0	0			+2			-2
	Saltmarshes, wetlands and samphire	18	0	0	0			-2		0	+1			+1			0			+2		0	0			+2			-2
	Intertidal reefs	45	0	0	0			-1		0	+1			+1			0			+2		0	0			0			-2
	Estuaries	30	0	0	0			0		0	+1			+1			0			+1		0	0			+1			-1
	Embayments	42	0	0	0			0		0	+1			+1			0			+1		0	0			+1			-1
	Lagoons	23	0	0	0			0		0	+1			+1			0			+1		0	0			+1			0
	Intertidal sand/mud flats	51	0	0	0			0		0	+1			0			0			+2		0	0			0			-1
	Sandy Beaches	54	0	0	0			0		0	+1			0			0			+1		0	0			0			+1
	Gravel beaches	59	0	0	0			0		0	+1			0			0			+1		0	0			0			+1
	Rocky shores	59	0	0	0			0		0	+1			0			0			+1		0	0			0			-1
Benthic Communities	Boulder/cobble/pebble shores and riprap	63	0	0	0			0		0	+1			0			0			+1		0	0			0			+1
	Cliffs	54	0	0	0			0		0	0			0			0			+1		0	0			0			0
	Sand dunes	23	0	0	0			0		0	0			0			0			0		0	0			0			+1
	Shorebirds	35	0	0	0			+2		0	+1			+1			0			+2		0	0			+1			+1
	Seagrass	18	0	0	0			-1		0	+1			+1			0			+2		0	0			-1			0
	Macroalgae	51	0	0	0			0		0	+1			+1			0			+2		0	0			0			0
	Giant kelp (Macrocystis pyrifera)	2	0	0	0			0		0	0			0			0			+1		0	0			0			0
	Hard corals (inc. deepwater corals)	23	0	0	0			0		0	0			0			0			-2		0	0			0			0
Demersal/ Pelagic Values	Subtidal reefs, shoals and banks	23	0	0	0			0		0	0			0			0			-2		0	0			0			0
	Benthic mixed algal/sessile epibiota communities (shallow)	54	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Benthic filter-feeding communities (deep water)	35	0	0	0			0		0	0			0			0			-2		0	0			0			0
	Benthic infaunal communities	63	0	0	0			0		0	0			0			0			-2		0	0			0			0
Marine Megafauna and Seabirds	Plankton (inc. pelagic larval stages)	51	0	0	0			0		0	+1			0			-1			-1		0	0			0			0
	Pelagic fish	35	0	0	0			0		0	0			0			-1			-1		0	0			0			0
	Demersal fish	35	0	0	0			0		0	0			0			0			-2		0	0			0			0
	Sharks and rays	49	0	0	0			0		0	0			0			-1			-1		0	0			0			0
	Prawns	14	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Rock lobster, lobster and Giant crab	23	0	0	0			0		0	0			0			0			-2		0	0			0			0
	Abalone	18	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Scallops	35	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Other shellfish	49	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Species with an extremely limited distribution (handfish, live-bea	9	0	0	0			0		0	0			0			0			-1		0	0			0			0
	fish/cuttlefish aggregation area	14	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Threatened fish	9	0	0	0			0		0	0			0			0			-2		0	0			0			0
	Shark BIAs	18	0	0	0			0		0	0			0			-1			-2		0	0			0			0
	Baleen whale BIAs	18	0	0	0			0		0	+1			0			-1			-2		0	0			0			0
	Sperm Whale (Toothed whales) BIA	23	0	0	0			0		0	+1			0			-1			-2		0	0			0			0
	Other Cetaceans	14	0	0	0	0		0		0	+1			0			-1			-2		0	0			0			0
	Marine Reptiles	45	0	0	0	0		0		0	+1			0			-1			-1		0	0			0			0
	Pinnipeds	30	0	0	0	0		+1		0	+1			+1			0			+1		0	0			0			+1
	Australian Sealion BIA	30	0	0	0	0		0		0	+1			+1			0			+1		0	0			0			+1
	Seabirds	30	0	0	0	+1		+2		0	+1			0			-1			+1		0	0			0			0
Fisheries and Aquaculture	Seabird/Shorebird BIA	9	0	0	0	0		0		0	+1			+1			0			+1		0	0			0			+1
	Threatened seabirds/shorebirds	9	0	0	0	+1		+2		0	+1			+1			-1			+1		0	0			0			+1
	Little Penguins	2	0	0	0	+1		+2		0	+1			+1			0			+1		0	0			0			+1
	Aquaculture (fin fish; inc. tuna ranching)	30	0	0	0			0		0	+1			+1			0			0		0	0			+1			0
	Aquaculture (shellfish)	1	0	0	0			0		0	+1			+1			0			0		0	0			+1			0
	Prawn fisheries	42	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Rock lobster, lobster and Giant crab fisheries	35	0	0	0			0		0	0			0			0			-2		0	0			0			0
	Scallop fisheries	42	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Abalone fisheries	2	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Other Commercial Fisheries	2	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Recreational Fisheries	45	0	0	0			0		0	0			0			0			-1		0	0			0			+1
	Protected areas	9	0	0	0			0		0	+1			+1			-1			-2		0	0			+1			-2
Other Socio-Economic Values	Coastal saltmarsh TEC	2	0	0	0			0		0	+1			+1			0			+2		0	0			+1			-2
	Giant kelp TEC	2	0	0	0			0		0	0			0			0			-1		0	0			0			0
	Posidonia TEC	2	0	0	0			0		0	0			0			0			0		0	0			0			0
	Shore-based Heritage sites (inc. Native Title)	35	0	0	0			0		0	+1			+1			0			+2		0	0			+1			-1
	Sub-tidal Heritage sites	23	0	0	0			0		0	0			0			0			0		0	0			0			0
	Ports	54	0	0	0			0		0	0			0			0			+1		0	0			+1			0
	Other coastal infrastructure and coastal settlements	65	0	0	0			0		0	0			0			0			+1		0	0			0			+1
	Shipping	54	0	0	0			0		0	0			0			0			+1		0	0			0			0
	Petroleum exploration and production	59	0	0	0			0		0	0			0			0			0		0	0			0			0
	Tourism and recreation	45	0	0	0			+1		0	+1			+1			0			+2		0	0			+1			+1
	Defence	59	0	0	0			0		0	0			0			0			0		0	0			0			0

Figure A9-1 NEBA planning phase workshop outputs

Appendix 10 Surface oil sampling checklist

[HOLD – TBC if required for water sampling]

Appendix 11 Shoreline assessment information

[HOLD – requires consultation with the states as control agency on their preference for shoreline assessment forms and guidance. If documented in the states own response plans, then the information below is not required and can be removed. If some states will defer to this information, then it can remain in this appendix.]

Shoreline assessment information can be downloaded free of charge from the following links:

- NOAA Shoreline Assessment Manual - https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/resources/shoreline-assessment-manual.html
- NOAA Shoreline Assessment Job Aid - https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/resources/shoreline-assessment-job-aid.html
- NOAA Shoreline Assessment Forms - https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-]spills/resources/shoreline-assessment-forms.html
- OSRL Shoreline Assessment Field Guide - https://www.oilspillresponse.com/technical-library/scat-field-guide/.

The table below provides summary information on shoreline clean-up techniques, constraints and effects. The table is based on information provided in the NOAA Shoreline Assessment Manual.

Method	Objective	Description	Applicable Habitat Types	When to Use	Biological Constraints	Environmental Effects	Waste Generation
Natural Recovery	No stranded oil is removed to minimise impact to the environment, or because no there is no effective/safe method for clean-up.	Oil is left in place to degrade naturally. Monitoring of the contaminated area may be required	Manmade Structures Rocky Shore Sandy Beach Tidal Flats Shallow Seagrass Reef Mangroves	When natural removal rates are fast (high evaporation, high energy coastline), when the degree of oiling is light or when clean-up actions will do more harm than natural recovery	Natural recovery may be inappropriate for area used by high numbers of mobile animals (birds, marine mammals) or endangered species	Same as from the oil alone	None
Manual Oil Removal	Removal of oil with hand tools and manual labour.	Removal of surface oil using hands, rakes, shovels, buckets, scrapers, sorbents, etc., and placing in containers. Includes underwater recovery of submerged oil by divers.	Preferred: Rocky Shore Sandy Beach Possible: Tidal Flats Mangroves	Light to moderate oiling conditions for stranded oil. Submerged heavy oils that have formed semi- solid/solid masses on the bottom.	Foot traffic over sensitive areas (wetlands, tidal pools, etc.) should be restricted or prevented. Shoreline access may need to be restricted/closed at times (i.e. during bird nesting/ turtle hatching). Permission to work in culturally significant sites.	Minimal, if surface disturbance by responders and waste generation is controlled.	Collection of oil mixed with sand. Oily wastewater following decontamination. Oiled personal protective gear. All will be properly treated and/or disposed.
Mechanical Oil Removal	Removal of oil from shorelines using mechanical equipment.	Oil is collected using equipment such as graders, bulldozers, dredges, beach cleaners, etc. Requires systems for temporary storage, transport and treatment/disposal of collected material.	Possible: Sandy Beach	When large amounts of oiled materials will be removed. Care should be taken to remove sediments only to the depth of oil penetration. Excessive sediment removal will cause erosion and significantly increase waste volume.	Use of heavy equipment in sensitive habitats (i.e. wetlands, soft substrates) should be restricted. Permission requested for use in culturally significant areas. Site area will be controlled to prevent physical disturbance to adjacent, unoiled areas. The noise generated by the mechanical equipment may present a constraint as well.	May be detrimental if excessive sediments are removed without replacement. Organisms in the sediment will be affected, although the need to remove oil may make this response method the best overall alternative. Re- suspension of exposed oil and fine- grained, oil sediments can affect adjacent bodies of water.	Can generate large quantities of contaminated sediment debris that requires treatment and/or disposal.
Sorbents	Removal of surface oil by absorption by oleophilic material placed at the waterline.	Sorbent material (boom, pads, snares) is placed on the floating oil or water surface, allowing it to absorb oil or is used to wipe or dab stranded oil. Recovery of all sorbent material is mandatory - they need to be firmly anchored in areas exposed to wave action/currents, to prevent stranding on the shoreline.	Preferred: Rocky shore Possible: Tidal Flats Shallow Seagrass Mangroves	When oil is free- floating in small rocky pools or stranded on shore. As a secondary treatment method after gross oil removal and in sensitive areas where access is restricted (i.e. mangroves). Note. Heavy oil will only coat the surface – therefore requires a large surface area to be effective.	Access for deploying and retrieving sorbents should not adversely affect wildlife. Application is soft or sensitive habitats will require deployment by boat or use of walking boards. Sorbent material left in place too long can break apart and present an ingestion hazard to wildlife.	Physical disturbance of habitat during deployment and retrieval.	All sorbent material will be collected and disposed appropriately. Caution should be taken to prevent overuse and the generation of large amounts of lightly oiled sorbents.
Pumps and Vacuums	Removal of oil pooled on a shoreline substrate or sub-tidal sediments.	Vacuum unit or pump is attached via a flexible hose to a suction head that recovers free oil. May be mounted on vessels for water-based operations, on trucks driven to recovery areas, or hand-carried to remote sites.	Preferred: Rocky shore Possible: Manmade Structures Sandy Beach Tidal Flats Shallow Seagrass Mangroves	When oil is stranded on the substrate, pooled against a shoreline, concentrated in rocky trenches or trapped in vegetation. May be used in combination with low-pressure flushing to lift the oil off the substrate and vegetation.	Restrictions should be established for areas where foot traffic and equipment operation may be damaging, such as soft substrates.	Minimal, if foot and vehicle traffic are controlled and minimal substrate/vegetation is damaged or removed. Site restrictions and procedures should be developed and implemented.	Collected oil and or oil/water mix will need to be stored temporarily prior to treatment/disposal. Large amounts of water are often recovered, requiring separation and treatment.
Debris Removal	Removal of debris in path of spill prior to oiling and to remove contaminated debris from the shoreline and water surface.	Manual or mechanical removal of debris (seaweed, driftwood, wreckage, trash) from the shore or water surface.	Possible: Sandy Beach Tidal Flats Mangroves	When debris is heavily contaminated and provides a potential source of secondary oil release and/or contamination for other resources that use the area such as birds and small mammals. Removal of non- oiled debris (beach wrack) may be considered to reduce potential oiled waste; or likely clogging of recovery skimmers; or if it is likely to cause safety problems for responders	Foot traffic over sensitive areas (wetlands, spawning grounds) will be restricted/controlled. Debris may be a habitat and an important source of prey (i.e. shorebirds feeding in wrack on beaches).	Physical disruption of substrate.	Potential to generate large volumes of contaminated debris. Waste disposal options should be less restrictive for debris collected pre-spill.

Method	Objective	Description	Applicable Habitat Types	When to Use	Biological Constraints	Environmental Effects	Waste Generation
Vegetation Removal	To remove portions of oiled vegetation or oil trapped in vegetation to prevent oiling of wildlife or secondary oil releases.	Oiled vegetation is cut (weed trimmers, blades), picked or raked up and bagged for disposal.	Possible: Tidal Flats Mangroves	When the risk of oiled vegetation contaminating wildlife is greater than the value of the vegetation that is to be cut, and there is no less-destructive method that removes or reduces the risk to acceptable levels. Also, to remove thick oil residues under the oiled vegetation.	Cutting only the oiled portions of the plants and leaving roots and stems (as much as possible) will reduce impact to plants. Operations will be strictly monitored to minimise the degree of root destruction and mixing oil deeper into the sediments.	Vegetation removal/unnecessary trampling will destroy habitat for many animals. Cut areas will have reduced plant growth and, in some instances, plants may be killed. Along exposed sections of shoreline, the vegetation may not recover, resulting in erosion and habitat loss.	Cut portions of oiled plants will be collected and disposed of properly.
Sediment Tiling	To break up oily sediments and surface oil deposits, increasing their surface area, and bringing deeper subsurface oil layers to the surface, enhancing the rate of degradation by aeration. Also, to increase the rate sediment re- working by wave action.	Oil sediments are mixed (i.e. rototilled) using mechanical equipment or manual tools. Along beaches, oiled sediments may be pushed to the lower intertidal zone to enhance natural clean-up by wave activity (surf washing). On gravel beaches, the process may be aided with high-volume flushing.	Possible: Sandy Beach Sedimentary substrate that can support mechanical equipment or foot traffic and hand tiling.	On sand to gravel beaches with subsurface oil where sediment removal is not feasible (due to erosion, transportation or disposal problems). On sand beaches where the sediment is stained or lightly oiled. May be appropriate for sites where the oil is stranded above the normal high waterline, so that the sediments can be reworked by wave action.	Avoid use on shores near sensitive wildlife habitats, such as fish-spawning areas or bird-nesting and adjacent to sub-tidal habitats such as shellfish beds, seagrass, or coral reefs.	Mixing of oil into sediments could further expose organisms that live below the original layer of oil. Repeated reworking could delay re-establishing of these organisms. Re-mobilised oil and oily suspended sediments from treated sites could contaminate adjacent waterbodies and shorelines.	None.
Flooding/ Deluging	To lift and wash oil stranded on land to the water's edge for collection and disposal.	A perforated hose is placed above the oiled shore. Sea water is pumped through the hose at low pressure and flows downwards to the water where any released oil is collected by booms and recovered by skimmers or vacuum. On porous sediments, water flows through the substrate, pushing loose oil ahead of it. On saturated, fine-grained sediments, the technique will lift and flush the oil.	Preferred: Sandy Beach Possible: Manmade Structures Rocky Shore Tidal Flats Shallow Seagrass	In heavily oiled areas when the oil is still fluid and adheres loosely to the substrate, and where oil has penetrated gravel sediments. Can be used with other washing techniques (i.e. low or high-pressure flushing).	Care should be taken to recover oil where nearshore habitats contain rich biological communities. Not appropriate for soft, muddy substrates.	Habitat may by physically disturbed by foot traffic during operations and smothered by sediments washing. If containment methods are not sufficient, oil and oiled sediments may be flushed into adjacent areas. Flooding may cause sediment loss and erosion of the shoreline and shallow rooted vegetation. Oiled sediment may be transported to nearshore areas, contaminating them and burying benthic organisms.	Depends on the effectiveness of the collection method.
Low- Pressure, Ambient- Water Flushing	Removal of fluid oil that has adhered to the substrate or man-made structures, pooled on the surface, or become trapped in vegetation.	Ambient- temperature water (sea water) is sprayed at low pressure (<72 kilopascals (kpa)) from a hand-held hose, to lift oil from the substrate and float it to the water's edge for recovery by skimmers, vacuum or sorbents. Can be conducted from barges or flat-bottom vessels with long-reach spray systems. Usually used with flooding systems to prevent released oil from re- adhering to the substrate downstream of the treatment area.	Preferred: Sandy Beach Possible: Manmade Structures Rocky Shore Tidal Flats Shallow Seagrass	Where fluid oil is stranded onshore or floating on shallow intertidal areas.	May need to restrict use so that the oil/water effluent does not drain across sensitive intertidal habitats, and the mobilised sediments do not affect rich sub-tidal communities. Use from boats will reduce the need for foot traffic in soft substrates and vegetation. Flushed oil will be recovered to prevent further oiling of adjacent areas.	If containment methods are not sufficient, oil and oiled sediments may be flushed into adjacent areas. Flooding may cause sediment loss and erosion of the shoreline and shallow rooted vegetation. Some trampling of substrate and attached biota may occur.	Depends on the effectiveness of the collection method.
High- Pressure, Ambient- Water Flushing	To remove oil that has adhered to hard substrates or man-made structures.	Similar to low- pressure flushing, except that water pressure is 720-7,200 kpa. High-pressure spray will more effectively remove sticky or viscous oils.	Preferred: Manmade Structures	When low-pressure flushing is not effective at removing adhered oil, which will be removed to prevent continued oil release or for aesthetic reasons. When a directed water jet can remove oil from hard to reach sites.	May need to restrict flushing so that the oil does not drain across sensitive habitat. Flushed oil will be recovered to prevent further oiling of adjacent areas. Should not be used directly on attached algae nor rich, intertidal areas.	All attached animals and plants in the direct spray zone will be removed, even when used properly. If containment methods are not sufficient, oil and oiled sediments may be flushed into adjacent areas. Some trampling of substrate and attached biota may occur. Inappropriate use may drive oil deeper into the substrate or erode fine sediments from shorelines.	Depends on the effectiveness of the collection method