OIL POLLUTION EMERGENCY PLAN

Beehive-1 Exploration Drilling

WA-488-P

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Rev 6

eog resources

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DOCUMENT CONTROL

Revision History

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Rev	Date	Purpose	Prepared	Reviewed	Approved
6	28/06/2024	Minor edits in Chapter 1 for multi-well drilling campaign	GP	JC, NP	JK, JL, GG
5.1	17/05/2024	Minor edits to appendices	CR	JC, NP, GP	NG, JK
5	20/02/2024	Re-issued for NOPSEMA assessment	CR	JC, NP, GP	NG, JK
4	22/09/2023	Issued for public exhibition	CR	JC, NP, GP, PH	NG, JK
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Front cover image: A blowout preventor (BOP) stack on the West Telesto jack-up drill rig. Taken by G. Pinzone, Aventus Consulting, May 2015.

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Applicability of this document to Beehive-1 Drilling and Multi-Well Drilling

The Oil Pollution Emergency Plan (OPEP) prepared for Beehive-1 (this document) remains valid for the Beehive multi-well drilling campaign for the following reasons:

- The wells will be drilled in close proximity to Beehive-1 (several kilometres);
- The same spill scenario applies for a diesel spill;
- The same worst-case discharge scenario for the loss of well containment (LoWC) applies;
    - The same oil type is predicted;
    - The same well blowout flow rate and duration is predicted;
- The same environment that may be affected (EMBA) applies for the diesel spill and LoWC spill scenarios;
- The same emergency response arrangements will be place; and
- Therefore, the same spill response strategies apply.

The only changes made in this version (Revision 6) of the OPEP are location details in Chapter 1 and the associated activity description (including the location map). This being the case, Revision 6 (this document) applies to the multi-well drilling campaign, whereas Revision 5.1 applies to Beehive-1 (i.e., the singular well).

As such, all references to Beehive-1 or a singular well in this OPEP should be interpreted as one or multiple wells drilled as part of the multi-well drilling campaign.

Summary Information for WA DoT

The information presented below meets the requirements of Appendix 6 of the Western Australian Department of Transport's *Offshore Petroleum Industry Guidance Note Marine Oil Pollution: Response and Consultation Arrangements*.

Appendix 6 – Department of Transport Consultation
1. Description of activity, including the intended schedule, location (including coordinates), distance to nearest landfall and map.
Section 1.1 of the Beehive-1 Drilling Oil Pollution Emergency Plan (OPEP) provides a brief description of the activity, including the intended schedule and distance to nearest landfall. Figure 1.1 of the OPEP provides a map of the Beehive-1 well location. Coordinates for the well location are provided below, noting that this may shift up to 1,500 m from this location based on continuous refinement during the well planning process. The operational area defines the spatial boundary of the proposed activity and for the purposes of this EP, the operational area is set as a 500 m radius around the final well location (which reflects the area of the Petroleum Safety Zone [PSZ] that will be gazetted around the MODU while it is on location).

Location of the proposed Beehive-1 well

Degrees, minutes, seconds		Eastings and northings	
Latitude	Longitude	Easting (m)	Northing (m)
14° 03' 16.41" S	128° 34' 14.54" E	453,651.86	8,446,199.05

GDA2020, UTM 52S.

Further details are provided in Section 2 of the Beehive-1 Exploration Drilling Environment Plan (EP).

2. Worst case spill volumes.
Section 1.5 of the Beehive-1 OPEP details the worst-case spill volumes.
3. Known or indicative oil type/properties.
Based on having an API closest to that expected at Beehive-1, together with being the most conservative in terms of the residual components, EOG elected to use Jabiru crude as the analogue for spill modelling purposes. The physical properties and boiling points of Jabiru crude are provided in the tables below. Further details are provided in the Oil Spill Trajectory Modelling (OSTM) report, appended to the EP.

Table 1 Physical properties of Jabiru crude

Characteristic	Jabiru Crude	MDO
Density (kg/m^3)	813.9 (at 15°C)	829.1 (at 25 °C)
API	42.3	37.6
Dynamic viscosity (cP)	3.0 (at 20°C)	4.0 (at 25 °C)
Pour point (°C)	18	-14
Oil property category	Group II	Group II
Oil persistence classification	Light-persistent	Light-persistent

4. Amenability of oil to dispersants and window of opportunity for dispersant efficacy.
Aerial surface dispersant use has been selected as a primary strategy for the OPEP; vessel surface dispersant use has been selected as a secondary strategy (see Section 4.6 of the OPEP). Aerial surface dispersants would be used from Day 2 following a spill; vessel surface dispersants from Day 4. As this is an exploration well, there are no samples of Beehive crude available to test dispersant effectiveness. Based on EOG's reservoir analysis, it was determined that Jabiru crude is the most analogous. To determine potential amenability, AMOSC reviewed information provided on the closest analogue to the expected oil based on EOG's existing knowledge. The information provided to AMOSC was provided to WA DoT as *Beehive-1 Oil Spill Dispersant Profile.pdf*. AMOSC's response was provided to WA DoT as *220329_AMOSC_EOG Dispersant Review.pdf*. AMOSC's review found that the analogue crude would be potentially amenable to dispersant use. They also noted that Dasic Slickgone NS would be the most applicable dispersant. Note that the OPEP includes the implementation of the AEP Joint Industry Operational and Scientific Monitoring (OSM) Framework, including Operational Monitoring Plan (OMP) *OMP-Surface Chemical Dispersant Effectiveness* from Day 2. This will initially be performed by trained personnel using 'shake jar' kits located on each of the support vessels and in the mud plant in Darwin. The OSM Service Provider will implement this OMP from Day 5 on, along with *OMP–Hydrocarbon Properties and Weathering Behaviour*.
5. Description of existing environment and protection priorities.
The existing environment is described in detail in Section 5 and Appendix 5 of the EP. Priority protection areas are identified in Section 4.4 of the OPEP.
6. Details of the environmental risk assessment related to marine oil pollution - describe the process and key outcomes around risk identification, risk analysis, risk evaluation and risk treatment. For further information see the Oil Pollution Risk Management Information Paper (National Offshore Petroleum Safety and Environmental Management Authority [NOPSEMA] 2017).
Section 6 of the EP details the Environmental Impact & Risk Assessment Methodology. Sections 8.5, 8.6 and 8.7 detail the risk assessments for Marine Diesel Oil (MDO) Release, Loss of Well Containment (LoWC) and Major Oil Spill, respectively, and Section 9 details the risk assessments for Hydrocarbon Spill Response Activities.
7. Outcomes of OSTM, including predicted times to enter State waters and contact shorelines.
The OSTM report (appended to the EP) provides detailed outcomes for floating oil, shoreline contact, entrained oil and dissolved oil. WA waters are predicted to be contacted by floating oil at the low exposure threshold (>1 g/m^2) as follows: • Summer (October to February): 91% probability of contact; minimum contact time of 5.63 days • Transitional (March and September): 90% probability of contact; minimum contact time of 7.33 days • Winter (April to August): 98% probability of contact; minimum contact time of 8.08 days WA shorelines are predicted to be contacted at the low exposure threshold (>10 g/m^2) as follows: • Summer: 70% probability of contact; minimum contact time of 14.92 days • Transitional: 77% probability of contact; minimum contact time of 14.5 days • Winter: 93% probability of contact; minimum contact time of 9.46 days
8. Details on initial response actions and key activation and mobilisation timeframes.
Section 3 of the OPEP details the initial response actions. Table 3.2 and Table 3.3 of the OPEP provide key activation and mobilisation timeframes for initial responses to MDO or crude oil spills, respectively. Table 3.4 provides key activation and mobilisation timeframes for the Incident Commander (IC) and the Drilling Incident Management Team (DIMT). Section 5 of the OPEP contains the activation and termination criteria for the Response Strategies. Details on initial response strategy actions and mobilisation timeframes are contained within Appendix B. Initial response actions and key activation and mobilisation timeframes for operational and scientific monitoring are included in Appendix C.

9. Potential Petroleum Titleholder Incident Control Centre requirements, facilities and locations.
Appendix A of the OPEP describes EOG's oil spill response arrangements for on-site response, the Perth-based DIMT and the Houston-based Crisis Response Team (CRT) and provides details on resourcing for the DIMT, including access to external contractors.
10. Potential Petroleum Titleholder Staging Areas / Forward Operating Base requirements, facilities and locations.
Section 5.10 of the OPEP describes the Forward Operations Plan, including preliminary plans for marine operations, shoreline staging areas, oiled wildlife response (OWR), waste transfer and logistics. Appendix B provides details on the resourcing requirements for forward operations and Appendix D demonstrates EOG's capability to meet these requirements.
11. Details on response strategies.
Section 5 of the OPEP describes the response strategies and includes initiation and termination criteria. Appendix B provides detail on the response strategies including resourcing requirements and Appendix D demonstrates EOG's capability to meet these requirements.
12. Details and diagrams on proposed Petroleum Titleholder and DoT IMT structures and interactions including integration of DoT arrangements as per this Guidance Note.
Section 2.3 of the OPEP describes the arrangements for cross-jurisdictional spills. Figure 2.1 of the OPEP shows the model for interactions with, and integration between, DoT's IMT and EOG's DIMT. Appendix A of the OPEP describes expanded DIMT requirements including EOG resourcing of potential WA DoT IMT requirements, as per the Offshore Petroleum Industry Guidance Note: Marine Oil Pollution Response and Consultation Arrangements
13. Details on exercise and testing arrangements of OPEP/OSCP.
Table 8.1 of the OPEP provides details on the exercise and training schedule.

1 Introduction

1.1 Summary of Proposed Activity

Figure 1.1 shows the location where EOG Resources Australia Block WA-488 Pty Ltd (EOG) propose to drill up to three exploration and/or appraisal wells (‘the activity’) targeting a light oil (Jabiru crude being the analogue) within Commonwealth marine waters in the WA-488-P exploration permit. Drilling is planned to commence no earlier than 1 January 2025 and be completed by 31 December 2029 (a period of 5 years). A jack-up mobile offshore drilling unit (MODU) will be used, with drilling activities estimated to take approximately 55-150 days per well.

Table 1.1 provides the coordinates for the activity polygon.

The operational area defines the spatial boundary of the proposed activity and for the purposes of the Environment Plan (EP) and this OPEP, the operational area is set as a 500 m radius around the final well location (which reflects the area of the Petroleum Safety Zone [PSZ] that will be gazetted around the MODU while it is on location).

Table 1.1 Coordinates for the proposed activity area

Point	Latitude	Longitude
1	14° 01' 29" S	128° 31' 30" E
2	13° 59' 55" S	128° 32' 52" E
3	13° 59' 55" S	128° 33' 59" E
4	14° 02' 36" S	128° 37' 11" E
5	14° 04' 42" S	128° 35' 20" E

GDA2020, UTM 52S.

The activity area is located 77 to the closest mainland point, 79 km to Lacross Island (Western Australia, WA) and 93 km to Docherty Island (Northern Territory, NT) in water depth of approximately 40 m.

A detailed activity description is provided in Chapter 2 of the EP.

1.2 Purpose and Scope

EOG has prepared this OPEP as part of the Beehive Multi-Well Exploration Drilling EP (996161-2024-Beehive-MW-Drilling-EP) as required under Regulations 22(8)(9) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS(E)).

The OPEP describes the arrangements for responding to and monitoring pollution in the event of a hydrocarbon spill during drilling of up to three exploration and/or appraisal wells (the Activity). The objectives of this OPEP are to:

- Support the timely implementation of pre-determined response strategies as outlined in this OPEP.
- Ensure that the management of the response is consistent with the:

  - Commonwealth National Plan for Maritime Environmental Emergencies (NatPlan);
  - Western Australia (WA) State Hazard Plan: Maritime Environmental Emergencies (SHP-MEE);
  - WA Department of Transport (WA DoT) Oil Spill Contingency Plan (OSCP);
  - Northern Territory (NT) OSCP;
  - WA DoT Industry Guidance Note (IGN) on Marine Oil Pollution (MOP): Response and Consultation Arrangements (July, 2020);
  - WA *Emergency Management Act 2005*; and
  - Australian Industry Cooperative Oil Spill Response Arrangements (AMOSPlan).
- Ensure effective integration and use of industry/government response efforts and resources.
- Ensure EOG has timely access to appropriately trained people and resources in order to effectively respond to and manage an oil spill response.
- Demonstrate the capability requirements for response activities.

Excluded from the scope of this OPEP are vessels transiting to or from the operational area (as described in the EP). These vessels are deemed to be operating under the Commonwealth *Navigation Act 2012* and not engaged in petroleum-related activity when they are outside the operational area.

This OPEP applies to all field-based response strategies. Information demonstrating preparedness and timeliness of Source Control measures is summarised within this OPEP and in accordance with NOPSEMA Information Paper *A787102: Source Control Planning and Procedures* (June 2021). Further details on source control for a LoWC are provided in the *Beehive-1 Source Control Emergency Response Plan* (SCERP) (2021-006-03-29-01).

1.3 Oil Spill Response Document Framework

The inter-relationship between this document and other EOG oil spill response documentation and external plans is presented in Table 1.1.

This OPEP supports arrangements under NatPlan, AMOSPlan, WA SHP-MEE, WA DoT OSCP, WA Oiled Wildlife Response Plan (WAOWRP), NT OSCP and the NT Oiled Wildlife Response Plan (NTOWRP).

This OPEP is supported by a series of field response guidance documents and site-specific Tactical Response Plans (TRPs) for the implementation of applicable response strategies as identified via the strategic Net Environmental Benefit Assessment (NEBA) process.

The OPEP is supported by the following appendices:

- Appendix A Drilling Incident Management Team (DIMT) Requirements.
- Appendix B Basis of Design and Response Strategy Requirements.
- Appendix C Operational and Scientific Monitoring (OSM) Bridging Implementation Plan (BIP).
- Appendix D Cumulative Requirements and Demonstration of Capability.
- Appendix E Environmental Sensitivities.

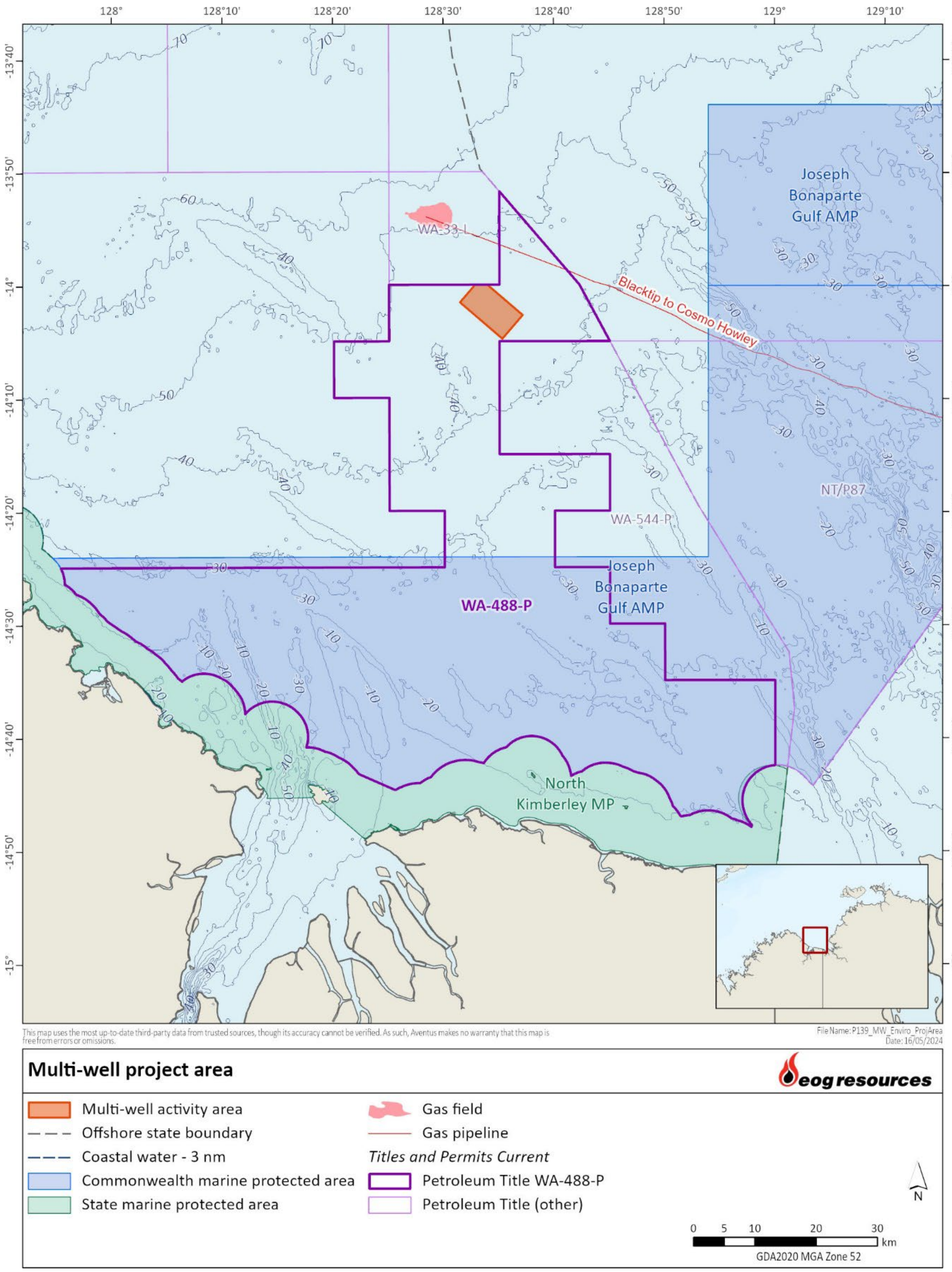

Figure 1.1 Location of the multi-well activity area in WA-488-P

Table 1.2 Interfaces with other organisations and plans

Organisation	Plan	Relevance
Titleholder		
EOG	Beehive Multi-Well Drilling EP (996161-2024-Beehive-MW-Drilling-EP)	Describes the activity, evaluates the impacts and risks and details control measures to reduce impacts and risks to as low as reasonably practicable (ALARP) and acceptable levels.
EOG	EOG Crisis Management Plan (CMP)	The CMP outlines a coordinated response designed to provide effective communication within EOG, the families of affected individuals, to the public and to regulatory agencies. It provides a framework to assess and respond to the crisis and document the response. Finally, it assigns crisis management responsibilities and provides important contact information for everyone who might be needed for the response.
EOG	EOG Australian Projects Health, Safety and Environment (HSE) Management Plan (996161-2022-Beehive #1-HSEPlan)	Details all aspects of HSE management in support of the activities undertaken by EOG, Labrador Petro-Management Pty Ltd (LPM) and the vessel and MODU contractors in relation to these Australian-based projects.
EOG	Beehive Multi-Well Well Operations Management Plan (WOMP)	Details well integrity aspects for the Beehive wells and includes EOG's emergency management systems and well intervention strategies.
EOG	Beehive Multi-Well Source Control Emergency Plan (SCERP)	The SCERP includes an initial investigation stage with provision for escalation including the Relief Well Plan (RWP) to undertake relief well activities. The SCERP provides the Source Control Branch within the DIMT with guidance and checklists in the event of a LoWC to implement source control strategies including relief well drilling, hydrostatic well kills and wellhead fluid containment.
EOG	Beehive Multi-Well Drilling Bridging Emergency Response Plan (ERP)	Overarching ERP to link the emergency response protocols of EOG, LPM, the MODU contractor and vessel contractor/s. EOG has contracted LPM to provide integrated operations project management services for the activity, including emergency response and incident management support. LPM will supply the Drilling Supervisor (DSV) and the key positions within the DIMT. The LPM ERP describes their organisational responsibilities, actions, reporting requirements and resources required to manage crises and emergencies

Organisation	Plan	Relevance
EOG	Beehive-1 OPEP Appendix A: Drilling Incident Management Team (DIMT) Capability Requirements (Appendix A)	The DIMT Capability Requirements evaluates the size and structure of the DIMT (inclusive of Source Control Branch) necessary to mobilise and maintain the field capability for a protracted worst-case oil pollution emergency (i.e., a LoWC scenario). It provides a detailed evaluation of DIMT requirements and competency to enable the implementation of response strategies for the full duration of the oil pollution emergency.
EOG	Beehive-1 OPEP Appendix B: Basis of Design Response Strategy Requirements (Appendix B)	The BOD presents an overview of the petroleum activity and associated oil spill risks. It includes an evaluation of modelling outcomes from the identified WCD scenarios. It includes a strategic NEBA for the identified WCD scenarios associated with the Beehive-1 Drilling Program. It also provides a detailed evaluation of response needs based upon WCD scenarios and presents an oil spill response field capability requirements analysis.
EOG	Beehive-1 OPEP Appendix C: Operational and Scientific Monitoring (OSM) Bridging Implementation Plan (BIP) (Appendix C)	EOG has elected to use the Joint Industry OSM Framework and supporting operational monitoring plans (OMPs) and scientific monitoring plans (SMPs) as the foundation of its OSM approach. The OSM BIP fully describes how the Framework interfaces with EOG's own activities, spill risks and internal management systems.
EOG	Beehive-1 OPEP Appendix D: Cumulative Requirements and Demonstration of Capability (Appendix D)	EOG's demonstration of resourcing capacity to meet the cumulative requirements of the DIMT, the Response Strategies and the vessel and aircraft requirements of the OSM BIP is included in Appendix D.
External		
Australian Maritime Safety Authority (AMSA)	NatPlan	AMSA manages NatPlan and is the designated Combat Agency for oil spills from vessels within Commonwealth jurisdiction. NatPlan sets out the national arrangements, policies, and roles and responsibilities of states, territories and industry in managing maritime environmental emergencies. NatPlan integrates Commonwealth and State government oil spill response framework to facilitate effective response to marine pollution incidents. AMSA manages NatPlan and works with State governments (who manage the equivalent State plans that integrate into the NatPlan). AMSA is to be notified immediately of all ship-source incidents through RCC Australia on +61 2 6230 6811.

Organisation	Plan	Relevance
AMOSC	Australian Industry Cooperative Spill Response Arrangements (AMOSPlan)	AMOSC is the lead Oil Spill Response Organisation (OSRO) in Australia. AMOSPlan describes mutual aid arrangements of the petroleum industry coordinated by AMOSC. It outlines membership arrangements, activation procedures and interfaces with other plans. EOG will be an Associate Member of AMOSC at the time of drilling and as such will have access to AMOSC's Level 2/3 resources as outlined in the AMOSPlan. AMOSC has contracts with all its member companies to enable the release of Core Group personnel to be made available for any EOG requirements as soon as possible (ASAP), as outlined in EOG's Master Service Contract with AMOSC.
WA DoT	State Hazard Plan: Maritime Environmental Emergencies (SHP-MEE)	Details the management arrangements for preparation and response to a marine oil pollution incident occurring in State waters. See Section 2.3 for further details on cross-jurisdictional arrangements.
	WA Oil Spill Contingency Plan (WA OSCP)	Outlines the procedures and arrangements for responding to and recovering from Marine Oil Pollution (MOP) emergencies in State waters in accordance with SHP-MEE. See Section 2.3 for further details on cross-jurisdictional arrangements.
WA Department of Biodiversity, Conservation and Attractions (DBCA)	WA Oiled Wildlife Response Plan (WAOWRP)	DBCA is the Jurisdictional Authority OWR and WA DoT is the Control Agency in WA waters. The WAOWRP defines the steps, personnel, equipment and infrastructure required for the management of wildlife in an oil pollution response. The DBCA has the primary response role. Each region has a Regional OWR Plan that gives further details on sensitivities and available resources.
Territory Emergency Management Council (TEMC)	Territory Emergency Plan	This plan describes the NT's approach to emergency and recovery operations, the governance and coordination arrangements, and roles and responsibilities of agencies. The plan is supported by regional and local emergency plans; as well as hazard-specific plans and functional group plans.
NT Department of Environment, Parks and Water Security (DEPWS)	NT Oil Spill Contingency Plan (NT OSCP)	Outlines the approach to management of marine oil pollution that are the responsibility of the NT Government (the NT OSCP is currently being revised).
NT Parks and Wildlife Commission (PWC)	NT Oiled Wildlife Response Plan (NTOWRP)	An industry prepared plan, which is designed to ensure timely mobilisation of appropriate resources (equipment and personnel) in the event of an incident affecting wildlife in NT waters.

Organisation	Plan	Relevance
Contractor Plans		
MODU contractor	MODU Safety Case	The MODU contractor must have a Safety Case accepted by NOPSEMA detailing the Major Accident Event (MAE) and Safety Critical Control details for the safety aspects for the activity.
Vessel and MODU contractors	Vessel and MODU Shipboard Marine Pollution Emergency Plan (SMPEP)	A SMPEP is required under the International Convention for the Prevention of Pollution from Ships (MARPOL). The SMPEP includes vessel specifications, procedures to follow for notification and spill response, and a list of spill equipment and locations.

1.4 Spill Classification

This OPEP uses the NatPlan classification system to assist in guiding agency readiness levels, incident notifications, response actions and potential response escalations. Table 1.3 describes the three levels, which are consistent with national and state incident response plans. The 'Level' is determined by the relevant Commander, such as the Emergency Response Team (ERT) On-Scene Commander (OSC) (for a small spill) or by the DIMT IC.

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

For Level 2/3 spills, EOG maintains a broad set of spill response capabilities, contracts and Memoranda of Understanding (MoUs) with national and international third-party spill response providers to ensure response capabilities can be drawn upon.

Table 1.3 Spill level classification (adapted from NatPlan)

Characteristic	Level 1	Level 2	Level 3
Management			
Jurisdiction	Single jurisdiction	Multiple jurisdiction	Multiple jurisdictions including international
No. of agencies	First Response Agency	Routine multi-agency response	Agencies from across government and industry
Incident Action Plan (IAP)	Simple/Outline	Outline	Detailed
Resources	Onsite resources required only	Requires intra-state resources	Requires national or international resources
Type of Incident			
Type of response	First Strike	Escalated	Campaign
Duration	Single shift	Multiple shifts - days to weeks	Extended response - weeks to months
Hazards	Single Hazard	Single Hazard	Multiple Hazards
Resources at Risk			
Human	Potential for serious injuries	Potential for loss of life	Potential for multiple loss of life
Environment	Isolated impacts with natural recovery in a few weeks	Significant impacts, recovery may take months. Remediation required.	Significant area impacted. Recovery may take months. Remediation required.
Wildlife	Individual fauna	Groups of fauna or threatened fauna	Large numbers of fauna
Economy	Business level disruption	Business failure	Disruption to a sector
Social	Reduced services	Ongoing reduced services	Reduced quality of life
Infrastructure	Short term failure	Medium term failure	Severe impairment
Public Affairs	Local and regional media coverage	National media coverage	International media coverage

1.5 Worst-Case Discharge Scenarios and Oil Properties

The EP identifies two WCD oil spill scenarios that have the potential for this OPEP to be implemented:

- A Level 3 LoWC event at the MODU, with a WCD of 786,858 m^3 surface release of crude oil over 77 days (EP Section 8.7).
- A Level 2 surface release of MDO to represent a vessel loss of containment, with a WCD of 160 m^3 over 6 hours (EP Section 8.6).

Table 1.4 presents the hydrocarbon properties for Jabiru crude and MDO.

Table 1.4 Hydrocarbon properties

Characteristic	Jabiru Crude	MDO
Density (kg/m^3)	813.9 (at 15°C)	829.1 (at 25 °C)
API	42.3	37.6
Dynamic viscosity (cP)	3.0 (at 20°C)	4.0 (at 25 °C)
Pour point (°C)	18	-14
Oil property category	Group II	Group II
Oil persistence classification	Light-persistent	Light-persistent

2 Jurisdictional Authorities and Control Agencies

With respect to a hydrocarbon spill during the activity, the relevant Jurisdictional Authority and Control Agency varies dependent upon the location of the spill (Commonwealth or State/ Territory waters) and the nature of the incident (vessel-based or petroleum activity based).

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

Table 2.1 identifies the Jurisdictional Authorities and Control Agencies relevant to this OPEP.

Table 2.1 Jurisdictional Authorities and Control Agencies for Beehive oil spill response

Location	Source	Jurisdictional Authority	Control Agency	
			Level 1	Level 2/3
Commonwealth waters	Vessel	AMSA[1]	AMSA	AMSA
	Petroleum activity	NOPSEMA[2]	EOG	EOG
WA waters and shorelines	Vessel	WA DoT[3]	WA DoT	WA DoT
	Petroleum activity	WA DoT	WA DoT	WA DoT
NT waters and shorelines	Vessel	DEPWS[4]	DEPWS	DEPWS
	Petroleum activity	DEPWS	DEPWS	DEPWS
International waters	Vessel	If a spill is likely to enter international waters EOG will liaise and work with DFAT[5] and the respective governments to support response operations.		
	Petroleum activity			

Notes to Table 2.1

1. Australian Maritime Safety Authority
2. National Offshore Petroleum Safety and Environmental Management Authority
3. WA Department of Transport. The WA DoT is the Hazard Management Agency for marine oil pollution in WA State waters under the Emergency Management Act 2005.
4. NT Department of Environment, Parks and Water Security
5. Australian Government Department of Foreign Affairs and Trade

2.1 Petroleum Activity Spill in Commonwealth Waters

NOPSEMA is the Jurisdictional Authority for offshore petroleum activity oil spills in Commonwealth waters. Under the OPGGS(E) and the OPGGS Act, the Petroleum Titleholder (i.e., EOG) is responsible for responding to an oil spill incident as the Control Agency in Commonwealth waters, in accordance with its OPEP.

If NOPSEMA identifies a requirement to delegate control, Control Agency responsibility may be delegated to AMSA who will assume control of the incident and respond in accordance with AMSA's NatPlan. In such an occurrence, EOG would act as a Support Agency throughout the response, providing services, personnel, material or advice in support of the Control Agency. EOG would also be required to implement monitoring activities as outlined in the Monitor and

Evaluate Plan (Operational Monitoring) (Section 5.1.1) and Scientific Monitoring Plans (Section 5.3).

2.2 Vessel Spills

For a vessel incident originating in Commonwealth Waters, the Jurisdictional Authority and Control Agency is AMSA. AMSA manages the NatPlan on behalf of the Australian Government, working with the WA and NT governments, emergency services and private industry to maximise Australia's marine pollution response capability.

The WA DoT is the Control Agency for all level 2/3 vessel-based spills in WA waters. Similarly, the NT DEPWS would assume the Control Agency role for level 2/3 vessel-based spills in NT waters.

The Vessel Master is responsible for implementing source control arrangements in accordance with the approved vessel specific SMPEP. EOG will undertake first strike response on behalf of AMSA for vessel-related spills in line with the relevant Oil Pollution First Strike Plans. EOG would act as a Support Agency throughout the response and implement monitoring activities as outlined in the Monitor and Evaluate Plan (Operational Monitoring) (Section 5.1.1) and Scientific Monitoring Plans (Section 5.3) as required.

2.3 Cross-Jurisdictional Spills

The management and coordination of cross-border incidents will follow the *National Plan Coordination of Cross-border Incidents Guidance* (NP-GUI-023) (AMSA 2017). If the Control Agency (i.e., EOG or AMSA) determines that a spill in Commonwealth waters is likely to enter WA or NT waters, they will notify all Jurisdictional Authorities that may be impacted. The Jurisdictional Authorities, in consultation with their respective appointed Control Agency will then agree to incident coordination arrangements for the entire incident. A Joint Strategic Coordination Committee (JSCC) comprising senior representatives from each Jurisdictional Authority and Control Agency would be established to ensure effective coordination across two or more jurisdictions.

In all cases, EOG would be required to implement monitoring activities as outlined in the Monitor and Evaluate Plan (Operational Monitoring) (Section 5.1.1) and Scientific Monitoring Plans (Section 5.3).

2.3.1 Level 2 Vessel Spill entering WA or NT Waters

If a Level 2 vessel spill crosses jurisdictions between Commonwealth and State or NT waters, two or three Jurisdictional Authorities may exist (AMSA for Commonwealth waters and WA DoT for WA waters or NT DEPWS for NT waters). Coordination of Control Agency responsibilities will be determined by WA DoT/NT Government and AMSA, with EOG providing first strike response and all necessary resources (including personnel and equipment) as a Support Agency.

2.3.2 Level 2/3 Petroleum Activity Spill entering WA Waters

In the case of a Level 2/3 Petroleum Activity spill entering WA waters, EOG will remain as Control Agency for responses in Commonwealth waters and the WA DoT will act as Control Agency and Hazard Management Agency (under the *Emergency Management Act 2005*) for responses in WA waters. Upon notification, the WA DoT would assume the role of Control Agency and would activate its Maritime Environmental Emergency Coordination Centre (MEECC), WA DoT Incident Management Team (IMT) and appoint the State Maritime Environmental Coordinator (SMEEC). EOG will conduct initial response actions in WA waters as necessary in accordance with this OPEP and continue to manage those operations until formal handover of incident control to WA DoT is completed.

EOG and the WA DoT will each establish IMTs with a JSCC established to facilitate effective coordination between the two Control Agencies. EOG will work in partnership with the WA DoT to ensure an adequate response is provided across the entire incident and will be required to provide an appropriate number of appropriately qualified personnel for the WA DoT IMT. The JSCC will be jointly chaired by the SMEEC and EOG's CRT Manager (or proxy) and will comprise of individuals deemed necessary by the chairs to ensure an effective coordinated response across both jurisdictions. Additional detail on the JSCC's key functions is outlined in the *Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements* (July 2020).

At the request of the SMEEC, EOG will be required to provide all necessary resources, including personnel and equipment, to assist the WA DoT's IMT in performing duties as the Control Agency for State waters response. This includes providing an initial 11 personnel to work within the WA DoT Incident Control Centre in Fremantle, no later than 8 am following the day of the request. It also includes providing personnel to serve in WA DoT's Forward Operating Base (FOB) no later than 24 hours following formal request by the SMEEC. WA DoT will in turn, provide EOG with Liaison Officer/s from WA DoT's command structure to sit within EOG's DIMT. Figure 2.1 shows the cross jurisdictional arrangements and Control Agency structure for a petroleum activity spill entering WA waters.

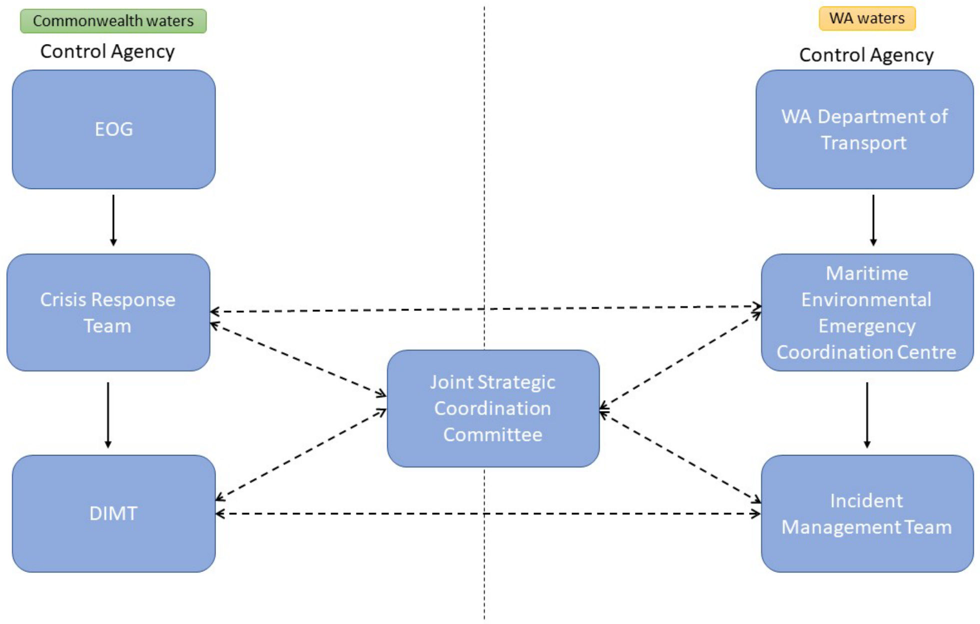

Figure 2.1 Cross-jurisdictional Control Agency arrangements (WA waters)

2.3.3 Level 2/3 Petroleum Activity Spill entering NT Waters

In the case of a Level 2/3 Petroleum Activity spill entering NT waters, EOG will remain as Control Agency for responses in Commonwealth waters and the NT DEPWS will act as Control Agency and Hazard Management Agency.

In the case of a Level 2/3 Petroleum Activity spill entering NT waters, EOG will notify the NT Regional Harbourmaster and NT Pollution Hotline as per Table 3.1 who will then contact the

DEPWS CEO in their role as Territory Marine Pollution Controller (TMPC). The TMPC notifies the Territory Emergency Controller (NT Commissioner of Police or delegate) who will appoint an NT Incident Controller (NT IC). The NT IC will form an IMT appropriate to the scale of the incident with representatives from relevant emergency "Functional Groups" as identified under the Territory Emergency Plan (TEP) (NT Emergency Services 2022). If required, an IMT will be established, made up of staff from across NT Government. If requested by the NT IC members from the National Response Team may also be present. The NT IMT will be supported by existing NT emergency response arrangements, as defined in the NT *Emergency Management Act 2013* and the TEP.

EOG will remain as Control Agency for responses in Commonwealth waters and the DEPWS for responses in NT waters and shorelines, with EOG acting as Support Agency. Additional support, if required, will be provided through the NT Government Functional Groups.

At the request of the DEPWS, EOG will provide all necessary resources, including personnel and equipment, to assist their IMT in performing duties as the Control Agency for NT waters and shoreline responses. EOG will provide Liaison Officer/s to sit within the NT IMT to ensure uniformity between the NT IMT and EOG in the incident response.

Figure 2.2 illustrates the Control Agency and coordination structure for spills entering NT waters and contacting NT shorelines.

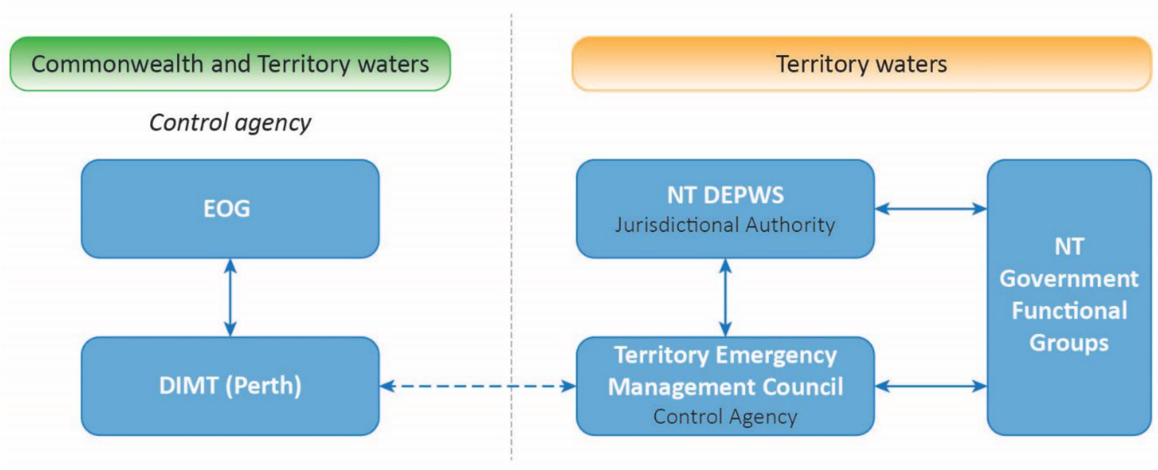

Figure 2.2 Cross-jurisdictional Control Agency arrangements (NT waters)

The DEPWS minutes of a meeting held on 20 June 2023 to discuss 'cross jurisdictional arrangements' notes that the NT government has arrangements for obtaining "just in time" Authority Certificates from the Aboriginal Areas Protection Authority (AAPA) to allow for access to NT shorelines.

2.3.4 Level 2/3 Petroleum Activity Spill entering Another Country's Exclusive Economic Zone (EEZ)

The NatPlan *Coordination of International Incidents: Notification Arrangements Guidance* (NP-GUI-007) provides guidance on the arrangements for spills entering another country's territorial waters.

If a level 2/3 petroleum activity spill is affecting, or likely to affect, another country, EOG will contact the Department of Industry, Science, Energy and Resources (DISER) who will contact the

Department of Foreign Affairs and Trade (DFAT) as soon as practicable through the contact point advised by DFAT. DFAT will take the necessary steps to meet Australia's international notification obligations and coordinate official communication between the Government of Australia and the foreign government concerned. AMSA maintains contact with counterparts in several neighbouring countries. Where AMSA has bilateral arrangements on marine pollution preparedness and response with a counterpart in the affected country, AMSA will notify all relevant parties. This notification will be in addition to notification provided by DFAT.

3 Notifications, Immediate Actions and DIMT Activation

3.1 Notifications

In the event of a Level 2 or 3 spill the OSC (either the Vessel Master or MODU Offshore Installation Manager (OIM)) is responsible for activating the available onsite initial response for all spills and notifying the MODU-based DSV. The DSV would then notify the IC. The IC (or delegate) is responsible for subsequent activations and notifications based on the spill circumstances. Notifications will include:

- All known material information and circumstances regarding the incident.
- Details of any action(s) taken to avoid or mitigate any adverse environmental impacts from the incident.
- Details of any corrective action(s) that has been taken (or proposed) to prevent a similar reportable incident.

Figure 3.1 outlines the notification procedure in the event of a Level 2 or 3 spill and Table 3.1 provides information on key roles and responsibilities for notifications, along with contact details. The environmental performance outcomes (EPO), environmental performance standards (EPS) and measurement criteria for notifications are provided in Chapter 9 of the EP.

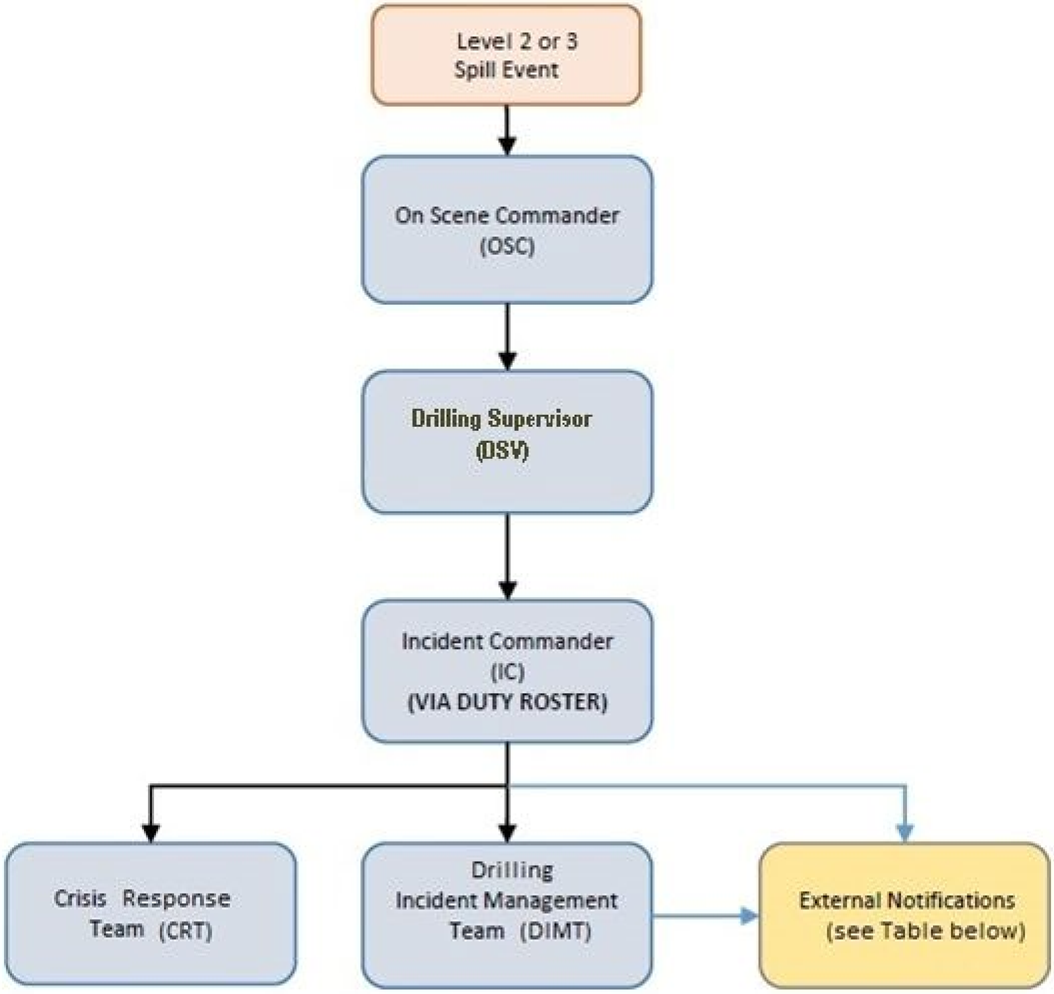

Figure 3.1 Beehive-1 spill notification flowchart

Table 3.1 Notifications

From	To	Description	Type of notification	Timing
EOG internal notifications				
Vessel Master	**DSV**	All spills (or probable spills) to the marine environment. Notify of incident and provide preliminary situational awareness information.	Verbal	ASAP and no later than 30 minutes after incident identification
DSV	**On-duty IC** (via Bridging ERP – Duty Roster and DIMT MS Teams site)	Notify IC of incident and provide preliminary situational awareness information.	Verbal Written – Initial Incident Notification Form	ASAP
IC (or delegate)	**DIMT** (via Bridging ERP – Duty Roster and DIMT MS Teams site)	Activate DIMT.	Verbal	ASAP
IC (or delegate)	**CRT Liaison** (via Bridging ERP – Duty Roster and DIMT MS Teams site)	Activate (Level 3) or inform (Level 2) the CRT.	Verbal	ASAP or within 1 hour of DIMT activation
External notifications (*in order of required timing*)				
Vessel Master	**AMSA (Rescue Coordination Centre)** +1 800 641 792 (24 hrs, in Australia) + 61 2 6230 6811 (24 hrs, outside of Australia) *Do not use this number when testing notification plan.*	Legal requirement to notify in the event of any spill of oil to sea. Notification and request for mobilisation of NatPlan resources. Jurisdictional Authority and Control Agency for all spills from ships in Commonwealth waters.	Verbal	ASAP and no later than 30 minutes after incident identification
			POLREP (pollution report) (link)	ASAP but no later than 1 day after incident identification
			SITREP (situation report)	As requested, or every 24 hours
IC/CRT (or delegate)	**AMOSC 24 hr number:** +61 438 379 328 (NB: IC will require written authority from EOG)	Support for escalated response. Additional resources and personnel will be requested as required via AMOSC through the AMOSPlan arrangements for access to personnel and equipment.	Verbal and written activation via the Service Contract	ASAP after incident identification

From	To	Description	Type of notification	Timing
IC/CRT (or delegate)	**Wild Well Control (WWC)** +1 281 784 4700	Industry service provider for source control of well blowout.	Verbal	ASAP after incident identification
IC/CRT (or delegate)	**Robert D. (Bob) Grace** +1 806-358-6894 –Work +1 806-679-5592 –Cell	Well Control Consultant	Verbal	ASAP after incident identification
IC/CRT (or delegate)	**Cudd Well Control** +1 281-719-2815	Industry service provider for source control of well blowout (secondary).	Verbal	ASAP after incident identification
IC/CRT (or delegate)	**OSRL** +65 6266 1566 (Singapore Duty Manager) +65 6266 2312 (Singapore Emergency Fax) dutymanagers@oilspillresponse.com (NB: IC will require written authority from EOG)	Industry resource for OPEP implementation.	Verbal OSRL Mobilisation Authorisation Form	ASAP after incident identification
IC (or delegate)	Operational and Scientific Monitoring (OSM) Service Provider - **RPS** +61 08 9211 1111	Support organisation for scientific monitoring.	Verbal	ASAP and no later than 2hrs after incident identification
IC/CRT (or delegate)	**NOPSEMA** (if reportable incident) +1 300 674 472 submissions@nopsema.gov.au (NB: IC will require written authority from EOG)	Jurisdictional Authority for all non-vessel spills in Commonwealth waters (i.e., LoWC spills). Requirement to submit regulatory report.	Verbal	ASAP and no later than 2hrs after incident identification
			Written notification	ASAP after oral notification
			Written report (FM0831)	ASAP, but within 3 days of incident identification

From	To	Description	Type of notification	Timing
IC (or delegate)	**AMSA** (Rescue Coordination Centre) +1 800 641 792 (24 hrs, in Australia) + 61 2 6230 6811 (24 hrs, outside of Australia) *Do not use this number when testing notification plan.*	Legal requirement to notify in the event of any spill of oil to sea. Notification and request for mobilisation of NatPlan resources. Jurisdictional Authority and Control Agency for all spills from ships in Commonwealth waters.	Verbal POLREP (link)	ASAP and no later than 2 hrs after incident identification ASAP but no later than 1 day after incident identification
IC/CRT (or delegate)	**Australian Energy Producers (AEP)** Phone: 08 9426 7200 Fax: 08 9321 9778 (NB: IC will require written authority from EOG)	EOG will request AEP to liaise with members to facilitate the Mutual Aid MoU and source assistance from nearby MODUs.	Verbal	ASAP and within 3 hours of incident identification
Operations Section Chief (or delegate)	**WA DoT** MEER Duty Officer 08 9480 9924 (24 hrs) marine.pollution@transport.wa.gov.au	If spill enters or is predicted to enter WA state waters. HMA for responses in WA State waters to spills originating in Commonwealth waters. Requirement to submit POLREP for any spill so WA State response agencies can be alerted if required.	Verbal	ASAP and no later than 2hrs of becoming aware that spill is predicted to enter State waters
			Written WA POLREP form (link)	ASAP after verbal notification
			Written WA SITREP form (link)	If requested, within 24 hours
Operations Section Chief (or delegate)	**NT Environmental Protection Authority (EPA)** Pollution Hotline 1800 064 567 pollution@nt.gov.au	Oil pollution incident response in NT waters.	Verbal	Within 2 hours of incident
Operations Section Chief (or delegate)	**NT Regional Harbourmaster** (08) 8999 3867/8924 7101 rhm@nt.gov.au	Emergency response for NT ports.	Verbal and/or written	Within 2 hours of incident

From	To	Description	Type of notification	Timing
DIMT Environment Team Leader	**Australian Fisheries Management Authority (AFMA)**	Reporting of marine oil pollution	Verbal	Within 24 hours of incident
Operations Section Chief (or delegate)	**Commonwealth Director of National Parks** 0419 293 465 (24-hr Marine Compliance Duty Officer)	Responsible for Australian Marine Parks (AMPs). The notification should include: • Titleholder details • Time and location of the incident (including name of marine park likely to be affected) • Proposed response arrangements as per this OPEP (e.g., dispersant application, containment and recovery) • Contact details for the response coordinator	Verbal	ASAP and within 3 hours of spill entering or predicted to enter an AMP
Operations Section Chief (or delegate)	**WA DPIRD** – Fisheries Senior Management Officer - Fisheries Certification/ Biodiversity (08) 9203 0281 (Primary Contact) 0447 453 677 (Primary Contact) (08) 9203 0281 (Secondary Contact) 0427 234 449 (Secondary Contact) DPIRD Spill Response Officer 0433 151 567 environment@fish.wa.gov.au	State fisheries department – primary contact for all fishermen.	Verbal and written	Within 24 hours of spill reaching State waters
Operations Section Chief (or delegate)	**WA DBCA** 08 9219 9108 State Duty Officer (OWR)	Provision of advice and support for OWR and/ or oiling of shorelines/ waters managed by DBCA.	Verbal	ASAP if potential for oiled wildlife and/ or oiling of DBCA managed water/ shorelines
IC (or delegate)	**WA Department of Water and Environmental Regulation** [DWER]) 24/7 Ph: 1300 784 782	If temporary waste storage areas are required	Verbal	ASAP

From	To	Description	Type of notification	Timing
IC/CRT (or delegate)	**National Offshore Petroleum Titles Administrator (NOPTA)**	Spill in Commonwealth waters that is reportable to NOPSEMA. Provide same written report as provided to NOPSEMA.	Written report (FM0831)	Within 7 days of the initial report being submitted to NOPSEMA
IC/CRT (or delegate)	**WA DMIRS** 0419 960 621 petroleum.environment@dmirs.wa.gov.au	Spill in Commonwealth waters that is reportable to NOPSEMA and is predicted to enter WA waters.	Verbal Email preferred	ASAP if potential for spill to enter WA waters
			Written report (link)	Within 3 days after the reportable incident notification
			Provide same written report as provided to NOPSEMA (FM0831)	Within 7 days of the initial report being submitted to NOPSEMA.
IC/CRT (or delegate)	**Department of Climate Change, Energy, the Environment and Water (DCCEEW)** Phone: +61 2 6274 1111 epbcmonitoring@environment.gov.au	Responsible for administration of *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in Commonwealth waters and to be notified if spill threatening wildlife in Commonwealth waters. This allows for timely response and for DAWE to provide an informed response to enquiries from media and stakeholders.	Written.	ASAP and within 7 days if spill incident injures or kills one or more of the following: • EPBC list threatened, migratory and/or marine species • Member of EPBC listed Threatened Ecological Community (TEC) • Cetacean
IC/CRT (or delegate)	**Department of Industry, Science and Resources (DISR)** +61 2 6213 6000 opicc@industry.gov.au	Lead agency in the event of an incident requiring coordinated strategic response from Government under OPICC Framework (if required) and for liaison with other agencies, including DFAT in the event a MODU spill is likely to impact another country.	Verbal or written	ASAP if spill exceeds EOG's first strike capability and/or response requires State or Commonwealth government support

From	To	Description	Type of notification	Timing
IC/CRT (or delegate)	**DFAT** – WA State Office (08) 9231 4499 dfat.wa@dfat.gov.au	Responsible for Australia's international notification obligations and coordinating official communication between the Government of Australia and any foreign government affected by a spill in Australian waters.	Verbal and written	ASAP if spill predicted to enter foreign waters, including the waters within the Timor-Leste and Indonesian agreement/treaty zones
Operations Section Chief (or delegate)	**Port Authority(ies)** Port authorities details available at: https://www.transport.wa.gov.au/Freight-Ports/port-authorities.asp	Responsible for maintaining water quality and the movement of vessels in Port waters	Verbal	ASAP if spill predicted to enter any Port waters
IC/CRT (or delegate)	Relevant stakeholders	Stakeholder consultation database	Verbal and/or written	ASAP

3.2 Immediate Actions and DIMT Activation

Immediate actions for a Level 2 or 3 oil spill have been planned in this section to expedite spill response by the EOG DIMT. These actions are to be undertaken while the Incident Action Plan (IAP) is developed (Section 4).

Table 3.2 and Table 3.3 provide guidance on initial responses in the event of an MDO spill or a crude oil spill, respectively. Table 3.4 provides guidance for the IC and the DIMT.

Appendix A details EOG's DIMT linkages to the EOG CRT, the DIMT Source Control Branch, the Oil Spill Monitoring (OSM) Management Team and linkages to field based ERTs, and with mutual aid capabilities including external OSROs. Appendix D demonstrates EOG's capability to implement these arrangements.

Table 3.2 Initial response guide – MDO spill from vessel

Step	Action	Responsibility	Indicative timing	More information
1	On discovery of a spill from the vessel - notify the Vessel Master	Spill Observer	Immediate	SMPEP
2	Activate SMPEP and this OPEP. Notify DSV.	Vessel Master	Immediate	SMPEP
3	Manage the safety of all personnel Secure sources of ignition and alert all personnel (appropriate to the level of the spill)	Vessel Master	Immediate	SMPEP
4	If safe, stop the spill through source control actions Assess incident and prevent further spillage if possible / safe	Vessel Master	Immediate	SMPEP
5	Determine spill parameters: • What is it - oil type/group/properties? • Where is it - latitude/longitude of leading edge (if known) • How big is it - area/volume? • What is happening to it - status of release i.e., continuing or under control? • Weather conditions at site (wind/currents)	Vessel Master	ASAP	SMPEP
6	Determine Spill Response Level required: Level 1 or 2: • If Level 1: Vessel Master to act as IC and refer to SMPEP • If Level 2: Contact DSV who will contact Drilling Superintendent (DS) to request DIMT Leader assume role of IC, with Vessel Master becoming OSC	Vessel Master	ASAP	SMPEP and OPEP
7	Commence vessel surveillance In the event of a Level 2 spill, deploy the oil spill tracking buoy(s), following the deployment instructions	Vessel Master	ASAP	Section 5.2
8	Complete tasks outlined in Table 3.4 – Initial Response Guide – IC and DIMT	Vessel Master / IC	ASAP	Table 3.4
9	Continue to assess spill parameters - provide regular reports to the IC regarding appearance and behaviour of surface spill, weather (surface wind speed, direction, sea state, current speed and direction), tidal conditions and any changes to release status	Vessel Master	Ongoing until terminated	SMPEP

Table 3.3 Initial response guide – oil spill from LoWC

Step	Action	Responsibility	Indicative timing	More information
1	On discovery of a hydrocarbon release - immediately notify the OIM.	Spill Observer	Immediate	MODU ERP
2	Activate MODU ERP and this OPEP. Notify DSV.	OIM	ASAP	MODU ERP
3	Manage the safety of all personnel. Secure sources of ignition and alert all personnel (appropriate to the level of the spill).	OIM	Immediate	MODU ERP
4	If safe, stop the spill through source control actions. Assess incident and prevent further spillage if possible / safe.	OIM	Immediate	MODU ERP Section 4
5	Determine spill parameters and issue POLREP: • What is it - oil type/group/properties? • Where is it - latitude/longitude of leading edge (if known)? • How big is it - area/volume? • What is happening to it - status of release i.e., continuing or under control? • Weather conditions at site (wind/current)?	OIM or delegate	ASAP	Section 3.1
6	Determine Spill Response Level required: Level 2 or 3: • Contact DS and confirm he will assume role of on-duty IC • Rig OIM assuming role of OSC in consultation with the with DSV.	DSV / OIM	ASAP but within 30 minutes of notification	Section 1.4
7	Issue alerts and initiate spill tracking: • Deploy the Oil Spill Tracking Buoy following the deployment instructions; • Alert support vessels; • Alert supply base; and • Alert helicopters provider.	DSV / OIM / on-duty IC or delegate/s	ASAP	Section 3.1 Section 5.2
8	Complete tasks outlined in Table 3.4 – Initial Response Guide – IC and DIMT.	On-duty IC	see Table 3.4	Table 3.4
9	Initiate Source Control – activate SCERP.	DSV / OIM / IC	ASAP	Section 4
10	Provide regular SITREPs to the DIMT IC (as agreed) regarding the appearance and behaviour of surface spill and weather (surface wind speed, direction, sea state, current speed and direction) and tidal conditions	DSV / OIM or delegate	Ongoing as agreed with IC	Section 4.1

Table 3.4 Initial response guide – IC and DIMT

Step	Action	Responsibility	Indicative timing	More information
1	Upon notification from site, determine if IC role being assumed by shoreside (DS). If yes, Vessel Master / DSV assuming role of OSC in consultation with the MODU OIM. If no, DS to monitor situation pending change in status of response.	IC	On notification	Appendix A
2	Notify DIMT members to standby or mobilise to Incident Control Room (ICR) and advise EOG CRT Manager.	IC	60 minutes from notification	Appendix A
3	Establish a reliable communications line with the incident site / OSC.	IC	Following notification	Beehive-1 Bridging ERP
4	Confirm with OSC: • Muster numbers and status of personnel; • POLREP showing current situation with release: o Shutdown and isolation; o Continuing or under control; o Material and quantity released; o Agreed SITREP frequency.	IC	90 minutes from notification	Beehive -1 Bridging ERP
5	Set up regular briefing of EOG Duty CRT Manager Obtain written authority from CRT for notifications and activations	IC	ASAP following notification from OSC.	Beehive -1 Bridging ERP Table 3.1
6	Undertake regulatory notifications and other stakeholder notifications (as required).	IC/CRT	Table 3.1	Table 3.1
7	Implement the Beehive -1 Drilling Program Bridging ERP and SCERP. • Establish Incident Command Post • Engage well control specialists and prepare for mobilisation • Activate OSM provider • Initiate AEP MoU: Mutual Assistance to facilitate relief rig.	IC	90 minutes from notification	Beehive -1 Bridging ERP and SCERP
8	Determine spill trajectory – weather conditions and perform initial vector analysis • Where is it going - Weather conditions/currents/tides? • What is in the way - Resources at risk? • When will it get there - Weather conditions/currents/tides? Activate Monitoring, Evaluation and Surveillance tactics.	IC or DIMT Planning Section	Within 90 minutes from DIMT activation	Section 5.1.1
9	Based on the preliminary assessment provided by DSV/Vessel Master and operational monitoring data: • Assess response required; and • Implement spill response commensurate to the size and level of risk.	IC	90 minutes from notification	Appendix A

Step	Action	Responsibility	Indicative timing	More information
10	If WA DoT/NT DEPWS to assume control as Control Agency, assist in completion of Incident Control Handover Checklist.	IC	As required	Section 2.3
11	Notify oil spill response contractor(s) and determine level of support required based on the escalation potential of the incident: • Activate OSROs (AMOSC/OSRL) to support the response; and • Engage Vessel Broker to identify additional support / surveillance vessels.	IC or delegate	ASAP	Table 3.1
12	Prepare for potential evacuation of personnel from the incident site.	IC	Refer to Bridging ERP	Beehive -1 Bridging ERP
13	Establish spatial context of the spill: • Obtain all necessary maps/modelling from GIS software and establish sensitivity mapping; and • Identify protection priorities and confirm response options via NEBA.	Planning Section Chief (or delegate)	90 minutes from notification	Section 4.4 Appendix E Section 4.5
14	Support IAP (as required) in consultation with AMOSC and Control Agency (WA DoT/NT IC, if applicable)	IC	Ongoing	Section 4
15	Review Operational and Scientific Monitoring Plan (OSMP) to determine which initiation criteria are triggered, and direct personnel to undertake required assessments.	Planning Section Chief (or delegate)	Refer to OSMP	Section 5.3

4 Incident Action Plan (IAP)

The IAP process governs the ongoing response following the initial response phase (see Section 3). The IAP process facilitates the determination of appropriate strategies as more information becomes available during a spill event. The Initial IAP facilitates the transition from the Initial Response phase to an Ongoing Response. An IAP is developed for each Operational Period (as defined by the IC) following the initial response. The IAP informs incident personnel of the objectives for that operational period, the specific resources that will be applied, actions taken during the operational period to achieve the objectives, and other specific operational information (e.g., weather, constraints, limitations, etc).

Figure 4.1 outlines the IAP process during a spill response.

4.1 Situational Awareness

To review the applicability of response strategies to an actual Level 2/3 spill incident's characteristics, and to conduct an Operational NEBA to ensure impacts of selected response strategies are ALARP, the DIMT must initially gain situational awareness by obtaining information from the field immediately after activation. Responsibility for collection of site information at the location of the spill will reside with the OSC.

The spill level will be classified via Table 1.3 to gauge a proportionate response. Where doubt exists over the severity or appropriate response to spill event, the OSC is to discuss the situation with the IC. The principle of prudent over-reaction and rapid de-escalation applies when considering the level of activation as it is easier and usually more effective to scale down an over-reaction than to ramp up an under-reaction.

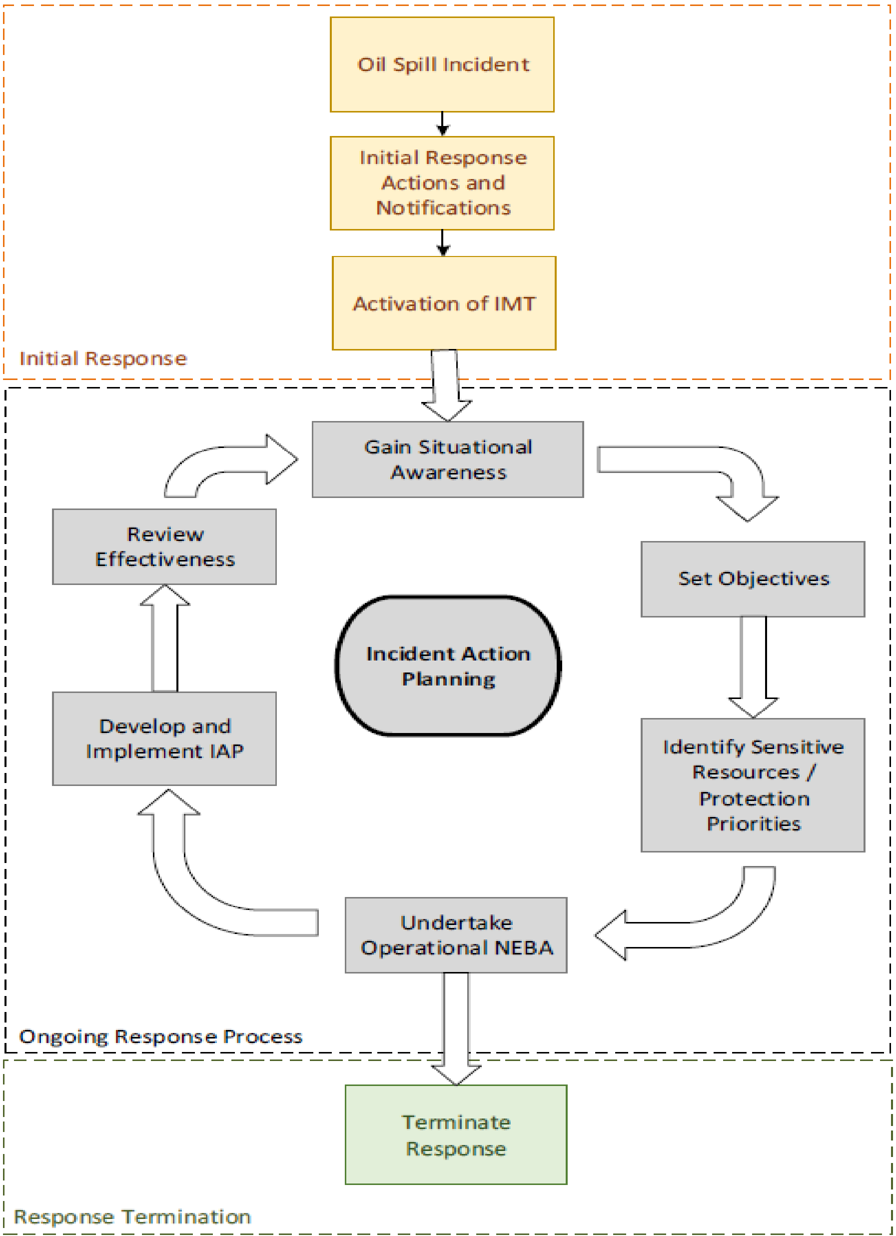

Figure 4.1 Incident Action Plan Process

4.2 Environment That May Be Affected (EMBA)

Stochastic oil spill modelling was used to determine the EMBA by an oil spill. Appendix 5 of the EP provides detailed descriptions of the environmental sensitivities and values within the EMBA and Appendix E provides a detailed summary. Figure 4.2 shows the EMBA from a Level 3 LoWC. Figure 4.3 shows the EMBA from a Level 2 MDO release. The thresholds used to define the outer extents of the EMBAs are described in Table 5.2 of the EP.

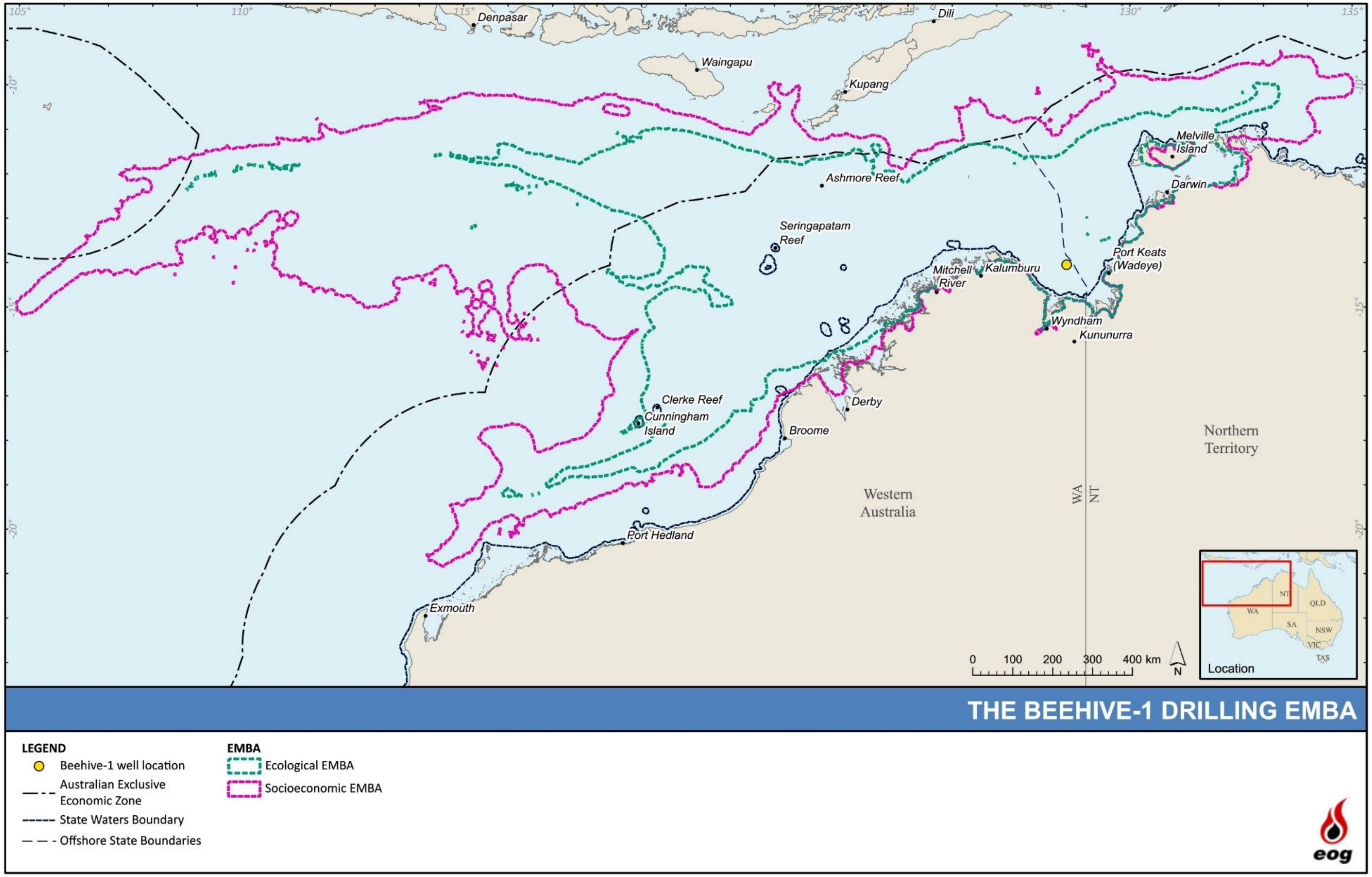

Figure 4.2 LoWC EMBA

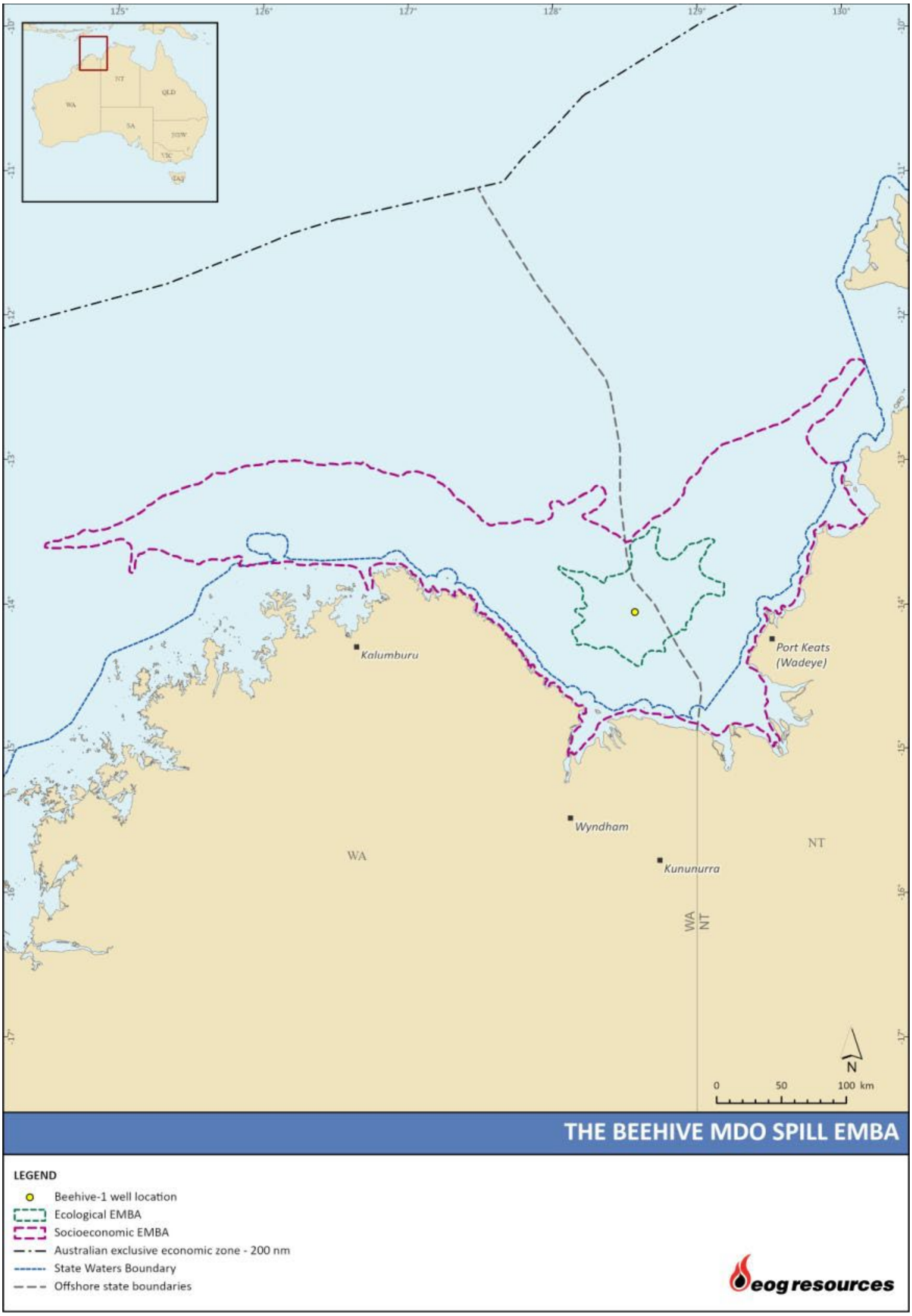

Figure 4.3 MDO EMBA

4.3 Resources at Risk

Appendix E provides a detailed assessment of the sensitivity of environmental receptors potentially at risk from an oil spill.

4.4 Protection Priorities

In the event of a spill, the primary aims of the response will be aligned with NatPlan (AMSA 2020) and include protection of the following sensitivities and values, in descending order of priority:

- Human health and safety;
- Habitat and cultural resources;
- Rare and/or endangered flora and fauna;
- Commercial resources; and
- Amenities.

The stochastic oil spill modelling (Appendix 10 of the EP) and the risk assessment for a LoWC (Section 8.7 of the EP) were used to identify potential impacts to these sensitivities and values and to prioritise areas for protection.

Table 4.1 presents the protection priorities for WA and NT locations based on shoreline oil accumulation (without dispersant use). The WA DoT protection priorities have been included. Tactical Response Plans (TRPs) will be prepared for those locations with less than 15 days to a shoreline residue of 10 g/m^2 (shaded blue).

4.4.1 Western Australia

For any oil spill entering or within WA State waters/shorelines, the WA Control Agency is the ultimate decision maker regarding identification and selection of protection priorities. The WA Control Agency will utilise their internal processes which typically includes the following:

- Evaluation of situational awareness information, including all surveillance, monitoring and visualisation data provided by the Titleholder;
- Evaluation of resources at risk including use of the WA Oil Spill Response Atlas (OSRA) and any other relevant WA/Commonwealth government databases or other information sources;
- Evaluation of shoreline types, habitat types and seasonality of environmental, socioeconomic and cultural values and sensitivities;
- Consultation with the State Environmental Scientific Coordinator and other relevant State and Federal government departments with environmental responsibilities;
- Consultation with other relevant oil spill agencies, including the AMSA Environment, Science and Technology network or any other experts as necessary; and
- All information is utilised in a NEBA type process, to determine protection priorities and response strategies.

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

The WA DoT undertook a prioritisation process for the Kimberley region (*DOT307215 Provision of Western Australian Marine Oil Pollution Risk Assessment - Protection Priorities. Protection*

Priority Assessment for Zone 1: Kimberley – Draft Report, WA DoT 2018). This OPEP has included the shoreline cells used by the WA DoT in determining priority protection areas. The WA Marine Oil Pollution Risk Assessment (WAMOPRA) web map application (link) augments the report.

4.4.2 Northern Territory

Within the NT, it is expected that priority protection areas will be selected by the NT DEPWS by utilising a similar process as described for the WA Control Agency, with guidance taken from the *Northern Territory Oiled Wildlife Response Plan* (AMOSC 2019).

Table 4.1 Protection priorities based on shoreline oil accumulation (unmitigated)

Location	Habitat Present	Sensitive Fauna Present	Landfall timeframe for 10 g/m² (Days)	Landfall timeframe for 100 g/m² (Days)
NT				
Darwin	NIW, mangroves, saltmarsh, seagrass	Turtles (habitat critical), seabirds, shorebirds	**48.1 (S),** NA (T), NA (W)	**51.7 (S),** NA (T), NA (W)
Peron Islands	Mangroves, Saltmarsh, Tidal Flats	Turtles, IBA	**18 (S),** 92 (T), NA (W)	**21.6 (S),** 92.5 (T), NA (W)
Daly River Estuary	NIW, mangroves, saltmarsh	Turtles, IBA	**18.3 (S),** 63.5 (T), 53 (W)	**25.8 (S),** 93.1 (T), 71 (W)
Moyle River Estuary	NIW, mangroves, saltmarsh	IBA	**11.6 (S),** 15.6 (T), 31.7 (W)	**14.5 (S),** 22.8 (T), 37.2 (W)
Victoria River Estuary	Mangroves, mudflats	-	14.8 (S), 12.3 (T), **14 (W)**	19.1 (S), 15.8 (T), **14.5 (W)**
Forsyth Creek*	Seafarms Group Limited (water intake)	Prawn farm	14.8 (S), 12.3 (T), **13.9 (W)**	19.1 (S), 15.8 (T), **14.5 (W)**
Keep River Estuary/Turtle Point	Mangroves, mudflats, sand beach	Turtles, IBA	18.6 (S), 22.7 (T), **13.9 (W)**	24.1 (S), 24.6 (T), **15 (W)**
WA (WA DoT cell #)				
Cape Domett (1&2)	Mangroves, saltmarsh, sand beach	Turtles (habitat critical), shorebirds	**21 (S),** 24.9 (T), 33.7 (W)	**22.6 (S),** 30.3 (T), 50.4 (W)
Cambridge Gulf/Lacrosse Island (3)	Ramsar wetland, NIW, mangroves, saltmarsh, inter-tidal mudflats	Turtles (habitat critical), IBA	16.5 (S), **11.8 (T),** 15.7 (W)	17.4 (S), **12.8 (T),** 26.9 (W)
Berkeley River (10)	Seagrass, mudflats, sand beach	Turtles, Shorebirds	20.4 (S), 17 (T), **11.7 (W)**	28.3 (S), 21.2 (T), **12.5 (W)**
King George River (13)	Mangroves, seagrass, corals	Turtles, shorebirds	24.7 (S), 18.1 (T), **12.5 (W)**	27.3 (S), 21.3 (T), **16.8 (W)**
Drysdale River/Napier Broome Bay (16 & 17)	NIW, mangroves, saltmarsh, inter-tidal flats, sand beach	Turtles (habitat critical), shorebirds	25.5 (S), 27.9 (T), **21.7 (W)**	35.5 (S), 37.6 (T), **26.3 (W)**

Location	Habitat Present	Sensitive Fauna Present	Landfall timeframe for 10 g/m^2 (Days)	Landfall timeframe for 100 g/m^2 (Days)
Sir Graham Moore Island (17)	Sand Beach, Corals, rocky shoreline	Turtles (habitat critical)	36 (S), 27.9 (T), **21.7 (W)**	49 (S), 37.6 (T). **26.3 (W)**
West Governor Island (17)	Sand beach, rocky shoreline, mangroves, tidal flats	Turtle (habitat critical), shorebirds	36 (S), 27.9 (T), **21.7 (W)**	49 (S), 37.6 (T), **26.3 (W)**
Cassini Island (22 & 23)	Sand Beach, rocky cliffs	Turtle (habitat critical), shorebirds	40 (S), 33.6 (T), **23.3 (W)**	40 (S), 35.8 (T), **30.2 (W)**
Maret Island & Coronation Islands (30 & 31)	Sand beaches, mangroves, rocky shoreline	Turtle (habitat critical)	55.6 (S), 46.9 (T), **35.4 (W)**	61.8 (S), 53.2 (T), **39.1 (W)**
Commonwealth				
Ashmore Reef	Ramsar wetland, coral reefs (sub-tidal, inter-tidal, seagrass	Turtle (habitat critical), shorebirds, seabirds	NA (S), NA (T), **70 (W)**	NA (S), NA (T), **80.9 (W)**

* Modelling results aren't available for Forsyth Creek. Results shown are the lowest for either Keep River or Victoria River
Landfall times - seasons: (S) – Summer; (W) – Winter; (T) – Transitional
TRPs prepared for locations shaded blue

4.5 Operational NEBA

A strategic NEBA was undertaken and presented in Section 5 of Appendix B. In the event of a Level 2 / Level 3 oil pollution emergency, an Operational NEBA will be undertaken to select spill response options that have a net environmental benefit based upon real-time environmental conditions. It is likely that spill response will involve a combination of response options and will evolve over time as conditions change.

The NEBA process is a decision support tool that is used to help select the most appropriate response options that together make up the oil spill response strategies that the DIMT are to implement in the event of a spill. Using the Strategic NEBA, the DIMT has the foundation for preparing Operational NEBA to inform response priorities.

For oil spill response, the development of the IAP involves the review of key decision-making criteria which are used as inputs to the Operational NEBA. This ensures the most effective response strategies with the least detrimental impacts can be selected and implemented.

The DIMT must first gain situational awareness by obtaining answers to the following key questions, which are fundamental to any oil spill response:

- What type of oil has been released?
- What is the expected behaviour of the oil that has been released?
- What volume has been released?
- Is the source under control?
- Where is the oil going?
- What environmental receptors/sensitivities are in the path of the predicted oil trajectory?
- Can the oil be approached or are there safety concerns?
- Can the oil be contained?
- Can the oil be dispersed?
- Will shoreline impact occur, and clean-up be required?

To answer these questions, the IC must review key information such as advice on the volume and characteristics of the oil released, OSTM, Oil Spill Tracker Buoys, the weather forecast, AIS vessel feed, aircraft data feeds, operational reports from field teams and operational and environmental monitoring teams to determine presence and/or extent of environmental receptors, advice from the Environmental Scientific Coordinator/s (ESC), any other external advice, the particular sensitivities of environmental receptors potentially exposed (see Appendix E of the OPEP), oil spill reference documents (specific to response strategy), daily field reports and any other relevant information.

This is then used to update the Operational NEBA, which assesses the impacts and risks of response strategy options on environmental sensitivities. The spill response risk assessment (Chapter 9 of the EP) provides generic information on the impacts and risks. To aid interpretation where both positive and negative impacts have been indicated for a spill response, cross-referencing potential impacts with the receptor's protection priority can be used to weight benefit/risk to receptors; and those with higher protection priorities can be weighted as of greater importance than risk to lower priorities for the determination of net environmental benefit.

Where a response has no reduction in risk or impact, this may still be assessed as presenting a net benefit (or carried forward to ALARP assessment) based on potential for indirect (rather than direct) reduction in risk. For example, the Monitor and Evaluate response strategy has no direct impact on the spill due to implementation of this strategy, but the situational awareness gained from the response allows proactive and effective application of other response strategies thereby contributing to reduction of risk to ALARP.

The NEBA prioritises environmental sensitivities and assesses the individual net effect that each response option may have on it allowing informed decision to be made. If there are conflicting outcomes for a particular response option, then the sensitivity with the higher priority becomes the preferred response option. A NEBA is a decision-making process and will ultimately result in a trade-off of priorities and response strategies. It is possible for a response strategy to be used for one sensitivity, even if it has been identified that this response option may not benefit one or several other sensitivities. The final outcome of the response, however, should result in an overall environmental benefit. Spill response options selected via the Strategic NEBA are detailed in Section 5 of Appendix B. An evaluation of the impacts and risks of the spill response options is provided in Chapter 9 of the EP.

In consultation with the relevant Control Agency, the DIMT will apply the Operational NEBA process to identify the response options that are preferred for the situation, oil type and behaviour, environmental conditions, direction of plume, and protection priority of sensitive receptors within the relevant jurisdiction.

The steps in the Operational NEBA aim to identify:

1. Key ecological values, environmental, socioeconomic and cultural heritage receptors (see Chapter 5 and Appendix 5 of the EP), within the plume path and predicted EMBA based on operational monitoring arrangements in the Monitor and Evaluate Response Strategy;
2. Protection priorities of either High, Medium or Low and determine if receptor is listed as Endangered (E), Threatened (T) or Migratory (M) under the EPBC Act (see Chapter 5 and Appendix 5 of the EP);
3. Receptors within the window of Ecological Sensitivity (Appendix E) for the period of the oil spill;
4. New situational awareness information that becomes available from the range of operational monitoring arrangements in the Monitor and Evaluate Response Strategy such as updated spill trajectory models, observations of oil on the water and/or shorelines, locations of sensitive receptors, effectiveness of implemented response strategies, Daily Field Reports, any updated advice from the ESC/other external sources (e.g. consideration of recommendations from the WA and/or NT Hazard Management Agency (HMA)) for inclusion into daily updates of the Operational NEBA to optimise the IAP. Some sensitive receptors are mobile (e.g., fish, mammals, birds) and may move in and out of the predicted oil path on numerous occasions throughout the response, requiring frequent review of the NEBA table and selection of response techniques documented in IAPs by the DIMT;
5. For Dispersant Application, evaluate the environmental trade-offs between applying or not applying dispersants to ensure that the response strategy has a positive benefit. Any dispersant application in or around State/Territory waters will require relevant Control Agency approval. Any dispersant application within an AMP will require approval from the Director of National Parks (DNP); and

6 Select response strategies to be included in the IAP work instruction.

The Planning Section Chief will supervise the development of the IAP with the DIMT. The IC authorises the IAP prior to releasing it to the Operations Section.

4.6 Selected Spill Response Strategies

The strategic NEBA (Section 5 of Appendix B) was used to assess and select appropriate spill response strategies and determine whether they would be applied as primary or secondary response options. Section 8 of Appendix B provides further detail on the ALARP assessment of spill response strategies. The implementation of these ALARP justified responses as control measures are the basis of this OPEP.

In the event of a Level 2/3 spill, operational NEBAs will be regularly undertaken as part of the Incident Action Plan (IAP) development process, so that the combination of spill response strategies and their implementation may evolve over time.

Table 4.2 presents a summary of the spill response strategies selected for this OPEP. Table 4.3 presents the proposed/potential response strategies which could be used for the priority protection areas for which TRPs are being developed (see Section 4.4).

Table 4.2 Selected primary and secondary spill response strategies

Response strategy	Crude spill	MDO spill
Source Control – Relief Well	Primary	N/A
Source Control – Vessel Spill	N/A	Primary
Monitor and Evaluate	Primary	Primary
Surface Dispersant Application – Vessel	Secondary	No
Surface Dispersant Application – Aerial	Primary	No
Containment & Recovery	Secondary	No
Shoreline Protection & Deflection	Secondary	No
Shoreline Clean-up	Secondary	No
Oiled Wildlife Response	Secondary	Secondary
Operational and Scientific Monitoring (OSM)	Primary	Primary
Waste Management	Primary	Primary
Forward Operations Base	Primary	Primary

Table 4.3 Response strategies for priority protection areas

Values and Sensitivities	Protection Priority Locations								Oil Spill Response Strategies													
									Crude Oil							MDO						
	Moyle River Estuary (NT)	Victoria River Estuary (NT)	Forsyth Creek (NT)	Keep River Estuary/ Turtle Point (NT)	Lacrosse Island/Cape Domett (WA)	Cambridge Gulf (WA)	Berkeley River (WA)	King George River (WA)	Source Control	Operational & Scientific Monitoring	Dispersant Application (Commonwealth Waters)*	Offshore Contain & Recover	Shoreline Protection & Deflection**	Shoreline Clean-up**	Oiled Wildlife Response**	Source Control	Operational & Scientific Monitoring	Dispersant Application (Commonwealth Waters)*	Offshore Contain & Recover	Shoreline Protection & Deflection**	Shoreline Clean-up**	Oiled Wildlife Response**
Marine																						
Cetaceans						Y	Y	Y	R	R	R	V	NA	NA	V	R	R	NR	NR	NA	NA	NA
Turtles	Y			Y	YC	YC	Y		R	R	R	V	V	V	V	R	R	NR	NR	NA	NA	R
Dugongs							Y	Y	R	R	R	V	NA	NA	V	R	R	NR	NR	NA	NA	NA
Seabirds				Y	Y	Y	Y		R	R	R	V	V	NA	R	R	R	NR	NR	NA	NA	R
Fish/Sharks	Y	Y	Y	Y	Y	Y	Y	Y	R	R	V	V	NA	V	NA	R	R	NR	NR	NA	NA	NA
Coral Reefs (sub-tidal)								Y	R	R	V	NA	NA	NA	NA	R	R	NR	NR	NA	NA	NA
Coral Reefs (inter-tidal)								Y	R	R	V	V	V	NA	NA	R	R	NR	NR	V	NA	NA
Seagrass	Y						Y	Y	R	R	V	NA	NA	NA	NA	R	R	NR	NR	NA	NA	NA
Commercial Fisheries	Y								R	R	V	V	NA	NA	NA	R	R	NR	NR	NA	NA	NA
Marine Parks					Y	Y	Y	Y	R	R	X	V	NA	NA	NA	R	R	X	NR	NA	NA	NA
Shoreline																						
Wetlands (RAMSAR, NIW)	Y			Y		Y			R	R	R	V	V	V	NA	R	R	NR	NR	V	NA	NA
Mangroves	Y	Y	Y	Y	Y	Y		Y	R	R	R	V	V	V	NA	R	R	NR	NR	V	NA	NA
Saltmarsh	Y				Y	Y			R	R	R	V	V	V	NA	R	R	NR	NR	V	NA	NA
Inter-tidal Flats	Y	Y	Y	Y		Y	Y		R	R	R	V	V	V	NA	R	R	NR	NR	V	NA	NA
Sandy Shorelines	Y		Y	Y	Y	Y	Y		R	R	R	V	V	R	NA	R	R	NR	NR	V	NA	NA
Rocky Shorelines	Y					Y	Y		R	R	R	NR	NR	NR	NA	R	R	NR	NR	NR	NA	NA
Turtle Nesting Beaches				Y	YC			Y	R	R	R	V	V	V	R	R	R	NR	NR	V	NA	R
Crocodile Nesting	Y								R	R	R	V	V	NR	NR	R	R	NR	NR	V	NA	NR
Shorebird	Y		Y	Y			Y	Y	R	R	R	V	V	V	R	R	R	NR	NR	V	NA	R
Indigenous Heritage	Y	Y	Y			Y	Y	Y	R	R	R	V	V	V	NA	R	R	NR	NR	V	NA	NA
Tourism							Y	Y	R	R	R	V	V	V	NA	R	R	NR	NR	V	NA	NA
Commercial (e.g. Port)			Y			Y			R	R	R	V	V	V	NA	R	R	NR	NR	V	NA	NA

Legend:

Y – Receptor Present (known)
C – Critical
R – Recommended
V – Viable (pending IAP Assessment)

NR – Not Recommended
NA – Not Applicable
X – Constraint - not to be undertaken

Notes:

* Dispersant Application is only undertaken in Commonwealth Waters in water depths > 20m and not in AMPs

** EOG is not the Control Agency for these response strategies except in the Commonwealth Territories of Ashmore Reef and Cartier Island.

5 Response Strategies

The response strategies presented in this section are based on the assessments in Appendix B, which provides the basis of design and analysis of resources required along with implementation timeframes. Appendix D demonstrates EOG's capability to meet these requirements.

5.1 Source Control

The initial and highest priority response to an oil spill incident, following the safety of personnel, is to prevent or limit further oil loss into the marine environment. For major hydrocarbon release incidents, the MODU Operator's ERP and the Beehive-1 Bridging ERP outline the initial actions to be taken by onsite personnel to control the source of a hydrocarbon spill and limit the volume released to the environment. The initial response to a LoWC event is to activate the emergency blow-out preventer (BOP). The primary source control method for a LoWC event is the drilling of a relief well (see Section 5.1.1). EOG has calculated that a relief well would be drilled within 77 days of a LoWC event (see Section 5.1.2). For the ongoing response to a LoWC incident, the SCERP is to be consulted as the overarching source of information for implementing a relief well response noting that the MODU Operator's ERP, Vessel SMPEP and SCERP, where applicable, will provide a higher level of detail for specific incidents.

The Source Control Response Strategy for a Level 2 vessel MDO spill is the vessel's SMPEP. Table 5.1 provides a generic overview. Table 5.2 provides an overview of the Source Control Response Strategy for a Level 3 spill resulting from a LoWC.

Chapter 9 of the EP provides the EPO, EPS and measurement criteria for Source Control implementation. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.1 Source control for Level 2 vessel MDO spill

Source Control: Level 2 Vessel Spill	
Initiation	Notification of a Level 2 vessel MDO spill.
Aim	Safely stop loss of MDO from a vessel spill to minimise releases to the marine environment.
Termination	Direct observation: MDO from spill is secured on the vessel and actions have been taken to prevent any further release, or that no more MDO can be released.
Documents	Vessel SMPEP MODU Operator's ERP Beehive-1 Bridging ERP

Table 5.2 Source control for Level 3 crude oil spill

Source Control: LoWC	
Initiation	Notification of a spill incident from a LoWC.
Aim	Safely re-establish primary well control to minimise hydrocarbon releases to the marine environment.
Termination	Direct observation: Well control has been permanently re-established with no hydrocarbons flowing or leaking from the well.
Documents	Beehive-1 SCERP Beehive-1 WOMP

5.1.1 Relief Well Plan (RWP)

The SCERP includes a Relief Well Plan (RWP). The RWP will contain relief well planning information, specifically:

- MODU positioning assessment for relief well drilling locations;
- Relief well tangible equipment requirements and availability;
- Relief well trajectory analysis and casing design; and
- Dynamic well kill hydraulic simulation results.

To ensure EOG has current MODU availability, EOG will maintain a register of suitable MODUs within the region and update this on a monthly basis. In the event a suitable MODU is not in Australian waters or is not predicted to be in Australian waters at the time of the activity, further work will be completed to identify a regionally suitable MODU, along with a mobilisation plan that demonstrates construction of a relief well within the time frame outlined in Table 5.3 is achievable.

In order to facilitate and expedite the use of regional MODU for relief well drilling an AEP Memorandum of Understanding: Mutual Assistance is in place. This agreement provides the mechanism to facilitate the transfer of drilling units and well-site services between operators in Australian and Timor-Leste administered waters in order to respond urgently to emergency source control events.

A Safety Case Revision (SCR) will be required for the relief well rig to undertake the activity; this cannot be submitted before the event. The SCR will be based on existing documents, specifically the SCR approved for the drilling of the original well and the Safety Case in force for the relief well rig. A SCR would be submitted within 16 days from the LoWC, however the critical path time allowed for the actual writing of the document is three days. The remaining estimated time would be used for gathering post-event data, mobilising the workforce and conducting a hazard identification. It is not practicable to reduce the critical path days with additional pre-planning as document revision, final review and approval will still be required after completing the hazard identification.

5.1.2 Relief Well Schedule

A relief well drilling schedule is provided in Table 5.3 based on control of the well by 11 weeks (77 days). This is based on indicative mobilisation durations, relief well planning and operations. It could take up to 24 days to have a MODU onsite ready to spud.

This timeline has been assessed as ALARP based on the current controls/measures in place; however, EOG supports measures to improve on the ALARP response time model through the AEP Drilling Industry Steering Committee Source Control Response Industry (SCRI) Working Group. The SCRI working group is an AEP Drilling Industry Steering Committee initiative which has been established to drive collaboration and continuous improvement in source control emergency response planning. The Working Group will explore and act on opportunities to align and strengthen the Titleholders' source control emergency response capability through "mutual aid" initiatives and drive continuous improvement by implementing fit-for-purpose and effective source control emergency response strategies.

Table 5.3 Relief well drilling activation time

Activity	Duration (days)	Comments
Planning (prior to Beehive-1 drilling)		
Initial relief well planning	3 months prior to spud	Relief well complexity assessment. Relief well location identification and initial design including: • Modelling assumptions and scenarios; • Primary kill strategy; • 2x relief well locations (or possible relief well quadrant); • Relief well design; • Proposed relief well trajectory and intersect drawings; • Relief well rig mud pumps specifications and ancillary equipment requirements to perform dynamic kill. MODU and long-lead equipment specification and identification. Signatory to AEP MoU and Operators equipment access agreements in place as required. Monthly Relief Well rig status report.
Execution (post-blowout)		
Suitable MODU identified	0-1	Provision for relief well aid is confirmed. Detailed relief well design is initiated.
SCR Schedule developed	1-2	Meet NOPSEMA to discuss imminent SCR and its urgency.
SCR prepared	2-16	Hazid, Relief Well Rig SMS interfaces, Formal Safety Assessment.
SCR submitted and NOPSEMA review process commences	16-23	Ongoing dialogue with NOPSEMA to optimise assessment process.
MODU mobilised	20-23	Spud equipment loaded onto MODU. Specialised equipment mobilised.
SCR accepted by NOPSEMA	24	MODU onsite and relief well drilling commences
Relief well drilling	24-77	Blowout is killed.
Total	**77**	

5.2 Monitor and Evaluate

Table 5.4 summarises the hydrocarbon surveillance and tracking methods employed in the OPEP and Table 5.5 shows the Bonn Agreement Oil Appearance Code (BAOAC) to assist with OPEP decisions.

Table 5.6 provides the initiation and termination criteria. Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.4 Hydrocarbon surveillance and tracking methods

Method	Description
Vessel Surveillance	Direct observations are used to assess the location and visible extent of an oil spill, aid with the verification of modelling and inform the application and effectiveness of response strategies. Vessel surveillance is limited in comparison to aerial surveillance and may also be compromised in rough sea conditions or where fresh hydrocarbons poses safety risks.
Aerial Surveillance	Aerial surveillance is used to record the presence and characteristics of oil at surface and environmental observations including weather conditions, marine fauna and sensitive receptors. Aerial surveillance provides superior coverage over vessel surveillance for estimating the spatial extent of a spill but is generally required only for larger Level 2/3 spills.
Tracking Buoys	Tracking buoys are on the MODU and support vessels. Each buoy acquires GPS data at 20 second intervals and transmits once every 30 minutes.
Satellite Imagery	Suitable imagery may be available through existing contracts with AMOSC and OSRL. The most appropriate images for purchase will be based on the extent and location of the oil spill. Synthetic aperture radar (SAR) and visible imagery may both be of value.
OSTM	The spill fate modelling service is to be initiated by the submission of the trajectory modelling request form by the DIMT to AMOSC. RPS is to provide at least daily updates to the DIMT of trajectory model outputs. More frequent updates can be provided if weather conditions are highly variable or change suddenly. Operational surveillance data (aerial, vessel, tracker buoys) is to be provided to RPS to verify and adjust predictions and improve predictive accuracy.

Table 5.5 The Bonn Agreement Oil Appearance Code (BAOAC)

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

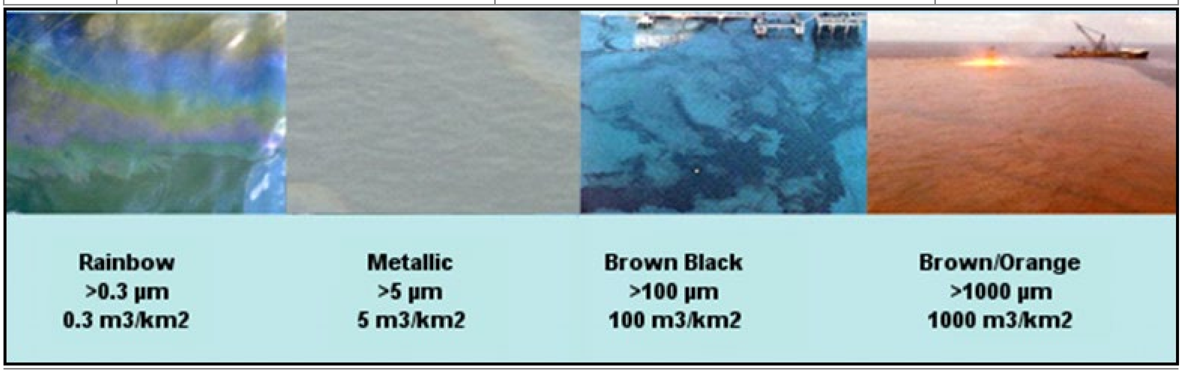

Table 5.6 Monitor and evaluate: hydrocarbon surveillance and tracking

Monitor and Evaluate: Hydrocarbon Surveillance and Tracking	
Initiation	Notification of a spill incident from a LoWC or a Level 2 MDO spill.
Aim	Tracking buoy, satellite imagery, opportunistic and planned vessel and aerial surveillance used to determine the distribution of the slick, validate OSTM, monitor the effectiveness of response strategies on the slick, and identify the presence of marine fauna in the response area.
Termination	Oil source controlled. Surface water does not have an oiled appearance, specifically 'silver/grey' as per BAOAC. NB: Vessel surveillance will terminate if there are unacceptable safety risks associated with volatile hydrocarbons at the sea surface.
Documents	Appendix A and D of CSIRO Oil Spill Monitoring Handbook. Operational and Scientific Monitoring Bridging Implementation Plan (OSM BIP).

5.3 Surface Dispersant Application

Preparedness modelling (see Appendix 10 of the EP) to evaluate the net environmental benefit of applying dispersant has shown that applying surface dispersants has the potential to reduce sea surface oil and the volume of oil loading onto shorelines, with its effectiveness likely to be limited to the immediate region near the well site where the probability of elevated surface oil concentrations is greater. However, the reduction in surface oil was concomitant with an increase in in-water hydrocarbons near the dispersant release site. A strategic NEBA conducted for the identified Protection Priority Areas indicates both a potential positive and negative impact (see Section 5.2 of Appendix B). An Operational NEBA is therefore required to evaluate the use of dispersants based on the incident specifics of the spill.

The Operational NEBA assessment will consider the dispersant effectiveness testing, the level of benefit or impact to sensitive receptors of the identified Protection Priority Areas (Section 4.4) and any other locations predicted to be contacted by the spill. This will consider the predicted trajectory of spill with respect to the location of key receptors, and the temporal variation in sensitivity of these receptors, and make use of forecast modelling of the spill with and without dispersants to inform the assessment. Further information is provided in Appendix B.

Table 5.7 provides the initiation and termination criteria for aerial surface dispersant use. Table 5.8 provides the initiation and termination criteria for vessel-based surface dispersant use.

Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.7 Surface dispersant application– Aerial

Surface Dispersant– Aerial	
Initiation	Selected as primary response measure by DIMT through IAP process for a Level 2/3 crude oil spill, or as directed by relevant Control Agency
Aim	• Reduce the amount of hydrocarbons on the surface to mitigate exposure risks of sensitive offshore, inshore and shoreline receptors. • Reduce the amount of hydrocarbons ashore.
Termination	The strategy is no longer practical and/or beneficial (e.g., poor dispersant amenability, thin surface oil thickness) as a response measure by the DIMT and terminated as per the IAP.
Documents	NatPlan NP-POL-004: National Plan Register of OSCAs for Maritime Response Use International Petroleum Industry Environmental Conservation Association (IPIECA) Dispersants: surface application, International Oil & Gas Producers Association (IOGP) Report 532, 2016 Revision

Table 5.8 Surface dispersant application– Vessel

Surface Dispersant– Vessel	
Initiation	Selected as secondary response measure by DIMT through IAP process for a Level 2/3 crude oil spill, or as directed by relevant Control Agency
Aim	• Reduce the amount of hydrocarbons on the surface to mitigate exposure risks of sensitive offshore, inshore and shoreline receptors. • Reduce the amount of hydrocarbons ashore.
Termination	The strategy is no longer practical and/or beneficial (e.g., poor dispersant amenability, thin surface oil thickness) as a response measure by the DIMT and terminated as per the IAP.
Documents	NatPlan NP-POL-004: National Plan Register of OSCAs for Maritime Response Use IPIECA Dispersants: surface application, IOGP Report 532, 2016 Revision

5.4 Containment and Recovery

Booms and skimming equipment can be used to create physical barriers on the water surface to contain and recover the oil to remove or minimise the risk of oil contacting environmental, social and cultural sensitivities. This strategy is often used in the nearshore environment. Once contained, an attempt to recover the hydrocarbons from the surface waters can be undertaken.

The Operational NEBA assessment will consider the level of benefit or impact to sensitive receptors of the identified Protection Priority Areas (Section 4.4) and any other locations predicted to be contacted by the spill. This will consider the predicted trajectory of spill with respect to the location of key receptors, and the temporal variation in sensitivity of these receptors, and make use of forecast modelling of the spill with and without dispersants to inform the assessment. Further information is provided in Appendix B.

Table 5.9 provides the initiation and termination criteria for surface dispersant use. Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.9 Containment and recovery– implementation guidance

Containment and Recovery	
Initiation	Selected as secondary response measure by DIMT through IAP process for a Level 2/3 crude oil spill.
Aim	To reduce the amount of oil impacting sensitive receptors and shorelines
Termination	The Monitor and Evaluate Response Strategy indicates hydrocarbons no longer predicted or observed to impact sensitive receptors and shorelines, or the strategy is assessed as no longer practical as a response measure by the DIMT and terminated as per the IAP.
Documents	IPIECA At-sea containment and recovery, IOGP Report 522, 2016 Revision

5.5 Shoreline Protection and Deflection

Shoreline protection and deflection is part of an integrated nearshore and shoreline response to be controlled by the relevant Control Agency. EOG will undertake first-strike protection and deflection activities as required and will direct resources (equipment and personnel) for the purposes of shoreline protection to the relevant Control Agency. The information provided here is included for planning purposes and represents EOG's first-strike response for protection and deflection activities.

Table 5.10 provides the initiation and termination criteria for shoreline protection and deflection. Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.10 Shoreline protection and deflection

Shoreline Protection and Deflection	
Initiation	Selected as secondary response measure by DIMT through IAP process for a Level 2/3 crude oil spill, or as directed by relevant Control Agency
Aim	To reduce the amount of oil impacting shorelines or coastal sensitivities
Termination	Monitor and Evaluate Response Strategy indicates hydrocarbons no longer predicted or observed to impact the identified priority protection area or the strategy is assessed as no longer practical as a response measure by the DIMT and terminated as per the IAP.
Documents	OSRA TRPs

5.6 Shoreline Clean-up

Shoreline clean-up is part of an integrated nearshore/shoreline response to be controlled by the relevant Control Agency(ies). EOG will undertake first-strike activations as triggered (refer below), until such time as Control Agency/ies assume control. Upon assumption of Control Agency responsibilities, they will direct resources (equipment and personnel) provided by EOG for the purposes of shoreline clean-up.

Several shoreline types may be impacted by oil, which will require tailored cleaning methods. The most appropriate clean-up method will be assessed and identified by the DIMT, the relevant

Control Agency and response team members (e.g., SCAT) in the IAP at the start of each operational round.

Each shoreline clean-up response activity will be assessed via a NEBA at each potentially impacted sensitive shoreline with inputs from relevant organisations (e.g., DBCA, WA DoT, NT DEPWS, TEMC, AMOSC, AMSA), the Monitor and Evaluate (operational monitoring) information and known key shoreline sensitivities and receptors as described in the EP, the OSRA and Appendix E. The decision to undertake shoreline clean-up for a particular shoreline segment will be documented within the operational NEBA and incorporated into the IAP if undertaken.

Table 5.11 provides the initiation and termination criteria for shoreline clean-up. Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.11 Shoreline clean-up

Shoreline Clean-up	
Initiation	Selected as secondary response measure by DIMT through IAP process for a Level 2/3 crude oil spill, or as directed by relevant Control Agency.
Aim	Removal of hydrocarbons from impacted shorelines: • To accelerate shoreline recovery • To reduce further impacts to the environment including wildlife and humans • To reduce re-mobilisation of hydrocarbons to marine waters from the shore due to tides and waves
Termination	Clean-up activities can have no further benefit to reducing long lasting impacts to environmental and social sensitivities caused by the spill. This criteria will only be met with consultation from stakeholders and the relevant Control Agency.
Documents	OSRA mapping TRPs Beehive-1 OSM BIP

5.7 Oiled Wildlife Response

The key plan for OWR in WA is the WA Oiled Wildlife Response Plan (WAOWRP). The WAOWRP has been developed by DBCA and AMOSC to define the minimum standards for OWR in WA. The WAOWRP can also be used for guidance on OWR in Commonwealth waters. If the WAOWRP is activated, a Wildlife Division Coordinator (WDC) will be established by WA DoT and will liaise with the DIMT to identify and coordinate the necessary OWR functional units of the Oiled Wildlife Division (OWD). The OWAs and WDC will provide advice to the DIMT on the level of OWR required and EOG will ensure provision of resources to support OWR operations.

The key plan for OWR in the NT is the NT Oiled Wildlife Response Plan (NTOWRP). The NTOWRP was produced by AMOSC with input from Shell Australia, Conoco Phillips and Inpex to define the minimum standards for OWR in the NT.

Table 5.12 lists the agency classifications for OWR.

Table 5.12 OWR jurisdictional responsibilities

Jurisdiction	Control Agency	Jurisdictional Agency
Commonwealth waters	EOG	Not applicable
WA waters	WA DoT*	DBCA
NT waters	TEMC	DEPWS

* Lead IMT for OWR when spill occurs in both Commonwealth and WA waters.

For OWR in WA/NT waters, EOG will provide all necessary resources to assist the Control Agencies (initially through its access to AMOSC oiled wildlife resources). AMOSC (through AMOSPlan) has a combination of owned and operated equipment, call-off contracts with suppliers and Oiled Wildlife Advisors (OWAs). Industry responders are also available through AMOSC mutual aid arrangements.

For spills contained solely in Commonwealth Waters, AMOSC would provide the above resources to the DIMT and be supported by the WA DCBA and/or the NT DEPWS. The decision to implement OWR will be made by the DIMT with advice from OWAs based on information from the Monitor and Evaluate Response Strategy, the OSM and the operational NEBA.

Table 5.13 provides the initiation and termination criteria. Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.13 Oiled wildlife response

Oiled Wildlife Response	
Initiation	Selected as secondary response measure by DIMT through IAP process for a Level 2/3 crude oil spill, or as directed by relevant Control Agency
Aim	Safely and effectively capture oiled wildlife for treatment and subsequent rehabilitation and release. Prioritise treatment of priority species of conservation value and to carry out humane triage operations when necessary and resources are limited. Prevent (e.g., through hazing) oiling of wildlife threatened by slicks.
Termination	Relevant Jurisdictional Authority is satisfied that OWR efforts are no longer required and accepts DIMT request to terminate the response.
Documents	WAOWRP NTOWRP AMOSPlan NatPlan

5.8 Operational and Scientific Monitoring

EOG has developed an Operational and Scientific Monitoring Bridging Implementation Plan (OSM BIP) (996161-2022-Beehive#1-OSM BIP) (Appendix C), aligned to the Joint Industry Operational and Scientific Monitoring Plan Framework (APPEA 2021), which will be implemented in the event of a Level 2/3 spill.

A number of Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs) form part of the Joint Industry Framework and provide standardised guidance on aims, initiation and termination criteria, monitoring design, resource requirements and reporting procedure. The

OSM BIP integrates with the Beehive-1 EP and OPEP and describes how the framework applies to EOG's activities and spill risks.

Appendix C of the OPEP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

5.9 Waste Management

The implementation of spill response strategies may generate significant amounts of waste that will require rapid management, storage, transport and disposal. Appropriate waste management is required during implementation of spill response options to not inhibit clean-up activities or further impact the environment. Types of waste to be managed in the event of a Level 2/3 spill will likely include:

- Contaminated hard waste (sand, rocks, vegetation, etc.);
- Liquids (hydrocarbons and contaminated water); and
- Contaminated materials, personal protective equipment (PPE) and other consumables.

All solid wastes will be managed, containerised and transported onshore for recycling and disposal by licensed waste contractors. All hazardous waste materials will be stored in appropriate containers as per requirements of the safety data sheet (SDS) for each substance, and in line with all applicable regulations. The type and amount of waste generated during a spill response will vary depending on the spill type/characteristics, volume released, and response strategies implemented. To account for this potential variability, waste management (including handling and capacity) needs to be scalable to allow a continuous response to be maintained.

Where EOG is the Control Agency (i.e., in Commonwealth waters), or at the request of the designated Control Agency, EOG will engage its contracted Waste Service Provider (WSP) to provide sufficient waste receptacles to store collected waste and manage oily waste collection, transport and disposal associated with spill response activities. The WSP will arrange for all personnel, equipment and vehicles to carry out these activities from nominated collection points to the final disposal points.

Where the WA DoT is the Control Agency, EOG will provide a Facilities Support Officer to the WA DoT IMT Logistics Unit to support in coordinating waste management services. Where the NT DEPWS is the Control Agency, EOG will provide support to the NT Waste Management Coordinator.

Table 5.14 provides the initiation and termination criteria. Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.14 Waste management

Waste Management	
Initiation	Selected as response measure by DIMT through IAP process for a Level 2/3 crude oil spill, or as directed by relevant Control Agency
Aim	Removal of waste hydrocarbons generated from various oil spill responses (e.g. source control, containment and recovery, protection and deflection and shoreline clean-up): • To support spill site and shoreline clean-up recovery • To reduce further impacts to the environment including wildlife and humans • To reduce re-mobilisation of hydrocarbons to marine waters from the shore due to tides and waves
Termination	Waste management activities no longer required as oil spill response arrangements (containment and recovery, shoreline protection and deflection, and shoreline clean-up) have no further benefit to long lasting impacts to environmental and social sensitivities caused by the spill. This criterion will only be met with consultation from stakeholders and the WA DoT.
Documents	OSRA. AMSA Marine Order 32 – Cargo Handling Equipment 2011. International Maritime Organisation (IMO) MSC/Circ.860 Guidelines for the Approval of Offshore Containers Handled in Open Seas. IPIECA Guidelines for Oil Spill Waste Minimisation and Management (IPIECA-OGP, 2014). DNV 2.7-1 certified units.

5.10 Forward Operations

The objective of this response strategy is to assist the DIMT in planning the oil spill response activities in the spill zone by assisting in the development of incident action plans, providing situational briefings/debriefings, overseeing field operations, managing rosters, and providing support services. Personnel within the forward command post will also maintain liaison with local emergency service organisations, industry, and other government departments active in the spill zone.

For a significant Level 2/3 response requiring coordination of resources deployed to the field, EOG will set up a Forward Operations Base (FOB) and Marine Operations Base (MOB) at Darwin Port and/or other appropriate locations as agreed with the WA and/or NT Control Agency.

Table 5.15 provides the initiation and termination criteria. Chapter 9 of the EP lists the EPO, EPS and measurement criteria for the implementation of this strategy. EPOs, EPSs and measurement criteria for Response Strategy preparedness are included in Appendix B.

Table 5.15 Forward operations

Waste Management	
Initiation	Selected as response measure by DIMT through IAP process for a Level 2/3 crude oil spill, or as directed by relevant Control Agency
Aim	Provide forward support to field response teams.
Termination	Forward operations no longer required. This criterion will only be met with consultation from stakeholders and the relevant Control Agencies.

6 OPEP Resourcing

6.1 Drilling Incident Management Team (DIMT)

A response to a Level 2 or Level 3 spill will require specialist skills for an extended period. The potential peak DIMT resourcing requirements to manage the response in the event of WCD scenario are described in Appendix A.

6.2 Response Strategies

Appendix B provides a detailed assessment of the appropriate response strategies resource needs to respond to the identified WCD scenarios associated with the activity. It includes:

- A summary of EOG's drilling activities in the Joseph Bonaparte Gulf;
- A summary of the WCD scenarios;
- Stochastic and deterministic modelling results providing the basis of design (BOD) for field capability assessments;
- The Strategic NEBA undertaken to select the appropriate response strategies;
- Assessments of the response needs for each response strategy based on the WCD scenarios;
- A description of the field capability and arrangements needed to implement the selected response strategies;
- An evaluation of response capability to implement each suitable response strategy (inclusive of source control) in an effective and timely manner, including an assessment of personnel, equipment, procedures both internal to EOG and from State and National resources and OSROs;
- Details of response timings for each response strategy; and
- Spill response logistical arrangements.

6.3 Operational and Scientific Monitoring

Appendix C details the resource requirements for operational and scientific monitoring and demonstrates the required capability.

6.4 Cumulative Resource Requirements and Demonstration of Capability

EOG's demonstration of resourcing capacity to meet the cumulative requirements of the DIMT and the Response Strategies is included in Appendix D.

7 Spill Response Termination

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

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

A NEBA will be conducted to inform the decision-making process. Termination criteria for each response strategy are defined in Section 5. Upon conclusion of the spill response activity, the DIMT will complete the following tasks:

- Prepare detailed reports and collate all documents;
- Report on the performance objectives of each individual spill response that was mobilised;
- Undertake an inventory of consumables and prepare accounts;
- Arrange for the return of equipment;
- Arrange for the refurbishment of consumed equipment;
- Conduct an investigation into the cause of the incident and report to relevant authorities; and
- Assess long-term environmental monitoring requirements.

8 OPEP Administration

8.1 OPEP Training

All personnel onboard the MODU and support vessels are trained in the application of the relevant SMPEP. Regular SMPEP drills and exercises are carried out on the MODU in accordance with the SMPEP to maintain the crew's knowledge of response equipment and incident response procedures. This verifies emergency response efficiency, effectiveness of procedures and detects any failure in equipment. These drills include, but are not limited to, spill response, collision, grounding, fire and explosion. All drills are documented, debriefings held, and corrective actions identified (including revisions to the SMPEP) and tracked to completion by the MODU OIM.

All nominated DIMT personnel in this OPEP will be trained to an appropriate level to undertake their role in its implementation. Competency requirements for the personnel and support resources that will fill DIMT roles are outlined in Appendix A. Competency requirements for the operational response personnel are outlined in Appendix B. Competency requirements for key roles associated with OSM implementation are detailed in Section 11.3 of the Joint Industry OSM Framework. Competency requirements for the Source Control Team will be specified in the SCERP and will be developed in conjunction with WWC.

A briefing on the BAOAC will be provided to relevant response personnel such as helicopter pilots that can assist with the initial assessment of a spill in the event of an incident. All personnel will receive Introduction to Oil Spill Prevention and Response (OSPR) training specific to the Beehive-1 OPEP.

8.2 OPEP Testing

In accordance with Regulation 22(12)(13)(14) of the OPGGS(E), the response arrangements will be tested:

- When they are introduced;
- When they are significantly amended;
- Not later than 12 months after the most recent test;
- If a new location for the activity is added to the EP after the response arrangements have been tested, and before the next test is conducted – testing the response arrangement in relation to the new location as soon as practicable after it is added to the plan; and
- If a facility becomes operational after the response arrangements have been tested and before the next test is conducted – testing the response arrangements in relation to the facility when it becomes operational.

Table 8.1 shows the exercise and training schedule. Two separate Level 3 spill incident desktop exercises will be undertaken to evaluate the effectiveness of oil spill incident response from a source control perspective and an overall incident management perspective by simulating the first several hours of an incident. Table 8.1 shows the key teams tested and the objectives for each type of test.

Table 8.1 OPEP exercise and training schedule for oil spill response personnel

Timing	Type of test	Objective	Team
3 months prior to spud	Familiarity training	Familiarisation sessions with Beehive-1 OPEP, SCERP.	• Perth DIMT ICs and Section Chiefs • Darwin FOB Leader • EOG CRT Liaison • AMOSC • OSRL • RPS
3 months prior to spud	Computer based	Test of hubbed DIMT support including remote DIMT Members, AMOSC, OSRL hubbed Support.	DIMT / CRT / AMOSC / OSRL
2 months prior to spud	Desktop Exercise	Beehive-1 LoWC exercise with focus on source control responses. • Practice activation of Source Control Branch Director functions. • Validate resourcing assumptions for Perth-based Source Control Branch Director role. • Validate resourcing assumptions for Houston based Source Control Advisory personnel. • Validate Relief Well Planning and execution. • Validation of Relief Well Rig / Vessel tracking software (Sea / Response). Validate SCERP Logistics Plan.	• DIMT Ops Section Chief • EOG CRT Liaison • Source Control Branch Director • WWC Houston
6 weeks prior to spud	Desktop Exercise	• Beehive-1 LoWC exercise with focus on initial reactive phase response actions. • Test establishment of DIMT, EOG CRT and FOB. • Test incident reporting protocols in relation to both internal and external requirements. • Test activation of OSRO's and readiness to mobilise personnel and equipment within specified timeframes as detailed within the OPEP. • Test communications with OSROs including arrangements for remote working. • Test DIMT communications and interface relationships with WA DoT and NT IMT. • Test activation of IMT support personnel to WA DoT and NT IMT. • Development of an IAP for Day 1 response in Commonwealth Waters.	• DIMT • EOG CRT • AMOSC • OSRL • RPS (OSM Services) • WA DoT • NT DEPWS*

Timing	Type of test	Objective	Team
		• Validate EOG capability to support a potential shoreline response in WA State NT Jurisdiction. • Validate capability to implement the OSMBIP. • Test arrangements for the emergency contact of indigenous stakeholders. • Test arrangements for integration of indigenous stakeholders into shoreline response activities.	
Pre-spud	Communications Test	• Communication & notification to test call-out response from MODU, including internal and external support. • Check currency of emergency contact numbers to ensure they are up to date. • Test DIMT call-out and messaging process for key contacts. • Test availability timeframes (within COVID restrictions if applicable).	• DIMT • EOG CRT • MODU IMT • AMOSC • OSRL • RPS (OSM Services) • WA DoT • NT DEPWS*

* if available

8.2.1 Evaluation of Effectiveness of Response Arrangements

Exercise evaluation of a functional exercise will be undertaken by selected external exercise evaluators and specialist incident management /source control training providers. The evaluation will consider if the exercise objectives have been achieved and include:

- If IMT roles and responsibilities were undertaken adequately to manage a WCD (LoWC) event;
- If key decision/trigger points were identified;
- If any resource issues were identified;
- If the SCERP and the DIMT framework support an effective response to a LoWC event;
- If the interface and support between Houston and Perth SCS resources was effectively managed;
- If participants within the SCS were familiar with the relevant SCERP components; and
- Lessons learned throughout the exercise and during the post exercise debrief will be recorded including identified strengths and areas for improvement.

8.2.2 Response Testing Recommendations

Any actions from exercises are tracked and closed out via the LPM Project Action Tracking process and lessons learnt incorporated into updated revisions of the OPEP and supporting documents.

8.3 OPEP Review and Updates

This OPEP will be reviewed and updated as necessary in response to one or more of the following:

- When major changes occur that may affect the spill response coordination or capabilities;
- Changes to the EP that affect oil spill response coordination or capabilities (e.g. a significant increase in spill risk);
- If improvements are identified after routine testing of the OPEP; and/or
- After an actual Level 2 or 3 spill.

The extent of changes made to the OPEP and resultant requirements for regulatory resubmission will be informed by the OPGGS(E) (see Section 10.10.3 of the EP).

EOG will submit a revised OPEP to NOPSEMA as soon as practicable where there are significant changes to the content of the OPEP or capability to respond to an incident. Any significant changes in the content of the OPEP or capability to respond to an incident will be captured through EOG’s Management of Change (MoC).

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Acronyms/Abbreviations

Acronym	Definition
AEP	Australian Energy Producers (formerly APPEA)
ALA	Atlas of Living Australia
ALARP	As Low as Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
APPEA	Australian Petroleum Production and Exploration Association
AS/NZS	Australian Standard/New Zealand Standard
ASAP	As Soon As Possible
BAOAC	Bonn Agreement Oil Appearance Code
BIA	Biologically Important Area
BOM	Bureau of Meteorology
BOP	Blow Out Preventer
CHARM	Chemical Hazard and Risk Management
CMP	Crisis Management Plan
CoC	Chain of Custody
CRT	Crisis Response Team
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cth	Commonwealth
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DBCA	Western Australian Department of Biodiversity Conservation and Attractions
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEPWS	NT Department of Environment, Parks and Water Security
DFAT	Department of Foreign Affairs and Trade
DIMT	Drilling Incident Management Team
DISER	Department of Industry, Science, Energy and Resources
DS	Drilling Superintendent
DSV	Drilling Supervisor
EIA	Environmental Impact Assessment
EMBA	Environment that May Be Affected

Acronym	Definition
EOG	EOG Resources Australia Block WA-488 Pty Ltd
EP	Environment Plan
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPO	Environmental Performance Outcome
ERA	Environmental Risk Assessment
ERP	Emergency Response Plan
ERT	Emergency Response Team
EUL	Environment Unit Lead
FOB	Forward Operating Base
GIS	Geographic Information System
GPS	Global Positioning System
HQ	Hazard Quotient
HSE	Health, Safety and Environment
HSEMS	Health, Safety and Environment Management System
IAP	Incident Action Plan
IAPP	International Air Pollution Prevention
IBA	Important Bird Area
IC	Incident Commander
ICR	Incident Command Room
ICS	Incident Command System
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organisation
IMT	Incident Management Team
IOGP	International Oil & Gas Producers Association
IPIECA	International Petroleum Industry Environmental Conservation Association
ITOPF	International Tanker Owners Pollution Federation
IUCN	International Union for the Conservation of Nature
JSCC	Joint Strategic Coordination Committee
KEF	Key Ecological Feature
LoWC	Loss of Well Control
LPM	Labrador Petro-Management Pty Ltd
MARPOL	International Convention for the Prevention of Pollution from Ships 1973, as

Acronym	Definition
	modified by the Protocol of 1978
MDO	Marine Diesel Oil
MFO	Marine Fauna Observer
MMscfd	Million standard cubic feet per day
MNES	Matter/s of National Environmental Significance
MNP	Marine National Park
MO	Marine Order
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit
MoU	Memorandum of Understanding
NatPlan	National Plan for Maritime Environmental Emergencies
NEBA	Net Environmental Benefit Analysis
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NRT	National Response Team
NT	Northern Territory
NT DEPWS	NT Department of Environment, Parks and Water Security
OHS	Occupational Health and Safety
OIM	Offshore Installation Manager
OMP	Operational Monitoring Plan
OPEP	Oil Pollution Emergency Plan
OPGGS Act	*Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Cth)
OPGGS(E)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OSC	On-scene Commander
OSM	Operational and Scientific Monitoring
OSM BIP	Operational and Scientific Monitoring Bridging Implementation Plan
OSMP	Operational and Scientific Monitoring Plan
OSPAR	Oslo-Paris Conventions
OSRA	Oil Spill Response Atlas
OSRL	Oil Spill Response Limited
OSRO	Oil Spill Response Organisation
OSRT	Oil Spill Response Team
OSTM	Oil Spill Trajectory Modelling
OWD	Oiled Wildlife Division

Acronym	Definition
OWR	Oiled Wildlife Response
PMS	Planned Maintenance System
POLREP	Pollution Report
PPE	Personal Protective Equipment
PSI	Pounds per square inch
PSZ	Petroleum Safety Zone
QA/QC	Quality Assurance and Quality Control
Ramsar	Convention on Wetlands of International Importance especially as Waterfowl Habitat
Resilient	Resilient Solutions Pty Ltd
ROV	Remotely Operated (underwater) Vehicle
RPS	RPS AAP Consulting Pty Ltd
SAP	Sampling and Analysis Plan
SCAT	Shoreline Clean-up and Assessment Technique
SCERP	Source Control Emergency Response Plan
SCRI	Steering Committee Source Control Response Industry
SIMOPS	Simultaneous Operations
SITREP	Situation Report
SMP	Scientific Monitoring Plan
SMPEP	Shipboard Marine Pollution Emergency Plan
SOP	Standard Operating Procedure
SRT	State Response Team
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
TMPC	Territory Marine Pollution Controller
UK	United Kingdom
VOC	Volatile Organic Carbon
WA	Western Australia
WA DoT	WA Department of Transport
WDC	Wildlife Division Coordinator
WOMP	Well Operations Management Plan
WWC	Wild Well Control

APPENDICES

Appendix A Drilling Incident Management Team (DIMT) Requirements

OPEP Appendix A: Drilling Incident Management Team (DIMT) Capability Requirements

Beehive-1 Exploration Drilling

WA-488-P

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Rev 3

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A	14/10/2022	Issued for client review	CR	GP, PS, PH	GP

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1 Introduction

1.1 Purpose

The purpose of this appendix is to:

- Assess the Drilling Incident Management Team (DIMT) capability requirements to mobilise and maintain the oil spill response field capability for a credible worst-case discharge (WCD) oil pollution emergency (i.e., a Loss of Well Control (LoWC) scenario), including initial ramp-up to peak/plateau and continuing for a 20-week response period.
- Provide an overview of EOG's spill response arrangements, including the integration and linkages between the DIMT, the EOG Crisis Response Team (CRT), the DIMT Source Control Branch, the Oil Spill Monitoring (OSM) Management Team, the field-based Emergency Response Teams (ERTs), and cross jurisdictional arrangements.
- Provide Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria related to the DIMT/Source Control capability and arrangements for oil spill response.

The demonstration of EOG's capability to meet these requirements is provided in Appendix D of the OPEP.

1.2 Methodology

EOG commissioned the Australian Marine Oil Spill Centre (AMOSC) to prepare a justification statement to support the demonstration of the capacity and capability of the DIMT and Operational Teams (OT) for the response strategies based on a WCD LoWC scenario. The objectives of the report were to:

- Develop a scalable time stepped approach identifying the necessary resources to tactically implement the identified response strategies for the worst-credible discharge scenario.
- Determine sensitivities likely to be impacted in a worst-credible scenario based on deterministic modelling and propose personnel and equipment resourcing required to support a response to counter these impacts.
- Demonstrate the scalability of the IMT structure size (time stepped, based on predicted operational oil spill response requirements, using EOG's IMT structure) and the size of the IMT and FT commensurate to the operational requirements for a worst-credible scenario. Using known resources gaps to be identified.
- Reference appropriate best practice guidelines (such as IOGP/IPIECA, API, AEP, AMOSC). in support of the IMT and operational team structure.

A WCD credible scenario for an oil spill was a 786,858 m^3 surface release of crude oil (Jabiru crude used as analogue) over 77 days from a LoWC event was used for planning purposes. Stochastic and deterministic oil spill modelling (Appendix 6 of the EP) was used to inform the risk assessment (see Section 8.7 of the EP) which was then used to identify priority protection areas (see Section 5.4 of the *OPEP Appendix B: Basis of Design and Field Capability*).

A Strategic Net Environmental Benefit Analysis (NEBA) was undertaken (Section 5.2 of the *OPEP Appendix B*) to identify appropriate response strategies (Section 5.5 of the *OPEP Appendix B*). Estimates of response resources (personnel and equipment) requirements for the timely and effective implementation of each response strategy for the duration of a response were then quantified (*OPEP Appendix B: Basis of Design and Field Capability*).

Deterministic modelling of a WCD (maximum shoreline loading) showed initial contact with shorelines would occur within 11 days during the transitional period, with shoreline response predicted to be required at seven sensitive shoreline receptors within the first three weeks. A further ten sites would require response within four weeks with another 18 sites requiring shoreline response after seven weeks.

This information was then used to identify the the DIMT and OT structure and resource ramp up requirements for a LoWC, sustained for a 20-week response period.

2 EOG's Oil Spill Response Arrangements

2.1 Overview

EOG's oil spill response management arrangements align with the Australasian Inter-Service Incident Management System (AIIMS) and have three levels of organisational control: tactical (Tier 1), operational (Tier 2) and strategic (Tier 3). This allows for a standardised and consistent approach to emergency response across EOG and the drilling, MODU and vessel contractors, Oil Spill Response Organisations (OSROs) and relevant State, Territory and Commonwealth government agencies. Figure 2.1 outlines the arrangements for this OPEP.

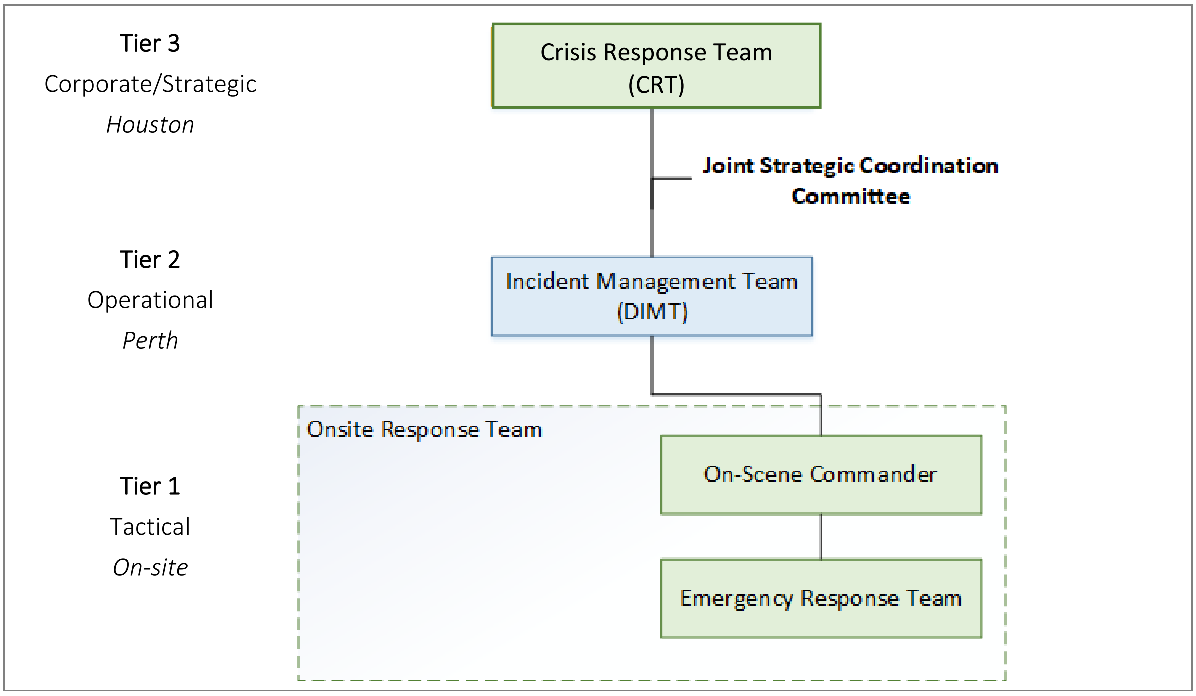

Figure 2.1 Beehive-1 oil spill response management arrangements

2.2 On-site Response

The tactical on-site response includes the vessel's and/or MODU's Emergency Response Teams (ERTs). The on-site response teams are responsible for the initial responses to a spill and initiation of the OPEP and the vessel SMPEP and/or the MODU ERP. The On-Scene Commander (OSC) (either the Vessel Master or MODU Offshore Installation Manager (OIM)) notifies the Drilling Supervisor (DSV) who notifies the Perth-based Drilling Incident Management Team (DIMT) and maintains ongoing communication.

As the situation escalates, the DIMT would be activated followed by the Houston-based Crisis Response Team (CRT). The DIMT and CRT will be activated in the event of a Level 2/3 hydrocarbon spill regardless of the type of spill or jurisdiction.

2.3 Drilling Incident Management Team (DIMT)

After consulting with the OSC, the Incident Commander (IC) will notify the core DIMT members to either standby or mobilise to the Incident Command Room (ICR). If the spill is classified as Level 2 or 3, the DIMT will scale appropriately in size and scope (operational and tactical levels, as applicable) to manage the impending response to the incident. The DIMT will conduct all relevant notifications, action any appropriate response plans and mobilise the required resources for the incident.

EOG has contracted Labrador Petro-Management Pty Ltd (LPM) to provide integrated drilling operations project management services for the Beehive-1 Drilling Program, including emergency response and incident management support. LPM will supply personnel to the Perth-based DIMT as well as a Drilling Supervisor (DSV) on board the MODU. Additional resources for the DIMT will be provided by EOG, AMOSC, OSRL, Core Group, and specialist third party contractors and consultants. The additional support includes personnel in Houston, Perth, Geelong and Melbourne providing support to the Forward Operations Base (FOB) in Darwin and the Operational Teams, consistent with the IPEICA Remote/Support Model as shown in Figure 2.2.

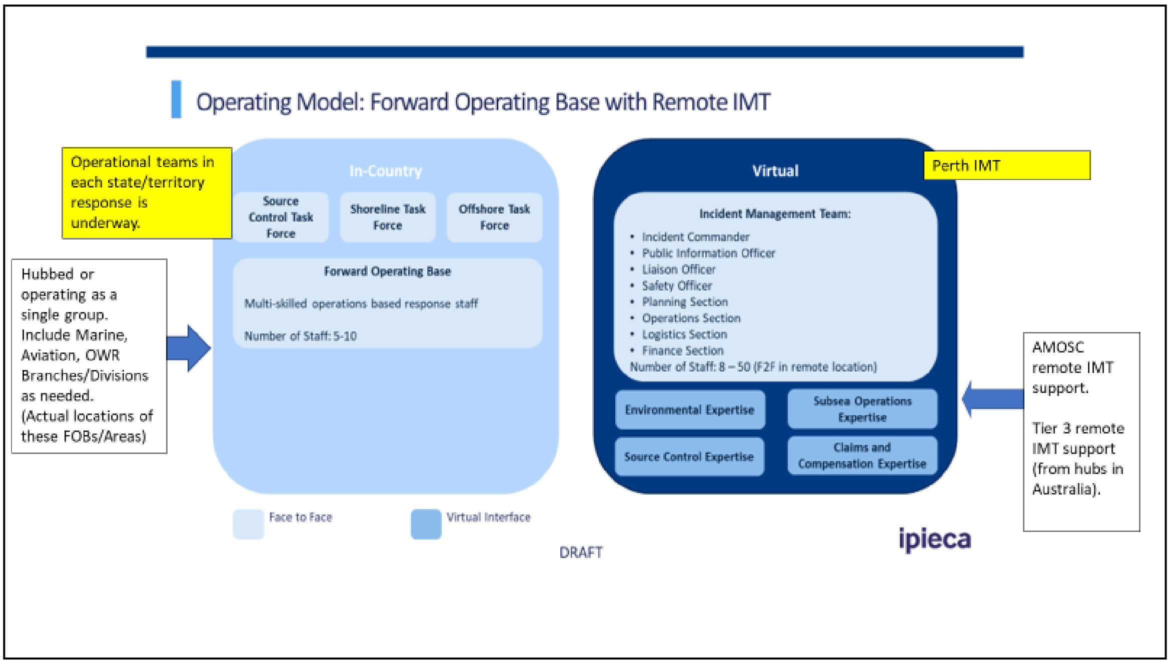

Figure 2.2 IPEICA Remote IMT Delivery Model

The DIMT is organised in accordance with the principles of the International Petroleum Industry Environmental Conservation Authority (IPIECA) Good Practice Guidelines – Incident Management System and designed to be scalable according to the particular response demands of the incident. The DIMT functions are consistent with the Australian Energy Producers (AEP) Guidance Document: Incident Management Teams Knowledge Requirements for Responding to Marine Oil Spills (APPEA, 2021).

The core DIMT members are on 24-hour call and can be stood up within 1 hour. Figure 2.3 shows the complete DIMT structure. The size and structure of the DIMT is expected to vary throughout the various stages of response and recovery dependant on the complexity of the incident. Table 2.1 outlines the key responsibilities, outputs and outcomes of the DIMT during a response. The DIMT is supported by:

- Public Information Officer - responsible for managing the DIMT related media issues for the response effort, in collaboration with the CRT.
- Legal Officer - provides legal advice for all actions undertaken or considered by the DIMT in response to the incident.

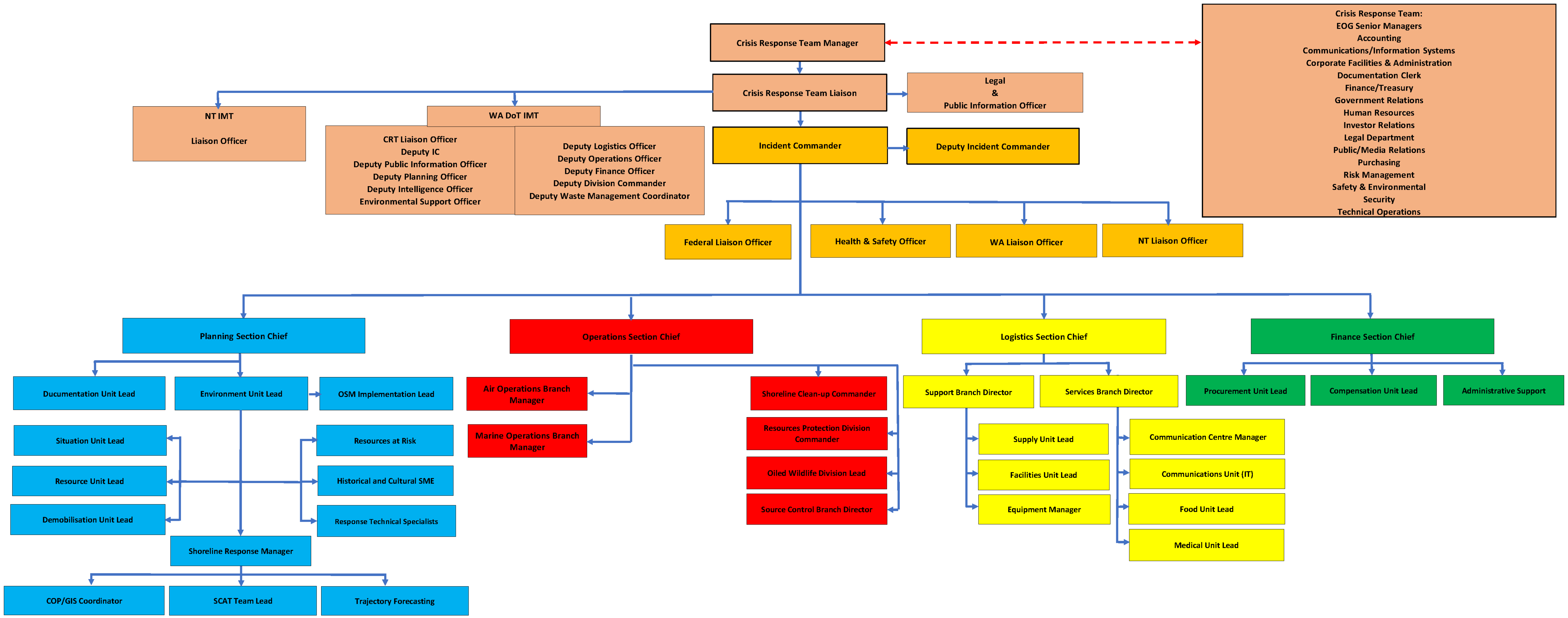

Figure 2.3 Complete DIMT Structure

Table 2.1 Expanded DIMT roles and responsibilities

DIMT Role	Job description	Outputs
Incident Commander (IC)	The IC leads the DIMT and is responsible for the overall response operations of the incident including: • Establishing command and taking control of the incident. • Activate the DIMT in accordance with the Beehive-1 OPEP and Bridging ERP. • Monitoring and reviewing safety and welfare. • Developing, implementing and monitoring the IAP. • Notifying the CRT. • Notifications as per Notification Plan. • Activate involvement of additional third parties. • Conclude and review emergency activities. • Supplying EOG personnel (or delegates) requested by the WA DoT consistent with Appendix 3 of the WA DoT Offshore Petroleum Industry Guidance Note (IGN) – Marine Oil Pollution: Response and Consultation Arrangements (July, 2020). • Supplying EOG personnel (or delegates) requested by the NT IMT.	Response operations tailored to the scenario and conditions presented at the time, consistent with the OPEP, EP, company policies and requirements of the National Plan.
Deputy Incident Commander	Deputises for the IC as required, directly supervises work of section chiefs and oversees the smooth implementation of the IMS. Oversees a particular portion of the response organisation.	As directed by the IC at the time.
Safety Officer	Provides support to the site safety officers; oversights the preparation, distribution and execution of the response safety plan; undertakes investigations of near misses/incidents; ensures technical expertise such as industrial hygienists, air monitoring specialists, etc – are deployed as needed.	Site risk assessments are in place and safety plan is in force across all of the response.
Federal Liaison Officer	Responsible for the management of company liaison into Commonwealth Government structures – OPICC, DIIS, relevant Minister's offices (Primary portfolio focus is Resources, secondary focus on Environment & Transport).	Facilitate the two-way exchange of critical situational and crisis management information b/w the title holder and commonwealth government. Daily one-on-one briefings & meetings as determined by the commonwealth.

DIMT Role	Job description	Outputs
WA/NT Liaison Officers	Responsible for the management of company liaison into State Government structures – State Control Agency and the Premier/Chief Minister's office.	Facilitate the two-way exchange of critical situational, crisis and incident management information b/w the title holder and state government. Daily one-on-one briefings & meetings as determined by the state.
Local Liaison Officer	Responsible for the management of company liaison into Local Government, local land managers, commercial, heritage and indigenous groups.	Facilitate the two-way exchange of critical situational, crisis and incident management information b/w the title holder and local bodies within the zone of predicted impact. Daily one-on-one briefings, town hall and small group meetings as determined as needed.
Planning Section Chief	The Planning Section is led by the Planning Section Chief who is responsible for: • Collecting, analysing and utilising incident information. • Engage other Section Chiefs to assist in response actions. • Organising incident response mobilisation/demobilisation. • Risk analysis of the incident and provision of specialist information (e.g. weather, spill behaviour). • Ensure that net environmental benefit analysis (NEBA) assessments are carried out appropriately to support the development of Incident Action Plans (IAPs). • Dissemination of incident information including to the media and public where required. • Coordination of surveillance flights. • Maintaining a record of communications and actions including resources requested/allocated/in use. • Liaises with the WA Department of Biodiversity, Conservation and Attractions (DBCA) Oiled Wildlife Advisor (OWA) and the NT Department of Environment, Parks and Water Security (DEPWS) OWA through the EOG OWA (provided by AMOSC).	Ensure that the planning process is adhered to, an IAP comprising all relevant sections is produced.

DIMT Role	Job description	Outputs
Documentation	Implement a record keeping and archival system to capture all documents, consistent with organisational and legal requirements.	Establish and maintain record keeping system including decision making logs (minutes of meeting, personal notes) and provide forms/formats of records as required by the organisation.
Environment Unit Lead	Discipline specialist responsible for providing specific information to assist with response. Responsible for disseminating relevant information from activity-specific EP and OPEP (and associated response documentation) to the DIMT to support IAP development and revision in a timely manner. Support initial notifications to regulators/stakeholders. Complete initial Operational NEBA. Support activation of monitoring and evaluation plan (i.e. satellite tracker buoys, satellite imagery, etc.) Conduct resources at risk assessment. Assist Planning Section Lead with development of IAP tasking for monitoring and evaluation and at-sea response strategies. Activate Operational and Scientific Monitoring (OSM) Management Team.	OSM BIP is enacted; NEBA completed/up-to- date, response is undertaken in accordance with the OPEP.
OSM Implementation Lead	Reports to the Environment Unit Leader. Implement OMS Bridging Implementation Plan (BIP). Commence notification/activation of OSM Contractors. Evaluate situational awareness information against OSM activation triggers to determine relevant operational monitoring programs (OMs) for immediate activation. Provide logistics with specifications of suitable OSM vessels/platforms.	
Trajectory Forecasting	Monitors and predicts the fate and weathering of the oil.	Regular (twice/three times daily) mapping data that displays predictions of future oil locations, and how the oil may change in chemical make up (weathering).
Historical & Cultural Subject Matter Specialist (SME)	Based on the trajectory and field observations, provides specialist advice around sensitivity impact for the deterministic NEBA.	Up to date NEBA; validate oil spill response strategies chosen; provide advice to operations teams on strategy selection.

DIMT Role	Job description	Outputs
Response Technical Specialist	Works with the enviro team to provide data on oil spill response strategy impacts on sensitivities; and that new/emerging technology is considered as part of the response.	Quality assure tactical strategy execution.
Resources at Risk	Based on the trajectory and field observations, completes the deterministic NEBA.	Up to date NEBA; validate oil spill response strategies chosen; provide advice to operations teams on strategy selection.
Situation Lead	Receipt and manage the information/data that is used to produce the COP and other information tools/displays. Responsible for collecting, processing and organising the display of information about the incident and the nature and status of the response operation. This will involve the use of status boards, maps and other items to enable the situational awareness for the DIMT members and supporting agencies, including NOPSEMA and the WA DoT and NT IMT.	Up to date COP; future COP. IMS system (computer or paper based) status boards and other records are on display as needed for decisions making.
Common Operating Picture (COP) Display / GIS Expert	Operates the GIS system that produces the COP	Up to date COP; future COP
Resource Unit Lead	Tracks resources that have been ordered/receipted/ dispatched	Up to date resource tracking available at any time.
Demobilisation Unit Lead	Development of a demobilisation plan that considers equipment, people and platform remediation and return/repair.	Production of a bespoke demobilisation plan.
Shoreline Clean-up and Assessment (SCAT) Team Lead	Leads the analysis of field data and the production of a shoreline treatment plan (STRs), along with the end point criteria for clean-up operations.	Shoreline treatment recommendations for affected/potentially affected shorelines are developed and disseminated to operations units.
Shoreline Response Programme Manager	Leads the development of the SRP plan, with the DoT. Ensures that inwards data flows are objectively analysed and appropriate STRs are developed and communicated to logistics/operational teams for execution.	Creating the SRP plan (with the DoT), acting as the single point of contact for the IMT on all shoreline- related issues.

DIMT Role	Job description	Outputs
Operations Section Chief	The Operations Section is led by the Operations Section Chief who is responsible for: • Development of spill response section of the IAP. • Notify most of the relevant organisations in the Notification Plan. • Coordinating spill response operations. • Engaging with other Section Chiefs to assist in response actions. • Mobilisation of OSRL and AMOSC resources if required. • Oversight of source control operations as detailed within the activity-specific Source Control Emergency Response Plan (SCERP).	Execute operations in line with the daily IAP. Draft the IAP for the following operational period.
Air Operations Branch Manager	Lead aviation operations. Draft and execute plans from the previous day (204s/Operational Briefing). Aerial dispersant operations.	Draft and execute Air operations Plan (ICS220); aerial dispersant plan (AMSA/AMOSC JSOP plan). Coordinate aerial assets in the field.
Marine Operations Branch Manager	Lead marine activities. Draft and execute plans from the previous day (204s/Operational Briefings/Operational Risk management plans). Marine dispersant operations.	Draft and execute marine operations plan (s) as they relate to the operations at the time. Coordinate marine assets in the field.
Oiled Wildlife Division Lead	In conjunction with the WA DoT and NT IMT, lead the implementation of industry equipment, materials and personnel for a OWR response. Work with planning to identify fauna that may be impacted by oiling (or response operations) and reduce / prevent the consequences on fauna.	Field activities, resourcing and facility support provided in aid of the OWR response.
Shoreline Clean-up Commander	In conjunction with the WA DoT and NT IMT, plan and lead the shoreline response operations	Tailored ICS 204, 204s and 204e (STRs) for each shoreline type by segment. Provide input to the safety documentation. Input into the production of maps and displays for operational teams. Work with Sit; Plan; Doc to provide current information. Monitor volumes of waste and concentrations of hydrocarbons to hard wastes.

DIMT Role	Job description	Outputs
Resource Protection Division Commander	In conjunction with the WA DoT and NT IMT, lead/provide input to the execution of nearshore protection activities (marine and shoreline). Draft and execute plans from the previous day (204s/Operational Briefings/Operational Risk management plans).	Draft and execute nearshore protection planning and execute plans from the previous day (204s/Operational Briefings/Operational Risk management plans).
Source Control (SC) Branch Director	The Source Control/Well Containment Team will operate under the direction of the Operations Section Chief. The Source Control Branch Director's responsibilities include: • Direct assessment and planning for source control actions. • Notifying Wild Well control (WWC) of the incident as per Notification Plan. • Development of source control section of the IAP. • Briefing and allocating operations personnel. • Management, supervision and monitoring of source control operations. • Assist in liaison with drilling and support contractors.	As per SC planning and guidance.
Logistics Section Chief	Ensures: • Development of logistics section of IAPs. • Provision of all facilities, services, support, persons and materials required for the response. • Particular focus on the provision of vessels and aircraft for spill response activities, spill response equipment and specially trained personnel for these tasks. • Waste disposal planning / resources • Estimate future service and support requirements. • Provision of technical advice to the Planning Section Chief.	Equipment, materials and other resources are appropriately sourced, deployed, maintained and serviced as required by the response.
Support Branch Director	The support branch is in charge of the logistics plans for the daily incident action plan. These plans cover the operations of Supply, Facilities, Ground and Vessel Support units.	Daily logistics planning completed.
Supply Unit Lead	Procurement of resources for the response (personnel, equipment & supplies).	Procurement matches the need identified by operations for daily taskings.

DIMT Role	Job description	Outputs
Facilities Unit Lead	Setup, maintenance and demobilisation of incident facilities. Includes the provision of accommodation and sanitation facilities.	Ensure that operating bases; the ICP; accommodation and other facilities are provided as needed and fit fir purpose.
Equipment Manager	Service, repair, and fuel for all equipment and gear.	Supply for the operation of (OSPR in particular) equipment and platforms.
Service Branch Director	Manages and runs the service aspects of the response - Communications, Medical and Food Units.	Service units operate effectively and efficiently as per the need at the time.
Communications Unit (IT) Manager	Run the communication networks and IT infrastructure critical for the response.	Effective communications from the IMT to the field, and intra-field communications. Ensure that all computer devices, networks, printers, etc work as they should.
Incident Command Centre Manager	Manage the Incident Command Centre	Works closely with facilities' management to ensure that the ICC is fit for purpose for an ongoing response.
Food Unit Lead	Put in place all of the catering and potable water requirements for the response.	Food and water as needed to the operational and management force.
Medical Unit Lead (includes infection control – COVID)	Provide expertise on medical issues as a result of the response; drafts and advises on operational issues from the execution of the Covid19 response plan.	Medical staff and expertise to assist develop and execute the safety risk management plan.
Finance Section Chief	The Finance and Administration Section is responsible for ensuring that finances are available to all areas that require the purchasing or hire of goods (e.g. equipment) and services (e.g. personnel, transportation) and to keep financial records of all spill response expenditures.	Accurate financial records keeping and daily cash 'burn rate' is tracked. Appropriate financial DOA is working amongst the IMT. Financial software/tracking system is in place with line items and cost centres established.
Procurement Unit (marine & aviation asset contracting)	Provides contractual support, leases and agreements with external parties.	Contractually enables the control agency to bring together all of the necessary third-party contractors to support the response.
Compensation Unit	Responsible for the administration of the claims process (collation of data and logging of claim) from third parties who may be affected by the response.	System in place to engage with affected parties so that they may log their claims (compensation).
Administration & Records	Provide administrative services (systems and facilities) to the IMT.	IMS software/paper-based system is used by all sections. Access to other software – databases, spreadsheet, internal SharePoint systems, etc, are in place.

2.4 Crisis Response Team (CRT)

The Houston-based Crisis Response Team (CRT) is responsible for the strategic management of EOG's response and recovery efforts in accordance with the EOG Crisis Management Plan (CMP). The CRT coordinates and manages threats to EOG's reputation and corporate requirements as a titleholder. It provides overall direction, strategic decision-making as well as providing corporate protection and support to activated response teams, and external communications related to government regulatory bodies, media liaison and related stakeholders.

The CMP will be activated by EOG's Senior Manager on the advice of EOG's Australian Operations Manager when they determine that an ongoing response to an incident has reached a crisis. The Senior Manager will then act as the CRT Manager throughout the duration of the crisis. The CMP outlines a coordinated response designed to provide effective communication within EOG, the families of affected individuals, to the public and to regulatory agencies. It provides a framework to assess and respond to the crisis and document the response. It assigns crisis management responsibilities and provides important contact information for everyone who might be needed for the response. The CRT has access to well control and oil spill response organisations through EOG's existing Master Services Agreements (MSAs) as detailed in the CMP. Figure 2.4 provides an overview of EOG's CRT organisational structure, including those people who are Senior Managers.

Chairman & CEO

Senior Managers/CRT Managers

President and Chief Operating Officer
Executive Vice President, Exploration & Production
Vice President & General Manager, International Division
Senior Vice President, Investor/Public Relations

Accounting	Communications/Information Systems	Corporate Facilities & Administration
Documentation Clerk	Finance/Treasury	Government Relations
Human Resources	Investor Relations	Legal Department
Public/Media Relations	Purchasing	Risk Management
Safety & Environmental	Security	Technical Operations

Figure 2.4 EOG's Crisis Response Team (CRT)

2.5 Source Control Branch

In the event of a LoWC event the Operations Section Chief will establish a Source Control Branch (SCB) under the command of the SCB Director.

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

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

The SCB Director role will be filled by Perth-based LPM (including Resilient Solutions Pty Ltd (Resilient) staff/consultants supported by Wild Well Control and EOG staff/consultants. The SCB will be responsible for:

- Relief well planning
- Directional drilling planning.
- Geophysical and geotechnical (G&G) data procurement and interpretation.
- Well kill strategies.

2.6 Operational and Scientific Monitoring (OSM) Implementation

The DIMT will be responsible for coordinating OSM activities, which will be led by the Planning Section, with support from each Section, in particular the Operations Section. For monitoring operations within WA and/or NT jurisdictions, the WA DoT and/or the NT TEMC (as the Controlling Agencies), will set monitoring priorities that EOG will implement with their oversight.

Figure 2.5 illustrates the structure of the Oil Spill Monitoring (OSM) Management Team during the response phase. The DIMT Incident Commander is ultimately accountable for managing the response operation, which includes this plan. Depending on the scale of the event, individual people may perform multiple roles; similarly, multiple people may share the same role.

OSM roles and responsibilities are listed in Section 10.13.2 of the AEP Joint Industry OSM Framework. The OSM Bridging Implementation Plan (OSM BIP) provides further detail and is included as Appendix C of the OPEP. Table 2.2 outlines the roles held by EOG and the OSM Services Provider relevant to DIMT capability. During the post-response phase, the Environment Unit Lead (EUL) and the OSM Services Provider will continue to be responsible for the coordination and delivery of monitoring plans.

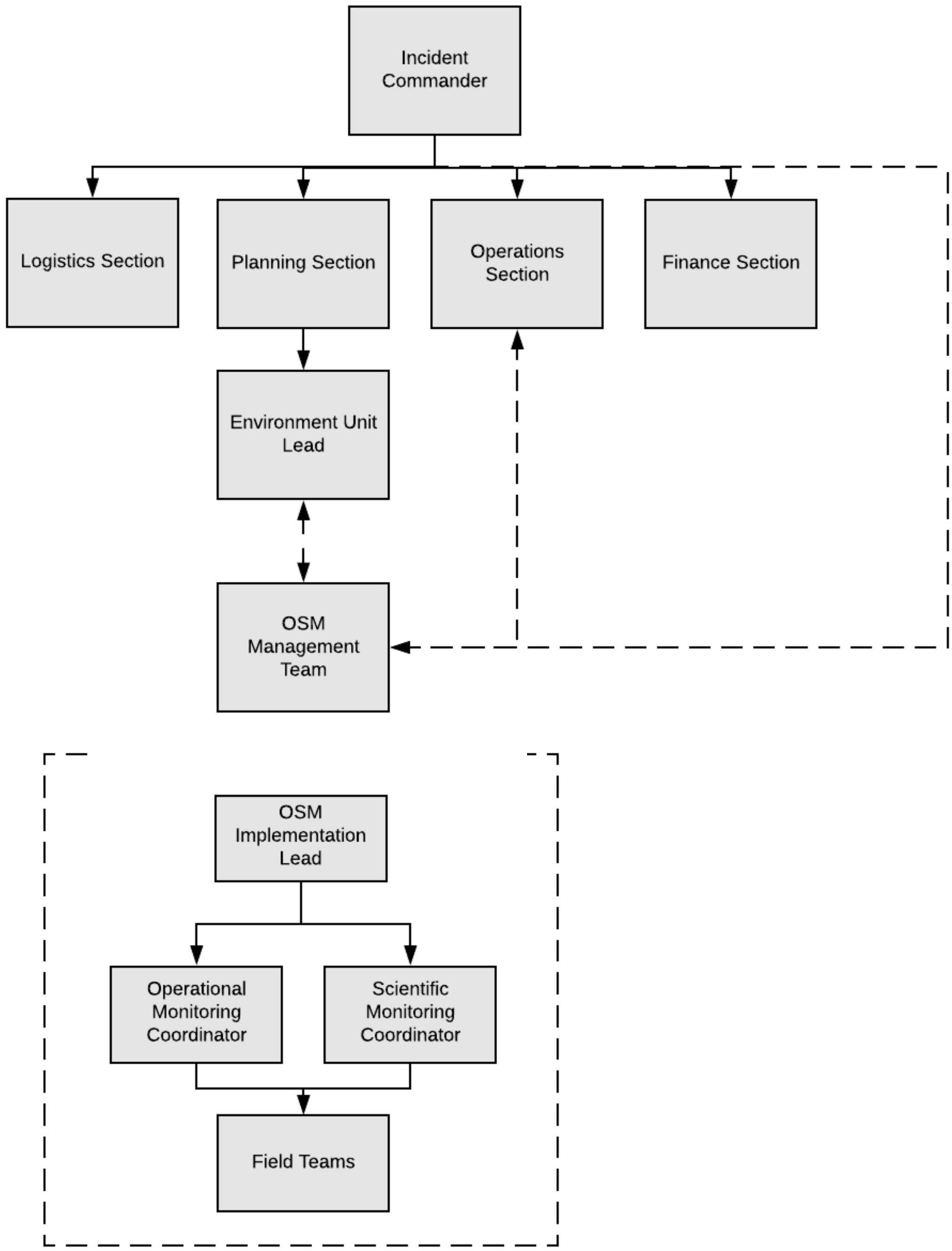

Figure 2.5 EOG's DIMT Structure with OSM Team

Table 2.2 Roles and responsibilities for OSM

Role	Held by
Environment Unit Lead (EUL)	EOG's Environmental Consultants
OSM Implementation Lead	OSM Service Provider
Operational Monitoring Coordinator	OSM Service Provider
Scientific Monitoring Coordinator	OSM Service Provider

2.7 Cross Jurisdictional Arrangements

Cross-jurisdictional arrangements are described in Section 2.3 of the OPEP.

2.7.1 Level 2/3 Petroleum Activity Spill entering WA Waters

At the request of the State Maritime Environmental Coordinator (SMEEC), EOG will be required to provide all necessary resources, including personnel and equipment, to assist the WA DoT's IMT in performing duties as the Control Agency for State waters response. This includes providing an initial 11 personnel to work within the WA DoT Incident Control Centre in Fremantle, no later than 8 am following the day of the request. It also includes providing personnel to serve in WA DoT's Forward Operating Base (FOB) no later than 24 hours following formal request by the SMEEC; WA DoT will in turn, provide EOG with Liaison Officer/s from WA DoT's command structure to sit within EOG's DIMT (Table 2.3).

Table 2.3 Personnel Requirements under the IGN*

From EOG to WA DoT	From WA DoT to EOG
CRT Liaison Officer	DoT Liaison Officer
Deputy Incident Controller	Media Liaison Officer
Deputy Intelligence Officer	
Environment Support Officer	
Deputy Planning Officer*	
Deputy Public Information Officer	
Deputy Logistics Officer*	
Deputy Finance Officer	
Deputy Operations Officer	
Deputy Waste Management Coordinator	
Deputy Division Commander	

* *Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements*.

2.7.2 Level 2/3 Petroleum Activity Spill entering NT Waters

EOG will provide a Liaison Officer to sit within the NT IMT to ensure uniformity between the NT IMT and EOG in the incident response.

2.8 DIMT Spill Response Objectives

Table 2.4 outlines the DIMT's spill response objectives during the initial ramp up for a WCD LoWC response. This is used to inform the DIMT Response Requirements Analysis in Section 3.

The EOG DIMT on site staff (Perth based) will be preparing an initial incident briefing sheet that comprises:

- Incident maps
- Summary of Incident & Current Actions
- Current Response Organisation
- Resources Summary, and
- Site safety & controls.

They will also complete the high-level components of the IAP that includes the Incident Briefing and Response Objectives. A small number of the EOG DIMT will be used through the night shift to finalise and progress activities that are not daylight dependant – these include the movement/forward deployment of plant and materials and elements required for Source Control.

AMOSC will be issued (under contract) a request to stand up its IMT and OT commensurate with the objectives at the time. EOG will communicate to AMOSC its objectives. These may include aerial observation, aerial dispersant, containment and recovery, shoreline response (including P&D for sensitivities and clean-up) and wildlife response. To undertake these operations, AMOSC will use its systems to undertake planning and execution of operations that will be outlined in taskings and operational daily orders, the air operations plan for aerial observation, the Organisation Chart and Site Safety plan specific to the operations. Further, AMOSC will develop and execute the resource protection and shoreline clean-up plans in conjunction with the relevant state/territorial jurisdiction. OWR plans will also be undertaken with the relevant state/territorial jurisdiction.

The state/territorial jurisdiction Liaison Officer (LO) function will be provided initially through the placement of an EOG resource into the state/territorial jurisdiction, escalating to serve their needs as required. Federal Government LO agency needs will be served remotely through direct communication with the EOG IC, with support from AMOSC. Should the response escalate, a senior AMOSC resource will facilitate the engagement with the Offshore Petroleum Incident Coordination Committee (OPICC) in conjunction with the EOG IC.

Logistics functions will be undertaken by the EOG DIMT and specialist third-party providers working in the EOG DIMT. The coordination of equipment to go to the site and coordination of services will each require a dedicated full-time equivalent (FTE) for the duration of the response. Communications and IT functions both require FTE or outsourced support, to provide interconnectivity and ICT for the DIMT personnel. Facilities Management (DIMT and OT), Food unit coordination (DIMT and OT) along with a specialised Medial Unit lead all require an FTE within the Logistics Section of the DIMT to coordinate/provide OT support.

EOG will subcontract a specialist third party provider for the GIS/COP generation, to take the situational data being generated by the response, and display this out to required parties.

For media and public information, EOG will task this to their CRT to provide up to date public statements.

Table 2.4 DIMT Spill Response Objectives

Operational Period	DIMT Spill Response Objectives	Rational/justification
0 – 24 Hours	1. Establish/maintain a DIMT with appropriate oil spill response trained personnel including mutual aid capabilities for specialist oil spill roles. 2. Implement activity-specific First Strike Plan. 3. Gain situational awareness of the safety of MODU crew and operability of MODU and LoWC scenario. 4. Gain situational awareness of spill trajectory, weathering, and potential environmental impact (use of response strategies/tactics including OSTM, visual surveillance, satellite imagery, SCAT surveys, and use of DIMT tools including NEBA, resources at risk evaluation, and common operating picture (COP). 5. Conduct regulatory and other stakeholder notifications. 6. Establish cross-jurisdictional DIMT coordination & resourcing arrangements with WA DoT and NT IMT. 7. Establish Forward Operations Base (FOB)/Staging Areas for aviation, shoreline and marine response strategies (Darwin). 8. Activate shoreline assessment/response capabilities including SCAT, OWR, resource protection and shoreline clean-up resources to FOB in anticipation of future deployment. 9. Mobilise/activate at sea response strategies, including: a. Mobilise vessel-based dispersant at Darwin port. b. Mobilise FWAD capability to Truscott. c. Mobilise C&R capability at Darwin port. 10. Activate DIMT Source Control Branch for implementation of SCERP. 11. Undertake risk assessments and develop Health, Safety and Environment (HSE) plan(s). 12. Activate and mobilise OSROs and mutual aid organisations. 13. Activate and mobilise OSM Team.	1. Establishing and maintaining an IMT is required to ensure that field response activities are undertaken consistent with EOG's regulatory obligations (OPEP) and are appropriately scaled to the spill scenario at the time. 2. Activity-specific implementation plan in standardised format based upon nature & scale of WCD and outcomes of strategic NEBA process. 3. Understanding the operability of the MODU influences the Source Control IAP. 4. This is the primary spill response needed for the first 24 – 96 hours, and then acts as a foundation/principle objective for the duration of the spill. It enables all other decisions to be made in regards to field or actions around the spilt hydrocarbon, on the basis of predicted and observed environmental and other impacts, and weathering of the spill. 5. It is important to maintain regulatory and stakeholder relationships & a regulatory requirement. 6. JSCC required for first-strike (and ongoing) response in WA and/or NT jurisdiction as coordinated by relevant Controlling Agency. 7. Establishment of FOB is required to support the mobilisation/deployment and execution of marine, aviation and shoreline response strategies. 8. The Strategic NEBA and OPEP BOD identified that these strategies may be required to be executed early in the response (depending on the scenario). Noting the long-lead times for deployment of these response strategies, pre-deployment of equipment and personnel to a FOB will reduce timeframes between 'need identified' and 'response strategy deployed', which is especially important given the geographic isolation. 9. The Strategic NEBA and OPEP BOD determined that these response strategies can (under the right circumstances) be used to reduce the environmental impact of a crude spill. Rapid deployment provides the highest likelihood of successful use of these strategies. 10. Source control is primary response strategy for LoWC scenario. 11. A risk assessment and HSE plan is required to be prepared, in order to assess the particular HSE risks associated with each relevant response strategy for the spill scenario. 12. OSROs and mutual aid organisations provide expertise and additional support into the IMT and field response capability. 13. OSM used to inform IAP.
24 – 72 Hours	1. Maintain and reinforce DIMT with appropriate support functions including oil spill response trained personnel and mutual aid capabilities for specialist oil spill roles. 2. Maintain situational awareness of spill trajectory, weathering, and any potential environmental impacts. 3. Support the mobilisation/deployment of response strategies/field capabilities through FOBs. 4. At the direction of WA DoT and/or NT IMT begin the deployment of shoreline assessment/response capabilities including SCAT, OWR, resource protection, and shoreline clean-up resources to FOB in anticipation of future deployment. 5. Mobilise/activate at sea response strategies, including: d. continue mobilisation of vessel based dispersant spraying e. continue mobilisation and/or commence FWAD spraying from a Truscott Airport f. continue mobilisation of C&R capability from Darwin port – commence operations in the field if possible. 6. Review hazard assessments and execute HSE plans for operational activities.	1. As above – ongoing. 2. As above – ongoing. 3. The DMT objective has shifted from establishing the FOBs to the operational activity taking place from these locations. 4. As above – ongoing. 5. Ongoing at sea response strategy operations should continue, based on a positive demonstrable environmental outcomes and weather conditions conducive to safe operations. 6. The DMT objective now includes the ongoing conduct of risk assessments and preparation of a HSE plans, as well as the execution and ongoing review of the HSE plan for operational response strategies.
72 Hours – onwards	1. Maintain and reinforce DIMT with appropriate support functions including oil spill response trained personnel and mutual aid capabilities for specialist oil spill roles. 2. Maintain situational awareness of spill trajectory, weathering, and potential environmental impacts.	1. As above – ongoing. 2. As above – ongoing. 3. The DIMT objective has shifted from establishing the FOB to the operational activity taking place from these

Operational Period	DIMT Spill Response Objectives	Rational/justification
	3. Support the mobilisation/deployment of response strategies/field capabilities through FOBs or direct from international (e.g. Singapore). 4. At the direction of WA DoT and/or NT IMT, mobilise shoreline assessment/response capabilities including SCAT, OWR, resource protection and shoreline clean-up resources to Tactical Response Plan locations (or other locations as directed). 5. Mobilise/activate at sea response strategies, including: a. commence/continue in-field vessel-based dispersant spraying. b. continue FWAD dispersant spraying. c. commence/continue with C&R activities in the field. 6. Review hazard assessments and execute HSE plan for operational activities.	locations. 4. As above – ongoing. 5. The WA DoT and/or NT IMT will determine the timing for actual activation of shoreline assessment and response capabilities from the FOB to the field. 6. As above – ongoing.

3 DIMT Response Requirements Analysis

This section describes the personnel requirements to fully implement and sustain the DIMT. Appendix D of the OPEP demonstrates EOG's capability to meet these requirements.

3.1 Overall Personnel Requirements for the DIMT, the WA DoT IMT and the NT IMT

The resourcing evaluation for a WCD LoWC presented below is based on the information provided above and includes the DIMT management of the response strategies presented in Appendix B of the OPEP. It accounts for resourcing required for the WA DoT (under the IGN) and for the NT IMT. It assumes that the full DIMT would be stood up, including core and support functions, and maintained for 20 weeks, which includes time for a relief well to be drilled, the well killed (11 weeks) and ongoing operational responses. This analysis adopted the following assumptions:

- DIMT function requirements identified by AMOSC (see Section 1.2) based on worst case spill modelling.
- All DIMT functions are stood-up over the response.
- All functions are independently resourced.
- 2x 12-hour operational periods per day.
- Five DIMT functions are required on a 24-hour basis (2x 12-hour operational periods per day) and are required within 2 hours.
- Following the peak at Day 8, all DIMT functions are required for extended durations until termination criteria of various response strategies have been met.
- Redundancy allowance of 7.5% per source of personnel from Day 1.
- Conservative assumption of second swing from Day 10.[1]
- Rotations are based on rosters with 2 week on / 2 week off.

Table 3.1 identifies 41 functions (positions) are required for the DIMT. Five of the DIMT functions have been identified as requiring 24 h/day operations (i.e. 46 functions in total). The WA DoT IMT requires 11 functions and the NT IMT requires 1 function. The total number of functions identified is 58.

The five DIMT functions identified as requiring 24 h/day operations are required within 2 hours. Eight functions are required within 24 hours. Peak requirements of 58 functions are required from Day 8.

There are 58 functions required for the first swing and 116 from Day 10 when resourcing for the second swing is required (based on a 2 week on/2 week off rotation). Various organisations have been nominated to provide personnel for the first and second swings.

[1] Day 10 was chosen as it aligns with ramp up requirements for the response strategies based on worst case spill modelling. See Section 4 of Appendix B of the OPEP for further detail.

Table 3.1 DIMT Function Requirements – Ramping up to Peak and first Rotation

DIMT Position	12/24 hour	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Rotation Support	Core/Initial Resource (First Swing)	Back-Up / Secondary (Second Swing)
EOG DIMT													
DIMT Leader/INCIDENT COMMANDER (IMO III)*	24	1	2	2	2	2	2	2	2	2	4	LPM	LPM
DEPUTY IC (IMO III)*	12		1	1	1	1	1	1	1	1	2	LPM	LPM
Health & Safety Officer	12		1	1	1	1	1	1	1	1	2	LPM	LPM
Federal Liaison Officer	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	EOG
WA Liaison Officer	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	EOG
NT Liaison Officer	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	EOG
PLANNING SECTION CHIEF (IMO II)*	24	1	2	2	2	2	2	2	2	2	4	LPM	LPM
PLANNING: Documentation (LEAD)	12			1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
PLANNING: Environment Unit (LEAD)	12	1	1	1	1	1	1	1	1	1	2	EOG Consultants	EOG Consultants
Trajectory Forecasting Lead	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
OSM Implementation Lead	12		1	1	1	1	1	1	1	1	2	EOG Consultants	EOG Consultants
Resources at Risk	12			1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Historical & Cultural SME	12							1	1	1	2	EOG Consultants	EOG Consultants
Response Technical Specialist	12					1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Shoreline Response Programme Manager	12					1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
PLANNING: Situation (LEAD)	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
CoP Display/GIS Expert	12			1	1	1	1	1	1	1	2	EOG Consultants	EOG Consultants
PLANNING: Resource Unit (LEAD)	12				1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
PLANNING: Demobilisation Unit (LEAD)	12								1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
SCAT Team Lead	12				1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
OPERATION SECTION CHIEF (IMO II)*	24	1	2	2	2	2	2	2	2	2	4	LPM	LPM
Air Operations Branch Manager	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Marine Operations Branch Manager	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Shoreline Clean-up Commander	12				1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Resource Protection Division Commander	12				1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Oiled Wildlife Division Lead	12				1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Source Control Branch Director	24	1	2	2	2	2	2	2	2	2	4	LPM	LPM
LOGISTICS SECTION CHIEF (IMO II)*	24	1	2	2	2	2	2	2	2	2	4	LPM	LPM
Support Branch Director	12		1	1	1	1	1	1	1	1	2	LPM	LPM
Supply Unit Lead	12			1	1	1	1	1	1	1	2	LPM	LPM
Facilities Unit Lead	12			1	1	1	1	1	1	1	2	LPM	LPM
Equipment Manager	12			1	1	1	1	1	1	1	2	LPM	LPM
Service Branch Director	12		1	1	1	1	1	1	1	1	2	LPM	LPM
Communications Unit (IT) Manager	12			1	1	1	1	1	1	1	2	Agency personnel	Agency personnel
Incident Comms Centre Manager	12			1	1	1	1	1	1	1	2	Agency personnel	Agency personnel
Food Unit Lead	12			1	1	1	1	1	1	1	2	Agency personnel	Agency personnel
Medical Unit Lead (includes COVID)	12			1	1	1	1	1	1	1	2	Agency personnel	Agency personnel
FINANCE SECTION CHIEF	12	1	1	1	1	1	1	1	1	1	2	LPM	LPM
Procurement Unit	12		1	1	1	1	1	1	1	1	2	Agency personnel	Agency personnel
Compensation Unit	12		1	1	1	1	1	1	1	1	2	EOG Consultants	EOG Consultants
Administration & Records	12		1	1	1	1	1	1	1	1	2	Agency personnel	Agency personnel
Total (EOG DIMT)		**7**	**27**	**37**	**42**	**44**	**44**	**45**	**46**	**46**	**92**		

DIMT Position	12/24 hour	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Rotation Support	Core/Initial Resource (First Swing)	Back-Up / Secondary (Second Swing)
WA DoT IMT													
CRT Liaison Officer	12	1	1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	EOG
Deputy Incident Controller	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Deputy PIO	12			1	1	1	1	1	1	1	2	EOG Consultants	EOG Consultants
Deputy Planning Officer	12		1	1	1	1	1	1	1	1	2	LPM	LPM/EOG
Deputy Intelligence Officer	12			1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Environmental Support Officer	12			1	1	1	1	1	1	1	2	EOG Consultants	EOG Consultants
Deputy Logistics Officer	12		1	1	1	1	1	1	1	1	2	LPM	LPM/EOG
Deputy Operations Officer	12			1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Deputy Finance Officer	12			1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Deputy Division Commander	12			1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Deputy Waste Management Coordinator	12			1	1	1	1	1	1	1	2	EOG Contractor	EOG Contractor
Total (WA DoT IMT)		**1**	**4**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**22**		
NT IMT													
Liaison Officer	12		1	1	1	1	1	1	1	1	2	AMOSC Staff/CG	AMOSC Staff/CG
Total (NT IMT)			**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**		
GRAND TOTAL		**8**	**32**	**49**	**54**	**56**	**56**	**57**	**58**	**58**	**116**		

Table 3.2 summarises the personnel requirements from each organisation providing the identified personnel in Table 3.1, for each swing, including a redundancy allowance of 7.5%, and then identifies the total number of personnel required from each organisation (including redundancy).[2]

Table 3.2 Personnel Requirements by Organisation

Source of Personnel	First Swing		2nd Swing		Total (incl. redundancy)
	from Table 3.1	incl. redundancy	from Table 3.1	incl. redundancy	
Agency personnel	6	7	6	7	14
LPM	20	22	20	22	44
AMOSC Staff/CG	24	26	20	22	48
EOG			4	5	5
EOG Consultants	7	8	7	8	16
EOG Contractor	1	2	1	2	4
Total	**58**	**66**	**58**	**67**	**131**

Table 3.3 shows the total personnel requirements from each organisation, including a redundancy allowance of 7.5% from Day 1, and the second swing starting from Day 10 through to peak requirements at Day 51.[3]

[2] The 7.5% redundancy requirement for each swing is calculated by multiplying the minimum number of personnel required from each organisation (identified in Table 3.1) by 1.075 and rounding up to the next whole number.
[3] Days 10, 24, 43 and 51 align with ramp up requirements for the response strategies based on worst case spill modelling. See Section 4 of Appendix B of the OPEP for further detail.

Table 3.3 Personnel Requirements by Organisation (incl. 7.5% redundancy from Day 1, and 2on/2off rotation from Day 10)

Source of personnel	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)
Agency personnel		3	7	7	7	7	7	7	14	14	14	14
LPM	7	19	22	22	22	22	22	22	44	44	44	44
AMOSC Staff/CG	2	11	18	23	25	25	25	26	48	48	48	48
EOG									5	5	5	5
EOG Consultants	2	4	7	7	7	7	8	8	16	16	16	16
EOG Contractor			2	2	2	2	2	2	4	4	4	4
Total personnel required	**11**	**37**	**56**	**61**	**63**	**63**	**64**	**65**	**131**	**131**	**131**	**131**

3.2 Immediate Response Requirements (0 – 2 hours)

During drilling activities, LPM will maintain a DIMT duty roster that is updated weekly with a minimum of 10 qualified DIMT personnel to fulfil core positions. A minimum of six personnel are rostered 'on-call' at any time to immediately fulfil the role of Incident Commander, Deputy Incident Commander Operations Section Chief, Planning Section Chief, Logistics Section Chief and Source Control Branch Director.

Each 'on-call' person is to be within 1 hour of the office and fit for work at all times. Each position has additional personnel trained for support. The DIMT duty roster enables the formation of the DIMT within two hours of the notification of an incident.

3.3 Response Requirements (0 – 24 hours)

Eight functions are required within 24 hours (Table 3.1), requiring 11 personnel to allow for redundancy (Table 3.3). These functions are required for the IC, the Section Chiefs, the Environment Unit Lead, the Source Control Branch Director and the CRT Liaison Officer for the WA DoT. These personnel will be sourced form LPM, AMOSC staff and/or CG and EOG consultants.

3.4 Response Requirements (Day 2)

Thirty-two functions are required within 48 hours, including five functions on 2 x 12 hour shifts (Table 3.1), requiring 37 personnel to allow for redundancy (Table 3.3). All of the IC and Finance Section functions would be filled along with the following positions:

- Trajectory Forecasting Lead (Planning Section)
- OSM Implementation Lead (Planning Section)
- Situation Lead (Planning Section)
- Air Operations Branch Manager (Operations Section)
- Marine Operations Branch Manager (Operations Section)
- Support Branch Director (Logistics Section)
- Service Branch Director (Logistics Section)
- Deputy Incident Controller (WA DoT)
- Deputy Planning Officer (WA DoT)
- Deputy Logistics Officer (WA DoT)
- Liaison Officer (NT IMT)

3.5 Response Requirements (Day 3 – 8 (peak))

Forty-nine functions are required by Day 3 requiring 56 personnel to allow for redundancy (Table 3.3), increasing to 58 functions by Day 8 (peak requirement) requiring 65 personnel to allow for redundancy (Table 3.3). All of the Logistics Section and WA DoT functions would be filled by Day 3, and all of the Operations Section functions by Day 4.

3.6 Ongoing Response Requirements

Rotation allowances are calculated to begin from Day 10. The total personnel required from Day 10 through to the end of the response, including redundancy allowances, is 131 personnel (Table 3.3).

4 DIMT Competency Assessment

EOG will ensure that all staff, contractors and remote third parties who are operating within their DIMT (or who provide remote services) have the requisite skills and knowledge for their prescribed role in the company's response structures. Training will be a mix of incident management system/process training, and Introduction to Oil Spill Prevention and Response (OSPR) training specific to the Beehive-1 OPEP, particular to the requirements of the role. EOG will use the drills and exercises programme as outlined in Section 8.2 of the OPEP to assist assure, test and train those who will be on the DIMT roster.

As a baseline, personnel operating within the EOG DIMT response structure will be required to undertake foundational familiarity sessions / training sessions to establish baseline competency and knowledge required for operating in a successful DIMT. Those who have IC, Section Chief or specialist roles within the DIMT, will require advanced level training as identified in Table 4.1.

Third parties providing remote services to DIMT roles need to meet the same training standards. For OSROs, this means that personnel will need to be trained and competent in the Australasian Inter-service Incident Management System (AIIMS), and Oil Spill Response Courses equivalent to the IMO Level II and above. OSRO personnel provided to fulfil specific duties in the DIMT must also have experience and a depth of knowledge in their area of expertise, gained through either practical experience, advanced exercises and drills, or as a practitioner in that field (e.g. Environmental specialist).

4.1 Introduction to OSPR Training

The introduction to OSPR describes the purpose and use of the OPEP; the relevant legislative settings of OSPR response for Beehive-1; the baseline characteristics of Beehive-1 Crude and its behaviours/fates; oil spill response strategies; the environmental consequences of the spill; the relationships EOG has with organisations providing resources to the DIMT and Operational Teams; and how these will operate together to execute the response. The training will be aligned with Table 2 of the AEP *Guidance Document: Incident Management Teams – Knowledge Requirements for Responding to Marine Oil Spills*, *V08* (APPEA, 2021).

4.2 IMO Level II Training (or equivalent)

For the leadership roles that have specific responsibilities for executing and implementing the process, a higher level of Incident Management System (IMS) training is required to successfully lead and execute the process. Staff fulfilling these roles are also required to be technically competent in oil spill response in order for the hazard specific elements of Spill Response to be successfully implemented within the DIMT.

IMO Level II Training (or equivalent) includes the roles and responsibilities of a multi-disciplinary oil spill management team in an oil spill response centre; the use of a defined structure (ICS) to develop and execute an oil spill IAP; the intelligence and environmental functions critical for oil spill response (fates, weathering, NEBA) and the logistics required to mount a response.

4.3 IMO Level III Training (or equivalent)

Those undertaking an IC/Deputy IC role will require IMO Level III Training (or equivalent). This includes elements under the IMO II equivalent training, with additional training around leadership and management of the DIMT; the legislative and political settings for an oil spill IMT; media and communications; interfacing with the CRT and Senior Government stakeholders; and managing a multi-agency response.

Table 4.1 DIMT Personnel Training Requirements

Position	OSPR Intro.	IMO II or Equivalent	IMO III or Equivalent	Function specific
Incident Commander			Yes	Yes
Deputy Incident Commander			Yes	Yes
Safety Officer		Yes		
Federal LO				Yes
State/Territorial LO				Yes
Local LO				Yes
Planning Section Chief		Yes		Yes
Documentation		Yes		Yes
Environment Unit Lead				Yes
Trajectory Forecasting				
Historical & Cultural SME				Yes
Response Technical Specialist				
Resources at Risk		Yes		
Situation Lead		Yes		Yes
COP Display / GIS Expert				Yes
Planning Resource Unit Lead				
Planning Demobilisation Unit Lead				
Operations Section Chief	Yes	Yes		Yes
Air Operations Branch Manager		Yes		Yes
Marine Operations Branch Manager		Yes		Yes
SC Director		Yes		
SC Deputy Director				
Logistics Section Chief		Yes		Yes
Support Branch Director				Yes
Supply Unit Lead				
Facilities Unit Lead				
Equipment Manager				
Service Branch Director				Yes
Communications Unit and (IT) Manager				
Incident Comms Centre Manager				
Food Unit Lead				
Medical Unit Lead (includes control – COVID)				Yes
Finance Section Chief		Yes		Yes
Procurement Unit				
Compensation Unit				
Administration & Records				

4.4 Function Specific Training

Function specific training will be aligned with Table 3 of the AEP *Guidance Document: Incident Management Teams – Knowledge Requirements for Responding to Marine Oil Spills*, *V08* (APPEA, 2021).

4.5 Well Control Training

Each Management, Engineering and Operations Supervisor role must have well control training via an accredited training organization (IWCF or IADC WellSharp) to a certification 'Level 4 – Supervisor'. Recertification for Operations roles is required every 2 years, whilst for Engineering and Manager roles it is every 4 years.

4.6 Source Control Training and Competency

It is expected that any secondee into the DIMT Source Control Branch during a well control incident holds a relevant tertiary qualification, has relevant industry experience and has undertaken well control training via an accredited training organisation.

4.7 OSM Management Team

Competencies required for key OSM roles will be in accordance with Table 11-1 of the AEP Joint Industry OSM Plan Framework (refer Section 9.1 of the EOG OSM BIP for further information). In addition, and where practicable, EOG will engage its most qualified local environment advisors in the initial stages of the monitoring program to help activate and mobilise monitoring teams and support the OSM Services Provider in the finalisation of monitoring designs.

4.8 Facility and Vessel ERT Training

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

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

4.9 Recommended Qualifications, Skills or Experience

Some DIMT roles require trade or tertiary qualifications, or workplace experience that aligns with the duty role being requested of the individual (Table 4.2).

Table 4.2 Recommended Qualifications, Skills or Experience

Position	Recommended qualifications, skills or experience
Incident Commander Deputy Incident Commander	Senior Company representative with delegation of authority from company for expenditure equivalent to the management of business unit and SC operations.7 + years experience in a senior role within a titleholder.
Safety Officer	Industry qualification in the application of workplace, health and safety systems with 5+ years experience.
Federal Liaison Officer	Familiarity with the Australian oil spill response arrangements; familiarity working with Federal, State/territorial or Local Government agencies.
State/territorial Liaison Officer	Familiarity with the Australian oil spill response arrangements; familiarity working with Federal, State/territorial or Local Government agencies.
Local Liaison Officer	Familiarity with the Australian oil spill response arrangements; familiarity working with Federal, State/territorial or Local Government agencies.
Environment Unit Lead	Tertiary qualifications in environmental science, as they relate to the marine environment; 5 + years expertise in the

Position	Recommended qualifications, skills or experience
	development and acceptance of EP's and OPEPs in the Australian upstream TH environment.
Historical & Cultural SME	Tertiary qualifications in environmental science, as they relate to the marine environment; and/or cultural heritage experience specific to the Dampier archipelago, surrounding islands, waters and coastlines.
COP Display / GIS Expert	Tertiary qualifications in the IT; experience in developing and implementing information layers in a "Common Operating Picture" through an online hosted platform (ArcView, etc) available for remote access.
Planning Demobilisation Unit Lead	Experience in the process of demobilisation through either significant natural or man-made emergencies; or knowledge and skills gained through exercises and training.
Air Operations Branch Manager	3+ years experience in the development and implementation of air operations plans in the Australian upstream O&G environment; or equivalent experience demonstrated through civilian or defence aircraft command and control.
Marine Operations Branch Manager	3+ years experience in the development and implementation of marine operational planning in the Australian upstream O&G environment; or equivalent experience demonstrated through civilian or defence marine command and control operations.
Facilities Unit Lead	3+ years experience in the management of facilities.
Equipment Manager	3+ years experience in the servicing and provisioning of O&G field campaigns (logistics FOB) for the service, repair, and consumables for plant and equipment; land and marine platforms.
Communications Unit and (IT) Manager	3+ years experience supplying and supporting systems for the use of ICT with an O&G; or remote operational industrial organisations; or emergency services/defence forces.
Medical Unit Lead (includes infection control – COVID)	Qualifications appropriate for registration in the State of WA/Northern Territory as a Registered Nurse or General Practitioner (Doctor); with expertise in the development and implementation of a CovidSafe Disease Management plan.
Finance Section Chief	Financial Qualifications appropriate to gain qualification as a CA or CPA in Australia; or other qualifications and experience deemed suitable by EOG to act as the financial point of accountability and to run financial systems during the response.
Procurement Unit	3+ years experience of procurement expertise in the O&G environment; prefeed experience in the resourcing emergency incidents/budget.
Compensation Unit	Experience in the administration, handling and processing of claims for compensation/insurance, preferably in the O&G industry or through emergency management events.
Administration & Records	3 + years experience in establishing and working in administrative systems for the support of other functions within an office environment.

5 Environmental Performance

The Environmental Performance Outcomes, Environmental Performance Standards and Measurement Criteria for emergency response training, capability and testing are presented in Chapter 9 of the EP.

Table 5.1 Preparedness EPS' – DIMT

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to implement the DIMT in an effective and timely manner	
Control Measure	Environmental Performance Standard	Measurement Criteria
Service Contracts	EOG shall have a contract in place with LPM, AMOSC and OSRL to facilitate access to trained response personnel.	Service contract with LPM Service contract with OSRL AMOSC membership
Specialist Service Providers	EOG maintains Master Service Agreements (MSA) with Wild Well Control for specialist assistance for engineering and operational support for relief well planning and execution.	MSA records. Correspondence from WWC confirming availability for the project.
	EOG shall have a contract in place with a medical and flight paramedic personnel provider, commencing six weeks prior to the commencement of the activity.	Service Level Agreement
	EOG shall have a contract in place with an agency hire provider, commencing six weeks prior to the commencement of the activity	Service Level Agreement
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of DIMT response readiness.	Exercise records
Personnel	All DIMT personnel are trained in accordance with the requirements detailed in Table 4.1.	Training records verify that crews are trained in spill response.
	EOG will provide LPM with Authority for Expenditure (AFE) on its behalf in the event of a LoWC.	AFE letter.
	LPM will maintain a DIMT duty roster that is updated weekly with a minimum of 10 qualified DIMT personnel to fulfil core positions. A minimum of six personnel are rostered 'on-call' at any time	DIMT duty roster.

Response Timing	EOG shall maintain arrangements to facilitate the mobilisation of DIMT operations in accordance with the following timeframes:
	• Meeting the objectives within the specified timeframes listed in Table 2.4.
	• The five 24-hour/day functions identified in Table 3.1 are active within 2 hours.
	• The eight functions identified in Table 3.1 are active within 24 hours.
	• The 58 functions identified in Table 3.1 are active within 48 hours.
	• Personnel are available from Day 10 from the following sources:
	  ○ Agency personnel: 14 personnel required.
	  ○ LPM personnel: 44 personnel required.
	  ○ AMOSC Staff/CG: 48 personnel required.
	  ○ EOG: 5 personnel required.
	  ○ EOG Consultants: 16 personnel required.
	  ○ EOG Contractor: 4 personnel required.
		Communication records confirming capability

6 References

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

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

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

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

Appendix B Basis of Design and Response Strategy Requirements

OPEP Appendix B: Basis of Design and Response Strategy Requirements

Beehive-1 Exploration Drilling

WA-488-P

20 February 2024

Rev 2

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1 Introduction

1.1 Purpose and Scope

This document provides a detailed description of the appropriate response strategies and resource needs to respond to the identified worst-case discharge (WCD) scenarios associated with EOG Resources Australia Block WA-488 Pty Ltd's (EOG's) Beehive-1 exploration drilling activities. This process is consistent with the oil spill response planning processes defined in *Oil spill risk assessment and response planning for offshore installations* (IPIECA-IOGP 2013). It includes:

- A summary of EOG's drilling activities in the Joseph Bonaparte Gulf;
- A summary of the WCD scenarios;
- Stochastic and deterministic modelling results providing the basis of design (BOD) for field capability assessments;
- The Strategic Net Environmental Benefit Analysis (NEBA) undertaken to select the appropriate response strategies;
- Assessments of the response needs for each response strategy based on the WCD scenarios;
- A description of the field capability and arrangements needed to implement the selected response strategies;
- Details of response timings for each response strategy;
- A detailed 'as low as reasonably practicable' (ALARP) evaluation of controls to prevent oil pollution for each response strategy; and
- Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and measurement criteria for response preparedness for each strategy;
- Spill response logistical requirements.

This document has been adapted from work undertaken jointly by the AEP Oil Spill Working Group and presented within the *Inpex Australia – Browse Regional OPEP – Basis of Design and Field Capability Assessment Report* (link) and the *Pyrenees Phase 4 | Basis of Design & Field Capability Assessment* (link). EOG specifically wish to acknowledge the work by Inpex Australia in the development of a draft framework for regional oil pollution response planning.

This document does not include the following:

- A detailed description of the environment (refer to Appendix 5 of the Beehive-1 Exploration Drilling Environment Plan (EP) (996161-2022-Beehive#1-Drilling-EP) (the EP);
- A detailed activity description (refer to Chapter 2 of the EP);
- Description and risk assessment of oil spills on environmental values and sensitivities (refer to Sections 8.6 and 8.7 of the EP);
- An environmental impact and risk evaluation for the implementation of each selected response strategy (refer to Chapter 9 of the EP);
- Operational and scientific monitoring programs (refer to Operational and Scientific Monitoring Bridging Implementation Plan (OSM BIP) (996161-2022-Beehive#1-OSMIP));

- Vessel-based spill response (refer to vessel-specific SOPEP/SMPEP);
- Detailed source control planning (refer to Source Control Emergency Response Plan (SCERP) (3211-1001-3.08-25396)); and
- An evaluation of response capability to implement each suitable response strategy (inclusive of source control) in an effective and timely manner, including an assessment of personnel, equipment, procedures both internal to EOG and from State and National resources and oil spill response organisations (OSROs) (refer to Appendix D of the OPEP: Cumulative Requirements and Demonstration of Capability).

1.2 Methodology

A WCD credible scenario for an oil spill of 786,858 m^3 surface release of crude oil (Jabiru crude used as analogue) over 77 days from a Loss of Well Control (LoWC) event was used for planning purposes. Stochastic and deterministic oil spill modelling (Appendix 6 of the EP) was used to inform the risk assessment (see Section 8.7 of the EP) which was then used to identify priority protection areas (see Section 4.4 of the OPEP). The WCD scenarios are summarised in Section 2.

1.2.1 AMOSC Capability Justification

EOG commissioned the Australian Marine Oil Spill Centre (AMOSC) to prepare a justification statement to support the demonstration of the DIMT and Operational Team (OT) capacity and capability based on a WCD LoWC scenario sustained for a 20-week response period. The objectives of the report were to:

- Develop a scalable time stepped approach identifying the necessary resources to tactically implement the identified response strategies for the worst-credible discharge scenario.
- Determine sensitivities likely to be impacted in a worst-credible scenario based on deterministic modelling and propose personnel and equipment resourcing required to support a response to counter these impacts.
- Demonstrate the scalability of the IMT structure size (time stepped, based on predicted operational oil spill response requirements, using EOG's IMT structure) and the size of the IMT and FT commensurate to the operational requirements for a worst-credible scenario. Using known resources gaps to be identified.
- Reference appropriate best practice guidelines (such as IOGP/IPIECA, API, AEP, AMOSC). in support of the IMT and operational team structure.

A summary of the AMOSC capability justification is included in Section 5.2.

1.2.2 Assessment of Requirements

The basis of design uses deterministic modelling of WCD scenarios (Section 3.2) to estimate worst-case requirements and timeframes to develop robust response strategy planning thresholds (Section 3.2). A Strategic NEBA was undertaken (Section 4.2) to identify appropriate response strategies (Section 4.3).

AMOSC's advice (Section 5.2) was applied using a 'cone of response' model (Section 5.3) and oil spill budgets (Section 5.4) (where relevant) to assess the tiered capability requirements to meet these worst-case requirements and timeframes (Section 5.6).

Estimates of ramp up requirements (personnel and equipment/resources) for the timely and effective implementation of each response strategy for the duration of a response were then quantified (Section 6). The cumulative requirements to independently implement all the selected response strategies was determined (Section 7). The personnel requirements were conservatively estimated by including a 7.5% allowance for redundancy (applied from Day 1) and using 2 weeks on/2 weeks off rotations, beginning from Day 10.

2 Worst Case Discharge Scenarios

The EP identifies two worst-case oil spill scenarios that have the potential for this OPEP to be implemented:

- A LoWC event at the MODU, with a worst-case scenario of 786,858 m^3 surface release of crude oil over 77 days (EP Sections 2.9 and 8.7).
- A surface release of marine diesel oil (MDO) to represent a vessel loss of containment, with a worst-case scenario of 160 m^3 over 6 hours (EP Section 8.6).

3 Spill Modelling Overview

3.1 Probabilistic (Stochastic) Modelling Methodology and Inputs

To understand the risks posed by a LoWC, EOG commissioned RPS to undertake oil spill trajectory modelling (OSTM) for each of the three distinct seasons in the region:

- Summer – October to February;
- Transitional – March and September; and
- Winter – April to August.

The modelling report is included as Appendix 12 of the EP. Table 3.1 outlines the key OSTM inputs.

Table 3.1 Summary of the OSTM inputs

Parameter	Details	
Oil type	Jabiru crude	MDO
Total spill volume	4,948,790 bbl (~786,794 m^3)	160 m^3
Release rate	64,270 bbl (10,218 m^3) per day	26.66 m^3/h
Release type	Sea surface	Sea surface
Release duration	77 days	6 hours
Simulation duration	98 days	28 days
Number of simulations	100 per season (300 in total)	100 per season (300 in total)
Reference	RPS (2022)	RPS (2021)

3.2 Deterministic Modelling Results and Basis of Design

This section presents the outputs of the WCD modelling runs (without dispersant use) against the most relevant response planning thresholds. The spill model outputs, assessed against response planning thresholds, has been termed the 'Basis of Design' (BOD). The BOD tables are used to inform the Field Capability Assessments presented in Section 7.

The stochastic LoWC runs were reviewed using the following criteria to select detailed deterministic runs for planning purposes:

- Highest accumulated shoreline loading of oil above the moderate threshold of 10 g/m^2 at the high sensitivity areas of:
  - Cape Domett (WA) (headland and area to east of Cambridge Gulf);
  - Lacrosse Island (WA) and Ord River Floodplain (WA) (Entrance to Cambridge Gulf); and
  - Turtle Point (NT) (at entrance to Keep River);
- Highest accumulated shoreline loading of oil on all shorelines (i.e., all locations) above 100 g/m^2;

- Minimum arrival time of oil to any shoreline above the moderate threshold of 100 g/m^2;
- Maximum daily surface oil area (km^2) of surface oil thickness above 50 g/m^2 (>50 µm); and
- Maximum daily surface area (km^2) of dissolved oil above 10 ppb.

The selected crude oil LoWC deterministic runs are summarised in Table 3.2 and Table 3.3 and are represented visually in Figure 3.1 through Figure 3.4 for these scenarios.

A summary of a worst-case MDO surface release is presented in Table 3.4 and Figure 3.5 shows the stochastic results for floating oil. Note that there was no shoreline contact predicted above the moderate threshold.

Table 3.2 Deterministic results for peak mass oil ashore (RPS, 2022)

Scenario Run Number	Planning Threshold	Peak Mass Oil Ashore (unmitigated)	Peak Mass Oil Ashore (mitigated)	Net Result of Mitigation
LoWC 77-day release 786,858 m^3 Run Number 17 19 December 2011	Highest accumulated shoreline loading of oil at Cape Domett	46.6 m^3 ashore 8 km shoreline contact	18.1 m^3 ashore 6 km shoreline contact	28.5 m^3 less oil ashore 2 km less contact.
	Highest accumulated shoreline loading of oil at Lacrosse Island and Ord River Floodplain	69 m^3 ashore 14.1 km shoreline contact	48.6 m^3 ashore 8 km shoreline contact	20.4 m^3 less oil ashore 6.1 km less contact
	Highest accumulated shoreline loading of oil at Turtle Point	29.4 m^3 ashore 6 km shoreline contact	26.4 m^3 ashore 6 km shoreline contact	3 m^3 less oil ashore 0 km less contact
	Highest accumulated shoreline loading of oil above 10 g/m^2 across all shorelines	705 m^3 ashore. 225 km shoreline contact.	421 m^3 ashore. 151 km shoreline contact.	294 m^3 less oil ashore. 21 km less contact.
	Highest accumulated shoreline loading of oil above 100 g/m^2 across all shorelines	629 m^3 ashore 115 km shoreline contact	362 m^3 ashore. 94 km shoreline contact	267 m^3 less oil ashore. 21 km less contact.

Table 3.3 Minimum arrival time to any shoreline and maximum daily surface area (RPS, 2022)

Scenario	Run Number (Release Date)	Planning Threshold	Modelling Result
LoWC 77-day release 786,858 m^3	Run 88 23 September 2016	Minimum arrival time of oil to any shoreline above low threshold (10 g/m^2)	10.29 days to reach Clump Island 11.83 days to reach East Cape Domett - WA-NT Border (C) (DoT cell: 3) 12.33 days to reach Victoria Daly sector 12.38 days to reach Un-named Head - Cape Rulhieres (C) (DoT cell: 14) 12.88 days to reach Davidsons Point - Cape Bougainville (D) (DoT cell: 285)
	Run 88 23 September 2016	Minimum arrival time of oil to any shoreline above moderate threshold (100 g/m^2)	12.54 days to reach Cape Bernier/Elsie Island (DoT cell: 10) 12.58 days to reach Cape Rulhieres/Cape Bernier (DoT cell: 11) 14.83 days to reach Un-named Head/Cape Rulhieres (A) (DoT cell: 12) 14.96 days to reach Turtle Point (NT: mouth of Keep River)
	Run 79 16 January 2011	Maximum daily surface oil area (km^2) of surface oil thickness >50 g/m^2.	Approx. 30 km^2 at Day 10. Approx. 60 km^2 at Day 23. Approx. 75 km^2 at Day 62. See Figure 3.2
	Run 7 27 November 2013	Maximum daily surface area (km^2) of dissolved oil above 10 ppb	Approx. 700-850 km^2 between Day 10 and Day 25. Approx. 1,200-1,600 km^2 between Day 27 and Day 46. Peak of approx. 2,600 km^2 at Day 53 (Figure 3.3

Table 3.4 Summary of worst-case MDO exposure (RPS, 2021)

Scenario	Potential Extent of Hydrocarbon Exposure
MDO spill 6-hour release 160 m^3	Maximum distance of floating oil above the moderate (10 g/m^2) threshold: • Summer – 27.6 km (ESE) • Transitional – 26.7 km (ESE) • Winter – 24.2 km (WNW)

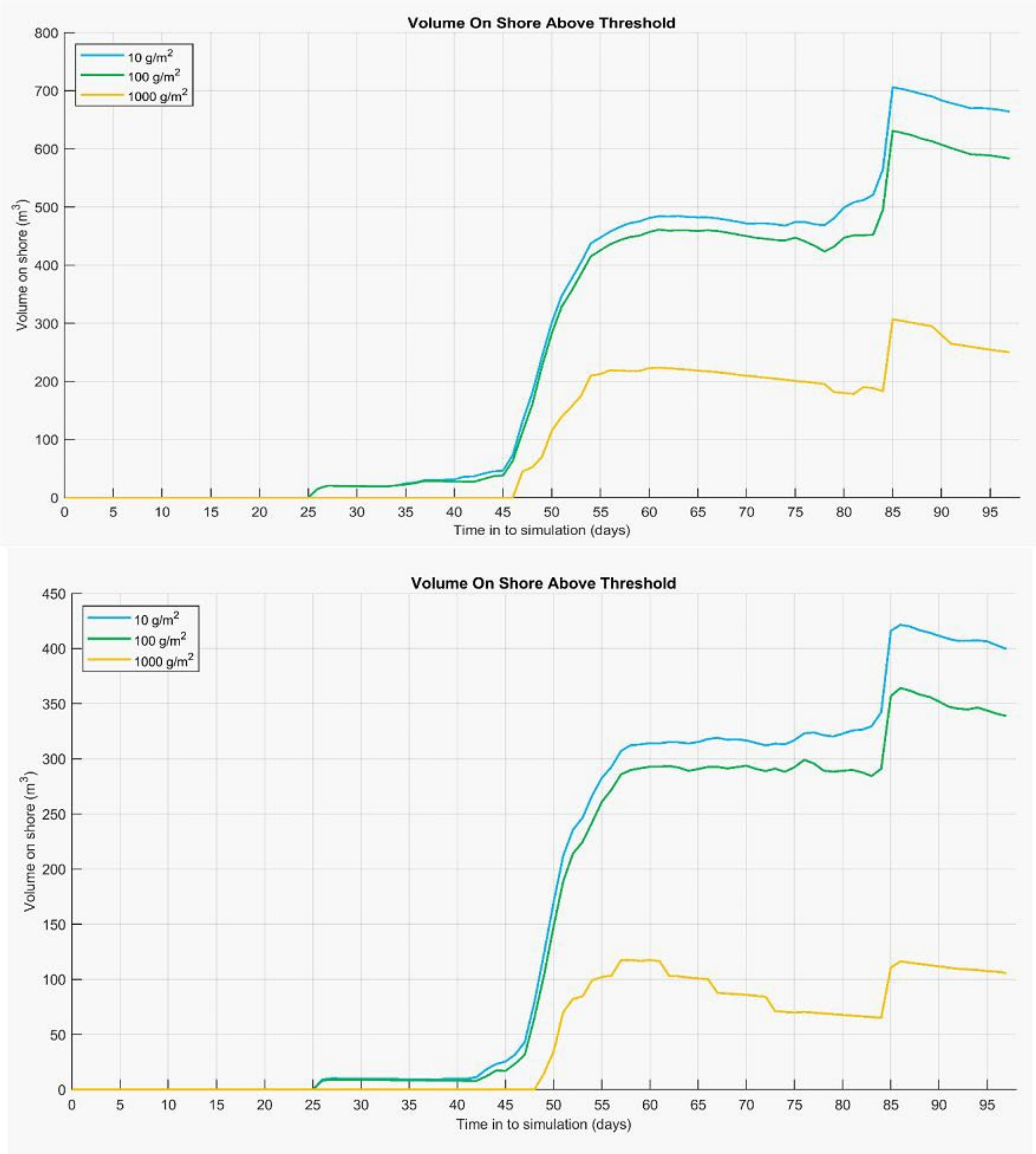

Figure 3.1 LoWC crude WCD modelling results for largest volume ashore (unmitigated & mitigated)

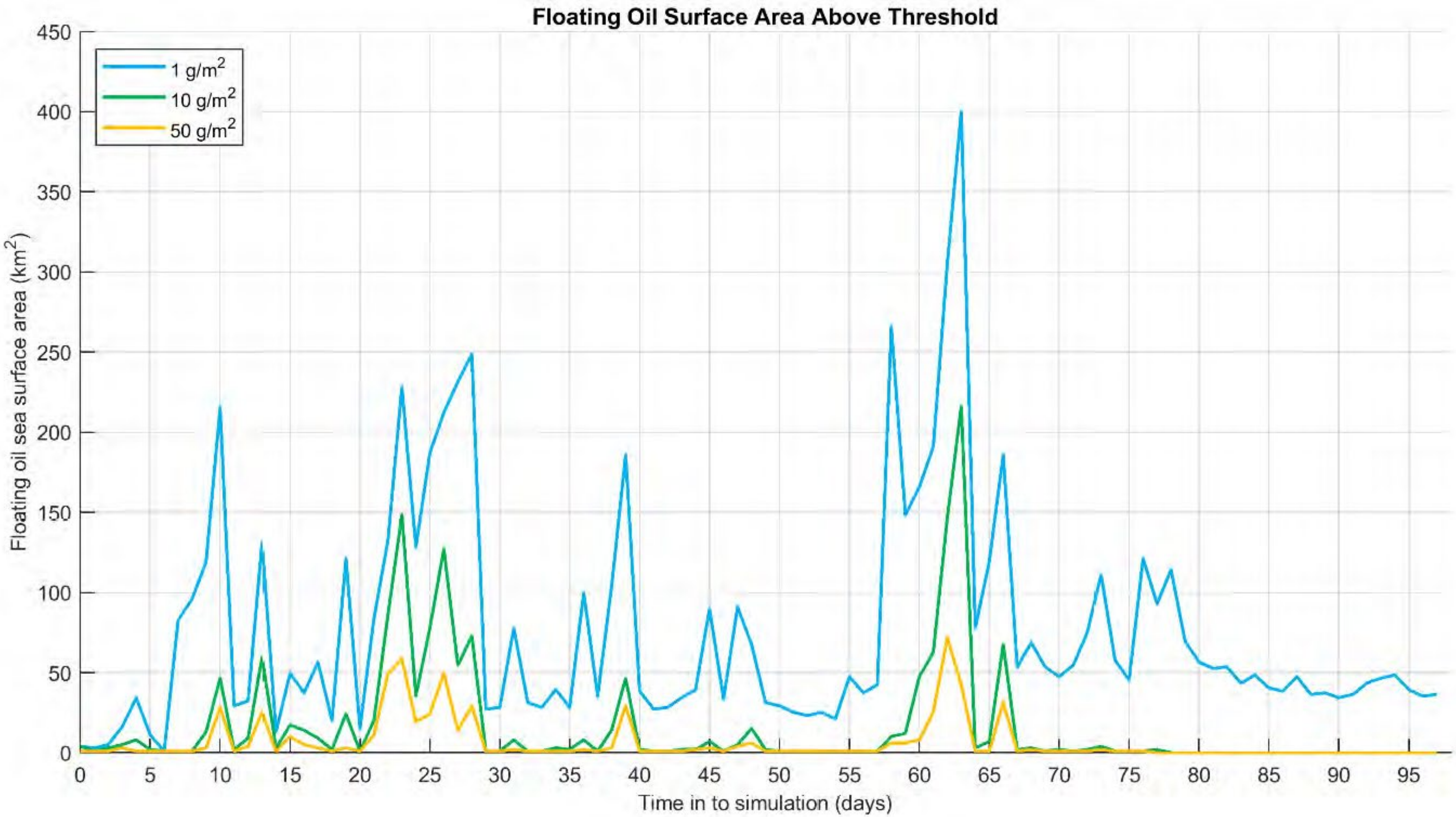

Figure 3.2 WCD modelling – Maximum daily surface oil area (km²) of surface oil thickness (unmitigated)

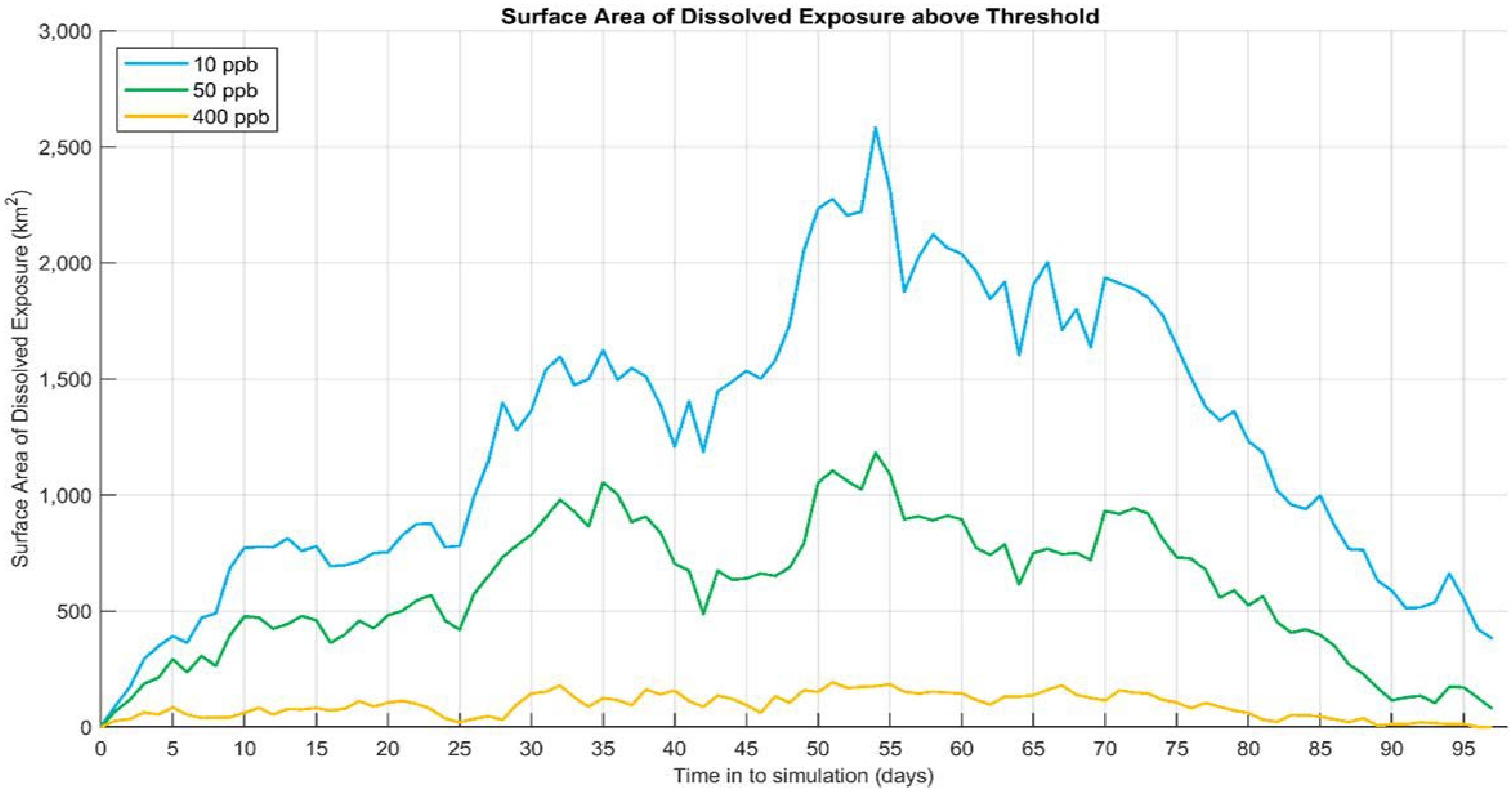

Figure 3.3 WCD modelling – Maximum daily surface area (km^2) of dissolved oil (unmitigated)

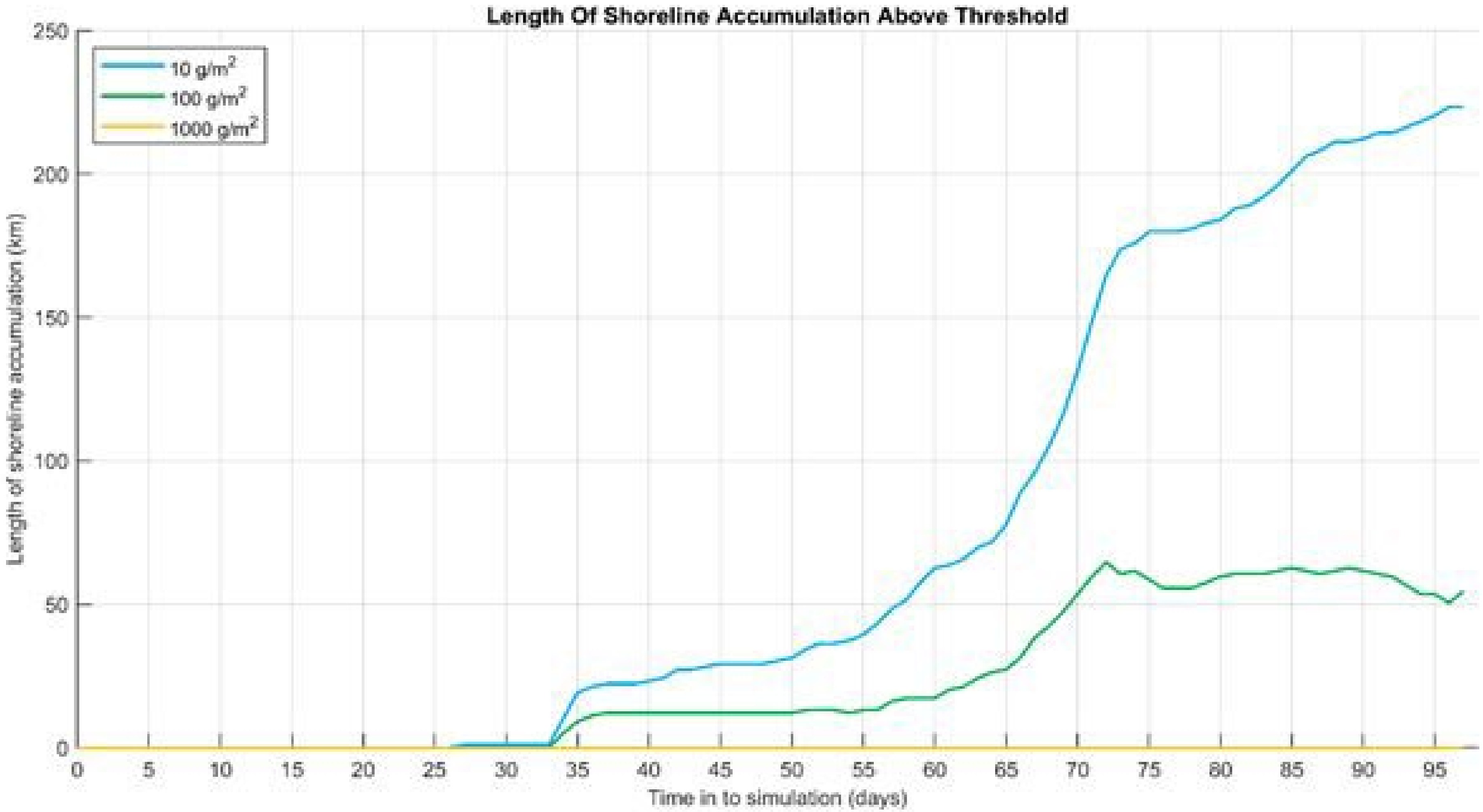

Figure 3.4 WCD modelling – Maximum length of shoreline oil accumulation (unmitigated)

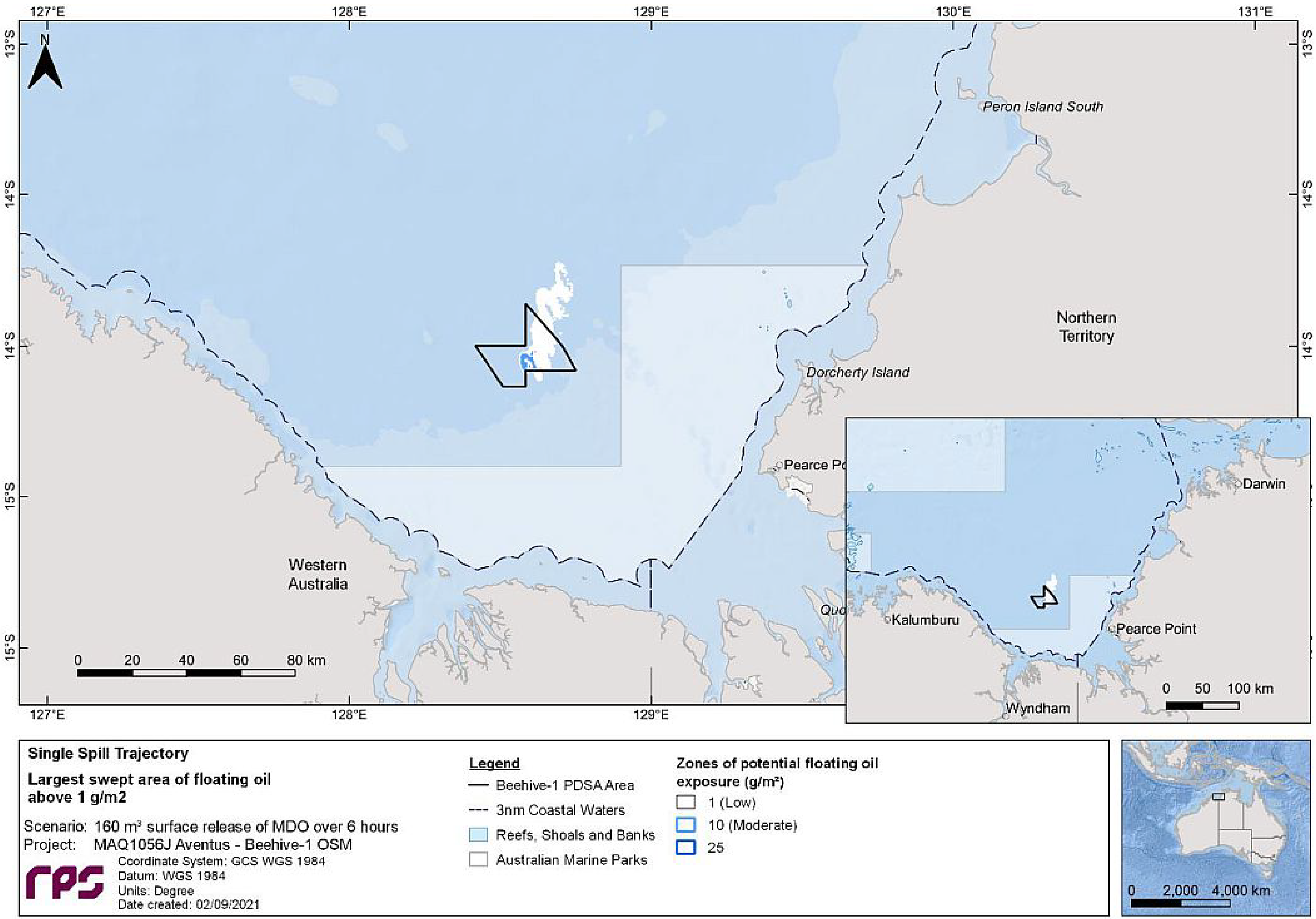

Figure 3.5 MDO WCD modelling results

3.3 Planning Thresholds and Basis of Design

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

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

Table 3.5 presents a literature review of various response strategy planning thresholds and discusses how each threshold can be used to inform response strategy planning. Key outputs from the deterministic modelling (Section 3.2) are included and form the 'basis of design' which is then used to inform the field capability assessments presented in Section 6.

Response strategy activation triggers to be utilised as decision-making tools by the DIMT during a real spill event are detailed in Section 5 of the OPEP.

The thresholds used to evaluate the environmental risk associated with an oil spill event are defined within Sections 8.6 and 8.7 of the EP.

Table 3.5 Hydrocarbon thresholds for response planning and Basis of Design

Planning Threshold	Response Strategy Planning Considerations	Reference/Justification	Deterministic Modelling Results (Basis of Design)
Max. area (km^2) of dissolved oil >10 ppb	Used to inform response planning regarding the: • maximum range of Monitoring and Evaluation (M&E) (operational and scientific water quality monitoring)	Establishes maximum planning area for scientific monitoring based on potential for exceedance of water quality triggers (NOPSEMA, 2019).	Approx. 700-850 km^2 between Day 10 and Day 25. Approx. 1,200-1,600 km^2 between Day 27 and Day 46. Peak of approx. 2,600 km^2 at Day 53.
Max. lineal distance (km) of floating oil >1 g/m^2(>1 µm)	Used to inform response planning regarding the: • maximum range of Monitoring and Evaluation (M&E) (e.g., aerial surveillance, satellite imagery) (Note, this floating oil threshold and entrained/dissolved thresholds can also be used to inform the potential extent of Operational and Scientific Monitoring programs, however these parameters are not primary considerations for OSMP capability planning).	The Bonn Agreement Oil Appearance Code (BAOAC) is a series of five categories or 'codes' that describe the relationship between the appearances of oil on the sea surface to the thickness of the oil layer. Bonn-Code 1 refers to silver/grey sheens of floating oil and Bonn Code 2 includes rainbow sheen (thickness of 0.0003 mm to 0.005 mm, or 0.3 to 5 g/m^2). 1 g/m^2 is therefore at the lower end of Bonn Code 2. Therefore, >1 g/m^2 has been selected as an appropriate minimum thickness to be used during oil spill modelling, to inform the geographic area which may potentially be impacted by oil, causing effects to socio-economic values, and at which water quality within a marine protected area may have been altered (NOPSEMA, 2019). Therefore, during WCD response planning, aerial/satellite surveillance capability/arrangements should be evaluated against this threshold.	1,517 km WNW (winter) 1,048 km WSW (summer) 1,136 km WSW (transitional)
Area (km^2) with floating oil >50 g/m^2 (>50 µm)	Used to inform response planning regarding the: • geographic area in which to undertake Surface Dispersant Application (SDA) (aerial/vessel) • geographic area in which to undertake Containment and Recovery (C&R) (booms and skimmers) • note: emulsification and changes in viscosity are factors potentially limiting the effectiveness of C&R, and more significantly, changes in viscosity and/or emulsification can reduce dispersant effectiveness. Therefore, consideration of these factors may be required during evaluation of modelling outcomes for response planning. • note: this threshold is not relevant for protection of sensitive resources response strategy. This response strategy typically uses booms to deflect/corral oil, the same as at sea containment and recovery. However, unlike at sea containment and recovery (which requires >100 g/m^2 floating oil thickness for operational efficiency), when conducting protection of sensitive resources, nearshore protection booms can be effective at deflecting low concentrations of floating oil, over a long duration, to prevent long-term accumulation of oil in a sensitive receptor. Therefore, there is no specified response planning threshold defined for the protection of sensitive resources response strategy.	Oil needs to be >100 g/m^2 (>0.1mm, which equates to Bonn Code 4/5) to feasibly corral oil with a boom and achieve any significant level, or operationally efficient level, of oil recovery with skimmers during an offshore C&R operation (O'Brien, 2002; IPIECA-IOGP, 2015a). In addition, as the capture/containment and corralling of oil with booms is required for in-situ burning, this threshold is considered appropriate for that response strategy. IPIECA-IOGP (2015b) and the National Research Council (2005) state that oil slicks need to be >100 g/m^2 (>0.1 mm, which equates to Bonn Code 4/5) to feasibly achieve a successfully dispersant operation. Whilst 100 g/m^2 may be the threshold for on water response strategy effectiveness stated in the literature, when evaluating oil spill modelling outputs, a lower response strategy planning threshold is considered appropriate. The effects of winds, currents etc. cause oil to spread, and it often forms into windrows with a range of oil thicknesses across a given area. During oil spill modelling, the oil thickness within a grid-cell is averaged. Therefore, for a grid-cell reporting an average thickness of 50 g/m^2, there will be range of thicknesses, due to oil behaviour, including patches/windrows/streamers of oil, of which some will be >100 g/m^2. 50 g/m^2 is aligned with the recommendation of NOPSEMA (2019). Therefore, during WCD response planning, on water response strategies including C&R, surface dispersant application and in-situ burning capability and arrangements should be evaluated against this threshold.	Approx. 30 km^2 at Day 10. Approx. 60 km^2 at Day 23. Approx. 75 km^2 at Day 62.
Longest length (km) or number of segments of shoreline oiled >10 g/m^2	Used to inform response planning regarding the: • number of segments, and tier/size of Shoreline Clean-up Assessment Technique (SCAT) teams, including Oiled Wildlife Response (OWR) and Shoreline Protection and Deflection (P&D).	IPIECA-IOGP (2015c) classifies oil on shorelines based on oil thickness. Stain is classified as <0.1mm (100g/m^2), and film as 'iridescent sheen', i.e., less than stain, with no minimum thickness. If a film were considered an order of magnitude lower than stain, the thickness would be 0.01 mm (10 g/m^2). For comparative purposes, 0.01 mm thickness is equivalent to ~2 teaspoons oil/m^2. Oil is just visible at this thickness on a shoreline and there is potential for some socio-economic impacts at this thickness. Therefore, 0.01mm (10 g/m^2) is considered an appropriate threshold to understand the potential length of shoreline/number of shoreline sectors for which SCAT may be required. This is aligned with the recommendation of NOPSEMA (2019). Therefore, during WCD response planning, SCAT capability and arrangements should be evaluated against this threshold.	Shorelines oiled spread over wide range of shorelines and islands from Tiwi Islands to western side of the JBG. Approx. 35 days for 20 km shoreline above 10 g/m^2. Approx. 55 days for 40 km shoreline above 10 g/m^2. Approx. 75 days for 180 km shoreline above 10 g/m^2. Maximum of 225 km of shoreline oiled >10 g/m^2 at Day 97.

Planning Threshold	Response Strategy Planning Considerations	Reference/Justification	Deterministic Modelling Results (Basis of Design)
Minimum time to shoreline contact for oil >10 g/m^2	Used to inform response planning regarding the: • timeline for mobilisation of SCAT, OWR and P&D assessment teams.	Understanding the shortest possible timeline between the spill event, and oil arriving on a shoreline at >10 g/m^2provides a metric to consider, for the arrangements required for the mobilisation of a SCAT capability.	10.29 days
Longest length (km) or number of segments of shoreline oiled >100 g/m^2	Used to inform response planning regarding number of segments, and tier/size of: • shoreline clean-up • OWR • protection of sensitive resources (or protect and deflect/P&D)	100 g/m^2 is often used as minimum thickness for effective shoreline clean-up (Owens and Sergy, 2000), and French-McCay (2009) conclude that 100 g/m^2 is the minimum oil thickness for effects on marine fauna and invertebrates on a shoreline. This is aligned with the recommendation of NOPSEMA (2019). Therefore, during WCD response planning, shoreline clean-up, P&D and OWR capability and arrangements should be evaluated against this threshold.	Maximum of 115 km of shoreline oiled (>100 g/m^2) Multiple marine avifauna and turtle BIA shorelines (several offshore islands, plus several islands of Buccaneer & Bonaparte Archipelago) contacted
Minimum time to shoreline contact for oil >100 g/m^2	Used to inform response planning regarding: • timeline for mobilisation of shoreline clean-up, OWR, P&D and waste management capabilities.	Understanding the shortest possible timeline between the spill event, and oil arriving on a shoreline at >100 g/m^2 provides a metric to consider, for the arrangements required for the mobilisation of a shoreline clean-up/OWR capability, and associated waste management capability that will be required by these response strategies.	Minimum time before shoreline accumulation (>100 g/m^2) is 12.54 days (turtle breeding Biologically Important Area (BIA) and habitat critical).
Highest peak shoreline loading above moderate threshold (100 g/m^2)	Used to inform response planning regarding the: • volume of waste likely to be generated during P&D, OWR and shoreline clean-up.	100 g/m^2 often used as minimum thickness for effective shoreline clean-up (Owens and Sergy, 2000; French-McCay, 2009) conclude that 100 g/m^2 is the minimum oil thickness for effects on marine fauna and invertebrates on a shoreline, and therefore triggers potential for OWR cleaning operations and associated waste generation. Therefore, during WCD response planning, the volume of oily waste potentially generated during shoreline clean-up, P&D and OWR and the associated waste management capability and arrangements should be evaluated against this threshold.	Approx. 25 m^3 on Day 26. Approx. 40 m^3 on Day 45. Approx. 420 m^3 on Day 53. Maximum of 629 m^3 total volume oil (>100 g/m^2) on Day 85.

4 Net Environmental Benefit Analysis

4.1 Operating Environment

A detailed description of the existing environment, including full EPBC Protected Matters Search outputs and literature review of the values and sensitivities potentially impacted by oil spills is contained within Appendix 11 of the Beehive-1 Exploration Drilling EP (996161-2022-Beehive#1-Drilling-EP). To provide context for spill response planning purposes, a very high-level summary of the environmental values and sensitivities of the region is provided below.

- Deep offshore waters:
  - Generally nutrient poor, supporting pelagic fish, sharks, cetaceans etc, and marine avifauna.
  - Some demersal fisheries.
  - Some offshore oil and gas developments.
- Offshore submerged banks and shoals:
  - Generally coral/coralline algae dominated substrates, supporting diverse shallow water reef ecosystems, including aggregation/feeding areas for marine megafauna.
- Offshore emergent reefs/islands:
  - Generally coral/coralline algae dominated substrates, supporting diverse shallow water reef ecosystems, including aggregation/feeding areas for marine megafauna.
  - Coarse sandy beaches, some with limited vegetation.
  - Most offshore islands typically supporting protected marine fauna (turtle/bird) roosting/breeding/nesting.
- Kimberley/NT coastline – outer islands:
  - Highly tidal, typically moderate wave energy rocky shorelines or coarse sandy beaches, with highly diverse fringing coral reef ecosystems.
  - Some beaches supporting protected marine fauna (turtle/bird) roosting/breeding/nesting, and occasional presence of estuarine crocodiles.
- Kimberley/NT coastline – inshore islands/mainland coast:
  - Highly tidal, typically moderate to low energy shorelines, dominated by extensive mangrove habitats, with some rocky outcrops and medium to fine grain beaches.
  - Mangrove and beach habitats support diverse ecosystems, including significant populations of estuarine crocodiles.

Cartier Island and the surrounding marine area within a 10 km radius was a gazetted Defence Practice Area up to 20 July 2011. Although no longer used, there is a substantial risk that Unexploded Ordnances remain in the area. Landing or anchoring anywhere within the Cartier Island Commonwealth Marine Reserve is strictly prohibited. Therefore, all SCAT of these islands should only be conducted via drone. The merits of conducting any shoreline operations at Cartier Island will need to be discussed in consultation with Director of National Parks.

4.2 Strategic NEBA

This section describes the strategic Net Environmental Benefit Analysis (NEBA) for the Beehive-1 project. The NEBA assesses each potential spill response strategy on the basis of the following criteria:

- Environmental benefits;
- Environmental impacts and risks; and
- Operational constraints.

If a response strategy is considered applicable, then its appropriateness as a primary or secondary response strategy is evaluated. This strategic NEBA employs the following process:

- List the available response strategies;
- Identify the benefit, environmental impacts and risks and operational constraints of each response strategy;
- Evaluate the applicability of each response strategy;
- The response strategies are further delineated as:
  - Primary response strategy - to be used as soon as possible in the event of a spill.
  - Secondary response strategy - to be implemented as and if needed, and only when practicable if there is a net environmental benefit.
  - Not applicable (N/A) response strategies.
  - Rejected response strategy – based on the lack of net environmental benefit.

In the event of an oil spill resulting from a LoWC, operational NEBAs will be undertaken by the Drilling Incident Management Team (DIMT) during the Incident Action Plan (IAP) process to evaluate response options that have a net environmental benefit. As such, the combination of spill response strategies and their implementation may evolve over time as conditions change on the basis of the operational (real-time) NEBAs.

Table 5.1 presents the strategic NEBA. A strategic NEBA for shoreline clean-up options is presented in Appendix B-1.

Table 4.1 Strategic NEBA of potential response strategies

Response strategy	Environmental benefits	Environmental impacts and risks	Operational constraints	Event	Suitable response?	Primary or secondary	Justification
Source control – vessel SOPEP	Limits and/or prevents further discharge of hydrocarbons to the marine environment by halting the spill (e.g., transfer fuel to another tank).	No significant impacts.	Health, safety & environmental considerations may delay implementation.	LoWC – Level 3	N/A	N/A	Control at the vessel will always be attempted as the immediate primary response to halt further spill to marine environment. SOLAS primary objective.
				MDO – Level 2	Yes	Primary	
Source control – BOP actuation	Limits the volume of oil released to the environment.		As the BOP is at the surface on the jack-up MODU, it would not be possible to actuate the BOP in the event of a LoWC.	LoWC – Level 3	N/A	N/A	Per 'operational constraints.'
				MDO – Level 2	N/A	N/A	
Source control – relief well	Limits the volume of oil released to the environment. Successful drilling of relief well estimated to take 77 days after the LoWC.	Routine discharges from the MODU and support vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8).	There are few jack-up MODUs generally available in Australia at any one time. Predicted to take 24 days to source and mobilise a MODU to the Beehive-1 location. Additional equipment is necessary to drill a relief well.	LoWC – Level 3	Yes	Primary	Most effective method to gain permanent control of the well and prevent further oil releases.
				MDO – Level 2	N/A	N/A	
Source control – capping stack	Limits the volume of oil released to the environment until a successful relief well is drilled.	Localised physical disturbance to seabed. Risks from operation of vessel spread to support deployment of equipment (e.g., all the routine planned and unplanned events associated with vessel operations, see EP Chapters 7 & 8).	Well capping is not suitable for Beehive-1 because these systems are designed for subsea wellhead applications and therefore not suitable for jack-up MODU surface application systems as is the case for Beehive-1.	LoWC – Level 3	No	N/A	Per 'operational constraints.'
				MDO – Level 2	N/A	N/A	
Source control – subsea first response toolkit			Not suitable for Beehive-1 because these systems are designed for subsea wellhead applications and therefore not suitable for jack-up MODU surface application systems as is the case for Beehive-1.	LoWC – Level 3	No	N/A	
				MDO – Level 2	N/A	N/A	
Monitor and evaluate	Vessel surveillance	Enables real-time decisions to be made to identify emerging environmental risks, to plan spill response and to assess response effectiveness. Risks from operations of monitoring vessels and aircraft (e.g., routine emissions and discharges, marine fauna interactions). Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8) and aircraft (fauna disturbance, noise, air emissions). Requires ready access to aircraft and trained oil observers. Access to both is available through AMOSC and OSRL.	Provides real-time information on spill trajectory and behaviour (e.g. weathering). Informs implementation of other response strategies. Vessel personnel may not be trained observers. Vessel observers on leaking vessel may not have capacity to observe oil during emergency response procedure implementation. Constrained to daylight. Limited to visual range from the vessel. Limited capacity to evaluate possible interactions with sensitive receptors.	LoWC – Level 3	Yes	Primary	Constant monitoring and evaluation of the spill enables better real-time response decisions to be made.
				MDO – Level 2	Yes	Primary	
	Aerial surveillance		Provides real-time information on spill trajectory and behaviour (e.g., weathering). May identify environmental sensitivities impacted or at risk of impact (e.g., seabird aggregations, other users such as fishers). Informs implementation of other response strategies.	LoWC – Level 3	Yes	Primary	
				MDO – Level 2	Yes	Primary	

Response strategy	Environmental benefits	Environmental impacts and risks	Operational constraints	Event	Suitable response?	Primary or secondary	Justification
	Oil spill trajectory modelling	Satellite tracking buoys deployed at the time of the release will assist in directing aircraft and vessels to visually monitor the spill. Visual observations will be restricted at night or during poor weather conditions.	Can be implemented rapidly. Predictive – provides estimate of where the oil may go, which can be used to prepare and implement other responses. No additional field personnel required. Not constrained by weather conditions. Can predict floating, entrained, dissolved and stranded hydrocarbon fractions. May not be accurate. Requires in-field calibration.	LoWC – Level 3	Yes	Primary	
				MDO – Level 2	Yes	Primary	
	Satellite imagery		Ancillary information can be gathered in all weather, day/night, however Synthetic Radar Analysis (SAR) algorithm used to generate oil on water detection depends significantly on wind conditions. Specifically: 1.5 – 2m/s to 15m/s range. Outside this range the imagery provided uses colour codes to indicate confidence levels for detection in various parts of the designated area of interest captured. Mobilisation likely to be >24 hours. Requires processing. May return false positives.	LoWC – Level 3	Yes	Primary	
				MDO – Level 2	Yes	Primary	
	Tracking buoys		Can be implemented rapidly. Tracking buoys simulate oil-on-water movement as defined roughly by 100% with current and 3% with the wind.	LoWC – Level 3	Yes	Primary	
				MDO – Level 2	Yes	Primary	
In-situ burning (ISB)	Combustion of oil on sea surface reduces the volume remaining on the surface.	Generates black smoke, particulates and GHG, with potential health risks to responders. Generates modest waste products for recovery and disposal. Incomplete combustion residues may be toxicologically damaging and could be ingested by marine life or coat gills, feathers, and hair. Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8) and aircraft (fauna disturbance, noise, air emissions).	Thick hydrocarbon film is required for ignition/ combustion (5-10 mm). The predicted light nature of the crude means this may not occur. There are no fireproof booms available in Australia. ISB has never been conducted in Australia (limited personnel experience). Ignition of hydrocarbon requires specialist training and equipment. Wind and sea conditions a key constraint, with light wind and low wave heights required for safe and controlled burning (wind limited to 10 kts, and wave height <1 m, IPIECA-IOGP, 2015).	LoWC – Level 3	No	N/A	Per 'operational constraints.'
				MDO – Level 2	No	N/A	
Dispersant – subsea application	Direct subsea application of dispersant at the wellhead decreasing volumes of dispersant required via aerial and/or vessel application. Reduced surface oil above the wellhead reduces safety hazard (volatile organic compounds [VOCs] and explosion risk) to allow use of other response strategies.	Minor localised physical disturbance to the seabed. Routine discharges from the MODU and support vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8). Toxicity effects of chemical dispersant to marine fauna. Increased concentration of hydrocarbons in the water column (reducing the opportunity for evaporation from the sea surface).	Subsea dispersant application is not suitable for Beehive-1 because this response is designed for subsea wellhead applications, and therefore not suitable for jack-up MODU surface application systems as is the case for Beehive-1.	LoWC – Level 3	N/A	N/A	Per 'operational constraints.'
				MDO – Level 2	N/A	N/A	

Response strategy	Environmental benefits	Environmental impacts and risks	Operational constraints	Event	Suitable response?	Primary or secondary	Justification
Surface dispersant application – vessel	Accelerates breakup of surface oil by reducing oil-water interfacial tension to increase entrained oil and its sub-surface dispersal, thereby reducing potential impacts at the sea surface (e.g., seabirds) and to sensitive shoreline receptors (e.g., mangroves, turtle nesting beaches). Oil stranded on shorelines will be more weathered and less toxic. Can be activated quickly (within first day after spill) over a wide area irrespective of sea surface conditions. Reduction in onshore hydrocarbon waste disposal requirements.	Adds chemical to the environment, introducing additional toxicity impacts to marine fauna that may not have otherwise been affected by the oil (e.g., pelagic species, coral reefs and shoals). Doesn't remove oil from the environment (simply pushes surface oil into the water column). Increased concentration of sub-surface hydrocarbons in the water column, which may take longer to weather. Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8) and aircraft (fauna disturbance, noise, air emissions).	Uncertain amenability of Beehive-1 oil to dispersant. A test spray would be required. Aerial application only possible with wind less than 35 knots, and wave height less than 5 m (IPIECA-IOGP, 2015). Vessel application may have a wider range of suitable weather conditions compared to aerial application, though the number of vessel boom spray equipment and vessels will be limited. The volume of suitable dispersant could potentially limit response implementation, but available stockpiles demonstrates that needs can be met (6,386 m^3 readily available from AMSA, AMOSC and OSRL, with a predicted need for 4,278 m^3). Requires clear area with no (or limited) simultaneous operations. Trajectory of sub-surface dispersed hydrocarbons is difficult to track (requires tracking of water currents rather than winds). Not applicable to diesel spills due to rapid dispersion and spreading.	LoWC – Level 3	Yes	Secondary	Environmental benefits outweigh the impacts and risks. This is a strategy that the oil and gas industry is well-prepared to implement.
				MDO – Level 2	No	N/A	
Surface dispersant application – aerial				LoWC – Level 3	Yes	Primary	
				MDO – Level 2	No	N/A	
Mechanical dispersion (vessel propellors)	Enhances dispersion and break-up of surface hydrocarbons to facilitate natural degradation processes.	Increases oil concentrations in the water column. Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8).	Vessels not designed to cavitate, not efficient at breaking up slicks. Potential OHS risks for vessel-based responders through ignition or inhalation of vapours from the oil, especially as Jabiru crude is so volatile (79% volatile components). Small oil droplet size required otherwise the oil can resurface. For some oil types there is limited benefit unless combined with dispersant application (suitability is unknown for Jabiru crude). Wind speeds above 20 knots provide natural dispersion, making this method redundant in windy weather.	LoWC – Level 3	No	N/A	AMOSC advises that this is not considered best practice and not recommended for either MDO or crude.
				MDO – Level 2	No	N/A	
Containment & recovery	Contains the spill as close as possible to the source. Recovery reduces spread of surface oil and thereby risks to sensitive shoreline receptors. Removal of oil from the environment. Requires minimum slick concentrations >10 g/m^2, which the OSTM predicts to be extensive.	Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8). Cleaning and disposal of contamination from booms and response vessels may introduce oil to other areas (e.g., local ports).	Containment is possible using the right equipment in 3 – 5 knots of current (well within listed current range). Strategy does not require placing boom around very large oil slicks. Limitations and constraints (high release rate, low strike rate, storage and waste management, labour intensive, weather, VoO availability) are not reasons to eliminate or downgrade this as a strategy.	LoWC – Level 3	Yes	Secondary	Strong tidal conditions are unlikely to permit efficient offshore containment in proximity to the well with booms, weirs and skimmers. Removing oil is beneficial. Prevents additional oil impacting shorelines and other sensitive areas. Strategy may be effective in nearshore low-energy areas (e.g., bays) to protect high priority receptors (such as turtle nesting or shorebird nesting beaches and mangroves). Not suitable for MDO spills due to rapidly spreading and high evaporation rates.
				MDO – Level 2	No	N/A	

Response strategy	Environmental benefits	Environmental impacts and risks	Operational constraints	Event	Suitable response?	Primary or secondary	Justification
Shoreline protection & deflection (booming operations)	Prevents or minimise oil exposure to sensitive receptors (e.g., turtle nesting beaches, mangroves, seagrass meadows) by deflecting oil to lower priority areas (e.g., rocky shores that are 'self-cleaning').	Disturbance to seabed sediments at booming anchor points. Potential for mixing of oil with beach sediments. Disturbance to shorelines (e.g., sandy beaches and sand dunes) where helicopter or foot access is required. Generation of waste from booms and disposal of recovered oil and water. Oiling of shorelines that oil is deflected towards. Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8).	Wind, waves and surface currents are key constraint in the deployment and operations of booms in nearshore coastal environments. Depending on the exact type of boom, currents cannot be >1-2 knots and breaking waves cannot be >30-50 cm. High tidal ranges in the region means keeping booms anchored could be challenging. Considerable resources and logistics support needed (i.e., equipment and labour intensive). Shoreline is remote with no facilities for responders. High OHS risks, including sun and heat exposure, risk of fauna bites/attack (mosquitoes, crocodiles, jellyfish), mud and high tidal ranges. Rescue and medical facilities are located a significant distance from shorelines. There is no road access – access is limited to vessels or aircraft only.	LoWC – Level 3	Yes	Secondary	Extremely poor site access and high OHS risks. Sensitive areas (e.g., mangroves, turtle nesting shorelines) may be targeted for protection by the DIMT (based on operational monitoring and real-time OSTM forecasting). Not applicable for MDO spill as modelling predicts only low probabilities of contact at the low threshold.
				MDO – Level 2	No	N/A	
Shoreline clean-up	Removes oil to minimise environmental risks to sensitive receptors and to accelerate recovery time. Reduces risk of oil re-entrainment from shoreline into marine environment. Areas of shoreline that are amenable to clean-up (contact >100 g/m^2) are predicted to occur over 120 km of shoreline in the worst-case deterministic modelling run (with a maximum shoreline loading of 825 m^2).	Potential shoreline disturbance to sensitive habitats (e.g., turtle nesting beaches) from clean-up operations (e.g., trampling by response personnel and equipment) may outweigh environmental benefits in some circumstances (such as natural weathering processes on the shoreline of biodegradation, photo-oxidation and volatilisation). Large volumes of waste will be generated from the removal of contaminated beach sediments. This may impact on coastal flora and fauna. Temporary storage of waste has the potential to cause contamination to areas not contacted by the spill. Presence of response personnel, equipment and facilities increase the risk of hydrocarbon cross-contamination from impacted to non-impacted sites. Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8).	Labour intensive (likely to require hundreds or thousands of people), with no local staging facilities or accommodation available. There is no road access – access is limited to vessels or helicopters only. Significant waste management logistics considerations required in a very remote area. Extensive areas of the shoreline are dominated by mangroves and mudflats, which are not accessible by foot and extremely difficult to remove oil from. High tidal ranges, with two high and two low tides per day, means shoreline clean-up hours are limited each day to period of low tide. High OHS risks, including sun and heat exposure, risk of fauna bites/attack (mosquitoes, crocodiles, jellyfish), mud and high tidal ranges. Rescue and medical facilities are located a significant distance from shorelines.	LoWC – Level 3	Yes	Secondary	Extremely poor site access and high OHS risks. Responses will be limited to sandy beaches only due to access constraints, high tidal ranges, safety of responders around rocky shorelines and in mudflats, and environmental sensitivity of mangrove forests (trampling may cause higher impacts than oil, assuming the oil is partially weathered by the time it reaches mangroves). Not applicable for MDO spill as modelling predicts only low probabilities of contact at the low threshold.
				MDO – Level 2	No	N/A	

Response strategy	Environmental benefits	Environmental impacts and risks	Operational constraints	Event	Suitable response?	Primary or secondary	Justification
Oiled wildlife response (OWR) • Onshore exclusion barriers • Hazing • Pre-emptive capture • Capture, treatment and rehabil-itation	Reduces impacts to wildlife populations, particularly threatened species such as turtles. Minimising suffering of affected fauna. Euthanasia of animals that have no prospect of survival are not consumed by predators or scavengers, thereby avoiding secondary contamination of the food web.	Hazing may accidentally drive wildlife into spills or separate groups/individuals (e.g., parents/ offspring pairs). It may push them away from resources they require (food, habitat). Potential risk of fauna injury due to inappropriate field collection/handling during capture. Rehabilitation activities could result in inappropriate animal handling leading to stress, injury or death. Inappropriate fauna relocation points leading to disorientation or stress and consequent health impacts. Generation of medical wastes and requirement for suitable disposal. Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8).	There is no road access – access is limited to vessels and helicopters only. Labour intensive with significant logistical considerations. Limited to sandy beach areas (e.g., turtle nesting beaches during nesting or hatchling emerging times and shorebird nesting beaches) due to OHS risks associated with access to shorelines dominated by rocks, mangroves and mudflats. Sandy beaches comprise a very small percentage of the shoreline within the spill EMBA and coastlines closest to Beehive-1. The number of oiled wildlife kits are limited (AMOSC, AMSA, OSRL and state-based wildlife government agencies). OWR is limited to trained wildlife handlers from AMSA and state-based wildlife government agencies, meaning responder numbers are small. Access to trained wildlife handlers from wildlife rehabilitation organisations could be limited due to access constraints and OHS risks. Most of the shoreline is not suitable for staging facilities (e.g., treatment and rehabilitation) due to its remoteness. High OHS risks, including sun and heat exposure, risk of fauna bites/attack (mosquitoes, crocodiles, jellyfish), mud and high tidal ranges. Rescue and medical facilities are located a significant distance from shorelines.	LoWC – Level 3	Yes	Secondary	OWR is justified when oiled wildlife is identified and the capability to respond is in place (through existing state plans). Extremely poor site access.
				MDO – Level 2	Yes	Secondary	
Natural recovery	No additional impacts associated with response activities. Potential benefit in locations where active response strategies have potential to create additional environmental harm.	No additional impacts. Potential for long recovery periods given persistence of crude.	Maintaining site exclusion of oiled environment.	LoWC – Level 3	Yes	Secondary	Makes use of the natural degradation and weathering process to breakdown and remove surface oil and stranded hydrocarbons. Effectively this response strategy means no direct action other than monitor and evaluate spill trajectory and rate of habitat/ community recovery.
				MDO – Level 2	Yes	Secondary	

Response strategy	Environmental benefits	Environmental impacts and risks	Operational constraints	Event	Suitable response?	Primary or secondary	Justification
Operational and Scientific Monitoring (OSM)	OSM and its supporting documents are instrumental in providing situational awareness of a hydrocarbon spill, enabling Incident Management Teams/Emergency Management Teams (IMT/EMTs) to mount a timely and effective spill response and continually monitor the effectiveness of the response. OSM is also the principal tool for determining the extent, severity and persistence of environmental impacts from a hydrocarbon spill and resultant remediation activities.	Routine discharges from vessels (e.g., all the impacts and risks associated with vessel operations, see EP Chapters 7 & 8) and aircraft (fauna disturbance, noise, air emissions).	Weather constraints. High OHS risks, including sun and heat exposure, risk of fauna bites/attack (mosquitoes, crocodiles, jellyfish), mud and high tidal ranges. Rescue and medical facilities are located a significant distance from shorelines.	LoWC – Level 3	Yes	Primary	Applicable as a primary response strategy to characterise impacts from oil spill and response activities, and subsequent recovery. EOG has adopted the AEP Joint Industry OSM Framework and has committed to implementing the relevant plans if their initiation criteria are met.
				MDO – Level 2	Yes	Primary	
Forward operations base	Benefits outweigh impacts. Establishes local command. Better communication with local resources and stakeholders.	Labour intensive – Health & Safety risks. Logistics – habitat & social disturbance. Mobilisation of personnel – aviation fuel, etc.	Availability of suitable command post (location/ building). Oil trajectory and potential for multiple / satellite command posts over large geographical area.	LoWC – Level 3	Yes	Primary	Constant monitoring and evaluation of spill and response activities by people on-location during a spill event.
				MDO – Level 2	Yes	Secondary	
Waste management	Benefits outweigh impacts. Oiled waste removed from site by trained contractors and dealt with at an approved waste management facility.	Labour intensive – Health & Safety risks. Logistics – habitat & social disturbance.	Logistics constraints in moving waste from site to approved waste facility.	LoWC – Level 3	Yes	Primary	Applicable where hydrocarbons accumulate on shorelines and shoreline clean-up response strategy implemented.
				MDO – Level 2	Yes	Primary	

4.3 Selected Spill Response Strategies

The strategic NEBA (Section 4.2) was used to assess and select appropriate spill response strategies and determine whether they would be applied as primary or secondary response options. Appendix 8 of the EP provides further detail on the 'As Low As Reasonably Practicable' (ALARP) assessment of spill response strategies. The implementation of these ALARP justified responses as control measures are the basis of this OPEP.

In the event of a Level 2/3 spill, operational NEBAs will be regularly undertaken as part of the Incident Action Plan (IAP) development process (see Section 4 of the OPEP), so that the combination of spill response strategies and their implementation may evolve over time.

Table 4.2 presents a summary of the spill response strategies selected for this OPEP.

Table 4.2 Selected primary and secondary spill response strategies

Response strategy	Crude spill	MDO spill
Source Control – Relief Well	Primary	N/A
Source Control – Vessel Spill	N/A	Primary
Monitor and Evaluate	Primary	Primary
Surface Dispersant Application – Vessel	Secondary	No
Surface Dispersant Application – Aerial	Primary	No
Containment & Recovery	Secondary	No
Shoreline Protection & Deflection	Secondary	No
Shoreline Clean-up	Secondary	No
Oiled Wildlife Response	Secondary	Secondary
Operational and Scientific Monitoring (OSM)	Primary	Primary
Waste Management	Primary	Primary
Forward Operations Base	Primary	Primary

4.4 Protection Priorities and Tactical Response Plans

The stochastic oil spill modelling (Appendix 6 of the EP) and the risk assessment for a LoWC (Section 8.7 of the EP) were used to identify areas for priority protection. Section 4.4. of the OPEP identifies a number of locations for which Tactical Response Plans (TRPs) will be developed in conjunction with RPS and will be in place 6 weeks prior to start of activity, including:

- Moyle River Estuary (NT);
- Victoria River Estuary (NT);
- Forsyth Creek (NT);
- Keep River Estuary/Turtle Point (NT);
- Cape Domett (WA DoT cell # 1&2);
- Cambridge Gulf/Lacrosse Island (WA DoT cell # 3);
- Berkeley River (WA DoT cell # 10); and
- King George River (WA DoT cell # 13).

RPS's contract with EOG includes the development of TRPs for each of the above locations, including:

- Details of the operating environment;
- Information on relevant shoreline types with an overview of environmental & socio-economic sensitivities within each;
- Establish relevant response strategies Client would employ for the environmental & socio-economic sensitivities identified;
- An overview of response equipment that might be required to enact the response strategies (i.e., shoreline boom, skimmers etc);
- Logistical considerations for response operations for the locations (e.g., access, availability, duration); and
- Safety considerations for response operations.

Table 4.3 provides the template to be used by RPS. EPOs, EPSs and Measurement Criteria for TRPs are included in Chapter 9 of the EP.

Table 4.3 Tactical Response Plan (TRP) template

SECTOR NAME:	**Coordinates**
	SITE DESCRIPTION
	SITE ACCESS
	SITE CONSTRAINTS
	MAIN SENSITIVITIES
	FACILITIES AND SERVICES

RESPONSE INFORMATION		
SPONSE STRATEGIES –		
RESPONSE TASKS		**RATIONALE BEHIND RESPONSE DECISON**
First Task: **Method:**		
Second Task: **Method:**		
Third Task: **Method:**		
Fourth Task: **Method:**		

SITE SETUP	**RESPONSE CHECKLIST**
	Safety **Environmental** **Support**

FIRST TASK –		
TACTICAL ASSIGNMENT	Tasking •	Considerations •

SECOND TASK –		
TACTICAL ASSIGNMENT	Tasking •	Considerations •

THIRD TASK –		
TACTICAL ASSIGNMENT	Tasking •	Considerations •

FOURTH TASK –		
TACTICAL ASSIGNMENT	Tasking •	Considerations •

Response strategy	Equipment	Minimum quantity	Vehicles / Vessels	Minimum quantity	Staging area/ancillary equipment	Minimum quantity

Maximum indicative response personnel	Peak response numbers
Indicative total response personnel	

5 Field Capability Basis of Assessment

This section presents the relevant information by which to undertake the detailed field capability assessments for each Response Strategy presented in Section 7. Supporting information applied to form the basis of the field capability assessment include:

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

5.1 Selection of WCD for Field Capability Assessment

In accordance with the processes described in IPIECA-IOGP (2013) Part 2, a single WCD scenario has been selected for detailed Field Capability Assessment, due to nature and scale and Strategic NEBA outcome. Table 5.1 presents the justification for the selected scenario.

Table 5.1 Selection of WCD for field capability assessment

WCD	Selected? (Yes/No)	Justification
Surface release of crude oil from a loss of containment from the Beehive-1 well.	Yes	This scenario represents the largest release of crude oil. The release would be from near the sea floor.
Surface release of MDO from fuel tank rupture on support vessel.	No	This scenario would have less impact than the loss of well control scenario with fewer response strategies being applicable. Those that are similarly applicable would be to a reduced scale compared with a LoWC event.

5.2 AMOSC Capability Justification

AMOSC's assessment of the field capability requirements to implement the response strategies in the OPEP was based on a LoWC WCD scenario (Section 2) and on the selected response strategies (Section 4.3). Each response strategy was considered individually (i.e. assuming that no other interventions have been successful). A summary of their assessment follows:

- Response predicted to be required within the first three weeks at seven of the thirty-five identified sensitive shoreline receptors for contact modelling.
- A further ten sites would require response within four weeks with the remainder extending up to seven weeks before shoreline response would commence.
- This allows sufficient time to mobilise the pre-identified human resources required for the response, with additional just-in-time on the job shoreline response training programme with the temporary workforce initiated in parallel to support an extended response.

- For the majority of the response locations liveaboard vessel support will be required to facilitate the response.
- The operational response will use all resources available within Australia. These include those from AMOSC, government parties to NatPlan, the state/territorial jurisdictions, industry and mutual aid. In addition, it is likely that Global Response Network Resources will be called upon to support the longer-term response through subject matter expertise and longer-term resourcing.

Table 5.2 details AMOSC's assessment of the peak field requirements for the response strategies. Figure 5.1 shows the organisational structure for the selected response strategies.

Table 5.2 Peak resourcing requirements (AMOSC)

Response Strategy	Tactics	Requirement	Equipment needed	Vessel/aircraft needed	Personnel needed
Monitoring and Evaluation – Aerial surveillance	Overflights of the spill area and areas likely to be impacted.	Daily overflights of the oil spill / search area	2 x Aerial Observer Grab Bags	2 x Aircraft – fixed wing or rotary	4 x pilots (2 per craft) 2 x aerial observers
Surface Dispersant Application	Aerial application	Airbase strike team with personnel to support 6 air tractors and 1 Hercules collectively applying up to 138 m^3 per day.	138 m^3 dispersant per day 3 x Dispersant transfer equipment packages 3 x Aircraft maintenance equipment 1 x airbase administration container	6 x Aerotech aircraft with support Crews 1 x OSRL Hercules aircraft 1 x air attack aircraft 1 x SAR aircraft	1 x aerial FOB manager 6 x Air tractor Pilots 2 x Hercules pilots 1 x Air attack supervisor 2 x pilot for air attack craft 2 x pilot for SAR aircraft 40 x ground staff
	Vessel application	4 x offshore Vessel Dispersant application strike teams each with the potential to apply 6 m^3 dispersant per 2 days (average)	4 x Dispersant application equipment 12 m^3 dispersant in IBCs per day.	4 x unlimited Class 'A' surveyed vessels; with 100 m^2 deck working space.	4 x trained operations oil spill responders, 12 x labour hire personnel
Containment and Recovery	Offshore oil recovery	4 x offshore containment and recovery strike teams, each collecting (50 m^3) per operational period	4 x 200 m offshore boom OR single advanced booming system; 4 x High capacity skimming system; 4 x Waste management capacity min 500 m^3 volume (temp tanks; mud tanks or similar on vessel)	8 x unlimited Class 'A' surveyed vessels; with 200 m^2 deck working space and waste collection capacity of 500 m^3	4 x trained operations oil spill responder, 12 x labour hire personnel
Shoreline Protection and Deflection	Shoreline sensitivity protection & deflection booming, recovery operations	10 x protection & deflection strike teams. (as required to protect sensitivities).	Minimum requirements: 10 x 50 m shore seal boom 10 x 50 m near shore boom (i.e. zoom boom or GP boom) 10 x Shoreline skimming system; 10 x Waste management capacity min 10 m^3 volume (fast tanks, IBC's)	10 x small vessel for towing boom offshore. 10 x large vessel if remote locations need to be accessed	10 x trained Operations oil spill responder 30 x labour hire personnel
Shoreline Assessment and Clean-up	Shoreline Clean-up Assessment Technique (SCAT) field survey teams	10 x SCAT teams	10 x drone – (allowing equipment redundancy) 10 x SCAT grab bag	10 x Vehicles for shoreline accessible locations; or 10 x vessel with capacity for 4 x SCAT personnel for inaccessible locations.	10 x SCAT team Lead 10 x labour hire 10 x wildlife observer 10 x drone operator
	Shoreline clean-up (shoreline type specific)	16 x Shoreline clean-up teams.	16 x Shoreline response kits incl (Type and quantalities to be adjusted according to shoreline type & oiling): 16 x Manual oil collection equipment 5 x Mechanical oil collection/removal machinery & plant 16 x Waste collection and containment equipment 16 x Equipment and personnel decontamination equipment 16 x Site zoning equipment for sealing of the site	32 x Vehicles to transport personnel and trailered equipment. 16 x vessel for teams working at inaccessible locations.	16 x shoreline clean-up team lead 160 x labour hire 5 x plant operators to work across teams where plant can access the beach and where it is deemed appropriate.
Oiled Wildlife Response	Oiled Wildlife Response	1 x wildlife response team	2 x First strike response equipment cache's (phases 1-4) 2 x wildlife response containers (phases 5-8) Immediate sourcing of equipment identified in the appendices of the OWR Plan.	10 x 4WD vehicles for terrestrially accessible locations 10 x vessels with capacity for hazing and rescue teams of 4-5 for coastal operations.	1 x Oiled Wildlife Coordinator 5 x trained section managers incl: Reconnaissance; Rescue and Transport; Staging and holding; Rehabilitation and Rehabilitation Facilities. >100 skilled wildlife handlers >100 unskilled labour Hire >20 specialist personnel (vets, vet nurses etc)

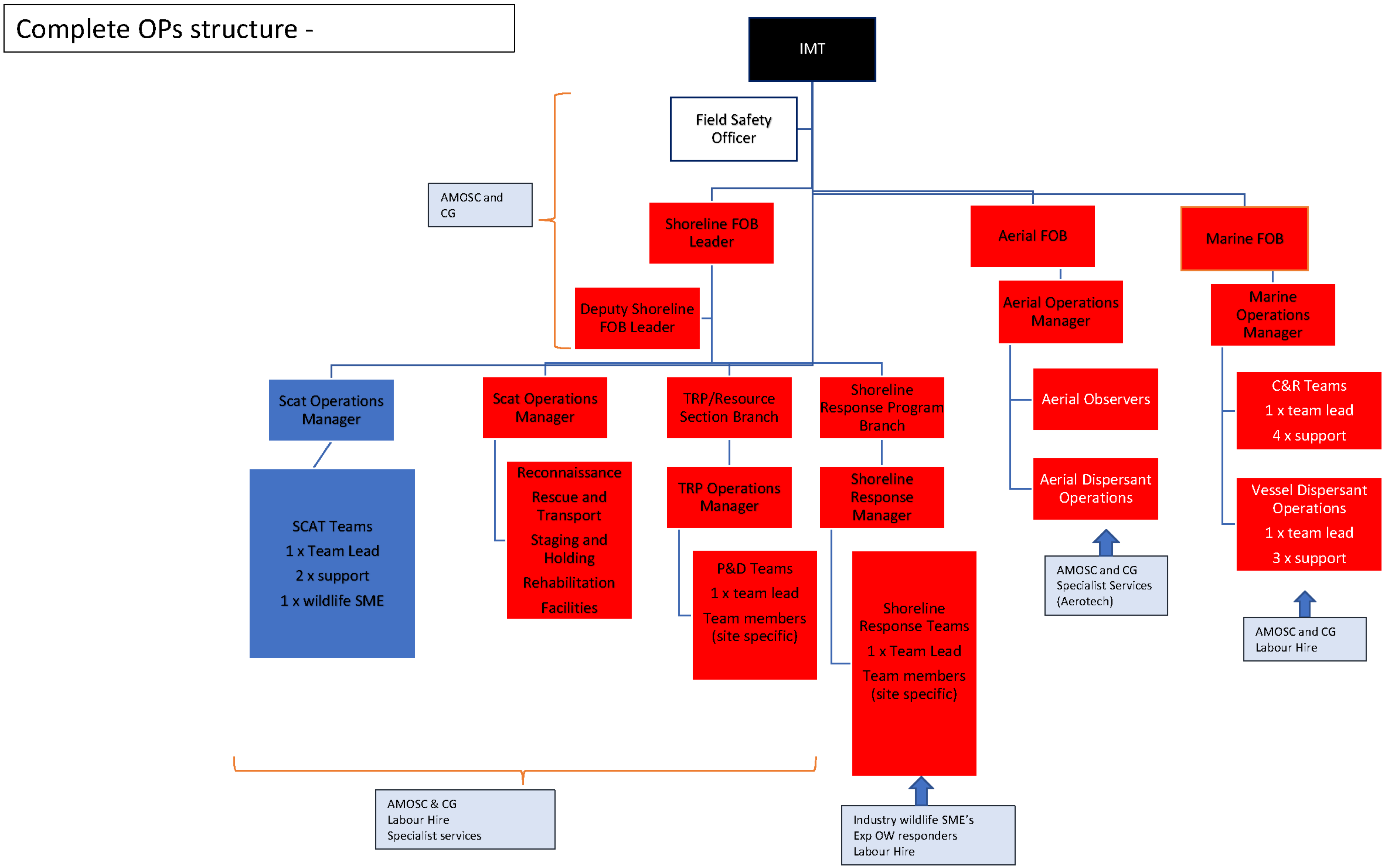

Figure 5.1 Peak response – organisational structure (AMOSC)

5.3 Cone of Response

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

Figure 5.2 provides the layout of at-sea response strategies with Zone A for Containment and Recovery (C&R) located closest to the spill source, followed by Zone B for FWAD and Zone C for vessel dispersant at increasing distances from the spill source (EOSP 2012). In contrast, Figure 5.3 shows the IPIECA-IOGP (2015b) model, with dispersant operations closest to the spill source and C&R used adjacent to a shoreline sensitivity.

Figure 5.4 presents another 'cone of response' model, which commences from the start of the spill has been developed by AMOSC.

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

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

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

Cone of response associated with on-water response strategies for a crude spill would typically involve a combination of the following:

- Monitoring and Evaluation;
- Surface Dispersant Application (SDA) via fixed wing aerial dispersant (FWAD) and vessel; and
- Containment and recovery.

The exact arrangement/combination of response strategies would be selected based on the spill scenario, state of weathering of the oil, weather forecast and best available combination of vessels/aircraft and equipment.

Remote shoreline operations are not typically addressed in spill response literature and the cone of response models. The OPEP encompasses a region with low levels of infrastructure along the mainland coastline, numerous islands within coastal waters, and remote offshore islands/reef systems. Therefore, some response activities such as SCAT, shoreline protection, shoreline clean-up and OWR may require the use of liveaboard charter vessels and other vessels with sufficient accommodation and infrastructure from which to mount logistics. These vessels would also act as offshore staging areas. However, additional logistical support such as smaller vessels, landing barges and twin-engine helicopters would be required to facilitate response logistics.

Remote shoreline oil spill response in north-western Australia present logistical constraints and hazards including:

- Remoteness of most locations (flight times to nearest town/city, minimal local services available);
- Minimal infrastructure (i.e., roads, ports, airfields) at most shoreline location;
- Potentially large tidal ranges and challenging met ocean conditions making shoreline landing via vessel difficult at times;
- Marine fauna hazards, especially for islands closer to the mainland; and
- Heat/humidity.

Response can sometimes be facilitated along remote mainland shorelines that have road access by establishing remote accommodation camps/forward operating bases (FOBs).

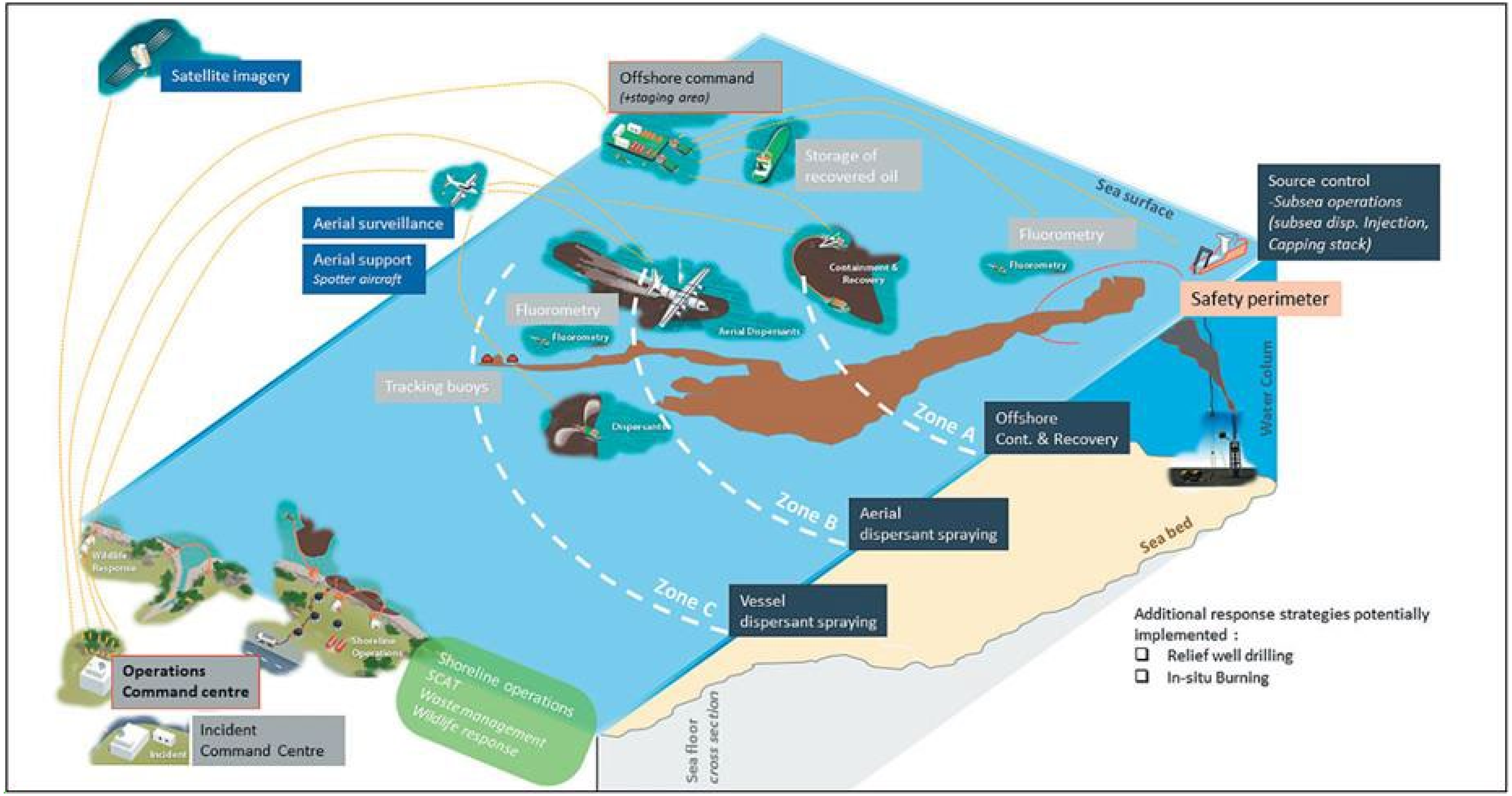

Figure 5.2 Cone of response model (Source: EOSP, 2012)

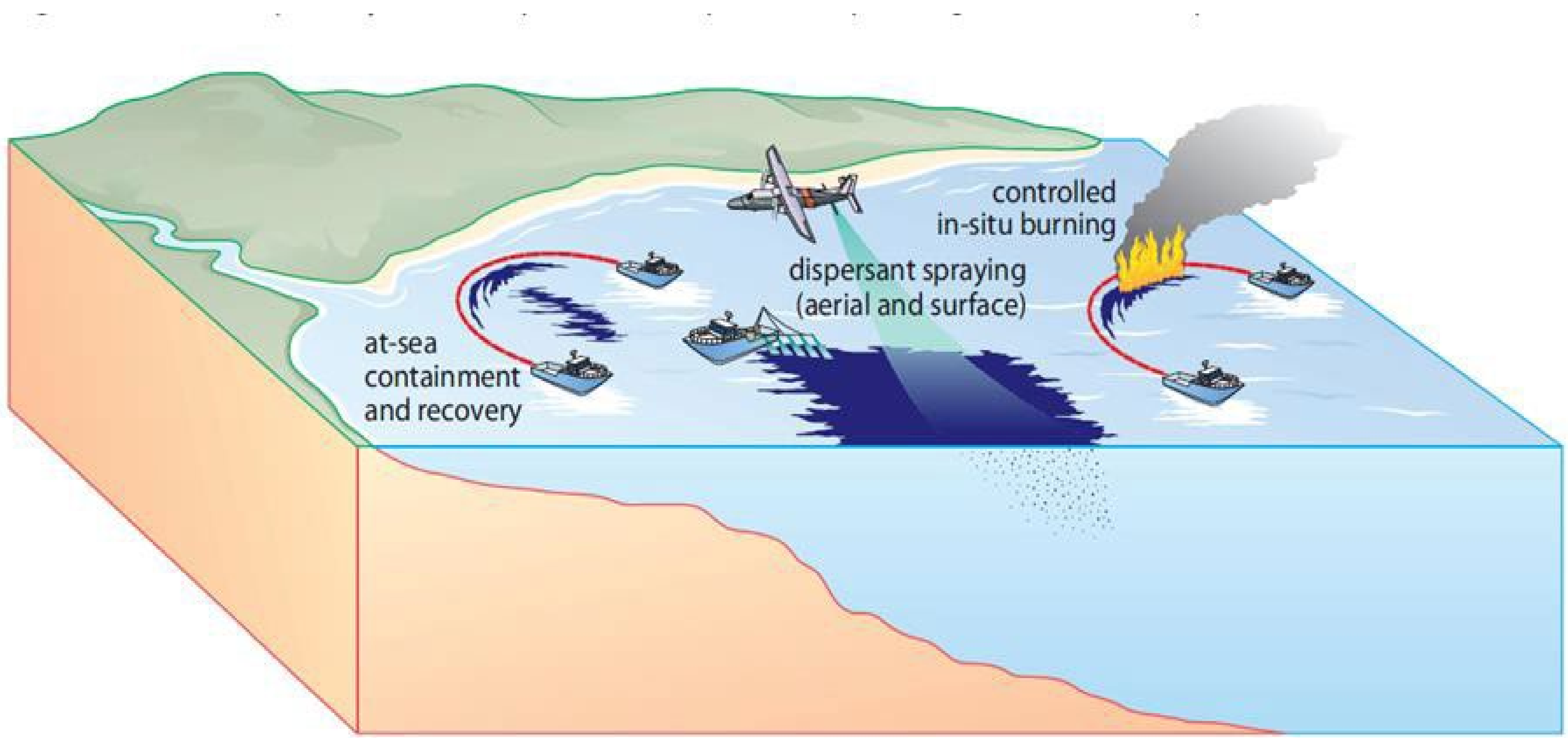

Figure 5.3 At sea response techniques for responding to a surface spill (Source: IPIECA, 2015b)

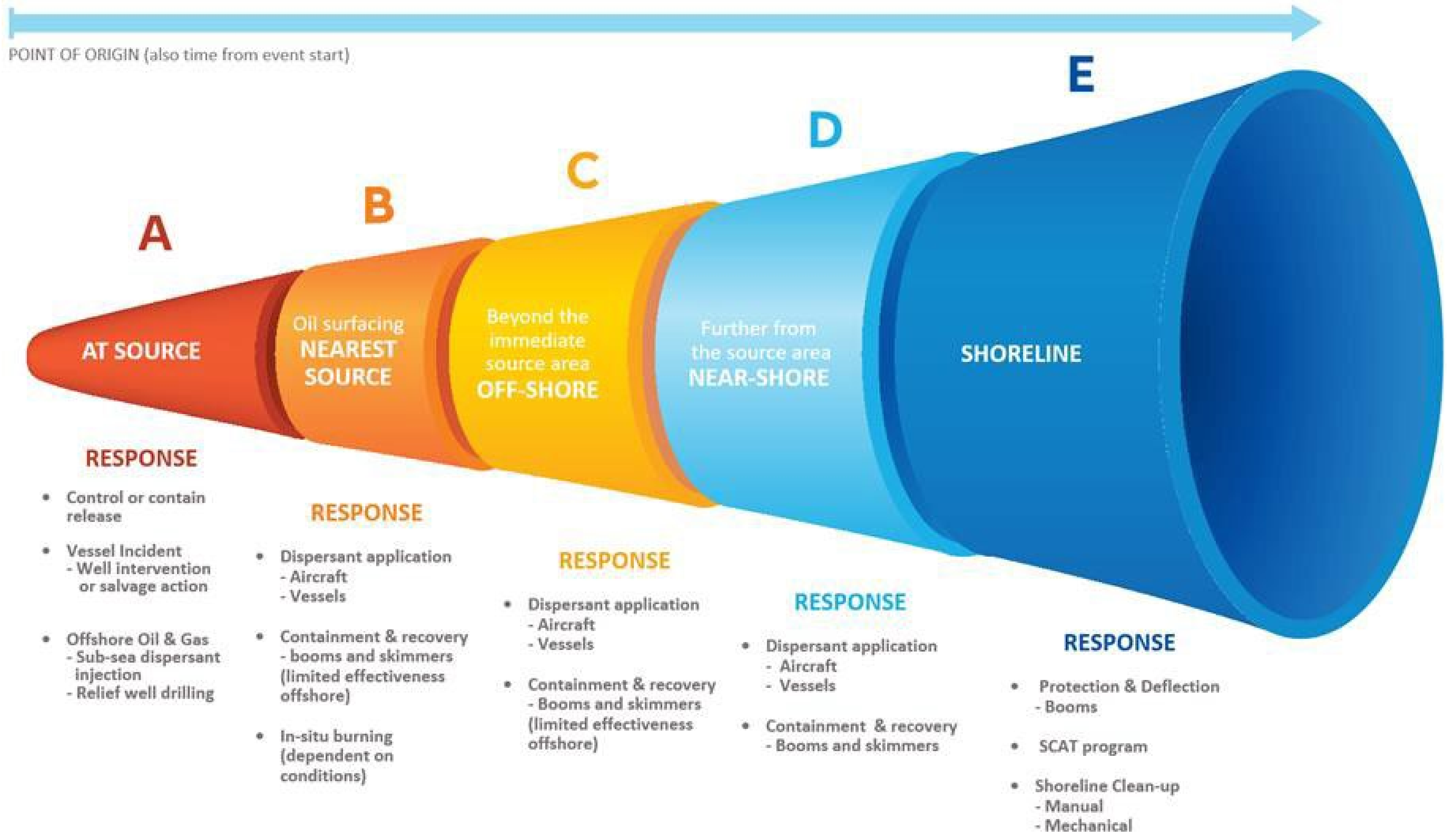

Figure 5.4 Cone of response - AMOSC model

5.4 Oil Spill Budget

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

Oil spill budgets are used as part of the field capability assessments, presented in Section 7.

The below sub-sections describe factors affecting an oil spill budget for the various response strategies. Generation of an oil spill budget can provide an early indication of several response parameters including:

- Potential waste volumes;
- Scale of response;
- Duration of response; and
- Efficacy of specific response strategies.

5.4.1 Surface Dispersant Application (SDA)

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

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

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

Australian stockpiles of dispersant consist of products considered to be effective on a broad range of oils rather than specific to a given type. The application rate may change considerably (high application rates for thicker layers of viscous oil, lower rates for thinner, lighter oils) but efficacy on a typical crude, according to IPIECA, is usually above 70%.

For the purposes of this assessment, EOG has conservatively assumed 65% efficacy.

Aircraft Application

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

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

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

- Total or daily volume of release;
- Calculated dispersant volume to treat at initial 1:20 dispersant to oil ratio;
- Dispersant efficacy on oil is 65%;
- Fixed-wing aircraft (FWADC) (AT802);
    - one FWDAC can deliver 3 m^3 per sortie
    - one FWDAC can conduct 4 sorties per day from Truscott (12 m^3/day)
    - one FWDAC can conduct 5 sorties per day from Wyndham (15 m^3/day) (from Day 12)
    - two FWDAC available from Day 2; four extra FWDAC available from Day 4 (6 FWDAC total)
- Hercules aircraft (C130);
    - one Hercules can deliver 12 m^3 per sortie
    - one Hercules can conduct 2 sorties per day from Truscott (24 m^3/day)
    - one Hercules available from Day 4.

The impact of one Fixed Wing Aircraft strike team is approximately 39 m^3 of oil treated per sortie or 156 m^3 per day with 4 sorties, or 195 m^3 per day with 5 sorties.

The impact of one Hercules Aircraft strike team is approximately 156 m^3 of oil treated per sortie or 312 m^3 per day with 2 sorties.

Vessel Application

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

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

- Mounting of spray arms as far forward as possible to avoid the bow wave moving oil out of the spray path;
- Nozzles that produce a flat spray of droplets (not mist or fog) that strike the water in a line perpendicular to the direction of vessel movement;
- Operation of vessel in prevailing wind/weather conditions to avoid overspray onto decks or personnel;

- Initial (rule of thumb) dispersant-to-oil ratio of 1:20 which can then be adjusted to actual field concentrations based on observed efficacy; and
- Treatment should initially target the outer edges of the thicker portions of any slick rather than through the middle or on thin sheen at surrounding edges.

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

- Total or daily volume of release;
- Calculated dispersant volume to treat at initial 1:20 dispersant to oil ratio;
- Dispersant efficacy on oil is 65%;
- Calculated vessels required based on 6 m^3 dispersant delivery every 2 days per vessel (AMOSC validated based on 11 m^3 per run with 15 hours steaming from Darwin – i.e., one run every 2 days); and
- Number of spray systems per vessel.

The impact of one vessel-based strike team is approximately 39 m^3 of oil treated per day (averaged over two days).

Application Strategy

Figure 5.5 shows varying mobilisation and operation times for each individual vessel and aircraft, including up to 4 vessels, up to 6 FWADC and 1 Hercules. Table 5.3 provides a summary of the application strategy.

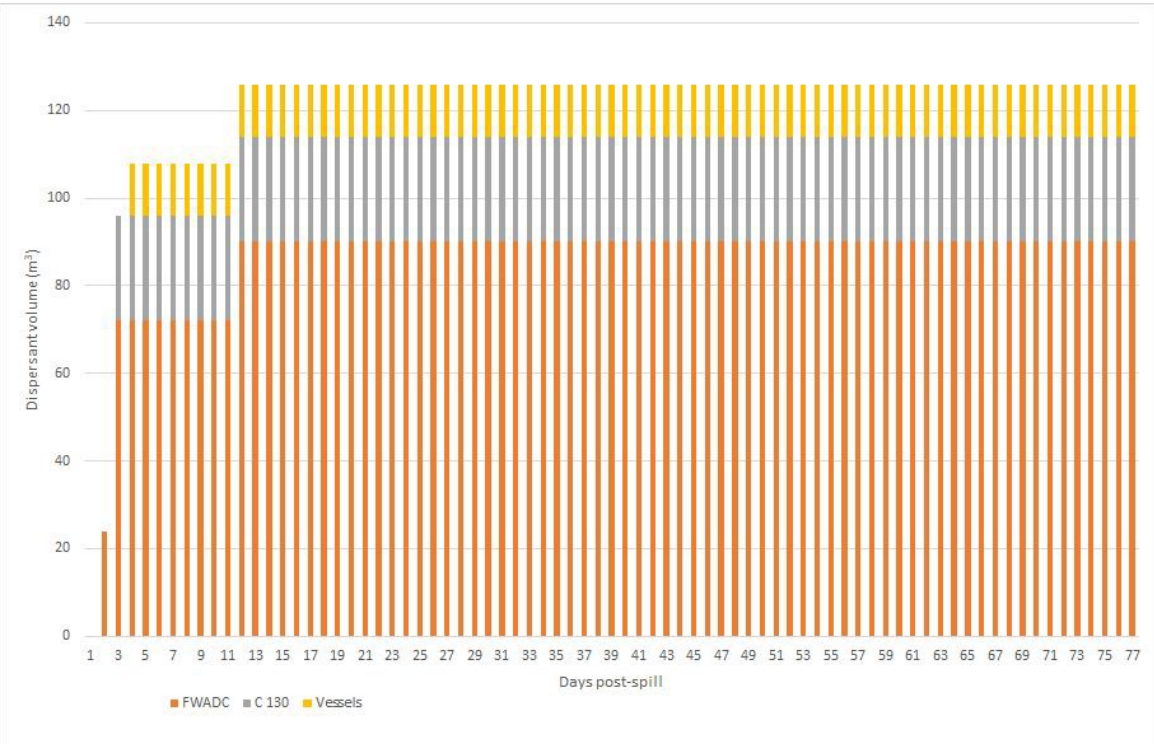

Figure 5.5 Modelled daily dispersant application

Table 5.3 Summary of surface dispersant application mitigation strategy

Parameter	Input
Dispersant to oil ratio	1:20 (only applied on oil >10 g/m^2)
Dispersant effectiveness (%)	65
Operational hours	11.5 (during daylight only)
Application window (age of oil)	12-72hrs
Dispersant application start	24 hrs after initial release
Dispersant application – operational wind speed range	2-35 knots
Aerial application	**Day 2**: 2 x FWADC delivering 24 m^3/day **Day 3**: 6 x FWADC delivering 60 m^3/day & 1 x C130 Hercules delivering 24 m^3/day **Aviation Base (initial):** Truscott (allows 4 FWADC sorties/day) FWADC flight time from Truscott: 45 minutes. Time to complete & turnaround plane per sortie: 2 hours, 20 minutes + 30 minutes refuelling (every 2nd sortie) = 4 sorties/day (10 hours, 20 minutes) **Aviation Base (Day 12):** Wyndham (allows 5 FWADC sorties/day) FWADC flight time from Wyndham: 30 minutes. Time to complete & turnaround plane per sortie: 1 hour, 50 minutes + 30 minutes refuelling (every 2nd sortie) = 5 sorties/day (10 hours, 10 minutes) **Aviation Base (77days):** Truscott (C130 Hercules – 2 sorties/day) C130 Hercules Flight Time from Truscott: <60 minutes.
Vessel application	From Day 4/5: Vessel application commences (6 m^3 per 2 days; 4 vessels operating) Steaming Time from Marine Base (Darwin): 15 hrs Marine Base: Darwin. 1,000 L applied every 50 minutes (11 m^3/day) – 2 day turnaround
Maximum dispersant application rate (based on assumptions)	126 m^3/day

Spill modelling undertaken by RPS (2022) was used to compare unmitigated (77-day LoWC scenario) with SDA (mitigated scenario) against various worst-case modelling realisations. The SDA simulation for the realisation used to determine the highest accumulated shoreline mass above the moderate threshold (100 g/m^2) across all shorelines yielded the following outcomes:

- A total of 786,858 m^3 of surface oil was treated by the response efforts of the FWADCs, Hercules and vessels. The simulated SDA response used 10,734 m^3 over 98 days .
- The SDA implementation yielded a substantial predicted reduction in peak loading across all shorelines with a decrease from 705 m^3 (unmitigated) to 421 m^3 (SDA mitigated).
- The maximum length of shoreline impacted above the moderate threshold (100 g/m^2) decreased from 115 km to 94 km.

5.4.2 Containment and Recovery

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

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

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

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

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

- Swathe width of the boom configuration;
- Speed at which the boom is being towed; and
- Thickness and continuity of the oil slick that is being encountered, which may vary due to slick spreading and fragmentation.

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

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

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

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

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

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

- Current buster strike team
  - Equipment Current Buster 4 (National Plan stockpile standard)
  - Encounter width full span (22 m)
  - BONN agreement Discontinuous True Colour Range, 50 µm and 2 knots speed over water (minimum)
  - BONN agreement Discontinuous True Colour Range, 200 µm and 4 knots speed over water (maximum)
  - Assumed maximum 12 hr operational period per day
  - **Minimum containment potential = 33 m^3/day**
  - **Maximum containment potential = 261 m^3/day**
- Traditional Ro-Boom strike team
  - Equipment 2 x 200 m lengths offshore Ro-Boom
  - U or J formation with encounter span 30% of total length = 120 m
  - BONN agreement Discontinuous True Colour Range, 50 µm (minimum) and 200 µm (maximum) oil on water
  - Speed over water 0.75 knots
  - Assumed maximum 12 hr operational period per day
  - **Minimum containment potential = 67 m^3/day**
  - **Maximum containment potential = 267 m^3/day**

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

The AMOSC report estimates that each strike team can collect 50 m^3/day. Oil spill modelling has shown that the release rate of the Beehive-1 well decreases from 11,539 m^3/day to 9,735 m^3/day over the 77 days of release; an average of 10,219 m^3/day. The Beehive-1 crude is expected to have 21% persistent fraction (after several days). Table 5.4 shows the minimum response need (number of active units) at the average anticipated release rate, assuming a minimum containment potential of 50 m^3/day/unit, and aiming for a containment and recovery target of 10%.

Table 5.4 Containment and recovery units required

	Average daily release	Average daily persistent oil	Recovered oil /day (assuming 10% recovery rate)	Recovered oil per unit/day
Volume (m^3)	10,219	2,146	215	50
Estimated containment and recovery units required				4.3 units

5.4.3 Shoreline Protection and Deflection

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

Oil spill budget factors include:

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

For the purposes of this assessment, it is assumed that each P&D team will collect 0.1 m^3 of oily water per day.

5.4.4 Shoreline Response

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

- Volumetric changes to the oil over time due to weathering;
- Bulking factors based on marine or shoreline debris;
- Bulking factors introduced through cleaning methods or requirements; and
- Waste management and hazardous waste minimisation.

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

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

- Maximum deterministic WCD volume ashore above 100 g/m^2 was 629 m^3;
- Using a bulking factor of 10x, a worst-case total volume of up to 6,290 m^3 of oil contaminated waste material that may require clean-up;
- Greater than 100 g/m^2 loading for clean-up;

- All waste is removed by hand (although where practicable machinery may be deployed); and
- Due to the remote location and climatic conditions, assumes one-person can clean up 1 m^3 of waste per day.

Based upon the above, it may take up to 6,290 person days to clear all oil contaminated waste, although this estimate is highly conservative given it is based on the worst-case shoreline loading outcome, assumes all waste is cleared by hand and assumes that other response strategies (i.e. surface dispersant application, containment and recovery, and shoreline protection and deflection) have not worked. As described above and in detail in Appendix B-1, not all shoreline types are amenable to clean-up techniques.

5.4.5 Oiled Wildlife Response

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

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

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

During oiled wildlife cleaning, it is expected that between 600 – 1000 L of fresh water may be required to wash and rinse one wildlife casualty. Additional water is required for rehabilitation pools, general cleaning etc. Therefore, the supply of fresh water, and oily water storage is a key consideration.

For planning purposes, it is estimated that the waste generated per day, per skilled wildlife handler would be 0.5 m^3 oil + 0.1 m^3 water + 0.25 m^3 other waste.

5.5 Tiered Preparedness

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

- Tier 1 capabilities describe the locally held resources used to mitigate spills that are typically operational in nature occurring on or near an operator’s own facility;
- Tier 2 capabilities are typically extra resources from regional or national providers, used to increase response capacity or to introduce more specialist technical expertise; and

- Tier 3 capabilities are globally available resources that further supplement Tiers 1 and 2. The resources held at the three tiers work to complement and enhance the overall capability by enabling seamless escalation according to the requirements of the incident.

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

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

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

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

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

5.6 Planning Timeframes

The AMOSC advice (Section 5.2), the deterministic modelling results (Section 3.2) and the response strategy thresholds (Section 3.3) were assessed to provide indicative implementation timeframes for the response strategies. Table 5.5 presents these key timeframes.

Table 5.5 Indicative Response Strategy Implementation Timeframes

Day	Indicative Response Strategy Implementation
Day 1	M&E (aerial surveillance [helicopter] commences. M&E (vessel surveillance) M&E (ESTBs) commences/peak. Forward operations commence.
Day 2	M&E (dispersant effectiveness – shake jar) commences. SDA (aerial) commences. Forward operations established.
Day 3	M&E (aerial surveillance [trained observers] commences. C&R commences. Shoreline operations (management) commences. OWR (management) commences. Waste Management commences.
Day 4	SDA (aerial) ramps up. SDA (vessel) commences. Waste Management established.
Day 5	M&E (dispersant effectiveness – OSM WQ team) commences.
Day 6	SDA (vessel) peak. SCAT commences. OWR (management) established.
Day 8	P&D commences. C&R peak.
Day 10	M&E (dispersant effectiveness – OSM WQ team) ramps up. Shoreline clean-up commences. OWR (operational) commences. Waste Management ramps up. SDA (aerial) peak (Day 12).
Day 24	M&E (dispersant effectiveness – OSM WQ team) peak. P&D ramps up. SCAT ramps up. Shoreline clean-up ramps up. OWR (operational) ramps up.
Day 43	P&D ramps up. SCAT peak. Shoreline clean-up ramps up. OWR (operational) ramps up. Waste Management peak.
Day 51	All response strategies at peak.

6 Field Capability Requirements for Selected Response Strategies

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

- A summary of each response strategy including basis of assessment considerations (where relevant) and response tier level;
- An evaluation of relevant oil spill budget considerations for the response strategy (e.g., the oil thickness over geographical area and minimum time to contact etc), above relevant response strategy planning thresholds;
- Identification of the maximum possible field capability in terms of equipment, personnel and logistics assets (vessels, aircraft etc) to treat the WCD oil spill budget requirement, within the geographical and time constraints derived from the BOD;
- A description of response timing for the implementation of each strategy (including relevant assumptions);
- An evaluation of operational considerations to determine the selected field capability;
- Response arrangements in place to meet response capability requirements and associated operational considerations;
- The overall response requirements for each response strategy;
- A summary of legislative and other considerations relevant to the response strategy;
- A detailed ALARP evaluation of each response strategy; and
- The environmental performance requirements to maintain field capability preparedness for each of the selected response strategies presented in the form of Environmental Performance Outcomes (EPOs), Environmental Performance Standards (EPSs) and Measurement Criteria.

Chapter 9 of the EP provides:

- An assessment of the potential environmental impacts and risks relevant for each response strategy;
- A demonstration of acceptability of preparedness arrangements for each response strategy; and
- EPOs, EPSs and Measurement Criteria for the implementation of the response strategies.

Table 6.1 provides a key to the codes used for the ‘nominated resources’ identified for each swing in the ‘Response Requirements’ tables in the following sections.

The total requirements to implement all the response strategies is provided in Section 7. Appendix D of the OPEP (Cumulative Requirements and Demonstration of Capability) describes how EOG meets these requirements.

Table 6.1 Nominated Resource Codes

Code	Nominated Resource
OSRO	Oil Spill Response Organisation (includes AMOSC and OSRL)
RPS	OSM Service Provider
AMOSC	AMOSC (where service is exclusive to AMOSC)
LH-Marine	Marine Labour Hire (unskilled personnel for marine operations)
LH-Shore	Shore-based Labour Hire (unskilled personnel)
EOG Contractor	EOG Contractors
Plant	Machinery/plant for shoreline operations and Operators
AMOSC-OWR	AMOSC OWR Capability Network – Skilled wildlife handlers
AMOSC-OWR*	AMOSC OWR Capability Network – includes: • Oiled Wildlife Coordinator • Reconnaissance Manager • Rescue and Transport Manager • Staging and Holding Manager • Rehabilitation Manager • Rehabilitation Facilities Management • Specialist Personnel (e,g. Veterinarians, Vet nurses)
LPM	LPM Staff, LPM Consultants and Resilient Personnel
VoO	Vessels of Opportunity
Vehicle	4WD hire
Helicopter	Helicopter contractor

6.1 Source Control – Vessel-based

6.1.1 Summary of Activity

The basis of assessment for vessel-based source control relates to the potential surface release of MDO from fuel tank rupture on an offshore vessel as per Section 2. The assessment assumes a fixed volume of hydrocarbon release within an offshore environment.

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

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

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

6.1.2 Response Arrangements

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

6.1.3 Response Timing

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

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

6.1.4 Legislative and Other Considerations

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

6.1.5 ALARP Evaluation and Preparedness Performance Standards

Table 6.2 presents the ALARP evaluation and Table 6.3 presents the EPSs for preparedness.

Table 6.2 ALARP Evaluation – Vessel-based Source Control

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	**Risk**	**Control Measure**	**Rationale**	**Response Capacity**	**Units**	**Implementation Time (Days)**	**Cost**	**Effectiveness (L/M/H)**					**Environmental Benefit Gained**	**Practicability / Constraints**	**ALARP Summary**
								A	F	R	S	I/C			
Eliminate	Negative environmental impact from not adopting source control.	No source control from vessel.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. Halting the release of MDO or chemicals is essential.	The do-nothing option is not considered acceptable.	**Reject:** Source control is a recognised strategy for the mitigation of oil spill impacts.
Substitute	Leaking vessel inoperable / unable to implement source control (i.e. SOPEP/SMPEP)	Source control from alternate/salvage vessel within region	Administered by AMSA	As per NatPlan	-	24 hrs (AMSA ship salvage capabilities)	Minor	H	H	H	H	H	Limit release volume	Availability of response vessel (24 hrs from Darwin) Remote area Weather and sea state	**Accept:** Control to form component of response strategy
Engineer	Spill control equipment unavailable	Spill control equipment available aboard support vessels as per SOPEP / SMPEP Certification Requirements	Control is based on MARPOL Annex I (Prevention of Pollution by Oil).	As per SOPEP/ SMPEP	-	Immediate	N/A	H	H	H	H	H	Limit release volume	Remote area Weather and sea state	**Accept:** Control to form component of response strategy
Isolate	Source of spill remains active	Isolate source of spill (tank / hose) / transfer between tanks as per SOPEP / SMPEP Certification requirements	Control is based on MARPOL Annex I (Prevention of Pollution by Oil).	As per SOPEP/ SMPEP	-	Immediate	N/A	M	H	H	H	H	Limit release volume	Remote area Weather and sea state	**Accept:** Control to form component of response strategy
Administrative	No MARPOL-compliant SOPEP or SMPEP.	Vessel-specific MARPOL-compliant SOPEP or SMPEP.	Control is based on MARPOL Annex I (Prevention of Pollution by Oil).	As per SOPEP/ SMPEP	-	Immediate	N/A	H	H	H	H	H	Implements response plan to deal with unplanned hydrocarbon spills quickly and efficiently in order to reduce impacts to the marine environment.	Controls have high effectiveness; are available, functional and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications for the operation.	**Accept**: Controls based on legislative requirements must be accepted. Controls are practicable and the cost sacrifice is not disproportionate to the environmental benefit gained.

Table 6.3 Preparedness EPSs – Vessel-based Source Control

Spill Response Preparedness		
Environmental Performance Outcome	Vessel crew/s prepared to implement source control in an effective and timely manner	
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**
SOPEP / SMPEP	The MODU and all vessels contracted to EOG shall have a MARPOL-compliant SOPEP / SMPEP (suitable to class).	Completed Vessel Assurance Questionnaire for each response vessel prior to entering field demonstrating compliance with MARPOL Annex I (Prevention of Pollution by Oil).
Personnel	MODU and support vessel crews are trained in spill response techniques in accordance with their SOPEP / SMPEP.	Training records verify that crews are trained in spill response.
Equipment	Fully stocked oil spill response kits (in accordance with their SOPEP / SMPEP) are available in relevant locations around the MODU and support vessels.	Inspection confirms that SMPEP kits are readily available on deck.
Testing/Exercises	Fuel spill response drills are carried out regularly on MODU and vessels.	Inspection records confirm fuel spill response drills conducted.

6.2 Source Control – Relief Well

6.2.1 Summary of Activity

The basis of assessment for relief well drilling source control relates to the potential release of crude oil from a worst-case LoWC as outlined in Section 2.

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

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

A conservative approach has been adopted for the assessment of a LoWC by modelling the worst-case release scenario over 77 days.

Source Control – Relief Well activities include:

- Establishment of the Source Control Branch (SCB);
- Implementation of the SCERP inclusive of a Relief Well Plan;
- Activation of the AEP Memorandum of Understanding: Mutual Aid to source and mobilise a MODU and support vessels within the region or source a suitable MODU from international waters (if required); and
- Mobilisation of resources (including EOG, third-party responder and Contractor Drilling personnel) to oversee relief well drilling operations.

The complexity of the Beehive-1 well has been evaluated according to the criteria detailed within the AEP - Australian Offshore Titleholders Source Control Guideline and has been evaluated as having a 'medium' to 'low' level of complexity, with modelling indicating only a single relief well would be required to kill the well.

6.2.2 Response Arrangements

Beehive-1 Source Control Emergency Response Plan (SCERP) (2021-006-03-29-01).

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

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

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

MODU Availability / Tracking

In the event of a LoWC, EOG would seek an alternate MODU located regionally in the first instance. The MODU would be sourced, if possible, under the arrangements of the AEP

Memorandum of Understanding: Mutual Aid agreement. Over the period of the proposed drilling activity, EOG anticipate there would be alternate MODUs located within Australian waters capable of undertaking relief well drilling operations. The status of these MODUs along with support vessels is monitored by EOG on a monthly basis during the activity.

In the event that a suitable MODU is unavailable within the region at the time of the activity, an alternate MODU would be sought from Southeast Asia to undertake the relief well drilling operation. EOG actively monitors current MODU market availability through third party services.

6.2.3 Response Timing

The AEP Memorandum of Understanding: Mutual Aid allows for 'best endeavours' for a MODU to be made available. It is anticipated it would take 77 days (11 weeks) to perform the well kill (including MODU mobilisation), as detailed in Section 5.1.1 of the OPEP.

6.2.4 Legislative and Other Considerations

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

In the event that an alternate MODU/support vessels are required, pending technical capability review, EOG shall prioritise engaging a locally/regionally available MODU and vessels with existing Safety Case with best endeavours arrangements under the AEP Memorandum of Understanding: Mutual Aid. The in-force Safety Case Revision would be leveraged to expedite the development of a MODU-specific Safety Case Revision for the relief well drilling operation.

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

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

Whilst the revision and acceptance timeframes for Safety Cases and Scope of Validations is subject to a number of variables, EOG's contract with LPM allows for experienced HSE professionals with relevant petroleum industry experience to facilitate and assist in approval development, revision and submission following MODU engagement until all required approvals are in-force.

6.2.5 ALARP Evaluation and Preparedness Performance Standards

Table 6.4 presents the ALARP evaluation and Table 6.5 presents the EPSs for preparedness.

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Table 6.4 ALARP Evaluation –Source Control (Relief Well)

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Eliminate	Negative environmental impact from not adopting source control.	No source control.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. Halting the release of hydrocarbons and spill clean-up activities are essential.	The do-nothing option is not considered acceptable.	**Reject:** Source control is a recognised strategy for the mitigation of oil spill impacts.
Substitute		None identified													None identified
Engineer	No MODU available to implement well kill via relief well	Alternate MODU on standby within field to immediately implement relief well.	Expedite commencement of relief well drilling	N/A	MODU	~53 days to kill well (excludes mobilisation time)	High ~$30M	M	H	H	H	H	Well kill potentially 24 days sooner than seeking alternate MODU via AEP MoU.	The availability of multiple MODUs within region not assured. Prohibitively expensive to engage multiple MODUs for single well campaign. Likely contracting & scheduling restrictions.	**Reject:** Cost of strategy grossly disproportionate given alternate MODUs available for mobilisation.
		Alternate & technically capable MODU engaged via AEP MoU	Initiate relief well drilling in a timely manner with technically capable & regionally available MODU (inclusive of Aust. Safety Case)	Multiple	MODU	~77 days to kill well (including mobilisation time)	High	H	H	H	H	H	Well kill potentially 3 weeks sooner than seeking alternate MODU from elsewhere in Australia or South East Asia via open market.	Alternate MODUs and associated support vessels suitable for relief well drilling identified within regional waters. All with existing Australian SC. Potential constraint should technical capacity of MODU not meet requirements.	**Accept:** Primary strategy to engage MODU via AEP MoU. Benefit outweighs cost.
	Alternate & technically capable MODU unavailable via AEP MoU	Alternate MODU sourced from South East Asia (Singapore)	Initiate relief well drilling in a timely manner with available MODU (Safety Case required)	Multiple	MODU	~77 days to kill well	High $20-30M, + day costs	H	H	H	H	H	Overall potential benefit in controlling well release. Extended period to implement well kill when compared with in- region MODU.	MODUs readily available from SE Asia. Potentially time constrained by procurement, quarantine readiness, mobilisation, COVID readiness & lack of Australian SC.	**Accept:** Secondary strategy to engage MODU via open market. Benefit outweighs cost.
	Required hardware and consumables not available in a timely manner to implement relief well drilling	Purchase casing, casing accessories and wellhead for relief well ahead of time.	Equipment availability	As per well design	N/A	Immediate	Moderate	H	H	H	H	H	Ready access to equipment	Moderate cost provides no greater benefit than existing agreement (in place 2 months prior to drilling)	**Reject:** No greater benefit than existing agreement
		Pre-drill top hole of relief well	Potential reduction in overall time to drill relief well.			Approx. time saved compared with relief well is 2-4 days	High	H	H	H	H	H	Possible 4 days less of hydrocarbon release	Time required to mobilise MODU to pre- drilled relief well.	**Reject:** limited benefit gained given mobilisation of MODU required to intercept well bore. Cost grossly

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
														Multiple jack-up operations increased risk (dropped objects on existing infrastructure)	disproportionate to limited benefit gained.
		Site geotechnical and geophysical surveys conducted for relief well location.	Provides assurance that relief well location(s) is/are suitable for use and provide information to complete mooring analysis.			In place 1 month prior to drilling.	Minor	H	H	H	H	H	Reduced duration of LoWC and therefore lower volumes of oil released.		**Accept:** Control measure practicable and effective, environmental benefit outweighs minor cost.
Isolate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Administrative	Required hardware and consumables not available in a timely manner to implement relief well drilling	Supply agreement in place for casing, casing accessories and wellhead for relief well	Equipment availability	As per well design	N/A	2 months prior to drilling	Low	H	H	H	H	H	Ready access to equipment	No identified constraints.	**Accept:** Benefit outweighs cost. Control to form component of response strategy.
	Lack of planning for relief well	Source Control Plan Emergency Response Plan (SCERP), including Relief Well Plan	Consistent with industry good practice, EOG corporate requirements, IOGP Report 594 and AEP Guidelines for source control	Multiple concurrent response strategies included	1	Immediate	Minor	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response through pre-planning.	No identified constraints.	**Accept:** Control to form component of response strategy.
	Alternate MODU unavailable to undertake relief well activities	AEP MoU: Mutual Assistance	Enables best endeavours access to suitable MODUs and support vessels to implement relief well drilling.	Multiple	1	Immediate	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response through pre-planning.	MODU availability and readiness. MoU best endeavours only with no binding commitment / obligation.	**Accept:** Control to form component of response strategy.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		MODU contract tracking and forecasting, including availability and SC status	Ongoing tracking of technically capable & available MODUs	Multiple	1	6 weeks prior to drilling	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by validating control readiness.	No identified constraints.	**Accept:** Control to form component of response strategy.
	Non-competent personnel increasing risk of unsuccessful well kill.	Well Control Training	Supervisory-level certificate from a well control accredited program (IWCF or IADC WellSharp).	Multiple personnel		6 weeks prior to drilling	Low	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by trained personnel	No identified constraints.	**Accept:** Control to form component of response strategy.
		DIMT Oil Spill Response Training to fulfil spill response roles	IMO spill competencies required to effectively act as Control Agency during Spill	Multiple personnel		6 weeks prior to drilling	Low	H	H	H	H	H	Increase in effectiveness of response with associated environmental benefit.	No identified constraints.	**Accept:** Control to form component of response strategy.
	No Safety Case in place for alternate MODU	Only seek alternate MODU with pre-existing NOPSEMA-accepted Safety Case in place	No delay in obtaining Australian Safety Case.	N/A	N/A	-	-	H	H	H	H	H	Safe management systems pre-validated leading to earlier implementation of response.	Alternate MODU without Aust Safety Case may have increased technical capability and be more suited to task.	**Reject:** Primary strategy involves alternate MODU with Aust. Safety Case, but alternate would not be excluded if available and technically capable.
		Relief Well MODU Mobilisation Plan will be activated.	If Safety Case required	N/A	N/A	3 months prior to drilling	Low - Admin	H	H	H	H	H	Safe operations essential	Support development concurrently with MODU mobilisation. Time to develop and have accepted.	**Accept:** Only if required. Secondary strategy if no alternate MODU available.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) A	F	R	S	I/C	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
		Prepare outline of relief well safety case (MoU MODU)	Reduces delays in preparation of safety case for relief well.			Implement post primary MODU safety case prior to entering reservoir.	~$25 k	H	H	H	H	H	Reduced duration of LoWC and therefore lower volumes of oil released.	Unknown MODU at time of preparation. Safety Cases are MODU-specific.	Reject: Minimal time saving benefit due to unknown parameters, and existing safety case(s) of MoU MODUs. Cost disproportionate to environmental benefit.
	Relief well personnel not available	Pre-mobilisation of relief well personnel	Having relief well team in place at the start of drilling greatly reduces the mobilisation time for source control personnel.			In place at the start of drilling	~$1.5 million	H	L	H	H	H	Negligible – source control team can work remotely during initial phase and then mobilise over time.		Reject: High costs grossly disproportionate to negligible environmental benefit.
		Aircraft on standby for source control personnel mobilisation	Allows for source control team to be mobilised in one flight.			In place at the start of drilling	$10-15 million	H	L	H	H	H	Negligible – source control team can work remotely during initial phase and then mobilise over time.		Reject: High costs grossly disproportionate to negligible environmental benefit.
	HLV vessels not available	Vessel brokerage vessel updates.	Weekly update on appropriate heavy lift vessels (HLV) for MODU transport. This fast-tracks the mobilisation period.			6 weeks prior to drilling until the end of drilling.	Minor	H	H	H	H	H	Reduced MODU transit time. Reduced duration of LoWC and therefore lower volumes of oil released.		Accept: Control measure practicable and effective, environmental benefit outweighs minor costs.
		Subscription to real-time vessel tracking and brokerage service.	Rapid identification and selection of appropriate HLVs for MODU transport.			In place 6 weeks prior to drilling until the end of drilling.	Minor	H	H	H	H	H	Reduced duration of LoWC and therefore lower volumes of oil released.		Accept: Control measure practicable and effective, environmental benefit outweighs minor cost.
		OPEP contact details for service providers are checked prior to the start of drilling	Reliable contact details to increase effectiveness of response			Prior to drilling	Minor	H	H	H	H	H	Increased effectiveness of response with associated environmental benefits	No constraints identified	Accept: Control measure practicable and effective, environmental benefit outweighs minor cost.

Controls				ALARP Evaluation											
Function	**Risk**	**Control Measure**	**Rationale**	**Response Capacity**	**Units**	**Implementation Time (Days)**	**Cost**	**Effectiveness (L/M/H)**					**Environmental Benefit Gained**	**Practicability / Constraints**	**ALARP Summary**
								A	F	R	S	I/C			
	Delay due to presence of invasive marine species (IMS)	IMS clearance of MODUs not already in Australia.	MODU cleared from IMS are able to mobilise directly to the relief well location.			Prior to commencement of drilling.	Moderate	H	H	H	L	L	Limit release volume		Reject: This control relies on contracting the required MODU ahead of time. High cost is disproportionate to environmental benefit.
		IMS risk assessment of MoU MODUs in Australia.	Risk assessment can be accessed from titleholders using the MODUs. This fast-tracks the mobilisation period.			Implement 6 weeks prior to drilling if no MoU MODU in Australia concurrent with mobilisation plan.	Minor	H	H	H	H	H	Reduced duration of LoWC and therefore lower volumes of oil released.		Accept: Control measure practicable and effective, environmental benefit outweighs minor costs.
	DIMT / SCS / third-party responders unfamiliar with relief well planning and increasing overall time and risk associated with relief well implementation	Emergency exercise testing arrangements in place for relief well operations.	Readiness review	All	-	As per Table 8.1 of the OPEP	Low - Admin	H	H	H	H	H	Potential increased timeliness and effectiveness of source control response by validating control readiness.	Desktop validation only. No deployment of alternate MODU, equipment or consumables.	Accept: Control to form component of response strategy.

Table 6.5 Preparedness EPSs – Source Control (Relief Well)

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to kill the well within 77 days	
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources.	AEP MoU: Mutual Aid signed by EOG
Source Control Plan Emergency Response Plan (SCERP)	EOG shall have a SCERP consistent with IOGP Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (2019) and AEP Australian Offshore Titleholder's Source Control Guideline (June 2021), prepared three months prior to the start of drilling.	Documented SCERP consistent with the IOGP Report 594 - Subsea Well Source Control Emergency Response Planning Guide for Subsea Wells (2019) and AEP Australian Offshore Titleholder's Source Control Guideline (June 2021)
Relief well equipment	Supply agreement in place 2 months prior to drilling for casing, casing accessories and wellhead for relief well	Supply agreement with documented inventory of available casing and wellhead equipment
Specialist Service Providers	EOG maintains Master Service Agreements (MSA) with WWC for specialist assistance for engineering and operational support for relief well planning and execution.	MSA records. Correspondence from WWC confirming availability for the project.
Monitoring of vessel availability & status	EOG shall actively monitor current heavy lift vessel (HLV) and support vessels market availability closest to the relief well location, commencing three months prior to the commencement of the activity. Considerations for engagement to include: • Location & availability / readiness to respond; • Technical specifications.	Monthly report
Monitoring of MODU availability & status	EOG shall actively monitor current MODU market availability along with support vessels located regionally on a monthly basis during the activity, commencing three months prior to the commencement of the activity. Considerations for engagement of alternate MODU include: • Location & availability / readiness to respond; • Technical specifications / capability to undertake scope of response; • Australian Safety Case status & Scope of Validation; and • Pathway to having Safety Case / Scope of Validation (if required).	Monthly MODU status reports
	In the event that no alternate MODUs are forecast to be in Australia during the activity, a MODU Mobilisation Plan is developed at least three months prior to spud, that: • Identifies suitable alternative MODU(s); • Evaluates reactivation/mobilisation; • Requirements, including tow and associated Safety Case and IMS approvals; and • Demonstrates capability to meet RWP timelines for relief well drilling.	MODU Mobilisation Plan
Well Control Training	All personnel involved in planning and managing well operations, in relation to well integrity, will hold a valid well control certificate	Training records
Personnel	LPM shall maintain HSE / Technical capability internally to support the development of Relief Well MODU Safety Case Revisions	Training records
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of source control response readiness.	Exercise records

6.3 Monitor and Evaluate

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

In the event of a Level 2/3 spill, the following monitoring and evaluation methods will typically be implemented, dependent on the nature and actual or potential volume of the spill:

- Aerial surveillance;
- Vessel surveillance;
- Electronic satellite tracker buoys (ESTBs);
- Spill trajectory modelling; and
- Satellite imagery.

6.3.1 Aerial and Vessel Surveillance

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

At least one support vessel will be on site at all times during drilling. The MODU personnel may also able to undertake spill observation/reporting. Close-range vessel surveillance during the initial stages of a loss of well containment event is not considered safe due to the potential for a significant explosion risk (flammable atmosphere) and a limited initial surface slick. Therefore, the DIMT will be unlikely to direct any vessel to undertake a surveillance activity near the source of any release.

It should be noted that in the event of a vessel/MODU collision, the damaged vessel ERT may not be able to conduct dedicated vessel surveillance activities, however, will be able to provide initial pollution report and ongoing situation report information, for the slicks within their visible range. Other vessels may be prioritised to complete tasks that are not directly related to the oil spill response, such as transfer of injured personnel to nearby facilities or to shore, supporting the damaged vessels involved in the collision, or search and rescue operations. These could also possibly provide some information to the DIMT on slick location, appearance and behaviour.

A typical support vessel bridge is 10 m to 20 m above sea level. A small support vessel bridge may only be 3 m to 5 m above sea level. Due to this low visual elevation (compared to aerial surveillance platforms) and typical vessel speed (~14-18 knots), the observational data a vessel of any size can provide is significantly limited, compared to the observation data able to be obtained by aerial observers.

Basis of Design – Table 3.5

Maximum lineal distance (km) floating oil >1g/m^2:

1,517 km WNW (winter)

1,048 km WSW (summer)

1,136 km WSW (transitional)

Localised slick during first 24-48 hours.

Maximum Selected Field Capability

Two or more air observation platforms, with trained aerial observers.

Full-time vessel on stand-by to conduct vessel surveillance of any possible slick.

Implementation Timeframe

Tier 1

During initial 48 hours – within 5 hours of DIMT activation, crew-change helicopter mobilisation to commence surveillance activities at the spill location, with second pilots using the Oil Spill Observation Guide (daylight operations only)

Vessel commences surveillance.

Tier 2

Day 3 – 1 x fixed wing aircraft. Multiple overflights per day using AMOSC/Core-Group trained aerial observers

Tier 3

Day 10 – 2+ x fixed wing aircraft. Multiple overflights per day, using trained aerial observers.

Response Arrangements

Guidance

Appendix A and D of CSIRO Oil Spill Monitoring Handbook.

Operational and Scientific Monitoring Bridging Implementation Plan (OSM BIP).

Aircraft

Prior to mobilisation, EOG will have a dedicated contract in place with a suitable contractor to provide helicopters for crew change, 24/7 Medevac, and Search and Rescue coverage. These helicopters can be used for initial aerial surveillance in event of an oil spill. A crew change helicopter could be cancelled from current tasking and diverted to the spill location immediately if safe to do so, provided it was not required for higher priority safety/evacuation related tasks. The crew change helicopters have the oil spill observation aid available, ready for use during a spill event.

Fixed wing aircraft on call-off contracts for rapid mobilisation are only available during the cyclone-season. During the dry-season, fixed wing aircraft are utilised by the tourism industry, and therefore these fixed wing aircraft service providers will not guarantee mobilisation within specified timeframes during the dry season, however, will provide services on a best-endeavours basis.

Trained Aerial Observers

The Oil Spill Observation Guide is considered a suitable substitute to formal training and is appropriate for use during the first 24-48 hours of the spill, when the spill is likely to be located in a small geographical area. It should be noted that the crew change helicopter pilots are familiar with observing the natural colours and shades of the ocean in the region, and therefore less likely to incorrectly identify natural phenomenon such as cloud shadow or algal bloom for oil slicks.

Trained aerial observers, for use during a protracted spill response are available via AMOSC. These personnel can be mobilised to Darwin, Truscott, etc., within 48 hours. Additional trained aerial observers are available via OSRL for a large/long duration response.

As the nearest emergent receptors are more than 60 km from the drilling location, immediate aerial surveillance is not critical to the DIMT's first strike or Day 1 Incident Action Plan (IAP) development.

Vessels

EOG will maintain a contract for support vessel operations, as required to support its petroleum activities. All contracted vessel Emergency Response Team (ERT) personnel will undertake an OPEP induction, which includes spill observation volume estimate and slick appearance reporting requirements, and an overview of the Oil Spill Observation Guide and Surface Spill Volume Calculator tool. In the event the DIMT determines that surveillance is required, the DIMT may task a vessel under existing contract to conduct opportunistic vessel- based surveillance activities.

6.3.2 ESTBs, Oil Spill Trajectory Modelling, and Satellite Imagery

The objective of the deployment of ESTBs is to assist with situational awareness of the DIMT during periods when aerial surveillance isn't available (e.g., night-time), and for the longer- term validation of the OSTM. These processes enable informed and timely DIMT decision making during a response.

OSTM requires access to information/situational awareness data provided by the Emergency Response Team on site. The DIMT should reasonably be able to activate and transmit relevant situational awareness data to the OSTM contractor within 4 hours of the formation of the DIMT.

The purpose of OSTM is to provide spill trajectory forecasts, to enable the DIMT to assess risks, select additional response strategies and develop IAPs, which would be implemented in the days after the initial response.

For the WCD, only a single OSTM provider is anticipated to be required; however multiple runs over weeks to months may be required for the well blow-out scenario.

Access to satellite imagery is limited due to the continuous movement and orbit of satellites around the globe. Typically, imagery can be obtained within 24 hours of the initial request to the satellite imagery from service providers. The delays are not considered a risk, as they do not reduce the DIMT's situational awareness. During the first few days of a spill, the slick will remain in a small geographic area, and other techniques including vessel and aerial surveillance should provide sufficiently accurate information, to inform DIMT decision making.

If the spill was 'Level 2', with a slick which will be easily monitored via air surveillance, and no significant or complex shoreline contacts are expected, satellite imagery may not be required. However, satellite imagery would be required for any Level 3 event, where monitoring of a significantly large or dispersed slick is required, or complex/multiple shoreline contacts in remote areas are anticipated, and therefore satellite imagery would help support OSTM validation, impact predictions.

Basis of Design – Table 3.5

Maximum lineal distance (km) floating oil >1g/m^2:

1,517 km WNW (winter)

1,048 km WSW (summer)

1,136 km WSW (transitional)

Localised slick during first 24-48 hours.

Maximum Selected Field Capability

1 x tracker buoys able to be deployed during initial 24 hours of spill.

Single OSTM provider on call at all times.

Minimum of one suitable satellite imagery provider/image analyst activated.

Implementation Timeframe

Tier 2/3

(Deployment of 1 ESTB on Day 1; additional as required)

(OSTM contractor activated within 4 hours of DIMT formation).

(Satellite imagery requested within 24 hours of DIMT formation for a Level 3 spill)

Response Arrangements

AMOSC has advised that one ESTB should be deployed at a time at the leading edge of the slick. ESTBs should be deployed preferrable at the end of daylight hours on Day 1, and then every five days or so, depending on the needs determined by the DIMT. EOG will maintain one ESTB on the MODU and one on each of the support vessels at all times. More ESTBs are available via mutual aid, AMOSC, OSRL, Fastwave and Advisian.

Experienced OSTM contractor available via EOG's Associate Membership with AMOSC and is available on- call 24/7, for activation by the DIMT.

EOG will maintain membership arrangements with AMOSC and OSRL to ensure suitable oil spill observation satellite imagery is available to be accessed by the DIMT.

6.3.3 Operational Monitoring

The objective of the surface and subsurface water quality operational monitoring program is to provide ongoing situational awareness of the slick location, size, appearance, behaviour, its potential impacts/risks, and to monitor the effects of dispersant application to enable informed and timely DIMT decision making during a response. Operational monitoring occurs in alignment with the AEP Joint Industry Operational and Scientific Monitoring (OSM) Framework and supporting operational monitoring plans (OMPs).

OMP 02- Surface Chemical Dispersant Effectiveness, is required from Day 2. This will initially be performed by trained personnel using 'shake jar' kits located on each of the support vessels and in the mud plant in Darwin. The OSM Service Provider will implement this OMP from Day 5 on, along with *OMP 02 – Hydrocarbon Properties and Weathering Behaviour*.

Section 6.8 provides further information on operational and scientific monitoring. Appendix C of the OPEP contains the OSM Bridging Implementation Plan (OSM BIP).

Basis of Design – Table 3.5

Maximum daily surface area (km^2) of dissolved oil above 10 ppb

Approx. 700-850 km^2 between Day 10 and Day 25.

Approx. 1,200-1,600 km^2 between Day 27 and Day 46.

Peak of approx. 2,600 km^2 at Day 53.

Localised slick during first 24-48 hours.

Maximum Selected Field Capability

All OMPs implemented and at peak by Day 24.

Implementation Timeframe

Tier 2/3

'Shake-jar' tests by trained personnel – Day 2-5

Two OSM WQ teams using AEP OMPs by Day 5

Four OSM WQ teams using AEP OMPs by Day 10

Five OSM WQ teams using AEP OMPs by Day 24

Other OMPs implemented as per OSM BIP

Response Arrangements

EOG will maintain a contract in place with an OSM service provider. Refer to *Beehive-1 Drilling Operational and Scientific Monitoring (OSM) Bridging Implementation Plan* (996161-2022-Beehive#1-OSMIP), for the specific OSMP activation and termination criteria and mobilisation timeframes.

6.3.4 Response Requirements

Table 6.6 presents the response requirements for the Monitor and Evaluate Response Strategy.

6.3.5 ALARP Evaluation and Preparedness Performance Standards

Table 6.7 presents the ALARP evaluation (including for OSM) and Table 6.8 presents the EPSs for preparedness.

Table 6.6 Response Requirements – Monitor and Evaluate

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
M&E - Aerial surveillance															
Functions/Positions															
Pilot/Observer (helicopter)	2	2											–	–	Existing part of drilling program
Aerial Observers			1	1	1	1	1	1	2	2	2	2	OSRO	OSRO	
Pilots			2	2	2	2	2	2	4	4	4	4	–	–	Supplied with fixed wing aircraft
Equipment/Resources															
Crew-change helicopter	1	1											–	–	Existing part of drilling program
Fixed wing aircraft			1	1	1	1	1	1	2	2	2	**2**	AMOSC	AMOSC	AMOSC supplementary contract
Grab bag			1	1	1	1	1	1	2	2	2	**2**	AMOSC	AMOSC	AMOSC membership
M&E - Vessel surveillance															
Functions/Positions															
Support vessel crew	1	1	1	1	1	1	1	1	1				–	–	Existing part of drilling program
Equipment/Resources															
Support vessel	1	1	1	1	1	1	1	1	1				–	–	Existing part of drilling program
M&E - Oil Spill Trajectory Modelling															
Functions/Positions															
AMOSC contract													–	–	AMOSC membership
Equipment/Resources															
AMOSC contract													–	–	AMOSC membership
M&E – Electronic satellite tracker buoys (ESTBs)															
Functions/Positions															
Support vessel crew	1				1				1	1	1	1	–	–	Existing part of drilling program
Equipment/Resources															
Support vessel	1				1				1	1	1	1	–	–	Existing part of drilling program
ESTB (approx. every 5 days; ~ 20 over 98 days)	1				1				1	1	1	1	AMOSC	AMOSC	AMOSC supplementary contract
M&E – Satellite imagery															
Functions/Positions															
AMOSC/OSRL contract													–	–	AMOSC/OSRL membership
Equipment/Resources															
AMOSC/OSRL contract													–	–	AMOSC/OSRL membership
M&E – Surface Chemical Dispersant Effectiveness															
Functions/Positions															
Mud plant personnel		1	1	1									–	–	Existing part of drilling program
OSM Water Quality (WQ) Team					2	2	2	2	4	5	5	5	RPS	RPS	See OSM BIP for details
Equipment/Resources															
Support vessel		1	1	1									–	–	Existing part of drilling program
Shake-jar test kit		1	1	1									AMOSC	AMOSC	AMOSC supplementary contract
OSM WQ Equipment (includes fluorometer)					2	2	2	2	4	5	5	5	RPS	RPS	See OSM BIP for details
OSM WQ Vessels					2	2	2	2	4	5	5	5	VoO	VoO	See OSM BIP for details

Functions/positions and equipment/resources highlighted in red are already included in the drilling program. They are not included in the overall requirements (Section 7).
Functions/positions highlighted in green are supplied as part of the contracts for the associated equipment/service (e.g. fixed wing aircraft). They are not included in the overall requirements (Section 7).
Functions/positions and equipment/resources highlighted in blue are included here for information. They are not included in the overall requirements (Section 7). Appendix C of the OPEP (OSM BIP) provides details on the resourcing of these.

Table 6.7 ALARP Evaluation – Monitor and Evaluate

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Eliminate	Negative environmental impact from the execution of this response strategy.	No situational awareness.	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. A monitoring and evaluate response strategy is a necessary component to have in place prior to and during operations to inform response strategy and verify effectiveness of spill response operation for all spill scenarios.	The do-nothing option is not considered acceptable.	**Reject:** The monitor and evaluate strategy is a mandatory response strategy to have in place and cannot be eliminated.
Substitute	None identified	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Engineering	No available fixed wing aircraft	Dedicated monitoring aircraft on standby	Immediate response deployment via dedicated aircraft	N/A	N/A	<6 hours	High	N/A	N/A	N/A	N/A	N/A	EOG has contract for helicopters based in Darwin (2 helicopters) that could be called upon to undertaken aerial monitoring. Additional helicopters of opportunity available via AMOSPlan. EOG will monitor availability of fixed wing aircraft contractors, with additional aircraft accessed via AMOSC.	The cost to maintain dedicated fixed wing aircraft would be $100,000 per month, per aircraft. The cost to maintain a single, or multiple dedicated fixed wing aircraft is not considered reasonable, as EOG's current contingency arrangements enable aerial surveillance (daylight only).	**Reject:** aircraft under contract and available.
Isolate	M&E activities create behavioural disturbances to wildlife (cetaceans, birds)	Helicopters will maintain a buffer distances of 500 m around cetaceans in accordance with EPBC Regulations 2000 (Part 8).	Environmental risk with activity is minimised to maximise environmental benefits	NA	NA	NA	Minor	H	H	H	H	H	Positive environmental benefit during the implementation of the M&E response activity.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		Fixed wing aircraft to maintain a buffer distance of at least 500 ft around bird colonies to avoid bird strikes	Environmental risk with activity is minimised to maximise environmental benefits	NA	NA	NA	Minor	H	H	H	H	H	Positive environmental benefit during the implementation of the M&E response activity.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		Vessels will maintain buffer distances around whales and dolphins in accordance with The Australian National Guidelines for Whale and Dolphin Watching (DoEE, 2017b) for those individuals not visibly affected by hydrocarbons (closer approaches may be necessary to determine impacts).	Environmental risk with activity is minimised to maximise environmental benefits	NA	NA	NA	Minor	H	H	H	H	H	Positive environmental benefit during the implementation of the M&E response activity.	Controls have High effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
Administrative	Monitor and evaluate response strategy executed without informed planning.	Monitor and evaluate operations to be reviewed and managed by DIMT via NEBA through Incident Action Plan (IAP) process.	Within the first 24 hours, DIMT will initiate the first strike plan in conjunction with NEBA informing the development of an IAP.	N/A	N/A	<24 hours	Minor	H	H	H	H	H	Positive environmental benefit by identifying the most effective M&E response activities to track the spill trajectory and to feed into real-time decision-making for further strategies for responding to and managing spill event.	Controls have High effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
													The review/evaluation of M&E options will be implemented immediately for all levels of spills.	Controls have minor cost implications for the operation.	
	Spill trajectory not known in early stages of the response.	Visual observations obtained from support vessels initiated immediately following a spill overboard	To assist with response planning	Support Vessels	3	Immediate	Minor	H	H	H	H	H	Information informs initial planning to increase effectiveness of response (& associated environmental benefits)	None Identified	
		The vessel deploys tracking buoys in the event of a Level 2 or Level 3 spill as soon as practicable but within 90 minutes of the spill event.	To assist with response planning	Support Vessels	3	90 mins	Minor	H	H	H	H	H	Information informs initial planning to increase effectiveness of response (& associated environmental benefits)	None Identified	

Controls				ALARP Evaluation												
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		Membership in place with AMOSC who maintains call- off contract with RPS-to provide spill modelling in the event of a hydrocarbon spill.	Real-time monitoring and evaluation of the spill is a mandatory primary response strategy implemented for Level 2 – 3 spills required for real-time decision-making during a spill event.	NA	NA	NA	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will enable real-time evaluation of which sensitive receptors require priority protection.	Available through EOG's AMOSC Membership	-
		Spill fate modelling initiated within 4 hours of DIMT forming to support Operational NEBA.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable evaluation of which sensitive receptors require priority protection.	N/A	N/A	<4 hours from DIMT forming	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will enable real- time evaluation of which sensitive receptors require priority protection. From these sources, an oil spill trajectory model for the next 5 days, which will allow the IMT to direct resources for the next phase of the response. Alternative oil spill modelling agencies may be selected dependent on operational requirements.	Available through EOG's AMOSC Membership	-
		EOG to have a dedicated emergency response contract with RPS to undertake modelling	Additional capability compared to AMOSC's agreement with RPS	N/A	N/A	<4 hours from DIMT forming	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will enable real- time evaluation of which sensitive receptors require priority protection.	Additional capability can be requested at any time if required. AMOSC Membership. Duplication of service available through AMOSC membership is not justified	**Reject:** Facility is available through AMOSC membership.
Administrative	Aerial surveillance resources not available	Agreement (MSA) in place for helicopter assistance to support oil spill activities	Provision of aerial resources to undertake surveillance activities	Helicopters	2	6-12 hours	Moderate	M	H	H	H	H	Positive environmental benefit gained from rapid response to spill. EOG has contract for 2 Helicopters based in Darwin that could be called upon to undertaken aerial monitoring.	Availability for 'non-routine' contract aircraft may be initially constrained, however additional availability through local spot-charter is available. Cost during activation would be moderate.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		Agreement (MSA) in place for fixed-wing aircraft to support oil spill activities	Provision of aerial resources to undertake surveillance activities	Fixed wing aircraft	2	24 hrs	Minor	M	H	H	H	H	Positive environmental benefit gained from rapid response to spill. EOG will monitor availability of fixed wing aircraft contractors. Dependent on the size of the spill, vessel/ aerial surveillance would be initiated immediately.	No constraints.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		Provision of standby aerial fixed-wing aircraft to cover any oil spill events	Guaranteed access to fixed wing resources	Fixed wing Planes	2	24hrs	$100K per month, per aircraft.	H	H	H	H	H	Positive environmental benefit gained from rapid response to spill. The cost to maintain a single, or multiple dedicated fixed wing aircraft is not considered reasonable, as EOG's current contingency arrangements enable aerial surveillance (daylight only).	Cost is too high for the benefit gained.	Reject: High cost is disproportionate to environmental benefit.
		Maintain a list of aircraft charter companies that could participate in surveillance activities.	Provides access to known resources which may have aircraft available	Fixed wing planes	2	24hrs	Minor	L	H	H	H	H	Positive environmental benefit gained from rapid response to spill.	Controls have high effectiveness but limited availability. Control is functional, reliable and in general are serviceable and compatible with other control measures.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Aerial surveillance personnel not available.	Access to aerial surveillance and trained observers from AMOSC Core Group or OSRL.	EOG has agreements in place to resource additional aerial surveillance and trained observers in the event of a spill.	Aerial Observers	2	48 hours	Minor – through memberships	H	H	H	H	H	Environmental benefit gained through increased accurate situational awareness to inform spill response planning. Dependent on the size of the spill, vessel/ aerial surveillance would be initiated immediately with aerial observers supplementing resources as they become available.	Constraint is getting personnel to Darwin	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		Visual observations from aircraft are initiated within 24 hours of request (subject to daylight hours)	Initial observations from untrained observers will assist in providing situational awareness	NA	NA	24hrs	Minor	H	H	M	H	H	Environmental benefit gained through increased accurate situational awareness to inform spill response planning. Dependent on the size of the spill, vessel/ aerial surveillance would be initiated immediately.	Controls have moderate effectiveness; high availability, functional, and reliable and in general are serviceable and compatible with other control measures.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Marine-based resources (vessels) are not available when required	EOG receives weekly vessel brokerage updates	Weekly update on appropriate vessels which will fast-track the mobilisation period.	NA	NA	2 weeks prior to commencement of drilling until the end of drilling.	Minor	H	H	H	H	H	Reduced duration of LoWC and therefore lower volumes of oil released.	Controls have moderate effectiveness; high availability, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Control measure practicable and effective, environmental benefit outweighs minor costs.
		Subscription to real-time vessel tracking and brokerage service	Rapid identification and selection of appropriate vessels.			In place one month prior to drilling until the end of drilling.	Minor	H	H	H	H	H	Reduced duration of LoWC and therefore lower volumes of oil released.		**Accept**: Control measure practicable and effective, environmental benefit outweighs minor cost.
		Dedicated oil spill response vessel on standby.	On standby 24/7 during operations to expedite monitoring	N/A	1	0-1	Moderate (~$2M)	H	H	L	H	H	Positive environment benefit gained by having dedicated aircraft/ vessels on standby to immediately monitor the spill.	Dedicated standby vessels have substantial costs, that do not provide a measurable advantage over utilising assets already in the field during the activity.	**Reject**: This control has high costs that are disproportionate to any environmental benefit that might be gained. This takes into consideration additional fuel required for having vessels on standby at site.
	Electronic satellite tracker buoys (ESTBs) not immediately available for deployment or are not serviceable.	ESTB's are available and maintained serviceable on support vessels and in Darwin mud plant to be deployed in a spill incident.	ESTBs on support vessels and in Darwin mud plant for the duration of drilling. ESTBs are tested and maintained onboard for the duration of drilling	ESTB	3	0-1	Minor	H	H	H	H	H	Positive environment benefit by in-field tracking capability. Immediate tracking of currants and associated hydrocarbons for effective decision-making	The control effectiveness is generally High – ESTB are available, functional, reliable, can survive in the available conditions and are independent of all other controls	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Real time monitoring arrangements not in place as part of response preparedness.	EOG has agreement in place with OSRL for the provision of satellite imagery.	Real-time monitoring and evaluation of the spill is a primary response strategy implemented for Level 2 – 3 spills required for real-time decision-making during a spill event. EOG has agreements in place to acquire satellite imagery in the event of a spill.	N/A	N/A	< 24 hours for acquisition of first satellite image.	H	H	H	H	H	H	Positive environmental benefit by having access to M&E resources obtained via contractual arrangements and service agreements with OSRL ensures activation of response strategy activities are expedited in the event of a spill.	The response capacity is minor, but the control effectiveness is generally High. The cost of having OSRL agreements in place is minor.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	M&E Response Strategy ceases early or continues with negative environmental impact.	M&E activities continued in accordance with operational NEBA and IAP to verify that there are net environmental benefits or until termination criteria is met.	Ensures that M&E continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that M&E response strategy continues until the performance outcome has been achieved.	The control effectiveness is generally High – available, functional, reliable, can survive in the available conditions and are independent of all other controls	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Operational and Scientific Monitoring															
Administrative	No OSM service provision.	EOG to have a service agreement with Operational and Scientific Monitoring (OSM) Service Provider.	Enable OSM response deployment via activation procedure with OSM Service Provider in a timely manner.	N/A	N/A	Initiated within 2 hours of forming DIMT	Moderate	H	H	H	H	H	Positive environmental benefit by reducing uncertainty during initiation and enables OSM Service Provider to expedite services in the event of a spill, particularly to identified priority protection areas.	No identified constraints to engage OSM service provision.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
Administrative	OSM Service Provider unable to meet personnel requirements based upon predicted peak demand of worst-case spill.	EOG service agreement with OSM Service Provider to include provision of pre-activity readiness report detailing ability of service provider to meet first-strike personnel requirements as per *Beehive-1 Exploration Drilling Operational and Scientific Monitoring Bridging Implementation Plan (996161-2022-Beehive#1-OSMBIP)*	Assurance of available monitoring personnel to enable the initiation and continuation of monitoring scopes.	N/A	N/A	Monthly	L	H	H	H	H	H	Positive environmental benefit by reducing uncertainty during initiation and enables OSM Service Provider to expedite services in the event of a spill.	Personnel availability at the time of a spill event compared with theoretical availability i.e., actual ability of individuals to be deployed to site presenting potential gaps in monitoring capability. Mitigated by having broader network of network of OSM personnel / organisations / institutes to scale up as required.	

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Administrative		EOG service agreement with OSM Service Provider to include provision for scaling up monitoring personnel to meet peak need based upon predicted nature and scale of worst-case spill to meet objectives of *Beehive-1 Exploration Drilling Operational and Scientific Monitoring Bridging Implementation Plan (996161-2022-Beehive#1-OSMBIP).*	EOG has agreements in place to provide required monitoring personnel to meet predicted need	N/A	N/A	N/A	L	H	H	H	H	H	Positive environmental benefit by reducing uncertainty during initiation and enables OSM Service Provider to expedite services in the event of a spill.	As above.	
Administrative	Nature and scale of spill event required additional monitoring support above predicted peak need.	Engagement with broader network of OSM personnel / organisations / institutes to scale up capability above predicted peak need if required.	EOG has agreements in place to provide additional monitoring personnel above predicted need	N/A	N/A	N/A	N/A	H	H	H	H	H	Positive environmental benefit by reducing uncertainty during initiation and enables OSM Service Provider to expedite services in the event of a spill.	OSM personnel / organisations / institutes not willing or unable to attend response. Best endeavours approach adopted to engage additional resources if required. Ability to change monitoring design based upon available peak resourcing i.e., reallocation of priority studies and personnel.	
Administrative	Operational and scientific monitoring equipment inappropriate or insufficient to enable timely and effective OSM response.	Monitoring equipment (type, quantity, and supplier) pre-identified to meet monitoring objectives.	Reduces uncertainty regarding equipment suitability and min requirements to meet monitoring objectives.	N/A	N/A	In place one month prior to drilling until the end of drilling.	L	H	H	H	H	H	Positive environmental benefit by reducing uncertainty during initiation and enables OSM Service Provider to expedite services in the event of a spill.	Low cost and practicable control.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Administrative	Operational and scientific monitoring equipment not available	Maintain detailed equipment register including supply chain arrangement for stocked and non-stocked items	Assurance of equipment to enable the initiation and continuation of monitoring scopes.	N/A	N/A	In place one month prior to drilling until the end of drilling.	L	H	H	H	H	H	Positive environmental benefit by reducing uncertainty during initiation and enables OSM Service Provider to expedite services in the event of a spill.	Low cost and practicable control.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
Administrative	Potentially longer-lead equipment such as autonomous and remotely operated monitoring vehicles not available at time of spill.	Establish standby contract for longer-lead autonomous and remotely operated equipment and personnel with service providers prior to undertaking the activity.	Provide certainty in relation to equipment and personnel mobilisation times.	N/A	N/A	Reduce deployment from approx. 14 days to approx. 4 days.	H	H	H	H	H	H	Benefit relates to accelerated monitoring of priority protection locations to inform post-spill pre-impact evaluation. Also relates to access of potentially inaccessible monitoring locations and broader geographical coverage of in a short timeframe. Potential gains where monitoring inform OPEP strategies.	Dedicated standby autonomous and remotely operated monitoring equipment (and personnel) have substantial costs. These assets can be arranged with providers post spill on a best endeavours approach without compromising the objectives of the relevant monitoring strategies i.e., alternate monitoring arrangement can be deployed to inform the response. Alternate means of M&E readily available, so actual benefit marginal.	**Reject**: This control has high costs that are disproportionate to any environmental benefit that might be gained. This takes into consideration the ability to deploy alternate monitoring methodologies, such as shaker tests and fluorometry to inform dispersant efficacy and the anticipated time for hydrocarbon contact to identified protection priorities.
Administrative		Engage with service providers prior to undertaking the activity to forecast availability of longer-lead equipment (location and state of readiness).	Reduce uncertainty in relation to 'best endeavours' equipment mobilisation times.	N/A	N/A	Engage suppliers two months prior to drilling until the end of drilling.	L	H	H	H	H	H	Positive environmental benefit by reducing uncertainty during initiation and enables OSM Service Provider to expedite services in the event of a spill. (see above).	Low cost and practicable control.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Table 6.8 Preparedness EPSs – Monitor and Evaluate

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to undertake monitoring and evaluation in an effective and timely manner	
Control Measure	Environmental Performance Standard	Measurement Criteria
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources.	AEP MoU: Mutual Aid signed by EOG
Service Contracts	EOG shall maintain a service agreement for 2 crew-change helicopters to support the Drilling Program, commencing six weeks prior to the commencement of the activity.	Service agreement with aircraft operator
	EOG shall have contracts in place, commencing six weeks prior to the commencement of the activity, to enable access: • Fixed-wing aircraft; • ESTBs; • Trained aerial observers; • Oil spill trajectory modelling; • Oil spill observation satellite imagery.	Service contract with OSRL AMOSC membership Additional agreements as required
	EOG shall maintain a service agreement for Operational and Scientific Monitoring including provision for: • Pre-activity readiness report detailing ability of service provider to meet first-strike personnel requirements as per OSMP BIP document at least 2 months prior to undertaking the activity. • Scaling up monitoring personnel to meet peak need based upon predicted nature and scale of worst-case spill to meet objectives of *Beehive-1 Exploration Drilling Operational and Scientific Monitoring Bridging Implementation Plan (996161-2022-Beehive#1-OSMBIP)*. • Engagement with broader network of OSM personnel / organisations / institutes to scale up capability above predicted peak need if required.	Service agreement with OSM provider. Pre-activity OSM Readiness Report OSM Service Provider subcontract arrangement (if required). OSM Service Provider engagement records with relevant OSM personnel / organisations / institutes.
	EOG shall maintain a service agreement for 2 support vessels, commencing six weeks prior to the commencement of the activity	Service agreement with vessel provider
ESTB	EOG shall maintain a minimum of 1 ESTB on the MODU and 1 ESTB on each of the support vessels (2) during the Drilling Program. ESTBs shall be function tested prior to undertaking the activity.	Inspection records
Dispersant Effectiveness	An oil sampling kit and dispersant efficacy (shake jar) kit is available on each of the support vessels and at the Dawin mud plant.	Inspection records
	EOG shall maintain a contract with a NATA accredited laboratory to undertake dispersant efficacy testing, commencing six weeks prior to the commencement of the activity	Service Level Agreement
	Two mud plant personnel trained in use of ‘shake jar’ kit, commencing six weeks prior to the commencement of the activity	Training records
Monitoring of vessel availability & status	EOG shall actively monitor current vessel availability through to identify emergency vessels and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.	Monthly report
Monitoring of fixed-wing aircraft availability & status	EOG shall actively monitor current aircraft availability to support monitoring and evaluation, commencing six weeks prior to the commencement of the activity.	Monitoring records
Oil Spill Observation Guide	Each crew change helicopter and support vessel will have copies of the Oil Spill Observation Guide on board. Crew change helicopter and support vessel personnel will be inducted in its use.	Inspection records Induction records
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of monitoring and evaluation response readiness.	Exercise records

<table>
<tr><th colspan="3">Spill Response Preparedness</th></tr>
<tr><td>Environmental Performance Outcome</td><td colspan="2">EOG prepared to undertake monitoring and evaluation in an effective and timely manner</td></tr>
<tr><td>Control Measure</td><td>Environmental Performance Standard</td><td>Measurement Criteria</td></tr>
<tr><td>Response Timing</td><td>EOG shall maintain arrangements to facilitate the mobilisation of monitoring and evaluation operations in accordance with the following timeframes:
• Aerial surveillance within 4 hours of forming DIMT (via existing helicopter contracts)
• Aerial surveillance using qualified observers within 72 hours of forming DIMT
• Vessel surveillance within 2 hours of forming DIMT (via in-field support vessels)
• ESTBs deployed within 2 hours of spill event
• Operational monitoring (OM):
o Initiated within 2 hours of forming DIMT;
o OMP: Surface Chemical Dispersant Effectiveness commences within 2 days of spill
o Other OMPs within 5 days (see Section 6.8)
• Fluorometry deployed within 7 days of spill event
• Spill Trajectory Modelling initiated within 4 hours of forming DIMT
• Satellite imagery initiated within 24 hours of spill event</td><td>Communication records confirming capability</td></tr>
</table>

6.4 Surface Dispersant Application

6.4.1 Summary of Activity

Dispersant application is a globally recognised and practiced response strategy, recognised under the NatPlan and, if used correctly, can greatly facilitate the protection of sensitive shorelines and other resources. Dispersant is not recommended for MDO spills. In the event of a Level 2 or Level 3 crude oil spill, two potential application methods that may be utilised should a decision to apply dispersant be made:

- Surface dispersant application (SDA) via Fixed Wing Aerial Dispersant (FWAD) capability; and
- SDA via vessel-mounted spray equipment.

The strategic NEBA (Section 4.2) and oil spill modelling (Appendix 6 of the EP) found SDA will likely have a net environmental benefit by significantly reducing the total volumes of shoreline loading across all shorelines. Surface dispersant application is adopted to break surface oil slicks into fine droplets that then disperse into the water column below entrained thresholds that may impact marine fauna and other sensitive receptors. This reduces the effect of surface oil from being driven by wind towards shore and promotes biodegradation of the oil in the water column, preventing or limiting oil contact with sensitive environmental receptors.

While dispersants reduce surface oil, thereby providing protection for sensitive receptors, they also increase the amount of dispersed oil in the immediate vicinity where it is applied. This will result in a larger magnitude of impact to sensitive receptors (if present) to dispersed oil than would have occurred if dispersant had not been applied. Further, dispersants are known to have their own toxic properties, have varying efficacy on different types of crude oil, and the physical process of applying dispersant has its own set of impacts and risks. For these reasons, dispersants must only be applied in accordance with a carefully considered strategy, which considers both the benefits and impacts, and risks associated with applying it in a particular situation.

The OMP, *Surface Chemical Dispersant Effectiveness*, is required from Day 2. This will initially be performed by trained personnel from the Darwin mud plant using 'shake jar' kits located on each of the support vessels and at the mud plant. The OSM Service Provider will implement this OMP from Day 5 on (see Section 6.3.3).

AMOSC has advised the following in relation to dispersant application:

- All dispersant stockpiles would need to be flown into Truscott Airfield as no road access is available. There is road access to Wyndham Airport.
- AMOSC stockpiles could be mobilised within 4 hours of activation and transported to a suitable airfield ready for air freight.
- Indicative flight times to move 20 m^3 of dispersant (in IBCs) from AMOSC stockpiles using a C-130 Hercules:
    - from Melbourne Airport (Nth Geelong Stockpile) are 6 hours.
    - from Perth Airport (Fremantle Stockpile) are 4 hours.
    - from Broome Airfield (Broome Stockpile) are 1 hours.
    - from Learmonth Airport (Exmouth Stockpile) are 3 hours.

- The Hercules could also be used to fly the Airbase Management container into Truscott from Fremantle or Nth Geelong.
- Using a single Hercules, AMOSC could deliver 18 m^3 of dispersant to the Truscott Airfield from Geelong within 24 hours.
- Activation of the FWADC aircraft out of Batchelor, NT (2x AT-802, VH-ODQ & VH-ZBI, XO Aviation NT) and as per contract would be ready to dispatch to Truscott within 4 hours of notification. Flight time from Batchelor to Truscott is between 1.5 and 2 hours (Based on 280 nm @ 180 knots = 1hr 33mins).
- Air attack supervisor (and platform), aircraft loading officer, AFR liaison and AMOSC personnel could be onsite within 24 hours.

Based on these assumptions, AMOSC advises that they would be ready to commence aerial dispersant operations by Day 2 of the spill.

There are 8 vessel-mountable dispersant spray systems available from AMOSC (2 each in Exmouth, Broome, Fremantle and Geelong). The two systems in Broom could be transported to Darwin within 24 hours. It is approximately 15.5 hours steaming to the Beehive-1 location. Therefore, two vessel-based dispersant systems could be operational within 4 days following the spill, with another 2 operational by Day 5.

Basis of Design – Table 3.5

Maximum daily area (km^2) of surface oil thickness >50 g/m^2.

Approx. 30 km^2 at Day 10.

Approx. 60 km^2 at Day 23.

Approx. 75 km^2 at Day 62.

Localised slick during first 24-48 hours.

Oil Spill Budget

Average of 10,220 m^3 crude released per day. Persistent fraction = 21% (i.e. 2,146 m^3/day to be treated).

The detailed oil spill budget presented in Section 5.4.1 showed that 11,862 m^3 of chemical dispersant would be required over 98 days to fully treat a LoWC of 786,858 m^3.

Maximum Selected Field Capability

6 AT802 aircraft + 1 C130 + 4 vessels delivering 126 m^3 of dispersant per day.

Implementation Timeframe

Tier 2/3

Day 2 – Two AT802 aircraft delivering 24 m^3/day.

Day 4 – Six AT802 aircraft + one C130 + two vessels delivering 102 m^3/day.

Day 6 – Six AT802 aircraft + one C130 + four vessels delivering 108 m^3/day.

Day 12 – Six AT802 aircraft + one C130 + four vessels delivering 126 m^3/day.

Response Arrangements

Guidance

- AMOSC FWAD Northern Operations Plan.
- NatPlan.
- NP-POL-004: National Plan Register of OSCAs for Maritime Response Use.
- Dispersants: surface application. Report 532, (IPIECA/IOGP 2016).
- Dispersants: surface application. Good practice guidelines for incident management and emergency response personnel (IPIECA/IOGP 2015).
- Vessel Dispersant Application Field Guide. A guide to the use of chemical dispersants in the combating of oil spills at sea (OSRL 2011a).
- Dispersant Application Monitoring Field Guide. Tier II and III (OSRL 2011b).
- Dispersant Application Field Guide (OSRL 2011c).

Preferred vessels specifications for dispersant application:

- Minimum 20 m length – depending on operating environment and expected sea conditions.
- Deck space sufficient for 11 x IBCs or combination including 10 m^3 ISO-tank.
- Be capable of utilising dispersant spray systems, such as fixed spray booms or AFEDO units.

Application Equipment

AMOSC maintains and stores oil spill equipment at Broome, Exmouth, Fremantle and Geelong. Systems stocked by AMOSC include the VIKO and AFEDO spray systems. Upon notification of a spill, this equipment will be transferred to Darwin (or other ports where vessels are located).

Fixed-Wing Aircraft

The current FWAD arrangement in place which covers the entire Australian coastline is jointly managed by AMSA & AMOSC. AMOSC's FWADC contract provides for 'wheels up' of four aircraft around Australia within 4 hours of activation. EOG will maintain a supplementary contract with AMOSC to ensure the provision of two additional aircraft.

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

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

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

An Air Attack Supervisor platform (helicopter or fixed wing) will need to be supplied by EOG. Aerotech First Response also have the capability to source this capability, if required.

Dispersant stocks would be transported from the nearest AMOSC or other mutual aid stockpile.

Dispersant Approved for Use

The dispersants used will be approved under the Australian Government National Plan arrangements as listed on the Oil Spill Control Agents (OSCA) register or the transitional list, or otherwise approved through the dispersant selection processes detailed below.

Consistent with selection of hazardous materials at facilities, where a product may be discharged to the environment, an assessment must be completed before the product is approved for mobilisation and subsequently approved for application.

The following dispersants will be automatically approved for mobilisation:

- Dispersants listed on the National Plan OSCA List (link);
- Dispersants listed on the National Plan transitional list;
- With reference to the UK's Offshore Chemical Notification Schedule (OCNS) CHARM Model Algorithm Definitive Ranked List of Approved Products, dispersant with a HQ of Gold or Silver or Group E or D (CEFAS, 2001); and
- Substances listed on the OSPAR List of Substances Used and Discharged Offshore which are considered to Pose Little or No Risk to the Environment (PLONAR).

6.4.2 Response Requirements

Table 6.9 presents the response requirements for the Surface Dispersant Application Response Strategy.

6.4.3 Legislative and Other Considerations

Dispersant may only be applied when the daily operational NEBA identifies a positive benefit and when there are no EPBC Act listed threatened or migratory species evident in the immediate application zone. The following no-go zones for dispersant application also apply:

- Not within 10 km of Australian Marine Parks (without approval from the Director of National Parks (DNP));
- Not within 10 km of WA or NT marine parks (without approval from WA DoT and/or NT DEPWS);
- Not within WA or NT waters (without approval from WA DoT and/or NT DEPWS);
- Not in waters less than 20 m deep; and
- Not within 1 km of the drill site.

6.4.4 ALARP Evaluation and Preparedness Performance Standards

Table 6.10 presents the ALARP evaluation and Table 6.11 presents the EPSs for preparedness.

Table 6.9 Response Requirements – Surface Dispersant Application

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Surface Dispersant Application – Aerial															
Functions/Positions															
Aerial FOB manager	1	1	1	1	1	1	1	1	1	1	1	1	AMOSC	AMOSC	AMOSC membership
Aerial FOB SME	1	1	1	1	1	1	1	1	1	1	1	1	AMOSC	AMOSC	AMOSC membership
AT802 Ground staff		10	10	30	30	30	30	30	30	30	30	30	AMOSC	AMOSC	AMOSC membership (FWAD)
AT802 pilots		2	2	6	6	6	6	6	6	6	6	6	AMOSC	AMOSC	AMOSC membership (FWAD)
C-130 pilots/flight crew				3	3	3	3	3	3	3	3	3	OSRL	OSRL	OSRL membership
C-130 ground staff				10	10	10	10	10	10	10	10	10	OSRL	OSRL	OSRL membership
Air attack pilots		2	2	2	2	2	2	2	2	2	2	2	AMOSC	AMOSC	AMOSC supplementary contract
SAR pilots		2	2	2	2	2	2	2	2	2	2	2	AMOSC	AMOSC	AMOSC supplementary contract
Equipment/Resources															
Airbase administration container		1	1	1	1	1	1	1	1	1	1	1	AMOSC	AMOSC	AMOSC membership (FWAD)
Aircraft maintenance equipment		3	3	3	3	3	3	3	3	3	3	3	AMOSC	AMOSC	AMOSC membership (FWAD)
Dispersant transfer equipment package		3	3	3	3	3	3	3	3	3	3	3	AMOSC	AMOSC	AMOSC membership (FWAD)
AT802 aircraft		2	2	6	6	6	6	6	6	6	6	6	AMOSC	AMOSC	AMOSC membership (FWAD)
C-130 aircraft				1	1	1	1	1	1	1	1	1	OSRL	OSRL	OSRL membership
Air attack aircraft		1	1	1	1	1	1	1	1	1	1	1	AMOSC	AMOSC	AMOSC supplementary contract
SAR aircraft		1	1	1	1	1	1	1	1	1	1	1	AMOSC	AMOSC	AMOSC supplementary contract
Daily dispersants – AT802 (m^3)		24	24	72	72	72	72	72	72	90	90	90	OSRO	OSRO	AMOSC/OSRL membership
Daily dispersants – C-130 (m^3)				24	24	24	24	24	24	24	24	24	OSRO	OSRO	AMOSC/OSRL membership
Accumulated dispersants (m^3)		24	48	144	240	336	432	528	720	2,298	4,464	5,376			10,734 m^3 over 98 days
Surface Dispersant Application – Vessel															
Functions/Positions															
Oil Spill Responder IMO 1 (or equiv.)				2	2	4	4	4	4	4	4	4	OSRO	OSRO	AMOSC/OSRL membership
Labour hire – marine				6	6	12	12	12	12	12	12	12	LH-Marine	LH-Marine	Marine labour hire
Equipment/Resources															
Dispersant vessel				2	2	4	4	4	4	4	4	4	VoO	VoO	Vessels of Opportunity
Application equipment				2	2	4	4	4	4	4	4	4	AMOSC	AMOSC	AMOSC membership
Daily dispersants – vessel (m^3)				6	6	12	12	12	12	12	12	12	OSRO	OSRO	AMOSC/OSRL membership
Accumulated dispersants (m^3)				6	12	24	36	48	72	240	468	564			1,128 m^3 over 98 days

Functions/positions and equipment/resources highlighted in green are supplied as part of the contracts for the associated equipment/service (e.g. FWAD). They are not included in the overall requirements (Section 7).

Table 6.10 ALARP Evaluation – Surface Dispersant Application

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Eliminate	Negative environmental impact from the execution of this response strategy	No dispersant application.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option; modelling with dispersant application shows that volumes of oil ashore are reduced when dispersants are applied to the sea surface. Dispersants work by breaking oil slicks into small droplets (i.e., the surface area to volume ratio of the oil is increased) that then disperse into the water column below entrained thresholds of concern for marine fauna and other sensitive receptors. This reduces the effect of oil from being driven by wind towards shore and promotes oil biodegradation of the oil in the water column, hence enabling prevention of contact with sensitive environmental receptors such as turtle nesting beaches and IBAs.	There may be occasions when dispersants are not applied during an oil spill response such as, for example, the presence of migratory EPBC listed species occurring within the dispersant application zone, but in general, the 'do nothing' option is not considered within the external context (e.g., stakeholder views) to be a viable option.	**Reject:** The use of dispersants is a recognised strategy for the mitigation of oil spill impacts.
Substitute	Environmental impact from dispersant use	Only dispersants with lowest toxicity to be used to treat an oil spill.	Reduce environmental effects by only selecting dispersants with lowest toxicity.	N/A	N/A	N/A	Minor	L	L	L	H	H	The objective of chemical dispersant application is to increase the surface area of the released oil by making the oil droplets smaller thereby increasing the potential for bacterial biodegradation to breakdown the hydrocarbons faster. In addition, dispersant application is intended to reduce concentrations of oil to below thresholds of concern faster than with natural weathering alone.	Dispersant efficacy relates to the dispersant type and oil characteristics that are treated. Not all dispersants have equal efficacy. Using dispersants with lowest toxicity does not guarantee best performance or a net environmental benefit. Those dispersants that have been tested have been chosen for the efficacy, their approval for use based on their environmental profile in Australian waters and availability for immediate use.	**Reject**: The control is not practicable, and it is possible that no environmental benefit may be gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Isolate	Dispersant use in sensitive shallow water habitats	Dispersant application restricted to water depths exceeding 20 m.	Limit application of dispersant on sensitive shallow water habitats,	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environment benefit gained by not applying dispersant in areas with a water depth of less than 20 m, thereby reducing the likelihood of impacts from dispersant and dispersed oil (through the application of dispersant) on sensitive shallow water habitats and receptors such as coral reefs, seagrasses, macroalgal beds and marine fauna such as fishes and cetaceans, by maximising the time for dispersal before contact and potentially reducing the concentrations of oil to below thresholds of concern.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Dispersant used in protected areas and/or State/Territory waters	Dispersant application is not applied within the: - JBG AMP or within 10km of park boundary; - North Kimberley Marine Park or within 10km of park boundary; - In WA and/or NT territorial waters	Apply dispersants only on oil amenable to chemical dispersants within a defined area but that excluding sensitive areas such as the JBG AMP, North Kimberley Marine Park and WA and/or NT territorial waters unless permitted by relevant WA/NT authority.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environment benefit gained by not applying dispersant inside park boundaries thereby reducing potential impacts to sensitive receptors such as coral reefs, seagrasses, macroalgal beds and marine fauna such as fish and cetaceans.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	Accept: Practicable and effective, environmental benefit outweighs minor cost.
	Dispersant exposure to EPBC Act listed species in the area during application	Visual observation is undertaken in accordance with OSMP (Marine Megafauna and Birds) and operations are directed such that wildlife is not sprayed.	Monitoring is undertaken during dispersant application activities to identify EPBC-listed species present in area. This will inform application activities	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environment benefit gained by reducing the potential impacts associated with applying dispersant in areas where EPBC Act Listed species have been observed, as determined from situational awareness reports. Operations would cease until the animal has moved out of the area to reduce the potential of interaction with dispersed oil.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	Accept: Practicable and effective, environmental benefit outweighs minor cost.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		Operational control to prevent impacts on EPBC-listed megafauna	Sightings of EPBC-listed megafauna in the immediate vicinity of any surface dispersant operations will trigger cessation of response until animal has moved and not been sighted for 30 minutes.	N/A	N/A	N/A	Minor	H	H	H	H	H	Reduced impact on EPBC-listed megafauna.		
	Aircraft maintain appropriate buffer distances from cetaceans and seabirds to prevent behavioural impacts.	Excepting for dispersant application activities, pilots to remain at a height of 300 m (fixed wing) above cetaceans in accordance with EPBC Regulations 2000 (Part 8).	Minimise disturbances to wildlife associated with dispersant application activities	N/A	N/A	N/A	Minor	H	H	H	H	H	Reduced behavioural impacts on EPBC-listed fauna.		
Administrate	Dispersant use without a clear emergency plan or issued IAP's	Dispersant Operations to be reviewed and managed by DIMT via NEBA through Incident Action Plan (IAP) process.	Within the first 24 hours, DIMT will initiate the first strike plan in conjunction with NEBA informing the development of an IAP.	N/A	N/A	24 hrs	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/evaluation of surface dispersant operations will take place almost immediately in the event of a Level 3 spill. The dispersant operations would be adapted based on real-time information regarding the spill incident: whether sea state and weather conditions are conducive to dispersant application, dispersant efficacy testing and applicability with other response strategies.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Impacts to sensitive species	Temporal windows of environmental sensitivity considered in operational NEBA.	Surface dispersant application during temporal windows of environmental sensitivity (e.g., coral spawning, turtle nesting, shorebird & EPBC listed species migrations) a key consideration in operational NEBAs.	N/A	N/A	N/A	Minor	H	H	H	H	H	Reduces environmental impacts during surface dispersant application, while delivering net environmental benefits to shoreline habitats.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	**Accept:** Practicable and effective, environmental benefit outweighs minor cost.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response activities not considered in preparedness planning therefore not allowing for input into the NEBA.	Operational NEBA to include evaluation of surface dispersant application.	Surface chemical dispersants will be applied if Operational NEBA indicates dispersant application would provide a net environmental benefit to sensitive environmental receptors.	N/A	N/A	4 hours from DIMT formation	Minor	H	H	H	H	H	Positive environmental benefit identifying the most effective response strategies with the least detrimental impacts. The Operational NEBA will be completed based on specific circumstances of the spill incident, using real-time information (OSTM, spill observations, weather and sea state conditions etc.) to confirm the response strategies to adopt to protect priority locations and sensitive receptors. Surface dispersants will be applied if the Operational NEBA indicates the potential harm of dispersed oil and dispersants is less than leaving the surface oil untreated by dispersants; and if the implementation of the dispersant response strategy would provide a net environmental benefit to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors. The application of dispersants will also be evaluated based on the time of year of the spill. For example, should the spill occur during peak turtle nesting season or seabird nesting, consideration of implementing the dispersant response strategy in combination with other response strategies to maximise the reduction of surface oil and minimise the volume of oil reaching sensitive shorelines. Likewise, should the spill occur during peak coral spawning events (March-April), then the implementation of alternative response strategies other than dispersant application would be more likely, in order to minimise the concentration of dispersed oil (and dispersants) in the water column.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Poor situational awareness and understanding of oil spill trajectory prior to dispersant application (i.e., oil could be heading out to sea).	Oil spill modelling contract in place (through AMOSC) to provide predictions of dispersed crude oil trajectory to be undertaken to support the Operational NEBA and activated within 4 hours of notification.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable evaluation of which sensitive receptors require priority protection.	N/A	N/A	4 hours from IMT formation	Minor	H	H	H	H	H	Positive environmental benefit gained as dispersant may not necessarily be applied to released oil that is heading offshore and away from sensitive receptors. Likewise, dispersant will not be applied to oil in sensitive areas such as the JBG AMP and North Kimberley Marine Park or within 10km of their boundaries, or shallow water habitats < 20m deep. Oil spill trajectory modelling will assist in the effective use of dispersant by directing dispersant to target areas and will also enable real-time evaluation of which sensitive receptors require priority protection.		
	Poor understanding of the effectiveness of the dispersant application and its impact on the environment.	Environmental monitoring (OSMP) is undertaken to evaluate the impacts to the environment (includes in-water testing, OSTM 3 day forecast modelling)	Environmental monitoring to evaluate the concentration of entrained hydrocarbons; the effectiveness of applied dispersant; and the impact of hydrocarbons and dispersant on marine and shoreline habitats.	N/A	N/A	Immediately and on-going	Minor	H	H	H	H	H	Positive environmental benefit gained from adopting this control measure. Allows evaluation of the effectiveness of applied dispersant which feeds into on-going decision-making in relation to dispersant application (i.e., altering volumes of dispersant/ continue/ halt dispersant application).	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Operational monitoring (initial and ongoing) to	Tests to include initial in-field effectiveness test	N/A	N/A	Immediately and on-going	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		ensure that dispersant application is effective.	(efficacy testing including test spray) to confirm the use and viability of the dispersant available on site prior to application. Ongoing monitoring using visual assessment by aerial observer to identify any issues with effectiveness.										Enables justification that dispersant stocks are viable and useful in dispersing hydrocarbons released and will provide an indication that there will be a net environmental benefit of using dispersant.		
		Dispersant is applied where effectiveness has been demonstrated via in-field test, test spray and NEBA.	All parameters need to align to apply dispersant.	N/A	N/A	24-48 hrs	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure.		
		An oil sampling kit and dispersant efficacy kit is available on each of the support vessels and the mud plant to assist with effectiveness testing.	Preparedness with equipment on-board vessels to assist with assessing dispersant effectiveness.	N/A	N/A	24-48 hrs	Minor	H	H	H	H	H	Positive environmental benefit gained from the implementation of this control measure.		
		Arrangements with National Association of Testing Authorities (NATA) accredited laboratories are in place to enable efficient sample logistics and analysis.	Allows for relevant analytical testing and verification of dispersant effectiveness to inform selection of priority of dispersant types for surface application	N/A	N/A	NA	Minor	H	H	H	H	Low (ability to acquire oil sample of sufficient volume and 'freshness').	Determination of effectiveness of the range of dispersants with greater certainty than the rapid assessment.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Poor 'hit rate' when spraying dispersant from aircraft.	FWADC is guided by aircraft with an onboard Air Attack Supervisor (to advise aircraft when the aircraft is on target to release dispersant) and trained aerial observer (to identify suitable slick thickness).	Aircraft will be deployed to inform the dispersant spray crew when they are on target.	N/A	N/A	24-48hrs	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. Directs dispersant spray crew to target areas, avoiding sensitive areas and allows real- time evaluation of the effectiveness of applied dispersant which feeds into on- going decision-making in relation to dispersant application. Also assists in real- time evaluation of which sensitive receptors require priority protection.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	Accept: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Dispersant is applied only during daylight hours (in order to monitor dispersion effectiveness).	Practical constraint to confirm effectiveness	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit obtained from implementation of this control measure as it ensures dispersant application is targeted towards the right areas, effectiveness can be assessed and safety of crews assured.		
		Dispersant is only applied to dispersible oil (i.e., oil that has not emulsified), with the window of opportunity for dispersant application to be determined based on field testing.	Continued refinement of dispersant application conditions to ensure effectiveness	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit obtained from implementation of this control measure as it ensures dispersant application is targeted towards the right areas, effectiveness can be assesed and safety of crews assured.		
	Poor understanding of the effectiveness of the dispersant application and its impact on the environment	Chemical dispersants confirmed to be acceptable for use in the marine environment.	Only dispersants approved under the Australian Government National Plan arrangements on the OSCA Register or transitional list will be used by EOG	N/A	N/A	N/A	Minor	H	N/A	H	H	H	Positive environmental benefit gained from the implementation of this control measure. The dispersants used will be approved under the Australian Government National Plan arrangements as listed on the Oil Spill Control Agents (OSCA) register or the transitional list. Dispersant stocks held by AMOSC and the National Plan are listed on the OSCA Register and are therefore considered to have met the standard for acceptable practice for use within the National Plan.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Dispersant use in impacting state/territory waters without permission.	Permission for dispersant application in or near NT/WA waters will be obtained prior to application	In WA/NT waters, chemical dispersant must not be applied without consent from appropriate CA.	N/A	N/A	N/A	Minor	H	H	H	H	H	Requirement		
	Dispersant use in Australian Marine Parks (AMP) without permission.	Permission for dispersant application in or around AMPs will be obtained prior to application	Chemical dispersant must not be applied without consent from Director of National Parks (DNP)	N/A	N/A	N/A	Minor	H	H	H	H	H	Requirement	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for the operation.	**Accept:** Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Dispersant use volumes unknown.	Volumes of dispersants applied will be visually assessed and recorded to determine that correct dosage rates have been applied. Dosage rates adjusted as needed.	All dispersants will be logged and reported to DIMT.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by determination of the correct dosage of chemical dispersant prior to application and through the continual monitoring and adjustment of the dosage during application. Adopting this control measure will aid in reducing the potential impact of dispersant on sensitive receptors through the controlled and 'measured' application of dispersant.		
	Dispersant use ceases early or continues with negative environmental impact.	Response strategy activities continue in accordance with operational NEBA and IAP until termination criteria met.	Ensures that the dispersant application response strategy continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the dispersant application response strategy continues until the performance outcome has been achieved.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) A	F	R	S	I/C	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
Administrative	Insufficient access to dispersant.	Access to dispersant stockpiles owned by AMSA/AMOSC (in Exmouth, Fremantle, Dampier, and Geelong) and equipment through Mutual Aid MOU.	Mobilisation of AMOSC owned dispersant stockpile and equipment through Mutual Aid MOU from Exmouth / Fremantle / Geelong.	Large	See EP Table 9.6	24-48hrs	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of dispersant application is to increase the surface area of the released oil by making the oil droplets smaller thereby increasing the potential for bacterial biodegradation to breakdown the hydrocarbons faster. In addition, dispersant application is intended to reduce concentrations of oil to below thresholds of concern faster than with natural weathering alone.	The response capacity is large, and the control effectiveness is generally high (cf. potential for weather downtime). EOG has access to this capability through membership arrangements with AMOSC.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Access to Global Dispersant Stockpile via OSRL.	Mobilisation of OSRL dispersant stockpile from Singapore and other countries	Large	See Table 9.6	< 72 hours to mobilise; onsite > 7 days (other countries)	Minor	L (due to time to mobilise)	H	H	H	H		Control has minor cost implications for the operation. EOG has access to this dispersant through membership with OSRL to the global dispersant stockpile	
		Commission manufacturer of additional dispersants	Expected volumes required exceed the current stockpiles	Large	m^3	Approx 12 weeks	Moderate	H	H	H	H	H		Control has moderate cost implications for the operation. EOG has access to dispersant manufacture through AMOSC/OSRL	**Accept:** Practicable and effective, environmental benefit outweighs minor cost.
		Access to 3rd party held dispersant stockpiles via OSRL's Global Dispersant Inventory Database	Expected volumes required exceed the current stockpiles	Large	m^3		Moderate	H	H	H	H	H		Control has moderate cost implications for the operation. EOG has access to 3rd party contact details and dispersant volumes through OSRL	**Accept:** Practicable and effective, environmental benefit outweighs minor cost
		Dispersant pre-mobilisation to nearby holding facilities	Faster application	Large	See EP Table 9.6	N/A	Moderate	H	H	H	H	H	Marginally quicker response may be possible with associated environmental benefit, however limitation would be availability of FWADC equipment.	Mobilisation of existing national and global stockpiles not possible.	**Reject:** High costs are grossly disproportionate to environmental benefit given that nearby stockpiles can be rapidly deployed to site.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) A	F	R	S	I/C	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
	Insufficient resources available to assist in the application of dispersant (vessels, aircraft)	Access to support vessels (mutual aid, local charter).	Acquisition of charter vessels on the spot-market from around Australia and/or SE Asia.	Medium	Multiple	3-4	Minor	M	H	H	H	L	The environmental benefit associated with vessel and aerial dispersant is considered to be significant.	The response capacity is small for vessel operations, but the control effectiveness is generally high (vessel operations are only possible during daylight hours, and SIMOPS in the same area with aerial operations is not possible). Vessels available through Mutual Aid and on the local spot charter market in Darwin/ Exmouth / Dampier / Broome has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
			VoO under EOG's MSA with Clarkson's				Minor							Cost during activation would be moderate.	
		Vessels/aircraft on standby for duration of drilling program	Allows for marginally quicker response and dispersant application	Large	Multiple	0-1	Per vessel:$ 35K/day x 55 days = $2M FWADC Not available for Standby	M	H	H	H	L	The environmental benefit associated with vessel and aerial dispersant is considered to be significant.	This response option is significant in cost and would allow for only marginally faster response times than current arrangements. Inter-dependency on the availability of dispersants also limits the effectiveness of this arrangement.	**Reject:** High costs are grossly disproportionate to environmental benefit given that nearby stockpiles can be rapidly deployed to site.
		Access to Fixed Wing Aerial Dispersant Contract (FWADC) includes provision of ground crew and air attack supervisors.	Activation of FWADC through AMOSC/AMSA. EOG is a member of AMOSC and therefore has access to this capability.	Large	6	<48 hrs	Moderate	H	H	H	H	L	The environmental benefit associated with vessel and aerial dispersant is considered to be significant. Scalable options for vessel and aerial dispersant operations involves accessing more vessels from around the regions, and all air tractors (AT802) and ground	EOG is a member of AMOSC, and this service is available through AMOSC membership and can be called on if required.	**Accept:** Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
				Large	1	<72hrs		L	H	H	H	L		EOG is a member of OSRL, and this service is available through	

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H) A	F	R	S	I/C	Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
		Access to OSRL Hercules C130.	Mobilisation of OSRL aircraft from overseas.				Moderate	(due to time to mobilise)					support staff available through the FWADC	OSRL membership and can be called on if required.	
	Insufficient resources available to assist in the application of dispersant (vessels, aircraft)	Dedicated OSV vessel on standby in field.	On standby 24/7 during operations to expedite initiation of vessel dispersant application.	Small	1	0-1	Major $35K/day x 55 days = >$2M	H	H	L	H	L no SIMOPS with aerial appli c'n	The environmental benefit associated with vessels on standby for dispersant application is considered to be limited.	Dedicated standby vessels and aircraft has substantial costs, that would be incurred for the duration of the activity.	**Reject**: These controls have high costs that are disproportionate to the potential environmental benefit that might be gained.
		Dedicated FWADC air tractor on standby in Darwin.	On standby 24/7 during operations to expedite initiation of aerial dispersant application.	Large	1	0-1	Major $312K/yr includes ground support	H	H	H	H	L		Negative sacrifice versus benefit gained when viewed in context of having the existing service available through AMOSC / AMSA and given the short response time for mobilisation to site of the AT802 air tractor from the NT base in Batchelor, i.e., <6 hours, which allows for aerial dispersant application to commence on Day 2.	
		Dedicated Hercules C130 on standby at suitable nearby airbases (e.g., Darwin, Broome).	On standby 24/7 during operations to expedite initiation of aerial dispersant application.	Large	1	0-1	Major	H	H	H	H	L			

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Stakeholder concerns over dispersant application to marine waters/sea country	EOG prepares a communications strategy for potentially affected stakeholders to advise on the background to the decision to use dispersants, OHS factors that need to be considered and operational exclusion requirements	EOG to provide open communication with concerned stakeholders on possible impacts associated with dispersant application (including positives and negatives of application)	Medium	NA	24 hrs	Minor	H	H	H	H	H	The social benefit which is derived from open communication on response strategies will assist in gaining stakeholder acceptance for the strategy.	Control has high availability and functionality, however additional resources will be required to communicate the information to all stakeholders.	**Accept:** Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.

Table 6.11 Preparedness EPSs – Surface Dispersant Application

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to implement surface dispersants in an effective and timely manner	
Control Measure	Environmental Performance Standard	Measurement Criteria
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources including vessel dispersant spray systems, dispersant stockpiles, and trained personnel.	AEP MoU: Mutual Aid signed by EOG
Service Contracts	EOG shall maintain a service agreement for fixed-wing aircraft to support oil spill activities, commencing six weeks prior to the commencement of the activity.	Service agreement with aircraft operator
	EOG shall have a contract in place with both AMOSC and OSRL to facilitate access to: • Regional and global dispersant stockpiles; • Manufacture of additional dispersants; • 3rd party held dispersant stockpiles; and • FWAD (including Hercules C130) capability includes provision of ground crew and air attack supervisors.	Service contract with OSRL AMOSC membership Additional agreements as required
	EOG shall maintain a contract with a NATA accredited laboratory to undertake dispersant efficacy testing, commencing six weeks prior to the commencement of the activity	Service Level Agreement
Monitoring of vessel availability & status	EOG shall actively monitor current vessel availability to identify emergency vessels and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.	Monthly report
Monitoring of fixed-wing aircraft availability & status	EOG shall actively monitor current aircraft availability to support monitoring and evaluation, commencing six weeks prior to the commencement of the activity.	Monitoring records
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of dispersant application response readiness.	Exercise records
Response Timing	EOG shall maintain arrangements to facilitate the mobilisation of surface dispersant operations in accordance with the following timeframes: • Two AT802 aircraft applying 12 m^3/day each within 2 days of spill event. • Six AT802 aircraft applying 12 m^3/day each within 4 days of spill event. • Six AT802 aircraft applying 15 m^3/day each within 12 days of spill event. • One C-130 aircraft applying 24 m^3/day within 4 days of spill event. • Two vessels applying 6 m^3/day each within 4 days of spill event. • Four vessels applying 6 m^3/day each within 6 days of spill event.	Communication records confirming capability

6.5 Containment and Recovery

6.5.1 Summary of Activity

The containment and recovery response strategy involves the deployment of a booming system by vessels to gather and contain surface oil, while a skimmer is used to retrieve the oil slick from the sea surface and decant it to suitable storage such as barges or internal tanks on vessels. The use of booms can assist with minimising the potential impact by reducing the amount of surface oil thereby preventing it from reaching environmentally sensitive shorelines.

Containment and recovery is not suitable for MDO spills as MDO rapidly spreads and has a high evaporation rate in the first 24 hours. Containment and recovery is not considered a primary method for reducing impacts from Level 3 spills, but rather as a secondary response strategy that may be applied under favourable environmental conditions at targeted locations. This strategy is highly dependent on weather conditions and sea state, hydrocarbon characteristics and boom type. Sea state of Beaufort 1-4 is optimal (IPIECA-IOGP, 2015a), with the operation primarily targeting Bonn Code 4/5 oil (>100 g/m^2) to the lower threshold of >50 g/m^2.

Each containment and recovery unit would require personnel, booms, skimmers, waste storage and vessel/s. Minimum required personnel are a vessel master, a supervisor and three deployment crew. The unit would include offshore containment boom, offshore skimmer and auxiliary equipment including pumps and power packs. Waste storage may comprise of vessel tanks, on deck storage or towable storage. Waste storage should be equivalent to daily recovery volumes. Vessel requirements would be met by a large support vessel, or other similar large vessels with a rolled stern, able to deploy offshore boom from the aft deck. For a single vessel operation, a boom-vane system would be required to maintain the booms configuration. If no boom-vane system was available, a second vessel (possibly slightly smaller) to tow the leading edge of the boom would also be required.

Basis of Design – Table 3.5

Maximum daily area (km^2) of surface oil thickness >50 g/m^2.

Approx. 30 km^2 at Day 10.

Approx. 60 km^2 at Day 23.

Approx. 75 km^2 at Day 62.

Localised slick during first 24-48 hours.

Oil Spill Budget

Average of 10,220 m^3 crude released per day. Persistent fraction = 21% (i.e. 2,146 m^3/day to be treated).

Depending on equipment and conditions, between 33 and 267 m^3 can be collected per strike team per day. AMOSC advises 50 m^3/day/ strike team.

Maximum Selected Field Capability

Four C&R units operating by Day 8.

Implementation Timeframe

Tier 2/3

Day 3 – Two C&R units operating.

Day 8 – Four C&R units operating.

Response Arrangements

Guidance

Containment and Recovery Field Guide (Oil Spill Response, 2011).

IPIECA At-sea containment and recovery, IOGP Report 522, 2016 Revision.

Standard Operating Procedure: Booms – Offshore RO-BOOM / Lamor HD boom (AMOSC, 2014).

Vessels

Preferred vessels for offshore containment and recovery are AHTS vessels with a large open deck (200 m^2), waste collection capacity of 500 m^3 and rolled/open stern for safe deployment of offshore boom.

Vessels of suitable capacity (AHTS, tug or small utility vessels) for this operation are available on spot market in the region. These classes of vessels do not require significant modification before they can be ready for containment and recovery operations. Vessel monitoring is undertaken by EOG.

Personnel

Containment and recovery supervisors would be sourced from AMOSC (staff and Core Group) and OSRL personnel trained in containment and recovery operations. Additional personnel will be sourced from marine labour hire companies.

Responders experienced in the marine recovery operation may also need to be deployed to other response activities. To enable the expansion of marine recovery operational units, Core Group, AMOSC or OSRL would be used to train experienced maritime crews in marine recovery operations.

Vessel masters and deployment crew would be sourced through existing maritime contracts and the local maritime industry.

Equipment

EOG will be an Associate Member Company of AMOSC for the duration of the Beehive-1 campaign and as such will have access to AMOSC equipment stockpiles and industry equipment. AMSA also maintain booming systems regionally in Darwin, Broome, Karratha, and Fremantle, with additional units in other National Plan stockpiles. This equipment is accessible under NatPlan arrangements, should it be required. Under an existing Service Level Agreement, EOG has guaranteed access to 50% of OSRL's equipment.

Waste

Waste storage may comprise of opportunistic containers including vessel tanks and IBCs and/or dedicated vessels (see Section 6.11). Dedicated oily waste storage including on-deck tanks and towable storage is available through spill response arrangements. An inventory of Mutual Aid, AMOSC and AMSA Australian stockpiles in 2022 noted 69 storage items ranging in capacity from 10 to 50 m^3. Additional waste storage comprising 21 offshore storage items are available internationally through OSRL with capacities ranging from 10 to 50 m^3. Smaller (5-10 m^3) inshore storage options are also available through OSRL. Waste storage options are considered adequate to supply estimated resource needs, with more waste storage available in the event that surge capacity is activated.

Disposal of recovered oil/water can be taken to existing waste storage facilities in Darwin. To improve the efficiency of the containment and recovery strategy, storage of recovered oil/water can utilise the recovery vessel storage tanks, supplemented by IBC's (or iso-containers on larger vessels). Gaps in storage capacity or to reduce transit times can be overcome by either:

- The use of decanting (in accordance with MARPOL requirements, AMSA guidelines and WA DoT and/or NT DEWPS or AMSA approvals). Decanting at the point of collection will limit environmental impact as the water would already be in contact with hydrocarbons and additional oil can be removed from the environment; and
- Establishing temporary storage transfer on barges or other vessels adjacent to recovery operations and using other vessels to transfer collected oil from the transfer location to disposal or processing locations.

Section 6.11 provides further detail on waste management.

6.5.2 Response Requirements

Table 6.12 presents the response requirements for the Containment and Recovery Response Strategy.

6.5.3 Legislative and Other Considerations

The use of decanting (in accordance with MARPOL requirements, AMSA guidelines and WA DoT and/or NT DEWPS or AMSA approvals).

6.5.4 ALARP Evaluation and Preparedness Performance Standards

Table 6.13 presents the ALARP evaluation and Table 6.14 presents the EPSs for preparedness.

Table 6.12 Response Requirements – Containment and Recovery

Response Strategy Requirements	Timing											Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Containment and Recovery															
Functions/Positions															
Oil Spill Responder IMO 1 (or equiv.)			2	2	2	2	2	4	4	4	4	4	OSRO	OSRO	AMOSC/OSRL membership
Labour hire – marine			6	6	6	6	6	12	12	12	12	12	LH-Marine	LH-Marine	Marine labour hire
Equipment/Resources															
C&R vessel			4	4	4	4	4	8	8	8	8	8	VoO	VoO	Vessels of Opportunity
Boom			2	2	2	2	2	4	4	4	4	4	AMOSC	AMOSC	AMOSC membership
High-capacity skimming system			2	2	2	2	2	4	4	4	4	4	AMOSC	AMOSC	AMOSC membership
Waste: accumulated oil/water (m^3)			120	240	360	480	600	840	1,320	4,680	9,240	11,160	Waste	Waste	22,440 m^3 over 98 days (see Section 6.11)

Table 6.13 ALARP Evaluation – Containment and Recovery

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	**Risk**	**Control Measure**	**Rationale**	**Response Capacity**	**Units**	**Implementation Time (Days)**	**Cost**	**Effectiveness (L/M/H)** A	F	R	S	I/C	**Environmental Benefit Gained**	**Practicability / Constraints**	**ALARP Summary**
Eliminate	Negative environmental impact from the execution of this response strategy.	No marine recovery.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option; experience from past oil spills suggests that volumes of oil ashore are reduced when marine recovery operations are activated. Removing oil from the surface will assist in effort to reduce the volume of oil making shoreline contact, hence enabling prevention of contact with sensitive environmental receptors.	There may be occasions when marine recovery is not implemented, e.g., during poor weather, or when operations are temporarily ceased such as, for example, due to the presence of migratory EPBC Act Listed species occurring within the area of operations, but in general, the 'do nothing' option is not considered within the external context (e.g., stakeholder views) to be a viable option.	Reject: Marine recovery using booms and skimmers (CAR) is a recognised strategy for the mitigation of oil spill impacts.
Isolate	Response occurs during periods of important windows of ecological sensitivity, e.g., coral spawning; turtle nesting season; migratory shorebirds arriving/departing during migration of EPBC-listed species.	Temporal / seasonal windows of ecological sensitivity to be considered in Operational NEBA.	Marine recovery is a key response strategy to facilitate the protection of sensitive shorelines and adjacent shallow water habitats particularly those occurring within the NMP. However, marine recovery during periods of important windows of ecological sensitivity, e.g., coral spawning; turtle nesting season; and during migrations of EPBC Act Listed species will be a key component of the Operational NEBA and will be subject to operational constraints.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environment benefit gained by reducing the potential impacts associated with marine recovery operations during windows of important ecological sensitivity.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Administrative	Response strategy executed ad hoc with no real planning process.	Marine CAR operations reviewed and managed by IMT through Incident Action Plan (IAP) process.	Within the first 24 hours, DIMT will initiate the first strike plan in conjunction with NEBA informing the development of an IAP	N/A	N/A	24 hrs	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/ evaluation of marine recovery operations will take place almost immediately in the event of a Level 3 spill. The marine recovery operations would be adapted based on real-time information regarding the spill incident: determine if sea state and weather conditions are conducive to operations and applicability with other response strategies.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational NEBA.	Operational NEBA to include evaluation of requirement for implementation of marine CAR operations.	The marine CAR response will be activated if Operational NEBA indicates it would provide a net environmental benefit to prevent environmental impacts to sensitive environmental receptors.	N/A	N/A	4 hours from IMT formation	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational NEBA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather and sea state conditions etc.) to confirm the appropriate response strategies to adopt for protection of priority locations and sensitive receptors. Marine recovery will be activated if the Operational NEBA indicates the potential harm of implementation is less than leaving the oil untreated on the surface; and if the implementation of the marine recovery response strategy would provide a net environmental benefit to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Poor situational awareness and understanding of oil spill trajectory prior to response execution (i.e., oil could be heading out to sea).	Modelling predictions of oil trajectory to be undertaken to support the Operational NEBA.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable direction of daily marine CAR operations.	N/A	N/A	4 hours from DIMT formation	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will assist in the effective deployment of marine CAR vessels to areas where sensitive receptors require priority protection.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		CAR operations are supported by trained aerial observers to position vessels in areas which contain oil in sufficient thicknesses for effective recovery.	Aerial guidance to direct CAR vessels to areas not compromised by dispersant operations and with recoverable quantities of oil present.	Plane & Aerial Observer	1	7 days	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will assist in the effective deployment of marine CAR vessels to areas where sensitive receptors require priority protection.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Oil recovered not recorded to allow for effectiveness analysis and Operational NEBA inputs.	Volumes of oil recovered will be recorded.	All recovered oil will be logged and reported to Incident Commander.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by understanding the efficiency of marine CAR operations. Positive environmental benefit gained by implementation of Waste Management Plan.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Weather impacting the response operations increasing safety and operational risk.	Marine recovery boom will not be deployed during periods of weather, currents and sea state conditions that are not appropriate for successful marine recovery operations.	Safety considerations for marine crew and reduces potential for inefficient oil spill response operations when weather conditions are not conducive for recovery of oil.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by reducing the potential for inefficient oil spill response operations when weather conditions are not conducive for recovery of oil.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Incompetent personnel utilised during response operations.	Trained operators to supervise boom deployment and marine recovery operations.	Use of skilled personnel to supervise boom deployment and oil skimming operations will increase efficiency of marine recovery efforts.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by using skilled personnel to supervise boom deployment and oil skimming operations to increase efficiency of marine recovery efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response continues with no end point or is removed early.	Response strategy activities continued in accordance with operational NEBA and IAP until termination criteria met.	Ensures that the marine CAR response continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the marine recovery response strategy continues until the performance outcome has been achieved.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
Administrative	Marine recovery resources (equipment) not available to respond when required.	Access to marine recovery equipment, e.g., Roboom, skimmers, power packs, storage containers owned by AMOSC (in Exmouth, Fremantle, Dampier, and Geelong) from AMOSC and Mutual Aid stockpiles	Mobilisation of AMOSC owned marine recovery equipment from Exmouth / Fremantle / Geelong	Small	AMOSC	0-1	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of marine recovery is to contain the oil on the surface and then recover it using skimming equipment. This reduces the volume of oil that has the potential to make shoreline contact and have negative consequences on sensitive shoreline receptors.	The response capacity is medium (when NATPlan resources are considered) but the control effectiveness is generally high (cf. potential for weather downtime). EOG has access to this capability through contractual arrangements with AMOSC / OSRL.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Access to marine recovery equipment, e.g., Roboom, skimmers, power packs, storage containers owned by OSRL.	Mobilisation of OSRL marine recovery from Singapore and other countries.	Small	OSRL	< 72hours to mobilise; onsite > 7 days	Minor	Low (due to time to mobilise)	H	H	H	H		Control has minor cost implications for operations.	

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		Obtain and locate additional marine recovery equipment including NATPlan equipment (accessed via AMOSC).	Acquisition of more marine recovery equipment to be on standby during the campaign. Additional NATPlan stockpiles available in other port locations.	Medium	AMSA	< 7 days	Moderate	H	H	H	H	H	Scalable options for marine recovery operations involve accessing more equipment from around Australia and internationally.	Suitable stockpiles of marine recovery resources (equipment) exist within AMOSC, Mutual Aid, AMSA and OSRL inventory.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Marine resources (vessels) not available to respond when required.	Access to marine vessels (support vessel, Mutual Aid, local charter).	Vessels available via Mutual Aid MoU's, and VoO available on the local spot charter market Vessels already on contract or readily available through existing vessel MSA, no additional standby cost.	Small	8+	0-1	Minor	L	H	H	H	H	The environmental benefit associated with marine CAR operations is potentially significant, which has the potential to reduce the environmental severity of the spill	The response capacity is small for vessel operations, but the control effectiveness is generally high (vessel operations are only possible during daylight hours, and SIMOPS in the same area with aerial operations is not possible). Additional vessels are available through mutual aid, spot market hire and other VoO. Cost during activation would be moderate.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Support vessels (Australia, SE Asia).	Acquisition of more support vessels via charter on the spot-market from around Australia and/or SE Asia.	Medium	As required	>10 days	Moderate	H	H	H	H	H	Marine recovery units on standby during event – scaling up a fleet of vessels/equipment during an event to be on standby during the response would enable increased collection of surface hydrocarbons. These vessels could then be deployed to areas where hydrocarbons are amenable to collection or if high shoreline sensitivities are predicted to be impacted. These vessels may work at a low efficiency rate (<35 m^3/day).	The response capacity is small for vessel operations, but the control effectiveness is generally high (vessel operations are only possible during daylight hours, and SIMOPS in the same area with aerial dispersant operations is not possible). The cost of using marine vessels through the spot-charter market around Australia and SE Asia has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
													Although the environmental benefit is low compared to the overall spill volume, a higher environmental benefit may be obtained by reducing hydrocarbons impacting shorelines. The environmental benefit associated with marine recovery is considered to be significant, particularly when shorelines are under threat.		
		Dedicated marine CAR vessels with recovery equipment (e.g., Roboom, skimmers, etc.) on standby in field or in Darwin.	On standby 24/7 during operations to expedite initiation of marine CAR operations.	Small	As required	0-1	Major	H	H	L	H	H	The environmental benefit associated with a dedicated marine CAR vessel on standby is not significant, given the limited recovery volume by this method with recovery operations limited to calm conditions. It does have the potential to reduce spill impacts at specific locations to reduce the environmental severity of the spill.	Dedicated standby vessels/equipment have substantial costs, during operations.	**<u>Reject</u>**: These controls have high costs that are disproportionate to the potential environmental benefit that might be gained particularly taking into consideration the small increment of oil volume that would be recovered which would occur on a time scale of 1-3 days.
							Per Vessel: $35K/day x 55 days = >$2M						Scalable options for marine CAR operations involve having dedicated vessels on standby with marine recovery equipment onboard in the unlikely event of a hydrocarbon spill. Having 4 vessels on standby in Darwin and J-boom/skimmers located at site for the initial response may enable an extra 4 days of marine operations (if conditions were favourable). This would collect additional 200 m^3 oil which is low in terms of the overall oil budget that may reach shore.	Recovery volumes are relatively small, expected to be between 5 and 20% of release volume. The primary response strategy of chemical dispersion, rather than marine CAR, is expected to be most effective in reducing surface oil.	
	Insufficient number of trained personnel.	Train additional marine recovery specialists.	Additional number of marine crew trained in the use of the equipment prior to mobilisation.	Small	As required	0-1	Moderate, includes standby crew	H	H	L	H	H	Training of marine crews in the use of the equipment can be done prior to mobilisation to the field in half a day with a small complement of AMOSC or OSRL specialists. This could be included in the mobilisation schedule given the likelihood of weather downtime in the use of this oil response strategy.	Providing training prior to the event, surplus to the existing trained AMOSC Core Group etc, has limited benefit as the training on site/on the job would not significantly impact (<4 hrs) the timeframe to operation of marine recovery. Controls have disproportionate cost/effort relative to environmental benefit gained.	**<u>Reject</u>**: These controls have costs/ effort sacrifice that are disproportionate to the potential environmental benefit that might be gained particularly taking into consideration the short timeframe for training (<4 hrs).

Table 6.14 Preparedness EPSs – Containment and Recovery

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to implement Containment and Recovery strategy in an effective and timely manner	
Control Measure	Environmental Performance Standard	Measurement Criteria
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources.	AEP MoU: Mutual Aid signed by EOG
Service Contracts	EOG shall maintain a service agreement for fixed-wing aircraft to support oil spill activities, commencing six weeks prior to the commencement of the activity.	Service agreement with aircraft operator
	EOG shall have a contract in place with both AMOSC and OSRL to facilitate access to industry containment and recovery equipment and trained response personnel.	Service contract with OSRL AMOSC membership
	EOG shall maintain a service agreement for 2x support vessels to support the Beehive-1 Drilling Program, commencing six weeks prior to the commencement of the activity. These vessels may be called upon to undertaken marine recovery operations.	Service agreement with vessel provider
Monitoring of vessel availability & status	EOG shall actively monitor current vessel availability to identify emergency vessels and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.	Monthly report
Monitoring of fixed-wing aircraft availability & status	EOG shall actively monitor current aircraft availability to support monitoring and evaluation, commencing six weeks prior to the commencement of the activity .	Monitoring records
Monitoring of equipment availability & status	EOG shall actively monitor C&R equipment availability through AMOSC and OSRL reports during the drilling campaign, commencing six weeks prior to the commencement of the activity.	AMOSC and OSRL reports
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of Containment and Recovery response readiness.	Exercise records
Response Timing	EOG shall maintain arrangements to facilitate the mobilisation of Containment and Recovery operations in accordance with the following timeframes: • Two C&R teams operating within 3 days of spill event. • Four C&R teams operating within 8 days of spill event.	Communication records confirming capability

6.6 Shoreline Operations

Shoreline operations will be carried out as directed by the relevant Controlling Agencies in State/Territory waters.

Shoreline response activities including P&D, SCAT and Clean-up are typically under the control of the relevant State/Territory Control Agency. They may choose to conduct the SCAT activity, including provision of SCAT specialists, wildlife specialists, local government rangers and/or Aboriginal heritage advisors/rangers. The Control Agency may also request of EOG some specialist support personnel including SCAT and OWR experts and logistical support for remote and/or larger SCAT operations.

At the direction of WA DoT and/or NT IMT, EOG will use the information gained from SCAT and the Monitor and Evaluate response strategy (Section 6.3) to predict shorelines with potential to be impacted to inform shoreline clean-up activities. Through information gathered and assessed by the DIMT and WA DoT and/or NT IMT, the trajectory of the spill towards the specific coast will be confirmed and the shoreline clean-up strategy will be implemented.

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

The only two shoreline locations within the region which do not have a State/Territory Control Agency are Ashmore Reef and Cartier Island[1], both of which are Commonwealth Lands. In the event of a spill from a petroleum activity reaching these locations, EOG would be the Control Agency. Under this scenario, the SCAT team would only consist of SCAT specialists and wildlife response specialists provided by industry mutual aid, and possibly a Parks Australia ranger or other government appointed person with local knowledge. There are no relevant Aboriginal Heritage Advisors required at Ashmore Reef/Cartier Island.

Remote shoreline response will not be triggered until sufficient M&E and/or SCAT information is provided to the relevant Control Agency, to make a determination that shoreline P&D is both safe and appropriate to undertake. It is expected that the minimum time for mobilisation (departure from a port) for any remote shoreline clean-up operation would be 10 days. Tasks undertaken during this 10-day preparation period include risk assessments and HSE planning, identification and mobilisation of a large number of specialist personnel and equipment (including significant number of government agency personnel), identification and mobilisation of a number of large and small vessels, and possibly twin-engine helicopter.

6.6.1 Logistical Constraints

<u>Access to areas requiring shoreline operations:</u> There is limited shoreline access to coastline for most of the protection priority areas. Where shoreline access is available by road, 4WDs will be used where possible. Access to most coastal areas and nearshore islands would be via barge or small vessel.

<u>Access to areas requiring shoreline protection:</u> There is limited shoreline access to coastline for most of the protection priority areas. Where shoreline access is available by road, 4WDs will be

[1] Refer note in Section 4.1 regarding Cartier Island unexploded ordinance risk.

used where possible. Access to the most coastal areas and nearshore islands would be via barge or small vessel.

Locations amenable to shoreline clean-up: The Tactical Response Plans being developed for the priority protection areas (see Section 4.4) will include an assessment of whether shoreline protection and deflection, and shoreline clean-up are feasible. The assessment will include consideration of the high tidal ranges, health and safety, and any other logistical constraints.

Accommodation: Availability of accommodation is a major constraint for the response. As noted above, many locations are only accessible from the water. EOG would engage dedicated liveaboard charter vessels and/or smaller charter vessels for accommodation, along with landing barges to support the shoreline operations.

Movement of personnel: Movement of personnel from their accommodation or transit point to the clean-up location can impact the effectiveness of the response. If the clean-up location requires a long commute the amount of effectiveness from the shoreline crews diminishes as the amount of time spent in the actual operation is reduced.

Weather: Storms may impede actual operations on the day or access to certain locations due to flooding. Shoreline crews will need to work around tidal movements on the beaches. Clean-up activities will be arranged around tidal cycles.

6.6.2 Legislative and Other Considerations

Shoreline operations are administered by WA DoT and/or NT IMT as the Controlling Agency within State/Territory jurisdiction. EOG via the Joint Strategic Coordination Committee (JSCC) (as described in Appendix A of the OPEP) would engage with other relevant WA and/or NT government organisations in relation to emergency response arrangements in State jurisdiction.

The DEPWS minutes of a meeting held on 20 June 2023 to discuss 'cross jurisdictional arrangements' notes that the NT government be developing oil spill response plans across all shorelines over next two years. The minutes also note that working with traditional owners will be a major part of developing the plans with 80% of NT coastline held and managed by traditional custodians. The NT government has arrangements for obtaining "just in time" Authority Certificates from the Aboriginal Areas Protection Authority, which will be formalised in the NT Oil Spill Contingency Plan and response plans.

Several Conservation Management Plans identify marine debris as a key threatening process to recovery. Also, the relevant action from the Threat Abatement Plan for the impacts of marine debris on vertebrate marine life (DEWHA, 2009) is to "contribute to the long-term prevention of the incidence of harmful marine debris". The prevention of garbage entering the marine environment and the appropriate management of sewage and food wastes reduces the risk of impacts to the marine environment and demonstrates alignment with the various Conservation Management Plans and Threat Abatement Plans.

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

The Threat Abatement Plan to reduce the impacts of exotic rodents on biodiversity on Australian offshore islands of less than 100,000 hectares (DEWHA, 2009), describes the threat of invasion or reinvasion of rodents on bird populations. The relevant action from DEWHA (2009) is to prevent invasion or reinvasion via prevention/ risk reduction for rodents gaining access to key vessels at key ports. BHP's controls align with the intent of preventing invasion/establishment of pests.

The Recovery Plan for Marine Turtles in Australia (DoEE, 2017) identifies that light pollution and vehicle damage (and therefore possibly excessive foot traffic) are possible threats to turtle nesting, which could result from shoreline response activities during an oil spill response. Controls which align with the intent of the Recovery Plan have been adopted, including consideration of the National Light Pollution Guidelines (DoEE, 2020).

6.6.3 Shoreline Protection and Deflection

Shoreline protection involves the deployment of protection and deflection booms which assist in minimising the amount of oil contacting shorelines. At the direction of the relevant Controlling Agencies , protective and deflective booms may be deployed to deflect a slick away from an identified sensitivity towards an area where collection can be more effective without impacting high value habitat areas. Alternatively, slicks can be deflected to shorelines of lower environmental value where the oil can be collected, or if appropriate, identification of nearby suitable sacrificial habitat. This response strategy involves the deployment of vessels, equipment and personnel and is dependent on favourable weather and sea state conditions.

Basis of Design – Table 3.5

Minimum time to contact (>10 g/m^2) 10.29 days for well blowout scenario.

Shorelines oiled spread over wide range of shorelines and islands from Tiwi Islands to western side of the JBG.

Approx. 35 days for 20 km shoreline above 10 g/m^2.

Approx. 55 days for 40 km shoreline above 10 g/m^2.

Approx. 75 days for 180 km shoreline above 10 g/m^2.

Maximum of 225 km of shoreline oiled >10 g/m^2 at Day 97.

Maximum of 705 m^3 total volume oil (>10 g/m^2) on Day 85

Oil Spill Budget

For the purposes of this assessment, it is assumed that each P&D unit will collect 0.1 m^3 of oily water per day.

Maximum Selected Field Capability

Fifteen P&D units operating by Day 51.

Implementation Timeframe

Tier 2/3

Day 10 – Two P&D units operating.

Day 24 – Six P&D units operating.

Day 43 – Ten P&D units operating.

Day 51 – Fifteen P&D units operating.

Response Arrangements

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

Guidance

Appendix E of the OPEP (Environmental Sensitivities)

TRPs:

- Moyle River Estuary (NT);
- Victoria River Estuary (NT);
- Forsyth Creek (NT);
- Keep River Estuary/Turtle Point (NT);
- Cape Domett (WA DoT cell # 1&2);
- Cambridge Gulf/Lacrosse Island (WA DoT cell # 3);
- Berkeley River (WA DoT cell # 10); and
- King George River (WA DoT cell # 13).

Personnel

In accordance with AMOSC advice, each team should consist of 1 x trained operations oil spill responder and 3 x labour hire personnel. Skilled personnel would initially be sourced from AMOSC, Core Group and OSRL to supervise response crews. All unskilled personnel would receive relevant on-the-job training prior to undertaking shoreline protection operations with some labour-hire personnel potentially upskilled to support supervisory roles during the course of the response.

Equipment and Vessels

To support 15 shoreline protection and deflection strike teams, the following equipment would be required:

- 15 x 50 m shore seal boom;
- 15 x 50 m near shore boom (i.e. zoom boom or GP boom);
- 15 x Shoreline skimming system;
- 15 x Waste management capacity min 10 m^3 volume (fast tanks, IBCs);
- 15 x small vessel for towing boom offshore; and
- 15 x large vessel if remote locations need to be accessed

As a member company, EOG has access to industry equipment maintained by AMOSC. Under an existing Service Level Agreement, EOG has access to OSRL equipment. EOG has ready access to regionally available equipment such as PPE, shelter, accommodation units, vehicles, and machinery.

6.6.4 SCAT

The objective of SCAT is to systematically collect data about the location, nature and degree of shoreline oiling and at risk/impacted wildlife, to inform shoreline treatment and oiled wildlife response planning.

Based on the IAP, SCAT teams shall be deployed for assessment of the shoreline and developing recommended clean-up strategies for the DIMT. SCAT team members will include members trained in oil spill response measures and environmental and coastal sensitivities of the region. Ideally, each SCAT team will include a representative from the appropriate state agency (WA DoT and/or NT IMT and the WA DBCA).

The SCAT teams will undertake systematic surveys of the shoreline that will be segmented into sections. The SCAT teams will then provide sketches and reports which will include recommendations for the most appropriate clean up strategy for the shoreline segment. This information will feed back to the DIMT who will then prioritise areas for clean-up and allocate resources. The SCAT teams will utilise techniques to determine appropriate termination end points for response in consultation with both WA DoT and/or NT IMT and the WA DBCA. The endpoints can be determined by either:

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

Basis of Design – Table 3.5

Minimum time to contact (>10 g/m^2) 10.29 days for well blowout scenario.

Shorelines oiled spread over wide range of shorelines and islands from Tiwi Islands to western side of the JBG.

Approx. 35 days for 20 km shoreline above 10 g/m^2.

Approx. 55 days for 40 km shoreline above 10 g/m^2.

Approx. 75 days for 180 km shoreline above 10 g/m^2.

Maximum of 225 km of shoreline oiled >10 g/m^2 at Day 97.

Maximum of 705 m^3 total volume oil (>10 g/m^2) on Day 85

Maximum Selected Field Capability

10 SCAT units operating by Day 43.

Implementation Timeframe

Tier 2/3

Day 3 – Shoreline Operations Manager operating.

Day 6 – Two SCAT units operating.

Day 24 – Six SCAT units operating.

Day 43 – Ten SCAT units operating.

Response Arrangements

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

Guidance

Appendix E of the OPEP (Environmental Sensitivities)

TRPs:

- Moyle River Estuary (NT);
- Victoria River Estuary (NT);
- Forsyth Creek (NT);
- Keep River Estuary/Turtle Point (NT);
- Cape Domett (WA DoT cell # 1&2);
- Cambridge Gulf/Lacrosse Island (WA DoT cell # 3);
- Berkeley River (WA DoT cell # 10); and
- King George River (WA DoT cell # 13).

Personnel

In accordance with AMOSC advice, each team should consist of 1 x team lead, 2 x team responders (labour hire personnel) and 1 x drone operator. Skilled personnel would initially be sourced from AMOSC, Core Group and OSRL to supervise response crews. All unskilled personnel would receive relevant on-the-job training prior to undertaking shoreline protection operations with some labour-hire personnel potentially upskilled to support supervisory roles during the course of the response. The relevant State/Territory Control Agency, or Commonwealth Government, will provide personnel such as Park rangers, and Aboriginal Heritage Advisors.

Equipment and Vessels

As it is assumed that most SCAT operations would occur from the water, EOG has allowed for one nearshore vessel for every two SCAT teams. This vessel would provide accommodation for the teams and would come equipped with two tender vessels which could be used by the SCAT teams.

Allowances have also been made for one 4WD vehicle and one drone per team.

6.6.5 Shoreline Clean-Up

At the direction of WA DoT and/or NT IMT, EOG will use the information gained from SCAT and the Monitor and Evaluate response strategy (Section 6.3) to predict shorelines with potential to be impacted to inform shoreline clean-up activities. Through information gathered and assessed by the DIMT and WA DoT and/or NT IMT, the trajectory of the spill towards the specific coast will be confirmed and the shoreline clean-up strategy will be implemented.

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

- Natural cleaning;
- Flushing (High pressure / low pressure);
- Ploughing / harrowing;
- Adsorbents;
- Manual collection;
- Sandblasting / steam cleaning;
- Mechanical collection;
- Chemical dispersants (shoreline application); and
- Vegetation removal.

Shoreline clean-up strategies consider the following factors:

- Shoreline characteristics (substratum type, beach type, shoreline exposure, biological/ social/ heritage/ economic values; characteristics of the oil (i.e., degree of weathering); amount of oil present, distribution of the oil on the shoreline; shoreline sediment type);
- Logistic considerations (availability of access – personnel, equipment; waste removal); availability of equipment and labour; availability of waste storage areas);
- Operational risk assessment of potential shoreline clean-up methods will be captured leading to the development of Operational NEBAs; and
- Damage to Aboriginal registered sites of cultural significance from shoreline clean-up activities.

Shoreline types of the region (as classified by IPIECA-IOGP 2015c) include:

- Rocky shorelines of the Bonaparte and Buccaneer Archipelagos and western shoreline of the JBG including outer islands (shoreline types 1A, 1B, 1C, 2A and 2B);
- Fine sands, silts, clays, muds of the sheltered and highly tidal mangrove/salt marsh and salt flat systems of the Kimberley and NT mainland shorelines (shoreline types 8A-E, 9 A-C, and 10A, 10C & 10D); and
- Coarse sandy/gravel beaches, typical of the offshore islands and outer islands of the Kimberley coastline (shoreline types 3B, 4, 5, 6A, 6B and 7).

Typically, cliffs and inaccessible rocky coves are highly exposed and are best left to clean naturally unless there are overriding reasons to do otherwise. Unless the oil has been thrown up to extreme heights by exceptional weather conditions and is therefore unlikely to be reached by the sea under normally prevailing conditions, residual staining would be expected to diminish markedly over two or three seasonal cycles. Given the extreme tidal regime of the Kimberley coastline, and recommendations from IPIECA-IOGP (2015c), planning for cleaning of remote rocky cliffs/shorelines of the Kimberley is not considered appropriate.

In regard to mangroves/salt marshes, IPEICA-IOGP (2015c) there is potential for significant damage to mangrove and salt-marsh plants/root systems from attempting most clean-up techniques. In general, oil deposited on mudflats does not penetrate into the substrate because the water table is sufficiently high to provide a barrier against the downwards migration of oil. It is most likely that the oil will re-float and migrate elsewhere, however this does not apply when there are open stemmed plants, animal burrows, wormholes, etc., or if oil is present in a storm which suspends sediment, oil can attach to the sediment and be deposited in the mudflat (IPIECA-IOGP, 2015). Erecting barriers across major inlets allowing water exchange but preventing oil ingress is the best strategy paying attention to the tidal currents that the barriers need to withstand (IPIECA-IOGP, 2015).

A strategic NEBA for shoreline clean-up techniques is presented in Appendix B-1 assessing the potential use of these techniques in various habitats.

Basis of Design – Table 3.5

Shoreline oiling >100 g/m^2

Minimum time before shoreline accumulation (>100 g/m^2) is 12.54 days (turtle breeding Biologically Important Area (BIA) and habitat critical). Multiple marine avifauna and turtle BIA shorelines (several offshore islands, plus several islands of Buccaneer & Bonaparte Archipelago) contacted at >100 g/m^2. Typically, up to 3-4 weeks before second shoreline sector is contacted.

Maximum of 115 km of shoreline oiled (>100 g/m^2).

Approx. 25 m^3 on Day 26.

Approx. 40 m^3 on Day 45.

Approx. 420 m^3 on Day 53.

Maximum of 629 m^3 total volume oil (>100 g/m^2) on Day 85.

Oil Spill Budget

By applying a bulking factor of 10x the volume of the oil stranded (see Section 5.4.4), a total volume of up to 6,290 m^3 of oil contaminated waste material may require clean-up.

Maximum Selected Field Capability

Sixteen Shoreline Clean-up units operating by Day 51.

Implementation Timeframe

Tier 2/3

Day 3 – Shoreline Operations Manager operating.

Day 10 – Two Shoreline Clean-up units operating.

Day 24 – Six Shoreline Clean-up units operating.

Day 43 – Ten Shoreline Clean-up units operating.

Day 51 – Sixteen Shoreline Clean-up units operating.

Response Arrangements

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

EOG will provide the resources within the times requested by the Control Agency (WA DoT and/or NT IMT). Supplementary resources (personnel and equipment) will continue to be deployed by EOG until peak capacity is reached as deemed appropriate by WA DoT and/or NT IMT until the termination of the response strategy.

Guidance

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

Appendix B-1: Strategic NEBA: Shoreline Clean-up

Appendix E of the OPEP (Environmental Sensitivities)

TRPs:

- Moyle River Estuary (NT);
- Victoria River Estuary (NT);
- Forsyth Creek (NT);
- Keep River Estuary/Turtle Point (NT);
- Cape Domett (WA DoT cell # 1&2);
- Cambridge Gulf/Lacrosse Island (WA DoT cell # 3);
- Berkeley River (WA DoT cell # 10); and
- King George River (WA DoT cell # 13).

Personnel

There is an appropriate limit to the number of personnel that should be put ashore during shoreline response in a remote and typically environmentally sensitive locations, to avoid additional impacts, e.g., trampling of turtle nests and disturbance to bird feeding, roosting and nesting behaviours. In general, to reduce wildlife disturbance on small, offshore remote locations, a longer duration response with a smaller number of personnel may be desired. The numbers of responders able to access a shoreline are also somewhat limited by accommodation/logistics support.

The exact numbers of personnel and skills of those personnel selected to respond on a shoreline will be made by the relevant Control Agency, based on the degree of oiling, seasonality and sensitivity of receptors are risk at the time. However, as a basis for planning, AMOSC has advised that each shoreline clean-up team would require a trained team leader and 10 unskilled personnel. AMOSC has estimated that 16 shoreline clean-up teams would be required to respond at peak. AMOSC also advises that five plant operators would be required for a peak response. Peak requirements would therefore be 16 x trained team leaders, 160 x unskilled personnel and 5 x plant operators.

Skilled personnel would initially be sourced from AMOSC, Core Group and OSRL to supervise response crews. All unskilled personnel would receive relevant on-the-job training prior to undertaking shoreline operations with some labour-hire personnel potentially upskilled to support supervisory roles during the course of the response.

It is expected the relevant State/Territory Control Agency will provide some government appointed personnel to oversee/lead the remote shoreline response operation. EOG would be required to provide the additional field response personnel.

However, should the Control Agency request/require additional remote shoreline response personnel, or EOG is the Control Agency (e.g., Ashmore/Cartier), EOG plus mutual aid capability and labour hire will provide the full shoreline response personnel capability.

Initial contingents of AMOSC staff and core-group personnel with shoreline clean-up expertise are available to mobilise to Darwin within 48 hours, however initial full team assembly is not expected until day 10. Additional shoreline clean-up trained personnel are available via OSRL for a large/long duration response. EOG is able to source additional labour hire personnel via contracted labour hire providers.

Equipment

Typical response strategies for sandy beaches will be small remote response teams, conducting manual clean-up (e.g., rakes, shovels and lined bulka-bags), with limited likelihood for use of any mechanical/machinery assisted cleaning, except for small, tracked vehicles which may be used for collection and transport of small volumes collected oily waste to collection points/landing barges. The high tidal regime will result in enhanced natural surf washing/flushing, a recognised technique within IPIECA-IOGP (2015c).

If significant volumes of buried oil (which could be re-mobilised) were identified, advanced cleaning techniques may be required. IPIECA-IOGP (2015c) states that the options for removal of buried oil include lifting the clean overburden and moving it aside to expose the band of buried oil, which is then removed and transported off the beach for disposal. Another option is to transport the band of buried oil to the water's edge for surf washing. If relatively close to the surface, the oil might be mobilised through harrowing or ploughing, or by using flushing lances to release the oil and flush it to the water's edge where it can be recovered with skimmers or sorbents. These techniques would need to be assessed/recommended by the Control Agency, as part of a long-term shoreline treatment program. This type of shoreline clean- up/treatment equipment is available from the AMOSC Level 3 stockpiles.

AMOSC has advised that 16 shoreline clean-up teams would require:

- 16 x Shoreline response kits incl (Type and quantalities to be adjusted according to shoreline type & oiling);
- 16 x Manual oil collection equipment;
- 5 x Mechanical oil collection/removal machinery & plant;
- 16 x Waste collection and containment equipment;
- 16 x Equipment and personnel decontamination equipment; and
- 16 x Site zoning equipment for sealing of the site.

The WA/NT Control Agency may choose to mobilise their own shoreline clean-up equipment. WA Control Agency spill response trailers are located in Karratha, Fremantle and Albany. Additional

AMOSC shoreline clean-up equipment stockpiles are located at Exmouth, Fremantle and Geelong. The AMOSC Broome stockpile and AMSA Darwin stockpiles also include additional shoreline clean-up equipment.

EOG has ready access to regionally available equipment such as PPE, shelter, accommodation units, vehicles, and machinery. Equipment required to perform clean-up operations can be sought through existing supplier and logistical arrangements. Additional clean-up equipment can be readily obtained from hardware/industrial suppliers and delivered to Darwin to meet the arrival time of responders.

Vessels/4WDs

As many of the locations which may require shoreline clean-up are only accessible from the water, EOG would engage dedicated liveaboard charter vessels and/or smaller charter vessels, along with landing barges to support the shoreline operations. Dedicated accommodation vessels may also be required. At peak, an allowance has been made for 16 small vessels and 5 landing barges.

4WD vehicles would be used where land access is possible. At peak, an allowance has been made for 10 4WDs.

Waste

It is estimated that 6,288 m^3 of oil-contaminated solid waste would be generated over 98 days. Section 6.11 provides further detail on waste management.

6.6.6 Response Requirements

Table 6.15 provides the response requirements for Shoreline Operations.

6.6.7 ALARP Evaluation and Preparedness Performance Standards

Table 6.16 presents the ALARP evaluation for Protection and Deflection and Table 6.17 presents the ALARP evaluation for Shoreline Clean-up.

Table 6.18 presents the EPSs for preparedness for Shoreline Operations.

Table 6.15 Response Requirements – Shoreline Operations

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Shoreline Operations															
Functions/Positions															
Shoreline Operations Manager			1	1	1	1	1	1	1	1	1	1	OSRO	OSRO	AMOSC/OSRL membership
Shoreline Protection and Deflection															
Functions/Positions															
Oil Spill Responder IMO 1 (or equiv.)								2	2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Labour hire – marine								6	6	18	30	45	LH-Marine	LH-Marine	Marine labour hire
Equipment/Resources															
Nearshore vessel								2	2	6	10	15	VoO	VoO	Vessels of Opportunity
Tender vessel								2	2	6	10	15	VoO	VoO	Vessels of Opportunity
50 m shore seal boom								2	2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
50 m near shore boom								2	2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Shoreline skimming system								2	2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Waste capacity min 10 m^3								2	2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Waste: accumulated oil/water (m^3)								0.4	1.2	7.6	31.2	48.2	Waste	Waste	189.2 m^3 over 98 days (Section 6.11)
SCAT															
Functions/Positions															
SCAT team lead						2	2	2	2	6	10	10	OSRO	OSRO	AMOSC/OSRL membership
SCAT team responders						4	4	4	4	12	20	20	LH-Shore	LH-Shore	Labour hire
Drone operator						2	2	2	2	6	10	10	EOG Contractor	EOG Contractor	EOG Contractor
Equipment/Resources															
Nearshore vessel						1	1	1	1	3	5	5	VoO	VoO	Vessels of Opportunity
Vehicle 4WD						2	2	2	2	6	10	10	Vehicle	Vehicle	4WD hire
Small vessel						2	2	2	2	6	10	10	VoO	VoO	Vessels of Opportunity
Drone						2	2	2	2	6	10	10	EOG Contractor	EOG Contractor	EOG Contractor
Shoreline Clean-up															
Functions/Positions															
Oil Spill Responder IMO 1 (or equiv.)									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Labour hire – shore									20	60	100	160	LH-Shore	LH-Shore	Labour hire
Plant Operators									1	2	3	5	Plant	Plant	Supplied with Plant
Equipment/Resources															
Vehicle 4WD									2	6	10	16	Vehicle	Vehicle	4WD hire
Small vessel									2	6	10	16	VoO	VoO	Vessels of Opportunity
Landing barge									1	2	3	5	VoO	VoO	Vessels of Opportunity
Shoreline response kits									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Manual oil collection equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Machinery/plant									1	2	3	5	Plant	Plant	Plant operator
Waste collection and containment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Zoning equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Waste: accumulated solid (m^3)									11	181	809	1,287	Waste	Waste	6,288 m^3 over 98 days (Section 6.11)

Equipment/Resources highlighted in green are supplied as part of the contracts for the associated equipment/service (e.g. nearshore vessel). They are not included in the overall requirements (Section 7).

Table 6.16 ALARP Evaluation – Shoreline Protection and Deflection

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation												
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Eliminate	Negative environmental impact from the execution of this response strategy.	No shoreline response.	Do nothing option.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option; experience from past oil spills suggests that environmental sensitivities can be protected effectively when shoreline protection operations are activated.	There may be occasions when shoreline protection is not implemented, e.g., during poor weather, or when operations are temporarily ceased such as, for example, due to the presence of migratory EPBC listed species occurring within the area of operations, but in general, the 'do nothing' option is not considered within the external context (e.g., stakeholder views) to be a viable option.	**Reject:** Shoreline protection using booms is a recognised strategy for the mitigation of oil spill impacts.
	Response use during periods of important windows of ecological sensitivity, e.g., coral spawning; turtle nesting season; migratory shorebirds arriving/departing the region and during migrations of EPBC Act Listed species.	During periods of important ecological sensitivity (e.g., coral spawning, turtle nesting/inter-nesting and hatching season), EOG will provide input into WA and/or NT Operational NEBA regarding these sensitivities and will assist with providing input into operational constraints.	Shoreline protection is a key response strategy to facilitate the protection of sensitive shorelines and adjacent shallow water habitats particularly those occurring within Marine Parks. However, shoreline protection during periods of important windows of ecological sensitivity, e.g., coral spawning; turtle nesting season will be a key component of the Operational NEBA and will be subject to operational constraints.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environment benefit gained by reducing the potential impacts associated with shoreline protection operations during windows of important ecological sensitivity. For example, shoreline protection operations would not be applied in areas with visible coral spawning slicks.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response strategy not executed effectively through planning or fast enough to prevent impact highly sensitive areas impacted.	Pre-deployment of shoreline protection boom at identified sensitivities within the JBG during operations.	Pre-deployment of shoreline protection boom at identified sensitivities along the JBG Coast would reduce the time to deployment following the loss of hydrocarbons thereby increasing the potential for protection of environmental sensitivities.	N/A	N/A	N/A	Major; 2 people $1,000 / day x 55 days = $55K	H	H	H	Low	H	Any possible positive environment benefit gained by pre-deploying shoreline protection boom such as beach guardian at identified sensitivities along the JBG Coast during operations would have some significant accompanying environmental hazards for local wildlife. It is noted that the minimum timeframe for shoreline contact (i.e. < $10g/m^2$) is 11 days with shoreline impacts occurring for Day 14 (unmitigated). There is sufficient time to mobilise and deploy shoreline boom to protect sensitive resources. This control offers no net benefit.	This control would have low survivability and major costs associated with standby rates for the field crew to monitor the condition of the boom.	**Reject**: Pre-deployment of shoreline boom has high costs that are disproportionate to any potential environmental benefit that might be gained particularly taking into consideration the time to shoreline impacts.
Administrative		Shoreline protection operations to be reviewed and managed by DIMT through Incident Action Plan (IAP) process.	Within the first 24 hours, DIMT will initiate the first strike plan in conjunction with NEBA informing the development of an IAP	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/evaluation of shoreline protection operations will take place almost immediately in the event of a Level 3 spill. The shoreline protection operations would be adapted based on real-time information regarding the spill incident: determine if sea state and weather conditions are conducive to operations and applicability with other response strategies.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational NEBA.	Operational NEBA to include evaluation of requirement for implementation of shoreline protection operations.	The shoreline protection response strategy will be activated if Operational NEBA indicates a net environmental benefit to prevent environmental impacts to sensitive environmental receptors.	N/A	N/A	<4 hours from DIMT forming	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational NEBA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather and sea state conditions etc.) to confirm the appropriate response strategies to adopt for protection of priority locations and sensitive receptors. Shoreline protection will be activated if the Operational NEBA indicates the potential harm of implementation is less than leaving the oil untreated on the surface; and if the implementation of the response strategy would provide a net environmental benefit to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors.	Controls have minor cost implications for operations.	<u>Accept:</u> Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		TRPs for shoreline protection are developed for priority protection areas with impacts at or above ecological impact levels within 20 days of release prior to drilling commencement. Shoreline TRPs factor in shoreline type, habitats, access and ecological, cultural heritage and socio-economic sensitivities.	Preparedness strategy for oil spills for priority protection areas with a high probability of impact within 20 days.	NA	NA	NA	Minor	H	H	H	H	H	TRPs assist in informing on sensitivities for protection when undertaking shoreline response activities. This has positive environmental benefit as environmental sensitivities have already been identified and can be managed to prevent damage.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	<u>Accept:</u> Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Predictive spill trajectory unknown when undertaking Operational NEBA.	Oil spill modelling contract in place to provide predictions of dispersed crude oil trajectory to be undertaken to support the Operational NEBA and activated within 2 hours of notification.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable direction of daily shoreline protection operations.	N/A	N/A	<4 hours from IMT forming	Minor	H	H	H	H	H	Positive environmental benefit gained as oil spill trajectory modelling will assist in the effective deployment of shoreline protection boom to areas where sensitive receptors require priority protection.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Incompetent personnel utilised during response operations.	Trained operators to supervise boom deployment and shoreline protection operations.	Use of skilled personnel to supervise boom deployment and shoreline protection operations will increase efficiency of oil spill protection efforts.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by using skilled personnel to supervise boom deployment and shoreline protection operations to increase efficiency of response efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.	Controls have high effectiveness; are available, functional, and reliable and in general are survivable and compatible with other control measures. Controls have minor cost implications for operations. Skilled personnel available through AMOSC/OSRL Memberships	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Shoreline response delayed due to poor understanding of impact area and specific operational response.	Deployment of boom and any laydown areas will follow pre-designated plans for establishing a works area, as described in Priority Protection Area TRPs, to protect environmental sensitivities and including areas of cultural sensitivity.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental and cultural sensitivity.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit obtained as environmental sensitivities have been established and correct equipment (for the situation) and management controls can be applied immediately to prevent environmental impacts	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		SCAT verify shoreline and nearshore sensitivities (environmental, cultural), determine 'no-go' zones (turtle nesting, shoreline bird habitats, etc), least impact zones and any limitations associated with shoreline response to inform the WA and/or NT operational NEBA and IAP for the predicted shoreline contact area.	Shorelines are surveyed prior to spill team deployment to identify sensitivities and management actions to minimise impacts.	SCAT Teams	10	48hrs prior to shoreline contact	Minor	H	H	H	H	H	Positive environmental benefit obtained as environmental sensitivities have been established and correct equipment (for the situation) and management controls can be applied immediately to prevent environmental impacts	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		TRPs are reviewed and updated based upon SCAT outcomes to become site-specific TRPs and to reflect outcomes of the operational NEBA.	TRPs are updated with ground-truthed information to inform the Operational NEBA.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit obtained as environmental sensitivities have been established and correct equipment (for the situation) and management controls can be applied immediately to prevent environmental impacts	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Damage to shorelines during SCAT	SCAT crews are inducted into the TRPs so that environmental, cultural heritage and socio-economic sensitivities are known and can be appropriately managed during survey.	All information is provided to ensure that known environmental sensitivities are managed from the start of spill response	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit obtained as known environmental sensitivities have been communicated to SCAT resources and management controls can be applied immediately to prevent environmental impacts	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Vessel selection limits the ability to deploy boom.	Vessels used to deploy boom will be suitable for site conditions (where safe and practicable) and no anchoring of vessels or booms will occur on emergent reefs or other fragile / sensitive benthic habitats.	Increases the potential that impacts to sensitive receptors will be prevented by using plant and equipment that is fit-for- purpose.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by using small marine craft that are fit for purpose in working in shallow water and not anchoring on emergent coral reefs or other sensitive benthic habitats.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Shoreline protection equipment is fails after deployment.	Monitoring teams are deployed to monitor and maintain to the operability of shoreline booms (including oiled wildlife surveillance and management).	Deployed booms require maintenance to ensure they are operating correctly and not creating a hazard for local wildlife	Maintenance teams	10	<11 days	Minor	H	H	H	H	H	Positive environmental benefit gained by monitoring condition of the deployed boom with respect to oil containment and trapped wildlife.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	<u>Accept:</u> Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response impact (positive or negative) is not known or measured.	OSMP monitoring is undertaken to evaluate the effectiveness of the shoreline protection response strategy.	Environmental monitoring to evaluate shoreline protection; and the impact of hydrocarbons on marine and shoreline habitats.	N/A	N/A	Immediately and on-going	Minor	H	H	H	H	H	Positive environmental benefit gained from adopting this control measure. Allows evaluation of the effectiveness of shoreline protection techniques.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	<u>Accept:</u> Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response continues with no end point or is removed early.	Response strategy activities continued until termination criteria met.	Ensures that the shoreline response strategy continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the shoreline protection response strategy continues until the performance outcome has been achieved.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	<u>Accept:</u> Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response resources (equipment) not available.	Access to shoreline protection equipment, e.g., beach guardian, fence boom, deployment kits, owned by AMOSC (in Exmouth, Fremantle, Dampier, and Geelong).	Mobilisation of AMOSC owned shoreline protection equipment from Exmouth / Fremantle / Geelong	Small	AMOSC	<7 days	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of shoreline protection is to separate the oil from shoreline sensitivities.	The response capacity is small, but the control effectiveness is generally high. EOG has access to this capability through contractual arrangements with AMOSC. Control has minor cost implications for operations.	<u>Accept</u>: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Access to shoreline protection equipment, e.g., beach guardian, fence boom, deployment kits, owned by OSRL (in Singapore).	Mobilisation of OSRL owned shoreline protection equipment from Singapore	Small	OSRL	< 24 hours to mobilise; onsite <7 days	Minor	Low (due to time to mobilise)	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of shoreline protection is to separate the oil from shoreline sensitivities.	The response capacity is small, but the control effectiveness is generally high. EOG has access to this capability through membership arrangements with OSRL. Control has minor cost implications for operations.	<u>Accept</u>: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.

eog resources

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		Access to shoreline protection equipment, e.g., beach guardian, fence boom, deployment kits, owned by AMSA as per NATPLan (in ports through Australia).	Mobilisation of AMSA owned shoreline protection equipment from Australian Ports via AMOSC	Small	AMSA	<7 days	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of shoreline protection is to separate the oil from shoreline sensitivities.	The response capacity is small, but the control effectiveness is generally high. EOG has access to this capability through membership arrangements with OSRL. Control has minor cost implications for operations.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Response resources (vessels) not available.	Access to small support vessels (AMOSC, local charter).	Mobilisation of AMOSC owned small craft from Geelong and/or vessels of opportunity available on the local spot charter market in Darwin/ Wyndham	Small	4	< 7 days	Minor	H	H	H	H	H	The environmental benefit associated with shoreline protection is potentially significant, which has the potential to reduce the severity of environmental impact.	The response capacity is small for vessel operations, but the control effectiveness is generally high (vessel operations are only possible during daylight hours) and the cost of using marine vessels available through AMOSC and on the local spot-charter market in Darwin/ Wyndham has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Support vessels (Perth / Australia).	Acquisition of more support vessels via charter on the spot-market from Perth and around Australia.	Small	As required	< 7 days	Moderate	H	H	H	H	H	The environmental benefit associated with shoreline protection is significant, which has the potential to reduce the severity of environmental impact.	The response capacity is small, but the control effectiveness is generally high and the cost of acquiring small marine vessels and more equipment as required through the spot-charter market around Australia and SE Asia has minor cost implications. Cost during activation would be moderate.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Response resources not available.	Dedicated shoreline protection vessel with boom deployment equipment on standby at Darwin Supply base.	On standby 24/7 during operations to expedite initiation of shoreline protection operations.	Small	1	0-1	Major $35K/day x 55 days = $2M	H	H	L	H	H	The environmental benefit associated with shoreline protection is significant, which has the potential to reduce the severity of environmental impact. However, minimum predicted times for shoreline contact are 11 days and shoreline impact are 14 days allowing sufficient time to mobilise and deploy equipment.	Dedicated standby vessels have substantial costs, in the order of $2M during operations.	**Reject**: These controls have high costs that are disproportionate to the potential environmental benefit that might be gained particularly taking into consideration the available time to deploy boom before oil spill impacts might be realised.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
		Pre-deployment of shoreline protection boom equipment (such as Cape Domett & Lacrosse Island) during operations.	On standby 24/7 during operations to expedite initiation of shoreline protection operations.	Small	1	0-1	Modera te, include s standby crew	H	H	L	L	H	The environmental benefit associated with the pre-deployment of shoreline protection boom at Cape Domett and Lacrosse Island during operations to reduce the amount of time lost prior to the first contact of hydrocarbons on the shoreline is not considered significant given the length of time before shoreline contact occurs. Potential for significant environmental interference with wildlife along shorelines with this pre-deployment of boom.	The response capacity is small, but the control effectiveness is moderate as the control would have a low survivability. Cost during activation would be high.	**Reject:** These controls have high costs that are disproportionate to the potential environmental benefit that might be gained. This control would have a low survivability (i.e., boom integrity may decrease with time in the period when no hydrocarbon is in the near-shore zone), and hence no potential increase in any environmental benefit.
	Delays in shoreline access due to traditional owner permissions	EOG requests NT government to arrange Authority Certificates from the Aboriginal Areas Protection Authority for access to shorelines.	Traditional owner permission to be sought with any associated conditions to access lands.	NA	NA	< 7 days	Minor	M	H	L	H	H	The environmental & cultural benefits associated with gaining permission to enter lands is significant and will assist in minimising damage to sensitivities.	As per DEPWS minutes of 20 June 2023 meeting, the NT government has arrangements for obtaining "just in time" Authority Certificates from the Aboriginal Areas Protection Authority.	**Accept:** Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Cultural heritage Impacts from access	Traditional owners are invited to participate in the activity to ensure that cultural heritage values are protected.	Cultural heritage is identified for protection.				Minor							Effectiveness of the control is reliant on relationships established during the consultation phase of the EP.	
	Response resources not available.	Pre-campaign road access works in PPAs to obtain improved access to equipment deployment location.	Expedite initiation of shoreline protection operations through improved shoreline access.	Small	1	0-1	Modera te, include s standby crew	H	H	L	H	H	The environmental benefit associated with widening access paths to remote coastlines to access sandy beaches to reduce the time to move equipment to the deployment location, would affect natural vegetation, impact upon culturally significant lands and require permission from traditional landowners. Access via marine-based platforms is an alternate, less damaging option together with land-side access via current established roads and pathways.	The negative environmental benefit is not desirable when marine-side operations are possible with less environmental impact.	**Reject:** This control is rejected due to the negative environmental impacts that would occur for a spill incident that has a very low likelihood.

Table 6.17 ALARP Evaluation – Shoreline Clean- up

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Eliminate	Negative environmental impact occurs as part of shoreline cleanup strategy	No shoreline clean-up	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option. If a shoreline habitat is under threat, environmental sensitivities can be protected effectively when shoreline clean-up operations are activated.	There may be occasions when shoreline clean-up is not implemented, e.g., during poor weather, but in general, the do- nothing option is not considered within the external context (e.g., stakeholder views) to be a viable option.	**Reject:** Shoreline clean-up is a recognised response strategy for the mitigation of oil spill impacts.
Separate	Sensitive vegetation impacted by machinery	No vehicle access or machinery to be used in mangroves, saltmarsh or other sensitive habitat.	Separate the potential of impacts due to machinery on sensitive receptors.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by separating the potential of impacts due to machinery on sensitive receptors.	Control has high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Control has no cost implications.	**Accept**: Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Coastal sensitive habitats/locations are disturbed by shoreline clean-up activities	SCAT verify shoreline and nearshore sensitivities (environmental, cultural), determine 'no-go' zones (turtle nesting, shoreline bird habitats, etc), least impact zones and any limitations associated with shoreline response to inform the WA and/or NT operational NEBA and IAP. Observations/ surveys prior to deployment of equipment and personnel includes avoidance of impacts to wildlife, organisation of ground disturbance, protection of sensitive areas, and consultation with shoreline Cas and local stakeholders.	Identification of non-compatible sensitivities with shoreline clean-up minimises the potential for environmental harm.	SCAT Teams	10	Within 24 hours of notification that a shoreline will be impacted within 3 days.	Minor	H	H	H	H	H	Positive environmental benefit gained by separating the potential of impacts due to machinery on sensitive receptors.	Control has high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Shoreline activities impact on areas of cultural significance	Unless directed otherwise by the shoreline CA, a Heritage Advisor and/or Traditional Owner and/or Aboriginal Ranger is consulted if shoreline operations overlap with areas of cultural significance to nominate 'no-go' zones for areas of cultural significance	Increases the potential that impacts to cultural sensitivities will be prevented by avoiding areas of known cultural significance.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by taking into consideration any advice from WA/NT government agencies, aboriginal owners and spatial information to avoid impacts to sensitive cultural heritage sensitivities.	Control has high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures.	**Accept:** Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Accommodation of shoreline response personnel impacts on coastal sensitivities and/or local communities	Where environmental sensitivities will be impacted by shoreline accommodation, deploy accommodation vessel/s to remote areas to provide accommodation for shoreline teams where onshore accommodation is not available or feasible to rapidly establish.	Eliminates accommodation impacts to shoreline areas	Vessels	Multiple	15 days	Moderate	H	H	H	H	H	Environmental benefit through the elimination of accommodation impacts in onshore coastal areas.	Control has high effectiveness; vessels are available, functional, and reliable and in general are serviceable and compatible with other control measures.	Accept: Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
Administrative	Insufficient response personnel leads to protracted clean-up of bulk oily waste and potential re-mobilisation of stranded oil.	Mobilise and maintain unskilled personnel and skilled (supervisors) personnel in-field to actively undertake bulk oil/waste clean-up operations, as directed by WA DoT or NT IC.	Rapid clean-up response to protection priority areas as directed by WA DoT or NT IC.	AMOSC Membership OSRL Membership	As required	Within 48 hours if there is a forecast of shoreline impact within 3 days	Moderate	H	H	H	H	H	Rapid response to identified priority protection areas limits environmental impacts to known sensitivities.	Given the lack of access to these remote regions, marine side access to shoreline is expected. In addition, accommodation for these resources is expected to be via a marine accommodation vessel.	Accept: Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		Engage additional personnel as required at the direction of WA DoT or NT IC.	Further accelerate clean-up operations.	Labour hire	As required / directed by DoT or NT IC	As directed by WA DoT or NT IC	Moderate	H	H	H	H	H	Additional personnel may accelerate cleaning operations, however negative effects by deploying excessive numbers of responders to sensitive habitats, thereby increasing potential for inadvertent / indirect impacts may occur. Maximum manning has been based on maximum shoreline loadings from OSTM. However, overall benefit to be determined by WA DoT and/or NT IC and facilitated by EOG as requested.	Potential constraints associated with accommodation and logistics depending on areas of shoreline exposure. Additional personnel mobilised in consultation with WA DoT or NT IC and when constraints resolved.	Accept: Control is practicable (pending logistical constraints in remote response locations), and the cost sacrifice is not disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	**Risk**	**Control Measure**	**Rationale**	**Response Capacity**	**Units**	**Implementation Time (Days)**	**Cost**	**Effectiveness (L/M/H)**					**Environmental Benefit Gained**	**Practicability / Constraints**	**ALARP Summary**
								A	F	R	S	I/C			
	Response personnel not suitably supervised or insufficiently trained	Maintain a suitable ratio of skilled to unskilled personnel per active response team throughout the clean-up. All shoreline personnel to undertake induction to understand sensitivities and key controls to avoid impacts.	Correct levels of supervision maintained for each response team to ensure response activities are undertaken in a planned and responsible manner to the satisfaction of the Controlling Agency.	AMOSC Member-ship (Core Group) Labour- hire	Min 1 per team of 10	As required / on-going to response termination	Minor	H	H	H	H	H	Appropriately trained and / or supervised teams limiting potential secondary impacts to particular values and sensitivities. Operations undertaken in a more effective and timely manner whilst under appropriate supervision.	No limit or constraints or upskilling labour-hire personnel for promotion to supervisory roles over the duration of the response.	<u>**Accept**</u>: Control is practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
Administrate	Shoreline cleanup strategy executed ad hoc with no real planning	Shoreline clean- up operations reviewed and managed by the shoreline CAs for WA and NT through Incident Action Plan (IAP) process with EOG providing resources.	EOG will liaise with shoreline Cas to provide requested resources to ensure there are no bottlenecks in response activities.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The review/evaluation of shoreline clean- up operations will take place continuously in the event of a Level 2 / 3 spill. Shoreline clean-up operations are adapted based on real-time information regarding the spill incident: (sea state, weather conditions) to ensure no conflicts with other response strategies.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications.	<u>**Accept**</u>: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
		For Ashmore/Cartier: Shoreline clean- up operations are reviewed and managed by EOG, in consultation with the Director of Marine Parks through IAP process.	EOG will liaise with DMP in developing IAPs for Ashmore/Cartier if affected.	N/A	N/A	30+ Days	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational NEBA.	Strategic NEBA to include evaluation of requirement for implementation of shoreline clean-up operations.	The shoreline clean-up response strategy will be activated if Operational NEBA indicates a net environmental benefit to prevent environmental impacts to sensitive environmental receptors. The strategic NEBA identifies shoreline types and areas where shoreline clean-up may be feasible/ beneficial	N/A	N/A	NA	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational NEBA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather, and sea state conditions etc.) to confirm the appropriate response strategies to adopt for protection of priority locations and sensitive receptors.		
	Poor situational awareness and understanding of oil spill trajectory prior to response execution (i.e., oil could be heading out to sea).	Modelling predictions of oil trajectory will inform and support the Operational NEBA.	Used as tool to gain situational awareness through real-time spill trajectory modelling to enable direction of daily shoreline clean-up operations.	AMOSC Membership	N/A	<4 hours from DIMT forming	Minor	H	H	H	H	H	Shoreline clean-up will be activated if the Operational NEBA indicates the potential harm of implementation is less than leaving the oil untreated on the shoreline; and if the implementation of the response strategy would provide a net environmental benefit to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors.		<u>**Accept:**</u> Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response strategy not executed effectively due to inadequate planning	EOG generates TRPs prior to drilling commencement for shoreline protection/ response for priority protection areas with impacts at or above ecological impact levels which are predicted to be impacted within 20 days of release.	Provides preliminary data to provide a planning basis for shoreline response. Shoreline sectors with impacts > 20 days will be developed at the time of the spill.	NA	NA	NA	Minor	H	H	H	H	H	Positive environmental benefit gained by using TRPs to increase efficiency of response efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response strategy not executed effectively through planning or fast enough to prevent impact highly sensitive areas impacted	In agreement with shoreline CAs, implement shoreline clean-up response strategy in accordance with shoreline protection methods for different coastal types.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental sensitivity.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by using established shoreline protection plans to increase efficiency of response efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.		
	Poor shoreline clean-up practices with remobilisation of oil in the marine environment	The establishment of forward staging areas and decontamination areas on shorelines is undertaken only under the direction of or in consultation with the WA DoT and/or NT DEPWS Decontamination zones are setup and implemented to ensure that responders do not cause secondary contamination.	Ensures that shoreline accumulated oil is contained and that impacts are not spread across a wider area.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by ensuring that shoreline accumulated oil is contained and that impacts are not spread across a wider area.		-
	Poor understanding of the effectiveness of shoreline clean-up and its impact on the environment	SCAT and OSMP monitoring continues to provide feedback on the effectiveness of the shoreline response to inform IAP.	Water, sediment, and benthic infauna quality monitoring to evaluate the effectiveness of shoreline clean-up techniques.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by understanding the effectiveness of shoreline clean-up techniques.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Shoreline activities impact areas of cultural significance	Unless directed otherwise by the shoreline CA, a Heritage Advisor and/or Traditional Owner and/or Aboriginal Ranger is consulted to establish if shoreline operations overlap with areas of cultural significance Shoreline clean- up operations will avoid cultural heritage sensitivities.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas of known cultural significance.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by observing advice from government agencies/indigenous land holders and spatial information to avoid impacts to sensitive cultural heritage sensitivities.		
	Response continues with no end point or is removed early	Response strategy activities continued until termination criteria met as determined by WA DoT and/ot NT IC.	Ensures that the shoreline response strategy continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the shoreline clean-up response strategy continues until the clean-up outcome has been achieved.		
Administrative	Response resources not available	Access to shoreline clean-up equipment owned by AMOSC (in Exmouth, Fremantle, Dampier, and Geelong).	Mobilisation of AMOSC owned shoreline clean-up equipment from Exmouth / Fremantle / Geelong.	Small	AMOSC	Mobilise to site < 11 days	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of shoreline clean-up is to remove the oil from shoreline sensitivities.	The response capacity is small, but the control effectiveness is generally high. EOG has access to this capability through contractual arrangements with AMOSC / OSRL.	<u>**Accept**</u>: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
		Access to shoreline clean-up equipment owned by OSRL	Mobilisation of OSRL shoreline clean-up equipment from Singapore and other countries.	Small	OSRL	Mobilise to site < 11 days	Minor	H	H	H	H	H			

Controls				ALARP Evaluation											
Function	**Risk**	**Control Measure**	**Rationale**	**Response Capacity**	**Units**	**Implementation Time (Days)**	**Cost**	**Effectiveness (L/M/H)**					**Environmental Benefit Gained**	**Practicability / Constraints**	**ALARP Summary**
								A	F	R	S	I/C			
		Access to small support vessels (AMOSC, local charter) to access shorelines through agreements or maintaining a register of shoreline response providers Access to accommodation vessels on spot charter market via Clarkson's contract	Mobilisation of AMOSC owned small craft from Geelong and / or vessels of opportunity available on the local spot charter market in Exmouth/ Darwin / Dampier / Broome. Contract with Clarkson's tracks large vessels.	Small Medium	AMOSC (4) Vessels of Opport-unity Clarkson's (numerous)	Mobilise to site < 11 days	Moderate	H	H	H	H	H	The environmental benefit associated with shoreline clean-up is potentially significant, as there are critical habitats for turtle species and IBAs on the affected shorelines.	The response capacity is small for small vessel operations, but the control effectiveness is generally high (vessel operations are only possible during daylight hours) and the cost of using marine vessels available through AMOSC and on the local spot-charter market in Exmouth / Dampier / Broome has minor cost implications. Cost during activation would be moderate.	**<u>Accept</u>**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	No arrangement with third-party services leading to insufficient resourcing during response	AMOSC and OSRL contracts and other third- party agreements for provision of resources for shoreline clean-up in place during operations.	Mobilisation of AMOSC / OSR personnel to provide situational awareness and expert advice to the IMT on clean-up protection priorities.	Small	AMOSC / OSRL	0-4	Moderate	H	H	H	H	H	Positive environmental benefit gained from mobilisation of AMOSC / OSRL personnel to provide situational awareness and expert advice to the DIMT on clean-up protection priorities and possible shoreline cleanup techniques.		

Table 6.18 Preparedness EPSs – Shoreline Operations

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to implement Shoreline Operations (including Protection and Deflection, SFCAT and Shoreline Clean-up strategies) in an effective and timely manner	
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources.	AEP MoU: Mutual Aid signed by EOG
Service Contracts	EOG shall have a contract in place with both AMOSC and OSRL to facilitate access to industry equipment and trained response personnel.	Service contract with OSRL AMOSC membership
	EOG shall maintain a contract with a labour-hire company, commencing six weeks prior to the commencement of the activity, to enable the engagement of shore-based labour hire personnel.	Service Level Agreement
	EOG shall maintain a contract with a marine labour-hire company, commencing six weeks prior to the commencement of the activity, to enable the engagement of marine labour hire personnel.	Service Level Agreement
	EOG shall maintain contractual arrangements with drone providers, commencing six weeks prior to the commencement of the activity, to enable the deployment of drones and operators.	Service Level Agreement
	EOG shall maintain contractual arrangements with logistics service providers, commencing six weeks prior to the commencement of the activity, to enable the deployment of industry equipment.	Service Level Agreement
Monitoring of vessel availability & status	EOG shall actively monitor current vessel availability to identify emergency vessels and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.	Monthly report
Monitoring of equipment availability & status	EOG shall actively monitor equipment availability through AMOSC and OSRL reports during the drilling campaign, commencing six weeks prior to the commencement of the activity.	AMOSC and OSRL reports
TRPs	TRPs are finalised 6 weeks prior to drilling commencing for Priority Protection Areas listed in Section 4.4.	Tactical Response Plans
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of Shoreline Operations response readiness.	Exercise records
Response Timing	EOG shall maintain arrangements to facilitate the mobilisation of Protection and Deflection operations in accordance with the following timeframes: • Two SCAT teams operating within 6 days of spill event. • Six SCAT teams operating within 24 days of spill event. • Ten SCAT teams operating within 43 days of spill event. • Fifteen SCAT teams operating within 51 days of spill event. • Two P&D teams operating within 8 days of spill event. • Six P&D teams operating within 24 days of spill event. • Ten P&D teams operating within 43 days of spill event. • Fifteen P&D teams operating within 51 days of spill event. • Two Shoreline Clean-up teams and 1 machine operating within 10 days of spill event. • Six Shoreline Clean-up teams and 2 machines operating within 24 days of spill event. • Ten Shoreline Clean-up teams and 3 machines operating within 43 days of spill event. • Sixteen Shoreline Clean-up teams and 5 machines operating within 51 days of spill event. • The deployment of additional response personnel and equipment at the direction of WA DoT and/or NT IMT until the response is terminated.	Communication records confirming capability

6.7 Natural Recovery

6.7.1 Summary of Activity

Natural recovery, as the title suggests, makes use of the natural degradation and weathering processes to breakdown, and remove surface oil and stranded hydrocarbons. Effectively this response strategy means that no direct action is taken other than to monitor and evaluate the oil spill trajectory, the rate of dispersion of the diesel or crude oil, and the rate of habitat/ community recovery. As such, no additional risks or impacts will occur, other than those already described previously.

6.8 Operational and Scientific Monitoring

6.8.1 Summary of Activity

Operational and scientific monitoring (OSM) is described in detail in the OSM BIP (Appendix C of the OPEP) which has been developed to be consistent with the *AEP: Operational and Scientific Monitoring Bridging Implementation Plan Template* (Rev A, March 2021) and the *AEP: Operational and Scientific Monitoring Plan Framework* (Rev D, March 2021).

Operational monitoring plans (OMPs) associated with the M&E strategy are described in Section 6.3.3. Additional OMPs would also be activated in the event of a spill, along with scientific monitoring plans (SMPs) designed to collect post-spill, pre-impact data at selected locations. Basic information is provided below; detailed information is included within the OSM BIP (Appendix C of the OPEP). The OMPs and SMPs to be implemented include:

- **OMPs 03-08 – Marine Fauna Assessment / SMPs 06-08 Marine Megafauna Assessment:** The objective of the OMPs and SMPs is to undertake an assessment marine fauna / marine megafauna to assist in decisions on appropriate management and response actions during an oil spill event to minimise the potential impact.
- **OMP 11 and SMP 10 – Sediment Quality Assessment / OMP 15 and SMP12 - Water Quality Assessment:** The objective of the of the sediment quality (OMP 11 / SMP 10) operational and scientific monitoring program is to provide a rapid assessment of the presence, type, concentrations and character of hydrocarbons in marine sediments to assess the extent of spill contact and verify impact predictions for other monitoring plans.

  The objective of the surface and subsurface water quality (OMP 15 / SMP 12) operational and scientific monitoring program is to provide ongoing situational awareness of the slick location, size, appearance, behaviour, its potential impacts/risks, and to monitor the effects of dispersant application to enable informed and timely DIMT decision making during a response.
- **SMP 01 – Benthic Habitat Assessment / SMP 04 – Intertidal and Coastal Habitat Assessment:** The objective of the of the benthic habitat assessment (SMP 01) scientific monitoring program is to assess the impact (extent, severity, and persistence) and subsequent recovery of subtidal benthic habitats and associated biological communities in response to a hydrocarbon release and associated response activities.

  The objective of the of the intertidal and coastal habitat assessment (SMP 04) scientific monitoring program is to assess the impact (extent, severity, and persistence) and subsequent recovery of intertidal and coastal habitats and associated biological communities in response to a hydrocarbon release and associated response activities.

- **SMP 02 – Commercial and Recreational Fisheries and SMP 05 - Marine Fish and Elasmobranch Assessment:** The objective of the of the commercial and recreational fisheries (SMP 02) scientific monitoring program is to monitor potential contamination and tainting of important finfish and shellfish species from commercial, aquaculture and recreational fisheries to evaluate the likelihood that an hydrocarbon spill will have an impact on the fishing and/or aquaculture industry.

  The objective of the of the marine fish and elasmobranch assessment (SMP 05) scientific monitoring program is to assess the impacts to and subsequent recovery of fish and elasmobranch (sharks and rays) assemblages associated with specific benthic habitats (as identified in SMP: Benthic Habitat Assessment) in response to a hydrocarbon release and associated response activities.
- **SMP 09 – Seabirds and Shorebirds Assessment:** The objective of the of the seabird and shorebird assessment (SMP 09) scientific monitoring program is to document and quantify shorebird and seabird presence, and any impacts and potential recovery from hydrocarbon exposure.

Basis of Design – Table 3.5

Maximum daily surface area (km²) of dissolved oil above 10 ppb

Approx. 700-850 km^2 between Day 10 and Day 25.

Approx. 1,200-1,600 km^2 between Day 27 and Day 46.

Peak of approx. 2,600 km^2 at Day 53.

Maximum Selected Field Capability

All OMPs and SMPs implemented and at peak by Day 24.

Implementation Timeframe

Tier 2/3

See OSM BIP (Appendix C of the OPEP).

Response Arrangements

EOG will maintain a contract in place with an OSM service provider. Refer to *Beehive-1 Drilling Operational and Scientific Monitoring (OSM) Bridging Implementation Plan* (996161-2022-Beehive#1-OSMIP), for the specific OSMP activation and termination criteria and mobilisation timeframes.

Part A of the OSM BIP (Appendix C of the OPEP) provides a detailed description of EOG's preparedness to implement OSM operations including details on:

- Trained scientific personnel for sampling, data interpretation and reporting;
- Scientific field sampling equipment;
- Logistics platforms (vessels); and
- Laboratories for analysis of water quality samples.

Guidance

Appendix C of the OPEP (OSM BIP)

Appendix E of the OPEP (Environmental Sensitivities)

TRPs:

- Moyle River Estuary (NT);
- Victoria River Estuary (NT);
- Forsyth Creek (NT);
- Keep River Estuary/Turtle Point (NT);
- Cape Domett (WA DoT cell # 1&2);
- Cambridge Gulf/Lacrosse Island (WA DoT cell # 3);
- Berkeley River (WA DoT cell # 10); and
- King George River (WA DoT cell # 13).

6.8.2 Response Requirements

The response requirements and capability for the OSM Strategy is presented in Appendix C of the OPEP. Table 6.19 identifies the function/position requirements for the OSM and the equipment/resources which are provided by EOG (i.e. vessels, aircraft). Other equipment requirements are detailed within the OSM BIP (Appendix C of the OPEP).

6.8.3 ALARP Evaluation and Preparedness Performance Standards

Table 6.7 includes the ALARP evaluation for OSM and Table 6.8 includes the EPSs for preparedness.

Table 6.19 Response Requirements – OSM

OSM Roles	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 19	Day 24	Day 43	Day 51 (peak)	Nominated resource		Notes/Comments
														1st swing	2nd swing	
OSM Management																
Functions/Positions																
OSM Implementation Lead (included in DIMT)														RPS	RPS	
OM Coordinator	1	1	1	1	1	1	1	1	1	1	1	1	1	RPS	RPS	
SM Coordinator	1	1	1	1	1	1	1	1	1	1	1	1	1	RPS	RPS	
Field Operations Manager	1	1	1	1	1	1	1	1	1	1	2	2	2	RPS	RPS	
WQSQBH - Offshore																
Functions/Positions																
Lead Scientist (WQSQBH)					1	1	1	1	2	2	2	2	2	RPS	RPS	
Support Scientist (WQSQBH)					1	1	1	1	2	2	2	2	2	RPS	RPS	
Trained Deck Crew (WQSQBH)					1	1	1	1	2	2	2	2	2	LH-Marine	LH-Marine	Marine Labour Hire
MFO - vessel					1	1	1	1	2	2	2	2	2	RPS	RPS	
Equipment/Resources																
Offshore Vessel					1	1	1	1	2	2	2	2	2	VoO	VoO	Vessels of Opportunity
WQSQBH - Nearshore																
Functions/Positions																
Lead Scientist (WQSQBH)					1	1	1	1	2	2	3	3	3	RPS	RPS	
Support Scientist (WQSQBH)					1	1	1	1	2	2	3	3	3	RPS	RPS	
Trained Deck Crew (WQSQBH)					1	1	1	1	2	2	3	3	3	LH-Marine	LH-Marine	Marine Labour Hire
MFO - vessel					1	1	1	1	2	2	3	3	3	RPS	RPS	
Equipment/Resources																
Nearshore Vessel					1	1	1	1	2	2	3	3	3	VoO	VoO	Vessels of Opportunity
Marine Megafauna																
Functions/Positions																
MFO - aerial					1	1	1	1	1	1	2	2	2	RPS	RPS	
Equipment/Resources																
Fixed-wing Aircraft					1	1	1	1	2	2	2	2	2			
Fish																
Functions/Positions																
Lead Scientist (Fish)									1	1	2	2	2	RPS	RPS	
Support Scientist (Fish)									1	1	2	2	2	RPS	RPS	
Equipment/Resources																
Offshore Vessel									1	1	2	2	2	VoO	VoO	Vessels of Opportunity

OSM Roles	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 19	Day 24	Day 43	Day 51 (peak)	Nominated resource		Notes/Comments
														1st swing	2nd swing	
Seabirds and Shorebirds																
Functions/Positions																
Lead Scientist (Birds)					1	1	1	1	2	2	3	3	3	RPS	RPS	
Support Scientist (Birds)					1	1	1	1	2	2	3	3	3	RPS	RPS	
Equipment/Resources																
Offshore Vessel									1	1	2	2	2	VoO	VoO	Vessels of Opportunity
Fixed-wing Aircraft					1	1	1	1	1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Small Vessel									1	1	2	2	2	VoO	VoO	Vessels of Opportunity
Intertidal and Coastal Assessment																
Functions/Positions																
Lead Scientist (IT&C)					1	1	1	1	1	1	1	1	1	RPS	RPS	
Support Scientist (IT&C)					1	1	1	1	1	1	1	1	1	RPS	RPS	
Equipment/Resources																
Nearshore Vessel					1	1	1	1	1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Social and Heritage																
Functions/Positions																
Lead Scientist (Social)									1	1	1	1	1	RPS	RPS	
Support Scientist (Social)									1	1	1	1	1	RPS	RPS	
Lead Scientist (Heritage)									1	1	1	1	1	RPS	RPS	
Support Scientist (Heritage)									1	1	1	1	1	RPS	RPS	

Functions/positions highlighted in blue are included here for information. They are not included in the overall requirements (Section 7). Appendix C of the OPEP (OSM BIP) provides details on the resourcing of these.

6.9 Oiled Wildlife Response

6.9.1 Summary of Activity

The objective of oiled wildlife response is to minimise the impacts of an oil spill on wildlife by both prevention of oiling where possible and mitigating the effects on individuals when oiling has taken place (IPIECA-IOGP 2014). Specifically, the response strategy seeks to define a system that addresses the overall aim focussing on the following key objectives:

- Respond safely and efficiently to oiled wildlife;
- Protect the health and welfare of wildlife threatened or impacted by oil;
- Co-ordinate field reconnaissance of at risk or impacted wildlife;
- Prevent or minimise exposure of wildlife to oil where possible;
- Recover oiled wildlife in a safe and effective manner;
- Prioritise the treatment of species of conservation value when resources are limited;
- Establish an effective system for the treatment and rehabilitation of oiled wildlife;
- Release wildlife back into the wild as healthy, contributing members of a population; and
- Identify and remove dead oiled wildlife from the coastal environment.

Oiled wildlife response includes pre-oiling activities such as the installation of onshore exclusion barriers (e.g. fencing) to stop shorebirds and terrestrial fauna gaining access to shoreline areas affected by the hydrocarbon spill; hazing techniques, either on the water or on shorelines and may involve a combination of visual and auditory devices to shepherd fauna away from oil slicks or oiled shorelines; and pre-emptive capture and removal of fauna that may otherwise come into contact with oil if they were to stay in the area.

Post-oiling activities will include the collection and rehabilitation to treat oiled fauna at dedicated Oiled Wildlife Response Centres and once treated, to return them to similar suitable habitat.

Oiled wildlife response will be carried out in consultation with the WA DBCA and DOT and/or NT IMT and as directed by the relevant Controlling Agencies in State and NT waters and consistent with the Western Australia Oiled Wildlife Response Plan (WAOWRP), the Pilbara Region OWR (PROWR) and the Northern Territory Oiled Wildlife Response Plan (NTOWRP).

Control Agencies may choose to deploy their own OWR team leads and support personnel, or the Control Agency may request EOG provide some specialist support personnel including OWR team leads, additional OWR trained personnel and labour hire, OWR equipment and logistical support for remote and/or larger OWR operations.

The only two shoreline locations within the region which do not have a State/Territory Control Agency are Ashmore Reef and Cartier Island[2], both of which are Commonwealth Lands. In the event of a spill from a petroleum activity reaching these locations, EOG would be the Control Agency. Under this scenario, the SCAT team would only consist of SCAT specialists and wildlife response specialists provided by industry mutual aid, and possibly a Parks Australia ranger or

[2] Refer note in Section 4.1 regarding Cartier Island unexploded ordinance risk.

other government appointed person with local knowledge. There are no relevant Aboriginal Heritage Advisors required at Ashmore Reef/Cartier Island.

Remote oiled wildlife response will not be triggered until sufficient M&E and/or SCAT (including OWR) information is provided to the relevant Control Agency, to make a determination that remote OWR is both safe and appropriate to undertake. It is expected that the minimum time for mobilisation (departure from a port) for any remote shoreline clean-up and OWR operation would be 10 days.

OWR associated with a WCD would require the establishment of multiple 'field oiled wildlife facilities' (units) with each supported by at least 5 x trained oiled wildlife responders, 5 x labour hire personnel and one Veterinarian. The purpose of each field facility is early triage and field processing of oiled animals and acting as a base for reconnaissance and rescue. Reconnaissance and rescue requires at least 2 of the 5 trained OW responders in a field unit. Field processing and early triage would require at least 2 of the 5 trained OW Responders including the Veterinarian.

In addition to the field facilities, a larger 'primary care' facility must be established. The purpose of the Primary Care Facility is stabilisation, cleaning, and rehabilitation.

Hazing/deterrence are terms used for activities that are undertaken to prevent wildlife from entering contaminated sites, and/or to make wildlife move away from areas that are likely to be affected by the spill (IPIECA-IOGP 2014). Techniques include:

- Human disturbance (the simple presence of people in the wildlife habitat);
- Vehicular disturbance (e.g., terrestrial vehicles, boats and aircraft);
- Visual disturbance (e.g., lights, reflectors, flags, effigies, etc.);
- Auditory disturbance (e.g., noise generators); and
- Physical structures (e.g., fences) to prevent wildlife accessing contaminated sites.

Animals often quickly become habituated to the deterrent stimulus, at which point efficacy will decrease markedly and the deterrent should be changed accordingly.

Hazing/deterrence is better undertaken by trained and experienced personnel as there are many factors to be considered, both before and during hazing. These include the geographical area (e.g., is there a suitable, un-oiled environment for the animals to relocate to) and species variation. Effective hazing requires the creativity of experts with a knowledge of species behaviour and their natural history so that the most appropriate methods can be applied. A significant consideration is the need to avoid methods that make animals move towards the oil instead of away from it (IPIECA-IOGP 2014).

Wildlife hazing/deterrence would be more suitable when used near or on sensitive shoreline habitats, and generally against more persistent oil slicks.

Both alive and deceased oiled wildlife will need to be collected during an oil spill response operation. Alive oiled wildlife is collected for translocation, and/or subsequent assessment, treatment, rehabilitation or other wildlife welfare options.

Basis of Design – Table 3.5

Shoreline oiling >100 g/m^2

Minimum time before shoreline accumulation (>100 g/m^2) is 12.54 days (turtle breeding Biologically Important Area (BIA) and habitat critical). Multiple marine avifauna and turtle BIA shorelines (several offshore islands, plus several islands of Buccaneer & Bonaparte Archipelago) contacted at >100 g/m^2. Typically, up to 3-4 weeks before second shoreline sector is contacted.

Maximum of 115 km of shoreline oiled (>100 g/m^2)

Approx. 25 m^3 on Day 26.

Approx. 40 m^3 on Day 45.

Approx. 420 m^3 on Day 53.

Maximum of 629 m^3 total volume oil (>100 g/m^2) on Day 85.

Maximum Selected Field Capability

OWR Management and 20 'field oiled wildlife facilities' operating by Day 51.

Two vessel-based Primary Care Facilities (PCFs) and one OWR Rehabilitation Centre operating by Day 51.

Implementation Timeframe

Tier 2/3

Day 3 – Oiled Wildlife Coordinator operating.

Day 6 – OWR Management operating.

Day 10 – Two field oiled wildlife units operating.

Day 24 – Six field oiled wildlife units operating; One PCF operating; One OWR Rehabilitation Centre operating.

Day 43 – Ten field oiled wildlife units operating; One PCF operating; One OWR Rehabilitation Centre operating.

Day 51 – Twenty field oiled wildlife units operating; Two PCFs operating; One OWR Rehabilitation Centre operating.

Response Arrangements

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

EOG will provide the resources within the times requested by the Control Agency (WA DoT and/or NT IMT). Supplementary resources (personnel and equipment) will continue to be deployed by EOG until peak capacity is reached as deemed appropriate by WA DoT and/or NT IMT until the termination of the response strategy.

EOG's primary capability for implementing OWR is through the AMOSC Oiled Wildlife Capability arrangements, with support from OSRL. Further detail on the OSRO's capability is provided in Appendix D of the OPEP (Cumulative Requirements and Demonstration of Capability).

Guidance

WAOWRP.

NTOWRP.

AMOSPlan.

Appendix E of the OPEP (Environmental Sensitivities).

Tactical Response Plans (TRPs):

- Moyle River Estuary (NT);
- Victoria River Estuary (NT);
- Forsyth Creek (NT);
- Keep River Estuary/Turtle Point (NT);
- Cape Domett (WA DoT cell # 1&2);
- Cambridge Gulf/Lacrosse Island (WA DoT cell # 3);
- Berkeley River (WA DoT cell # 10); and
- King George River (WA DoT cell # 13).

Personnel

The exact numbers of personnel and skills of those personnel selected to response on a shoreline will be made by the relevant Control Agency., based on the degree of oiling, seasonality, density and sensitivity of receptors are risk at the time. However, as a basis for planning, AMOSC has advised that, at peak, the following personnel would be required:

- 1 x Oiled Wildlife Coordinator;
- 1 x Reconnaissance Manager;
- 1 x Rescue and Transport Manager;
- 1 x Staging and Holding Manager;
- 1 x Rehabilitation Manager;
- 1 x Rehabilitation Facilities Management;
- 100 x Skilled wildlife handlers;
- 100 x Labour hire – shore; and
- 20 x Specialist Personnel (i.e. veterinarians, vet nurses).

It is expected the relevant State/Territory Control Agency will provide some government appointed personnel to oversee/lead the remote shoreline response operation, including key OWR personnel such as vets and other OWR team leads. Personnel from government agencies with local knowledge of the species potentially impacted are most likely to be living/working in Darwin, Kununurra and Broome, and therefore the mobilisation of these personnel should not limit the overall OWR mobilisation timeframes.

The WA Control Agency expect to provide approximately 5 of the OWR personnel. EOG would be required to provide the additional OWR personnel. However, should the Control Agency request/require additional remote shoreline response personnel, or EOG is the Control Agency (e.g., Ashmore/Cartier) EOG plus mutual aid capability and labour hire, will provide the full OWR personnel capability.

AMOSC manages a database of trained/qualified OW Responders from industry that could be called upon to support a response, including for the OWR management positions, the skilled wildlife handlers and the specialist personnel. OSRL also has OWR capability.

Primary Care Facility

The WAOWRM (DBCA 2021) notes that a Primary Care Facility (PCF) be located as close as possible to the field of operations, preferably within one hour of travelling time, and should be available for an extended period. The following infrastructure is required for a fully functional PCF:

- Parking and laydown area: adequate and easy access for unloading animals, placing equipment and facilitating waste disposal.
- Water - access to an unlimited supply of heated fresh water. A water flow capacity reaching 60,000 L/day will be required for a centre dealing with 100 to 500 wildlife casualties at any one time. It takes approximately 600 L of water to clean a heavily oiled seabird, and additional water is required for pools, general cleaning, showers, food preparation etc.
- Ventilation - facilities must be adequately ventilated for the health and safety of humans and wildlife. Indoor animal holding areas must achieve a minimum of 10-15 air exchanges per hour to minimise petroleum fume effects and reduce risk of airborne diseases.
- Heating/cooling – animal holding facilities and pools must be able to be heated/cooled as required.
- Communication – good mobile phone coverage and wireless communications systems are essential.
- Services – gas and electricity services must be accessible - preferably a mains supply, however large generators may be the only alternative in isolated locations. An electrical load of at least 800A (220V/3 phase) will be required for a centre dealing with 100 to 500 wildlife casualties.
- Security – it must be possible to secure facilities from both people.
- Accommodation and service providers – the PCF must be located within a reasonable distance of accommodation and other ancillary services required to support personnel.

The following space would be needed for an incident involving 500 oiled wildlife casualties:

- 3,000 m^2 of indoor space to accommodate:
  - Wildlife holding rooms for 500 wildlife casualties (approx. 900 m^2).
  - Wildlife cleaning (approx. 240 m^2).
  - Wildlife food preparation and storage (approx. 180 m^2).
  - Wildlife intake, live animal processing and dead animal processing.
  - Personnel facilities (ablution, dining, first aid) and administration (IT, meetings, communications, training).
- 2,000 m^2 of outdoor space to accommodate:
  - 6 pools (@ 5x3m).

- Miscellaneous holding enclosures.
- Wash down area.
- Space for parking vehicles/equipment.
- Waste storage.

Shoreside facilities would be used, if possible, however allowance has been made for the use of two large Platform Supply Vessels (PSVs) to supply the PCF requirements.

Equipment

Physical structures, such as drift-fences (e.g., wooden stakes and rolls of shade-cloth), could be set-up on remote beaches to capture emergent turtle hatchlings before they enter an oiled intertidal zone, and relocate/release the hatchlings to an area well away from the slick (informed by modelling to determine the best locations for release). This type of equipment (and other visual disturbance type equipment) is readily available from gardening or hardware stores within the region.

Oiled wildlife containers (20 ft sea containers, specifically built for oiled wildlife cleaning) are located around Australia including Darwin, Karratha and Fremantle. Oiled wildlife containers are accessible via AMOSC. The oiled wildlife containers could be mounted onto the deck of a large support vessel, to facilitate the intake/TRIAGE and possibly cleaning of small numbers of oiled wildlife.

However, following cleaning, wildlife would be required to be transported to a dedicated/purpose build oiled wildlife rehabilitation centre. If a full rehabilitation centre was required for a large number of animals, it would need to be established at an onshore location. The physical area required for wildlife intake, first-aid, necropsy, cleaning, rehabilitation etc. is far larger than can be accommodated utilising vessels offshore. The challenge associated with remote operations is the time to transport oiled wildlife from the collection location to a rehabilitation centre; this could be >24 hours for transport alone. The welfare of animals, and overall objectives of the oiled wildlife response operation will need to be taken into consideration, before establishing a full rehabilitation centre. The relevant State/Territory Control Agency would make the decision based on OWR information available at the time.

A list of suppliers of oiled wildlife response equipment, and contractors in WA, is provided in Appendix G and Appendix K of the Pilbara Region Oiled Wildlife Response Plan (PROWRP). Through its arrangements with AMOSC, EOG has access to equipment sufficient to construct 2x OWR Washing and Rehabilitation facilities to treat 1,000 oiled wildlife units. This includes contracts with vendors to construct the facility. If the spill demanded a larger oiled wildlife response, additional response equipment would be purchased in an ongoing basis from suppliers/contractors, as detailed in the Appendices of the PROWRP.

AMOSC maintains 3x oiled wildlife (washing) containers. AMOSC OWR kits have been developed and are located around Australia including in Broome, Exmouth, Fremantle and Geelong. In addition, the types of equipment are readily available to be purchased from typical retail outlets/hardware stores.

Vessels/4WDs

As many of the locations which may require OWR are only accessible from the water, EOG would engage dedicated liveaboard charter vessels and/or smaller charter vessels, along with landing barges to support the operations. Dedicated accommodation vessels may also be required. At peak, an allowance has been made for 10 small vessels and 5 landing barges. Additionally, an allowance has been made for two large PSV vessels for offshore PCFs, if required.

4WD vehicles would be used where land access is possible. At peak, an allowance has been made for 10 4WDs.

Waste

It is estimated that 3,546 m^3 of oily water and 1,478 m^3 of solid waste would be generated over 98 days. Section 6.11 provides further detail on waste management.

6.9.2 Response Requirements

Table 6.20 presents the response requirements for OWR.

6.9.3 Legislative and Other Considerations

Specific wildlife permits are required from the DBCA for activities involving the protection and treatment of wildlife during an Oiled Wildlife Response, including those listed below:

- Hazing: deterring wildlife from entering oiled sites;
- Pre-emptive capture: capturing and holding (or translocating) wildlife;
- Recovery of oiled wildlife from the environment;
- Treatment and rehabilitation of oil impacted wildlife;
- Release of rehabilitated wildlife;
- The humane euthanasia of oiled animals as necessary (under veterinary direction); and
- The retrieval of dead oiled wildlife from the marine and coastal environment.

6.9.4 ALARP Evaluation and Preparedness Performance Standards

Table 6.21 presents the ALARP evaluation and Table 6.22 presents the EPSs for preparedness.

Table 6.20 Response Requirements – Oiled Wildlife Response

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Oiled Wildlife Response															
Functions/Positions															
Oiled Wildlife Coordinator			1	1	1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*	AMOSC/OSRL membership AMOSC-OWR capability (see Appendix D of the OPEP for details)
Reconnaissance Manager				1	1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*	
Rescue and Transport Manager					1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*	
Staging and Holding Manager					1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*	
Rehabilitation Manager						1	1	1	1	1	1	1	OSRO	AMOSC-OWR*	
Rehabilitation Facilities Management						1	1	1	1	1	1	1	AMOSC-OWR*	AMOSC-OWR*	
Skilled wildlife handlers									10	30	50	100	AMOSC-OWR	AMOSC-OWR	
Labour hire – shore									10	30	50	100	LH-Shore	LH-Shore	Labour hire
Specialist Personnel									2	6	10	20	AMOSC-OWR*	AMOSC-OWR*	e.g. Veterinarians
Equipment/Resources															
Vehicle 4WD									1	3	5	10	Vehicle	Vehicle	4WD hire
Small vessel									1	3	5	10	VoO	VoO	Vessels of Opportunity
Primary Care Facility (PCF) vessel										1	1	2	VoO	VoO	Vessels of Opportunity
Landing barge									1	2	3	5	VoO	VoO	Vessels of Opportunity
1st strike equipment cache									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
Wildlife response container									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
OWR Rehabilitation centre										1	1	1	OSRO	OSRO	AMOSC/OSRL membership
Waste: accumulated oil/water (m^3)									6	102	456	726	Waste	Waste	3,546 m^3 over 98 days (see Section 6.11)
Waste: accumulated solid waste (m^3)									3	43	190	303	Waste	Waste	1,478 m^3 over 98 days (see Section 6.11)

Table 6.21 ALARP Evaluation – Oiled Wildlife Response

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
Eliminate	Negative environmental impact from OWR strategy	No OWR	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environment benefit would be gained from this option.	This control is practicable and not implementing it would not be satisfactory from a stakeholder perspective.	Reject: OWR is a recognised strategy for preventing impacts of an oil spill on environmental sensitivities.
Administrative	Response strategy executed ad-hoc with no real planning leading to ineffective response.	OWR operations will be reviewed and managed by DIMT through Incident Action Plan (IAP) process informed by SCAT and OSMP activities.	Within the first 24 hours, the EOG DIMT will develop IAP to be refreshed at regular intervals.	N/A	N/A	24hrs	Minor	H	H	H	H	H	Positive environmental benefit from identifying the most effective response strategies with the least detrimental impacts. The review/evaluation of OWR operations will take place during the first 24 hours of a Level 3 spill. OWR will be adapted based on real-time information (situational awareness / OSTM) to inform collection of wildlife.	Controls have high effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications.	Accept: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational NEBA.	Operational NEBA to include evaluation of requirement for implementation of OWR.	The OWR strategy will be activated if Operational NEBA indicates a net environmental benefit in preventing impacts to sensitive receptors.	N/A	N/A	24 hrs	Minor	H	H	H	H	H	Positive environmental benefit from the Operational NEBA will be completed based on specific circumstances of the spill incident, using real-time information (spill trajectory modelling, spill observations, weather, and sea state conditions etc.) to confirm the appropriate level of response to adopt for protection of priority locations and sensitive receptors. OWR will be activated by the Operational NEBA to prevent impacts to sensitive receptors.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Unsuitably qualified personnel.	Capture and treatment of oiled wildlife is undertaken only by trained personnel.	Use of skilled personnel to implement oiled wildlife response will increase efficiency of oil spill protection efforts and minimise unnecessary harm to wildlife. All personnel are inducted into OWR handling restrictions.	N/A	N/A	7	Minor	H	H	H	H	H	Positive environmental benefit gained by using skilled personnel to implement OWR following Industry and WA State Government OWR plans increase the efficiency of response efforts, increases the potential that impacts to sensitive receptors will be prevented and reduces the possibility that mistakes are made that magnify the severity of the situation.		
	Response strategy executed adhoc with no real planning leading to ineffective response.	Activation and implementation of OWR will follow pre-designated plans for establishing works areas, as described in WA Oiled Wildlife Response plan (WAOWRP) and NT Oiled Wildlife Response Plan (NTOWRP) under the direction of the relevant shoreline agencies.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas with environmental sensitivity.	N/A	N/A	7	Minor	H	H	H	H	H			
	Response activities impacting areas of cultural significance.	OWR operations will avoid cultural heritage sensitivities.	Impacts to sensitive receptors will be prevented by avoiding areas of known cultural significance.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained by taking into consideration any advice from WA and/or NT government agencies and traditional landowners and spatial information to avoid impacts to sensitive cultural heritage sensitivities.		
	Wildlife surveys with drones create unnecessary behavioural impacts	Wildlife surveys (by drone) are undertaken by experienced drone pilots at highest altitude possible to avoid disturbance.	Utilisation of scientific information to ensure that all precautions are taken to prevent further oiling of wildlife.	NA	NA	NA	Minor	H	H	H	H	H	Positive environmental benefit preventing wildlife from disturbance with potential to increase oiling.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response continues with no end point or is removed early.	Response strategy activities continued until termination criteria met.	Ensures that the OWR strategy continues until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that the OWR continues until the performance outcome has been achieved.		
Administrative	No access to suitable specialised equipment in reasonable timeframes.	Access to containerised oiled wildlife wash facility (via AMOSC contract) and trained responders, mobilisation within 24 h of notification by Incident Commander with establishment of Primary Facility in 1-2 weeks.	Contract with AMOSC for mobilisation of OWR resources and equipment.	N/A	N/A	1-2 weeks	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of OWR is to prevent effects of an oil spill on environmental sensitivities.	The response capacity is small, but the control effectiveness is generally high. EOG has access to this capability through contractual arrangements with AMOSC and OSRL. Control has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Insufficient specialised personnel available – resourcing.	Access to more oiled wildlife responders.	Mobilise more oiled wildlife responders from around Australia and overseas.	N/A	N/A	14-21	Minor	H	H	H	H	H	Positive environmental benefit gained from implementation of this control measure. The objective of OWR is to prevent effects of an oil spill on environmental sensitivities.	The response capacity is small, but the control effectiveness is generally high. EOG has access to this capability through contractual arrangements with AMOSC and OSRL. Control has minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	No access to suitable specialised equipment in reasonable timeframes.	Pre-deployment of OWR facilities on standby at Darwin Port during operations.	On standby 24/7 during operations to expedite initiation of environmental monitoring operations.	Small	1	0-1	Moderate	H	H	Low	H	H	The environmental benefit associated with OWR is considered to be significant, which has the potential to reduce the environmental severity from a spill. Scalable options for OWR involve a pre- deployment and establishment of the oiled wildlife facility to be on standby, fully functional, and capable of receiving oiled wildlife on Day 1 of an incident.	Dedicated standby oiled wildlife crews have substantial cost.	**Reject**: This control has moderate costs that are disproportionate to the potential environmental benefit that might be gained particularly taking into consideration the availability and mobility of the containerised oiled wildlife wash facility operated by AMOSC and available in Perth, i.e., 36 hours by road freight once activated by the EOG DIMT. In addition, given the minimum time to shoreline contact (~11 days), there is sufficient time to mobilise resources.

Table 6.22 Preparedness EPSs – Oiled Wildlife Response

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to implement oiled wildlife strategy in an effective and timely manner	
Control Measure	Environmental Performance Standard	Measurement Criteria
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources	AEP MoU: Mutual Aid signed by EOG
Service Contracts	EOG shall have a contract in place with both AMOSC and OSRL to facilitate access to industry equipment and trained response personnel	Service contract with OSRL AMOSC membership
	EOG shall maintain a contract with a labour-hire company, commencing six weeks prior to the commencement of the activity, to enable the engagement of shore-based labour hire personnel.	Service Level Agreement
	EOG shall maintain contractual arrangements with logistics service providers, commencing six weeks prior to the commencement of the activity, to enable the deployment of industry equipment to priority protection areas.	Service Level Agreement
Monitoring of vessel availability & status	EOG shall actively monitor current vessel availability to identify emergency vessels and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.	Monthly report
Monitoring of equipment availability & status	EOG shall actively monitor equipment availability through AMOSC and OSRL reports during the drilling campaign, commencing six weeks prior to the commencement of the activity.	AMOSC and OSRL reports
TRPs	TRPs are finalised 6 weeks prior to drilling commencing for Priority Protection Areas listed in Section 4.4.	Tactical Response Plans
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of oiled wildlife response readiness.	Exercise records
Response Timing	EOG shall maintain arrangements to facilitate the mobilisation of oiled wildlife operations in accordance with the following timeframes: • Two SCAT teams operating within 6 days of spill event. • Six SCAT teams operating within 24 days of spill event. • Ten SCAT teams operating within 43 days of spill event. • Fifteen SCAT teams operating within 51 days of spill event. • Ten skilled wildlife handlers and 2 specialist personnel operating within 10 days of spill event. • Thirty skilled wildlife handlers and 6 specialist personnel operating within 24 days of spill event. • Fifty skilled wildlife handlers and 10 specialist personnel operating within 10 days of spill event. • One hundred skilled wildlife handlers and 20 specialist personnel operating within 10 days of spill event. • The establishment of a 'Primary Care Facility' (as determined by and at the direction of WA DoT/DBCA and/or NT IMT/DEWPS) within 24 days. • The deployment of additional response personnel and resources to peak capacity at the direction of WA DoT and/or NT IMT until the response is terminated.	Communication records confirming capability

6.10 Forward Operations

6.10.1 Summary of Activity

The objective of this response strategy is to assist the DIMT in planning the oil spill response activities in the spill zone by assisting in the development of incident action plans, providing situational briefings/debriefings, overseeing field operations, managing rosters, and providing support services. Personnel within the forward command post will also maintain liaison with local emergency service organisations, industry, and other government departments active in the spill zone.

For a significant Level 2/3 response requiring coordination of resources deployed to the field, EOG will set up a Forward Operations Base (FOB) and Marine Operations Base (MOB) at Darwin Port and/or other appropriate locations as agreed with the WA and/or NT Control Agency. Although Darwin is 300 km from the Beeehive-1 location, it is the closest centre with sufficient resources to support a spill response. Towns nearest to Beehive-1 (e.g., Wadeye, Wyndham, Kununurra, Kalumburu) are too small and remote to readily support the personnel required for a response to a LoWC, although Wyndham would be used to support some operations (e.g. transfer vessels, aerial dispersant operations from Day 12, and operational monitoring (aerial) of marine fauna, helicopter support).

For a Level 2/3 spill crossing from Commonwealth to WA and/or NT waters, the relevant Control Agency will establish a FOB. Appendix A of the OPEP details the requirements for EOG providing personnel to a WA DoT and/or NT IMT FOB.

The FOB Contractor will subcontract to provide required services (e.g. catering facilities, power, ablutions) for the FOB and MOB. A Waste Management Contractor will set up the non-oily and oily waste management infrastructure, and associated logistics. Supplies provided by (or the responsibility of) the FOB contractor.

If instructed by the DIMT, the FOB Contractor will set up and maintain the shoreline staging area(s) closer to response activities (location TBD with relevant Control Agency at time of incident response) and supply the shoreline clean-up equipment. Shoreline clean-up equipment and other supplies to the Shoreline Staging Area(s) will be transported by the FOB Contractor. The Waste Management Contractor will set up cold, warm and hot zones and control points between the zones established as per industry-standard Standard Operating Procedures (SOPs).

Ideally, waste material will be dispatched immediately to the final waste processing plants. Given the predicted potential for significant waste volumes to be generated (Section 6.11), the set-up of a proper fit-for-purpose waste handling supply chain is critical in the event of substantive response efforts in terms of shoreline clean-up, offshore containment and recovery, OWR, and protection and deflection measures. As mentioned previously, a waste transfer station will be established at the MOB, and if required at the FOB(s). Waste transfer stations will also be established at Shoreline Staging Areas so that waste can be properly handled by the Waste Management Contractor.

Table 6.23 summarises logistical considerations for forward operations. Depending on the location of the shoreline staging area(s) in terms of proximity to towns some of these services may be required, which will be set up by the Shoreline Staging Area(s) contractor.

Table 6.23 Logistical considerations

Consideration	Details
Transport, Mobile Plant	• Transportation on shoreline locations will be supported by 4x4 vehicles and all-terrain vehicles. These can be supplied by locally and nationally through hire/purchase 3rd parties. • Mobile plant and equipment for mechanical clean-up in initial response can be provided from suppliers in Darwin or Perth as required. • Transport provided by vessel contractors and their tenders, fixed wing contractors and helicopter contractors where possible. • Mainland transport contractor for freight.
Accommodation	• Where possible local facilities will be utilised to accommodate response personnel, however transportable accommodation and messing facilities can be supplied through contract suppliers if required. • Accommodation on vessels. • EOG has access to transportable accommodation and messing facilities supplied through specialist facilities management companies. • Where additional support and remote accommodation is required, EOG would engage the services of integrated logistics and materials management service companies, who provide a complete service for remote messing and accommodation, inclusive of transportation, laundry, potable water, etc. • Transportation to respective work sites would be facilitated via modal and multimodal transport solutions, dictated by the geographical constraints of each site. Under current contractual arrangements, EOG has access to transportation providers for Land, Air and Marine operations. In general, transport between accommodation locations and operational areas would be via road using the services of a third-party supplier. Should additional services be required to meet the demand, this would be engaged under a Service Agreement as determined and authorised by the DIMT.
Communications	• EOG would utilise the services of a specialist communication provider, mutual aid arrangements, or control agency arrangements to access hand-held and vehicle mounted UHF radios to support response and clean-up personnel. Portable deployed repeater stations (battery or mains powered) can be positioned along the shoreline to provide a 'voting' system for transmitting and receiving during the clean-up operation. • Use of satellite phones • Provision of laptops, wireless internet hubs, routers, printers, generators • Use of a local high gain antenna with a mobile phone repeater station • Photographic equipment and data pads with geo- referencing capabilities • Use of a SPOT tracker to send instant coordinates
Office facilities	• Operate from support vessels • Hire of local space on mainland • Converted accommodation or shipping containers
PPE	• Specialist providers of PPE for clean-up operations. All PPE would be sourced in Perth and transported to the forward operating centres. • In the event of a spill incident, EOG would engage the services of a third party to provide and maintain inventory for the duration of oil spill operations.

Basis of Design

Implemented in response to a Level 2/3 spill.

Maximum Selected Field Capability

FOB and MOB operating by Day 2.

2 x Accommodation vessel (250 pax), 5 x Helicopter and 2 x Transfer vessel at peak.

Implementation Timeframe

Tier 2/3

FOB and MOB operating by Day 2.

Day 4 – One helicopter operating; 1 x Transfer vessel operating.

Day 10 – Two helicopter operating; 1 x Transfer vessel operating; 1 x Accommodation vessel operating.

Day 24 – Three helicopter operating; 2 x Transfer vessel operating; 2 x Accommodation vessel operating.

Day 43 – Four helicopter operating; 2 x Transfer vessel operating; 2 x Accommodation vessel operating.

Day 51 – Five helicopter operating; 2 x Transfer vessel operating; 2 x Accommodation vessel operating.

Response Arrangements

Guidance

TRPs:

- Moyle River Estuary (NT);
- Victoria River Estuary (NT);
- Forsyth Creek (NT);
- Keep River Estuary/Turtle Point (NT);
- Cape Domett (WA DoT cell # 1&2);
- Cambridge Gulf/Lacrosse Island (WA DoT cell # 3);
- Berkeley River (WA DoT cell # 10); and
- King George River (WA DoT cell # 13).

Personnel

Table 6.24 shows the four required positions as identified by AMOSC.

Helicopter Support

The objective for use of a twin-engine helicopter during remote shoreline response is to provide a mechanism for transporting personnel, equipment and oily waste/wildlife, between the remote shoreline and remote support base (accommodation support vessel or remote shoreline FOB). The minimum requirements for a helicopter to support oil spill response activities at remote shoreline locations are:

- capacity to carry at least 6 personnel and their equipment;

- ability to be fitted with cargo hooks for the ability to sling loads (i.e. equipment/waste) between the shoreline and nearby support vessels;
- long range fuel tanks due to the distance offshore;
- twin engines; and
- life raft, satellite tracking and other safety systems.

Under the International Civil Aviation Organization (ICAO) Annex 6 Civil Aviation Safety Regulation (CASR) 133, transport category helicopters with a seating capacity of >19 must be operated under Performance Class 1 or Category A. Therefore, crew transfer helicopters, including the search and rescue (SAR) helicopter, are not available for shoreline oil spill response support activities. Smaller helicopters can be operated under Performance Class 2 or 3 (Category B) and under ICAO Annex 6 CASR 133 and the Civil Aviation Safety Authority (CASA) regulations may be able to land at remote shoreline locations with extreme caution.

Under the International Association of Oil and Gas Producers - Aircraft Management Guidelines Document 390 and CASA Civil Aviation Advisory Publication 234-1 (2) Paragraph 5.4.2 recommends all aircraft operating under charter should have sufficient fuel to fly to an alternate aerodrome which is not a remote island. For example, for a response at Ashmore or Cartier Islands, the closest usable airport would be Truscott Airbase. The remoteness of other potential shoreline response locations presents similar challenges.

An allowance has been made for five helicopters at peak (Day 51) to support spill response activities.

Transfer vessels

An allowance has been made for two fast transfer vessels based out of Wyndham Port. These vessels would be used to support crew rotations from vessels operating offshore, the transport of water/sediment quality samples, and for other activities to support the spill response.

Transfer vessels based out of Wyndham following transfer from Darwin. Back in port at least every 5 days. Allows time for refuelling/recrewing. Personnel fly to Wyndham and board fast (20+ knot) crew transfer vessel to site

Accommodation

An allowance has been made for two accommodation vessels (250+ pax) to support remote operations.

6.10.2 Response Requirements

Table 6.24 presents the forward operations requirements.

6.10.3 Preparedness Performance Standards

Table 6.25 presents the EPSs for preparedness.

Table 6.24 Response Requirements – Forward Operations

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Forward Operations															
Functions/Positions															
FOB Leader	1	1	1	1	1	1	1	1	1	1	1	1	LPM	OSRO	
Deputy FOB		1	1	1	1	1	1	1	1	1	1	1	OSRO	OSRO	
Safety Officer		1	1	1	1	1	1	1	1	1	1	1	LPM	OSRO	
Marine Base SME		1	1	1	1	1	1	1	1	1	1	1	OSRO	OSRO	
Equipment/Resources															
Accommodation vessel (250 pax)									1	2	2	2	VoO	VoO	Vessels of Opportunity
Helicopter				1	1	1	1	1	2	3	4	5	Helicopter	Helicopter	Helicopter contractor
Transfer vessel				1	1	1	1	1	1	2	2	2	VoO	VoO	Vessels of Opportunity

Table 6.25 Preparedness EPS' – Forward Operations

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to implement forward operations in an effective and timely manner.	
Control Measure	**Environmental Performance Standard**	**Measurement Criteria**
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources.	AEP MoU: Mutual Aid signed by EOG
Service Contracts	EOG shall have a contract in place with both AMOSC and OSRL to facilitate access to industry equipment and trained response personnel.	Service contract with OSRL AMOSC membership
	EOG shall maintain a contract with a helicopter provider, commencing six weeks prior to the commencement of the activity.	Service contract
	EOG shall maintain a contract with FOB Contractor, commencing six weeks prior to the commencement of the activity.	Service contract
	EOG shall maintain contractual arrangements with logistics service providers, commencing six weeks prior to the commencement of the activity.	Service Level Agreement
Monitoring of vessel availability & status	EOG shall actively monitor current vessel availability and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.	Monthly report
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of forward operations readiness.	Exercise records
Response Timing	EOG shall maintain arrangements to facilitate mobilisation of forward operations in accordance with the following timeframes: • FOB and MOB operating within 2 days of spill event. • Day 4 – One helicopter operating; 1 x Transfer vessel operating) • Day 10 – Two helicopters operating; 1 x Transfer vessel operating; 1 x Accommodation vessel operating • Day 24 – Three helicopters operating; 2 x Transfer vessels operating; 2 x Accommodation vessels operating • Day 43 – Four helicopters operating; 2 x Transfer vessels operating; 2 x Accommodation vessels operating • Day 51 – Five helicopters operating; 2 x Transfer vessels operating; 2 x Accommodation vessels operating • The deployment of additional response personnel and resources to peak capacity at the direction of WA DoT and/or NT IMT until the response is terminated.	Communication records confirming capability

6.11 Waste Management

6.11.1 Summary of Activity

During an oil spill clean-up, the disposal of waste material must not pose any threat to the health and safety of people or the environment and must be carried out in accordance with relevant State and/or Territory legislation. The type and amount of waste generated will depend on the spill itself and its location. It is important to note that the volumes of oily waste recovered from shorelines may be significantly greater than the volume of oil spilled. Table 6.26 identifies the types of waste likely to be generated from a spill from the operations.

Table 6.26 Major waste streams typically generated by oil spill response

Response strategy	Waste generated	
Dispersant application	Empty dispersant containers	PPE
Offshore containment and recovery (see Section 6.5)	Recovered weather oil Oily water Oiled equipment (booms skimmers) Oiled vessels	Oiled PPE Oiled sorbent materials Oiled flotsam & jetsam Animal carcasses
Shoreline protection & deflection Shoreline clean-up (see Section 6.6)	Recovered weather oil Oily water Oiled equipment (booms skimmers) Oiled vessels Oiled storage facilities (temporary tanks, pit liners, barrels, sacks, skips, bins)	Oiled PPE Oiled sorbent materials Oiled flotsam & jetsam Animal carcasses Oiled vegetation Oiled beach material (sand, wrack materials) General domestic wastes
OWR (see Section 6.9)	Animal carcasses Animal capture materials (nets, slings, stretchers, transport boxes) Veterinary wastes Oil absorbent materials	Oiled equipment (booms, skimmers) Oiled vessels Oily water (from washing) Oiled PPE General domestic wastes

Waste Management Plan

For any spill likely to produce significant amounts of waste, a Waste Management Plan will be developed in conjunction with AMOSC and the relevant Control Agency to ensure that:

- Oily waste is properly handled and stored;
- Oil and oily debris is adequately segregated, treated, and stored at the point of collection;
- Oil and oily debris is rapidly collected and taken to designated sites for storage, treatment, or disposal; and
- Treatment or disposal practices ensure that the waste poses no future threat to the environment.

In addition, the Waste Management Plan will identify how waste volumes will be minimised. EOG will adhere to, and implement strategies to support the waste minimisation hierarchy when dealing with waste (IPIECA-IOGP, 2014):

- Avoid/eliminate – consider actions which will eliminate or avoid the production of waste (e.g., removal of shoreline wrack prior to oiling);
- Reduce – techniques to reduce waste generated (e.g., in-situ treatment of oiled material such as offshore decanting of water collected in contain and recover activities and careful control of consumables such as sorbent materials);
- Reuse – implement programs to reuse resources where possible during clean-up (e.g., reusing oiled equipment and PPE where possible);
- Recycle – implement programs to reuse wastes such as waste oil recovery into refinery streams or road building;
- Recovery – utilise waste oil as a fuel for power or heat generation; and
- Disposal – wastes that cannot be dealt with by the above techniques are disposed of through options such as incineration, landfill or composting in accordance with the relevant WA and/or NT legislative requirements.

The Waste Management Plan will include a demonstration of:

- Temporary on-site waste storage. Care will be taken in selecting a location for a temporary waste handling base to allow for waste separation. Local authorities and waste management contractors will be consulted regarding the selection of suitable disposal routes, local regulations and may provide local facilities.
- Segregation of waste. Wherever possible, wastes will be segregated in accordance with the preferred segregation. It may be required to separate oil from associated water, sediment, and debris, in order to minimise volumes. It is preferable that this is not attempted on the spill site.
- Onsite handling. Attention will be given to the prevention of leaching or spillage of oil from vehicles or containers. Onsite handling equipment is available via MAC, Dampier Port Authority, WA DoT OSRC, AMOSC or AMSA.
- Offsite transport and storage. Only State waste contractors will be used. Care will be taken that all vessels, vehicles, or containers used for the transport of oily wastes are effectively sealed and leak-proof.
- Waste treatment and disposal options. The disposal method most appropriate in an incident will depend on several factors, including the nature and consistency of the waste, the availability of suitable sites and facilities, the costs involved, as well as regulatory restrictions.
- Waste separation. Waste separation is usually undertaken offsite at a designated waste processing area.
- Disposal. Waste must be disposed of in accordance with WA and/or NT regulations.
- Establishing a field decontamination facility. The size and complexity of field decontamination facilities required will depend on the character of the oil and on the scale and nature of the clean-up being implemented.

The following waste management strategy is proposed for a Level 3 LoWC incident:

- **Offshore:** Waste generation via "contain and recover" activities may, based on nature and scale of the spill, utilise the following strategy:
    - Vessels engaged in skimming operations will seek approval from AMSA to undertake oil/water decanting activities to maximise recovered oil storage capacity;
    - An oil tanker or offshore barge will be spot-hired to act as an oil storage collection vessel. This vessel will be positioned at a location appropriate to the "contain and recover" operation and will collect oil from skimming vessels. This location will be outside AMPs and within Commonwealth waters. The use of tankers of FSOs for oil collection have been successfully used in spill clean-up operations such as Montara;
    - The tanker will deploy from the clean-up location and deliver oil residues to refinery or waste delivery systems onshore during or at the end of operations.
    - A waste transfer station will be established at the Marine Operations Base to manage wastes generated and collected by marine vessels.
- **Onshore:** Waste operations will utilise the capacity of the EOG waste management contractor to provide the required decontamination, containment, transport and treatment/ disposal for onshore wastes generated where access is possible. However, given the remoteness of EMBA coastlines, shoreline collection and transport of wastes from sandy beaches or protect/deflect activities it is expected that waste removal will require marine access and support (barges, accommodation, waste containment). Landing barges can be used for transporting equipment and personnel to shore and backloading oiled waste and wildlife as part of remote shoreline operations.

Monitoring and Reporting of Waste

The Shoreline Clean-up Commander will be responsible for maintaining a Waste Management Register for all waste generated from the shoreline response strategy. The designated Waste Contractor will monitor measure and record all waste streams that are disposed of onshore.

Measurement as required by Waste Contractor Conditions, including without limitation:

- Types of waste collected (e.g., liquid oily waste);
- Quantities of types of wastes collected (e.g., tonnes, litre);
- Destination of waste collated (named authorised disposal facility);
- Method of waste disposal (e.g., landfill, recycling); and
- Quantity of recyclable waste by type.

The Logistics Section Chief (or delegate) shall ensure that adequate waste disposal records are being maintained by the Waste Contractor, and that the Waste Reference Number for all waste is communicated to the Onshore Materials Logistics Coordinator for updating the Waste Management Register once waste is disposed.

Basis of Design

Accumulated waste (m^3) – see Table 6.27

	Day 10	**Day 24**	**Day 43**	**Day 51**	
Oily water	1,327	4,790	9,727	11,934	26,175 m^3 over 98 days
Solid	14	224	1,008	1,590	7,766 m3 over 98 days

Maximum Selected Field Capability

Waste Management contractor, 10 support personnel, tanker and very large barge by day 43.

Implementation Timeframe

Tier 2/3

FOB and MOB operating by Day 2.

Day 4 – Waste Management operating.

Day 8 – Waste Management operating; tanker and very large barge operating.

Day 10 – Waste Management operating – ramps up; tanker and very large barge operating.

Day 24 – Waste Management operating – ramps up; tanker and very large barge operating.

Day 43 – Waste Management operating – peak; tanker and very large barge operating.

Response Arrangements

Guidance

OSRA.

AMSA Marine Order 32 – Cargo Handling Equipment 2011.

International Maritime Organisation (IMO) MSC/Circ.860 Guidelines for the Approval of Offshore Containers Handled in Open Seas.

IPIECA Guidelines for Oil Spill Waste Minimisation and Management (IPIECA-OGP, 2014). DNV 2.7-1 certified units.

Personnel

EOG will maintain contracts with licensed waste contractors for the disposal of solid and liquid oil contaminated wastes. Additional personnel are available via labour hire.

Equipment

EOG's waste contract allows for immediate mobilisation of any required waste receptacles (drums, Intermediate Bulk Containers (IBCs), covered skip-bins, tote-tanks etc.) to offshore facilities, when requested. There are no limitations/no additional capability required, for obtaining waste storage and transport receptacles, as these are used as part of routine offshore operations.

Shoreline clean-up waste would likely be captured in lined bulka-bags and 1 m^3 IBCs or transportable half-height containers.

EOG will be an Associate Member Company of AMOSC for the duration of the Beehive-1 campaign and as such will have access to AMOSC equipment stockpiles and industry equipment. AMSA also maintain booming systems regionally in Darwin, Broome, Karratha, and Fremantle, with additional units in other National Plan stockpiles. This equipment is accessible under NatPlan arrangements, should it be required. Under an existing Service Level Agreement, EOG has guaranteed access to 50% of OSRL's equipment.

Vessels

An oil tanker will be spot-hired to act as an oil storage collection vessel. This vessel will be positioned at a location appropriate to the "contain and recover" operation and will collect oil from skimming vessels. This location will be outside AMPs and within Commonwealth waters. Vessels engaged in skimming operations will seek approval from AMSA to undertake oil/water decanting activities to maximise recovered oil storage capacity.

An offshore barge will be spot-hired to facilitate transfer of wastes from shoreline and OWR operations.

6.11.2 Response Requirements

Table 6.27 presents the response requirements and total estimated waste.

6.11.3 Legislative and Other Considerations

Waste management reporting will comply with the following reporting requirements:

- Environmental Protection (Controlled Waste) Regulations 2004;
- National Pollutant Inventory annual reporting of emissions and discharges relating to resource consumption e.g., waste effluent; and
- In addition to reporting all waste generated from a spill event, it will also be tracked upon mobilisation of the waste contractor using the Controlled Waste Tracking System (CWTS). This is an online user system provided by DBCA to enable the electronic tracking of controlled waste loads across the State. Upon request DBCA generates user profiles that enable access to components of the CWTS that are specific to waste generators, carriers and/or waste disposal sites (treatment plants) and enable them to complete their statutory obligations online.

6.11.4 ALARP Evaluation and Preparedness Performance Standards

Table 6.28 presents the ALARP evaluation and Table 6.29 presents the EPSs for preparedness.

Table 6.27 Response Requirements – Waste Management

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Waste Management															
Functions/Positions															
Waste Management Coordinator			1	1	1	1	1	1	1	1	1	1	EOG Contractor	EOG Contractor	Waste Contractor
Waste Management Responder				3	3	3	3	3	6	6	10	10	LH-Shore	LH-Shore	Labour hire
Equipment/Resources															
Tanker								1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Very large barge								1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Accumulated Waste (m^3)															
Oil/Water (m^3)															
Containment and Recovery			120	240	360	480	600	840	1,320	4,680	9,240	11,160			22,440 m^3 over 98 days
Protection and Deflection								0.4	1.2	7.6	31.2	48.2			189.2 m^3 over 98 days
Oiled Wildlife Response									6	102	456	726			3,546 m^3 over 98 days
Total			**120**	**240**	**360**	**480**	**600**	**840**	**1,327**	**4,790**	**9,727**	**11,934**			**26,175 m^3 over 98 days**
Solid (m^3)															
Shoreline Clean-up									11	181	809	1,287			6,288 m^3 over 98 days
Oiled Wildlife Response									3	43	190	303			1,478 m^3 over 98 days
Total									**14**	**224**	**1,008**	**1,590**			**7,766 m^3 over 98 days**

Table 6.28 ALARP Evaluation – Waste Management

Effectiveness: A – Availability; Functionality – F; Reliability – R; Survivability – S; Independence/Compatibility – I/C

Controls				ALARP Evaluation											
Function	**Risk**	**Control Measure**	**Rationale**	**Response Capacity**	**Units**	**Implementation Time (Days)**	**Cost**	**Effectiveness (L/M/H)**					**Environmental Benefit Gained**	**Practicability / Constraints**	**ALARP Summary**
								A	F	R	S	I/C			
Eliminate	Negative environmental impact from waste management execution.	No waste management	Do nothing option	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No environmental benefit would be gained from this option not execution this option. Environmental sensitivities can be protected effectively when waste management operations are activated.	Waste management is practicable, and the do-nothing option is not considered within the external context (e.g., stakeholder views) to be a viable option.	**Reject:** Waste management is a recognised strategy for the mitigation of oil spill impacts.
Administrate	Response strategy executed ad hoc with no real planning leading to ineffective response.	Waste management operations reviewed and managed by DIMT through Incident Action Plan (IAP) process.	Within the first 48 hours, the EOG DIMT will be supplemented by Waste Contractor representative to assist with development of waste management operations within the IAPs.	Small	1	1	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective waste management strategy with the least detrimental impacts. The review/ evaluation of waste management operations will take place within 48 hours of a Level 2 or 3 spill. This response is scalable based on the spill level.	Controls have effectiveness; are available, functional, and reliable and in general are serviceable and compatible with other control measures. Controls have minor cost implications.	**Accept**: Controls are practicable, and the cost sacrifice is not disproportionate to the environmental benefit gained.
	Response activities not considered in preparedness planning therefore not allowing for input into the Operational NEBA.	Operational NEBA to include evaluation of requirement for implementation of waste management operations.	The waste management response strategy will be activated to prevent environmental impacts to sensitive environmental receptors (in accordance with relevant CA requirements as required).	N/A	N/A	12 hours	Minor	H	H	H	H	H	Positive environmental benefit from identification of the most effective response strategies with the least detrimental impacts. The Operational NEBA will be completed based on the specific spill incident, using real-time information (OSTM, spill observations, weather, and sea state conditions etc.) to confirm the appropriate response strategies to adopt for protection of priority locations and sensitive receptors. Waste management will be activated to prevent/minimise environmental impacts to sensitive shorelines and shoreline receptors.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	No access to suitable specialised resources (people & equipment) in reasonable timeframes.	Contractual (waste contractor) & membership (AMOSC, OSRL) arrangements provide for access to suitable specialised resources in appropriate timeframes (i.e. waste management contractor representative to IMT & personnel/ equipment deployed to shorelines 48hrs prior to shoreline stranding). IAP is continually updated to reflect outcomes.	Timely implementation of waste management plan and contractor.	Large	National Footprint Waste Manage ment Contract or AMOSC OSRL	12 hours	Modera te	H	H	H	H	H	Positive environmental benefit gained from rapid response of waste management resources from OSRL, AMOSC and waste management contractor.		
	Recovered waste is not handled or managed effectively or efficiently creating secondary impacts on the environment.	Waste collection facilities are set out in accordance with TRPs/specific spill waste management plan (e.g. temporary bunding, spill kits, secured areas, decontamination areas, etc.). All waste is treated or disposed in accordance with WA and/or NT legislative requirements.	Ensures waste management policies and procedures are being followed.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from planned and considered response of waste management resources according to available TRPs, waste management plans.		
	Poor understanding of the effectiveness of waste management and its impact on the environment.	Implement environmental monitoring to determine the ongoing acceptability of the environmental risk associated with waste management methods.	Environmental monitoring (SCAT) will be used to determine the effectiveness of waste management controls and techniques for removing waste oil from site.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from environmental monitoring to verify the effectiveness of waste management controls and techniques for removing waste oil from site. Outcomes of environmental monitoring will be used to inform waste management response strategy through the IAPs.		

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response activities impacting areas of cultural significance.	Waste management operations will avoid cultural heritage sensitivities.	Increases the potential that impacts to sensitive receptors will be prevented by avoiding areas of known cultural heritage significance.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from information provided from Cas and spatial information to avoid impacts to cultural heritage sensitivities.		
	Response continues with no end point or is removed early.	Response strategy activities continued until termination criteria is met.	The waste management response strategy continues to prevent environmental impacts to sensitive environmental receptors until the performance outcome has been achieved.	N/A	N/A	N/A	Minor	H	H	H	H	H	Positive environmental benefit gained from ensuring that waste management continues until the performance outcome has been achieved.		
	Inappropriate waste oil transfer at sea creates additional oil spills	Waste transfer will only occur after a risk assessment or in accordance with approved procedures (appropriate equipment, weather conditions, supervision) to limit risk of oil spill.	Identified additional oil spill source which requires controls to minimise risk.	Small	NA	2	Minor	H	H	H	H	H	Environmental benefit obtained by negating other oil spill risks.	Control is effective and expected to have only minor cost implications.	<u>Accept:</u> Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.
	Oil/water storage capacity on vessels restricts time available to recover oil residues from sea surface (e.g. CAR operations).	Apply to AMSA to allow for separated water decanting in Commonwealth waters outside of AMPs.	Increase CAR vessel endurance. Allows for more efficient CAR operations.	Small	NA	2	Minor	H	H	H	H	H	Positive environmental benefit increasing oil recovery times and reducing port calls for vessels.		<u>Accept:</u> Controls are practicable, and the cost sacrifice is not grossly disproportionate to the environmental benefit gained.

Controls				ALARP Evaluation											
Function	Risk	Control Measure	Rationale	Response Capacity	Units	Implementation Time (Days)	Cost	Effectiveness (L/M/H)					Environmental Benefit Gained	Practicability / Constraints	ALARP Summary
								A	F	R	S	I/C			
	Response strategy executed ad hoc with no real planning leading to ineffective response.	Pre-position temporary waste storage locations along most likely area for oil to come ashore (Moyle River NT to King George River WA).	In preparation for spill response, pre-position waste storages along affected coastline to enable rapid collection of oil following shoreline contact.	Large	Waste Management Contractor or AMOSC OSRL	Up to 35 days	Moderate	H	L	L	H	H	Reduced timeframe for set-up would ensure efficient waste management operations (i.e. no hinderance due to limitations in capacity).	Temporary storage disposal locations will vary depending on the concentrations of contaminates and location ashore. Locations require pre-approval by WA & NT Cas, landholders, aboriginal groups, local councils, and WA/NT EPAs. Permits/approvals required to set-up multiple temporary waste storage locations.	**Reject:** Construction of temporary storage area prior to spill event is not a recognised strategy for the mitigation of oil spill impacts. Worst possible volumes ashore and associated waste volumes can be managed with existing infrastructure and arrangements within the necessary timeframes for shoreline contact. In addition, given remoteness of impacted sites, it is expected most waste management will occur utilising marine vessels to minimise impacts landside for clearing, etc. The control has low functionality and low reliability; implementation of the control measure does not greatly reduce the risk/impact of oil on shore, and has not been adopted for other oil and gas projects in Australia.
													Potential negative environmental impacts due to access road clearing for coastal sites (as roadside access is limited) and coastal storage locations.	Requires approval from landholders, landowners. Requires sufficient area to lay-down storage equipment, road access and transfer areas (hardstand) at coastal locations. Potential for interference with native species behaviours (e.g. nesting turtles).	

Table 6.29 Preparedness EPSs – Waste Management

Spill Response Preparedness		
Environmental Performance Outcome	EOG prepared to implement waste management strategy in an effective and timely manner.	
Control Measure	Environmental Performance Standard	Measurement Criteria
AEP Memorandum of Understanding: Mutual Aid	EOG shall be a signatory to the AEP Memorandum of Understanding: Mutual Aid to enable access to industry resources.	AEP MoU: Mutual Aid signed by EOG
Service Contracts	EOG shall have a contract in place with a Waste Management Contractor with regional capacity to manage oil contaminated wastes, commencing six weeks prior to the commencement of the activity.	Service Level Agreement
	EOG shall have a contract in place with both AMOSC and OSRL to facilitate access to industry equipment.	Service contract with OSRL AMOSC membership
	EOG shall maintain a contract with a labour-hire company, commencing six weeks prior to the commencement of the activity, to enable the engagement of shore-based labour hire personnel.	Service Level Agreement
	EOG shall maintain contractual arrangements with logistics service providers to enable the deployment of industry equipment to priority protection areas, commencing six weeks prior to the commencement of the activity.	Service Level Agreement
Monitoring of vessel availability & status	EOG shall actively monitor current vessel availability to identify emergency vessels and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.	Monthly report
Monitoring of equipment availability & status	EOG shall actively monitor equipment availability through AMOSC and OSRL reports during the drilling campaign, commencing six weeks prior to the commencement of the activity.	AMOSC and OSRL reports
Testing / Exercising	EOG shall undertake a desk-top exercise against the spill response testing objectives detailed within Table 8.1 of the *Beehive-1 OPEP* (996161-2022-Beehive#1-Drilling-OPEP) prior to undertaking the activity including validation of Waste Management-up response readiness.	Communication records confirming capability

7 Overall Requirements for the Response Strategies

This section provides a summary of the personnel and equipment/resource requirements identified in this document. Appendix D describes the cumulative requirements, including for the DIMT and OSMP, and demonstrates the capability to implement the requirements.

7.1 Personnel

The analysis of personnel requirements to independently implement the response strategies identified in Section 6 adopted the following assumptions:

- All response strategies are fully implemented.
- All response strategies are independently resourced.
- All personnel requirements identified by AMOSC (see Section 5.2) are implemented.
- All identified functions/positions are stood up over the response.
- Response maintained for at least 20 weeks.
- 2 x 12-hour operational periods per day.
- Conservative redundancy[3] allowance of 7.5% from Day 1.
- Conservative assumption of second swing from Day 10.[4]
- Rotations are based on rosters with 2 weeks on / 2 weeks off.

Table 7.1 provides the total function/position requirements for all the response strategies identified in Section 6, including the ramp-up to peak requirements on Day 51, when 564 functions/positions are required.[5] Table 7.2 identifies the function/position requirements from each of the nominated resources for the first swing. It then applies a 7.5% redundancy allowance[6] to each of the nominated resources. In total, 610 personnel are required in the first swing for the identified 564 functions/positions. Table 7.3 repeats this process for the second swing (609 personnel required for the 564 functions/positions).

Table 7.4 provides the total personnel requirements (including 7.5% redundancy) from each of the nominated resources, ramping up to peak (Day 51). Days 1-8 reproduce the personnel requirements identified in Table 7.2 while Days 10 on include the sum of personnel requirements from Table 7.2 and Table 7.3 to conservatively allow for rotations. At peak, 1,219 personnel will be required to staff the identified 564 functions/positions, inclusive of 7.5% redundancy.

[3] Allows for sick leave, absenteeism.
[4] Day 10 was chosen as it aligns with ramp up requirements for the response strategies based on worst case spill modelling. See Table 3.5 for further detail.
[5] Note that the functions/positions coloured red, green and blue are not included in the total requirements.
[6] The 7.5% redundancy requirement for each swing is calculated by multiplying the minimum number of personnel required from each organisation (identified in **Error! Reference source not found.**) by 1.075 and rounding up to the next whole number.

Table 7.1 Response Strategy Function/Position Requirements – Ramping up to Peak

Response Strategy Requirements	Timing												Nominated resource: see Table 6.1	
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing
M&E - Aerial surveillance														
Pilot/Observer (helicopter)	2	2											–	–
Aerial Observers			1	1	1	1	1	1	2	2	2	2	OSRO	OSRO
Pilots			2	2	2	2	2	2	2	2	2	2	–	–
M&E - Vessel surveillance														
Support vessel crew	1	1	1	1	1	1	1	1	1	1	1	1	–	–
M&E - Oil Spill Trajectory Modelling														
AMOSC contract													–	–
M&E – Electronic satellite tracker buoys (ESTBs)														
Support vessel crew	1				1				1	1	1	1	–	–
M&E – Satellite imagery														
AMOSC/OSRL contract													–	–
M&E – Surface Chemical Dispersant Effectiveness														
Mud plant personnel		1	1	1									–	–
OSM Water Quality (WQ) Team					2	2	2	2	4	5	5	5	RPS	RPS
Surface Dispersant Application - Aerial														
Aerial FOB manager	1	1	1	1	1	1	1	1	1	1	1	1	AMOSC	AMOSC
Aerial FOB SME	1	1	1	1	1	1	1	1	1	1	1	1	AMOSC	AMOSC
AT802 Ground staff		10	10	30	30	30	30	30	30	30	30	30	AMOSC	AMOSC
AT802 pilots		2	2	6	6	6	6	6	6	6	6	6	AMOSC	AMOSC
C-130 pilots/flight crew				3	3	3	3	3	3	3	3	3	OSRL	OSRL
C-130 ground staff				10	10	10	10	10	10	10	10	10	OSRL	OSRL
Air attack pilots		2	2	2	2	2	2	2	2	2	2	2	AMOSC	AMOSC
SAR pilots		2	2	2	2	2	2	2	2	2	2	2	AMOSC	AMOSC
Surface Dispersant Application - Vessel														
Oil Spill Responder IMO 1 (or equiv.)				2	2	4	4	4	4	4	4	4	OSRO	OSRO
Labour hire - marine				6	6	12	12	12	12	12	12	12	LH-Marine	LH-Marine
Containment and Recovery														
Oil Spill Responder IMO 1 (or equiv.)			2	2	2	2	2	4	4	4	4	4	OSRO	OSRO
Labour hire - marine			6	6	6	6	6	12	12	12	12	12	LH-Marine	LH-Marine
Shoreline Operations														
Shoreline Operations Manager			1	1	1	1	1	1	1	1	1	1	OSRO	OSRO
Shoreline Protection and Deflection														
Oil Spill Responder IMO 1 (or equiv.)								2	2	6	10	15	OSRO	OSRO
Labour hire - marine								6	6	18	30	45	LH-Marine	LH-Marine
SCAT														
SCAT team lead						2	2	2	2	6	10	10	OSRO	OSRO
SCAT team responders						4	4	4	4	12	20	20	LH-Shore	LH-Shore
Drone operator						2	2	2	2	6	10	10	EOG Contractor	EOG Contractor

Response Strategy Requirements	Timing												Nominated resource: see Table 6.1	
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing
Shoreline Clean-up														
Oil Spill Responder IMO 1 (or equiv.)									2	6	10	16	OSRO	OSRO
Labour hire - shore									20	60	100	160	LH-Shore	LH-Shore
Plant Operators									1	2	3	5	Plant	Plant
OSM														
Trained Deck Crew					2	2	2	2	4	5	5	5	LH-Marine	LH-Marine
Oiled Wildlife Response														
Oiled Wildlife Coordinator			1	1	1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*
Reconnaissance Manager				1	1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*
Rescue and Transport Manager					1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*
Staging and Holding Manager					1	1	1	1	1	1	1	1	OSRO	AMOSC-OWR*
Rehabilitation Manager						1	1	1	1	1	1	1	OSRO	AMOSC-OWR*
Rehabilitation Facilities Management						1	1	1	1	1	1	1	AMOSC-OWR*	AMOSC-OWR*
Skilled wildlife handlers									10	30	50	100	AMOSC-OWR	AMOSC-OWR
Labour hire - shore									10	30	50	100	LH-Shore	LH-Shore
Specialist Personnel									2	6	10	20	AMOSC-OWR*	AMOSC-OWR*
Forward Operations														
FOB Leader	1	1	1	1	1	1	1	1	1	1	1	1	LPM	OSRO
Deputy FOB		1	1	1	1	1	1	1	1	1	1	1	OSRO	OSRO
Safety Officer		1	1	1	1	1	1	1	1	1	1	1	LPM	OSRO
Marine Base SME		1	1	1	1	1	1	1	1	1	1	1	OSRO	OSRO
Waste Management														
Waste Management Coordinator			1	1	1	1	1	1	1	1	1	1	EOG Contractor	EOG Contractor
Waste Management Responder				3	3	3	3	3	6	6	10	10	LH-Shore	LH-Shore

Total functions/positions	**3**	**6**	**18**	**30**	**34**	**52**	**52**	**68**	**119**	**241**	**366**	**564**

Functions/positions highlighted in red are already included in the drilling program. They are not included in the overall requirements.
Functions/positions highlighted in green are supplied as part of the contracts for the associated equipment/service (e.g. fixed wing aircraft, FWAD). They are not included in the overall requirements.
Functions/positions highlighted in blue are included here for information. They are not included in the overall requirements. Appendix C of the OPEP (OSM BIP) provides details on the resourcing of these.

Table 7.2 1st Swing Personnel Requirements by Source of Personnel

Source of personnel	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)
From Table 7.1												
LPM	1	2	2	2	2	2	2	2	2	2	2	2
EOG Contractors			1	1	1	3	3	3	3	7	11	11
Shore-based Labour Hire				3	3	7	7	7	40	108	180	290
OSROs	2	4	9	12	14	19	19	23	26	38	50	61
Marine Labour Hire			6	12	14	20	20	32	34	47	**59**	74
Plant Operator									1	2	3	5
AMOSC-OWR*						1	1	1	3	7	11	21
AMOSC-OWR									10	30	50	100
Total functions/positions	**3**	**6**	**18**	**30**	**34**	**52**	**52**	**68**	**119**	**241**	**366**	**564**
Including 7.5% redundancy												
LPM	2	3	3	3	3	3	3	3	3	3	3	3
EOG Contractors			2	2	2	4	4	4	4	8	12	12
Shore-based Labour Hire				4	4	8	8	8	43	117	194	312
OSROs	3	5	10	13	16	21	21	25	28	41	54	66
Marine Labour Hire			7	13	16	22	22	35	37	51	64	80
Plant Operator									2	3	4	6
AMOSC-OWR*						2	2	2	4	8	12	23
AMOSC-OWR									11	33	54	108
Total personnel required	**5**	**8**	**22**	**35**	**41**	**60**	**60**	**77**	**132**	**264**	**397**	**610**

See Table 6.1 for resource/personnel codes

Table 7.3 2nd Swing Personnel Requirements by Source of Personnel

Source of personnel	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)
From Table 7.1												
LPM												
EOG Contractors			1	1	1	3	3	3	3	7	11	11
Shore-based Labour Hire				3	3	7	7	7	40	108	180	290
OSROs	3	6	10	12	12	16	16	20	23	35	47	58
Marine Labour Hire			6	12	14	20	20	32	34	47	**59**	74
Plant Operator									1	2	3	5
AMOSC-OWR*			1	2	4	6	6	6	8	12	16	26
AMOSC-OWR									10	30	50	100
Total functions/positions	**3**	**6**	**18**	**30**	**34**	**52**	**52**	**68**	**119**	**241**	**366**	**564**
Including 7.5% redundancy												
LPM												
EOG Contractors			2	2	2	4	4	4	4	8	12	12
Shore-based Labour Hire				4	4	8	8	8	43	117	194	312
OSROs	4	7	11	13	13	18	18	22	25	38	51	63
Marine Labour Hire			7	13	16	22	22	35	37	51	64	80
Plant Operator									2	3	4	6
AMOSC-OWR*			2	3	5	7	7	7	9	13	18	28
AMOSC-OWR									11	33	54	108
Total personnel required	**4**	**7**	**22**	**35**	**40**	**59**	**59**	**76**	**132**	**263**	**397**	**609**

See Table 6.1 for resource/personnel codes.

Table 7.4 Personnel Requirements by Source of Personnel (incl. 7.5% redundancy from Day 1, and 2on/2off rotation from Day 10)

Source of personnel	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)
LPM	2	3	3	3	3	3	3	3	3	3	3	3
EOG Contractors			2	2	2	4	4	4	8	16	24	24
Shore-based Labour Hire				4	4	8	8	8	86	234	388	624
OSROs	3	5	10	13	16	21	21	25	53	79	105	129
Marine Labour Hire			7	13	16	22	22	35	74	102	128	160
Plant Operator									4	6	8	12
AMOSC-OWR*						2	2	2	13	21	30	51
AMOSC-OWR									22	66	108	216
Total personnel required	**5**	**8**	**22**	**35**	**41**	**60**	**60**	**77**	**265**	**527**	**794**	**1,219**

See Table 6.1 for resource/personnel codes.

7.2 Equipment/Resources

Table 7.5 provides the total equipment/resource requirements for each of the response strategies identified in Section 6, including the ramp-up to peak requirements on Day 51. Note that the equipment/resources coloured red, green and blue in Section 6 are not included in this table.

Table 7.6 provides a breakdown of equipment and resource requirements by type.

Table 7.5 Equipment and Resource Requirements by Response Strategy

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
M&E - Aerial surveillance															
Fixed wing aircraft			1	1	1	1	1	1	2	2	2	**2**	AMOSC	AMOSC	AMOSC supplementary contract
Grab bag			1	1	1	1	1	1	2	2	2	**2**	AMOSC	AMOSC	AMOSC membership
M&E - Oil Spill Trajectory Modelling															
AMOSC contract													–	–	AMOSC membership
M&E – Electronic satellite tracker buoys (ESTBs)															
ESTB (approx. every 5 days)	1				1				1	1	1	1	AMOSC	AMOSC	Approx. 20 over 98 days
M&E – Satellite imagery															
AMOSC/OSRL contract													–	–	AMOSC/OSRL membership
M&E – Surface Chemical Dispersant Effectiveness															
Shake-jar test kit		1	1	1									AMOSC	AMOSC	AMOSC supplementary contract
Surface Dispersant Application - Aerial															
Daily dispersants - AT802 (m^3)		24	24	72	72	72	72	72	72	90	90	90	OSRO	OSRO	AMOSC/OSRL membership
Daily dispersants - C-130 (m^3)				24	24	24	24	24	24	24	24	24	OSRO	OSRO	AMOSC/OSRL membership
Accumulated dispersants (m^3)		24	48	144	240	336	432	528	720	2,298	4,464	5,376			10,734 m^3 over 98 days
Surface Dispersant Application - Vessel															
Dispersant vessel				2	2	4	4	4	4	4	4	4	VoO	VoO	Vessels of Opportunity
Application equipment				2	2	4	4	4	4	4	4	4	AMOSC	AMOSC	AMOSC membership
Daily dispersants - vessel (m^3)				6	6	12	12	12	12	12	12	12	OSRO	OSRO	AMOSC/OSRL membership
Accumulated dispersants (m^3)				6	12	24	36	48	72	240	468	564			1,128 m^3 over 98 days
Containment and Recovery															
C&R vessel			4	4	4	4	4	8	8	8	8	**8**	VoO	VoO	Vessels of Opportunity
Boom			2	2	2	2	2	4	4	4	4	**4**	AMOSC	AMOSC	AMOSC membership
High capacity skimming system			2	2	2	2	2	4	4	4	4	**4**	AMOSC	AMOSC	AMOSC membership
Shoreline Operations															
Shoreline Protection and Deflection															
Nearshore vessel									2	6	10	15	VoO	VoO	Vessels of Opportunity
50 m shore seal boom									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
50 m near shore boom									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Shoreline skimming system									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Waste capacity min 10 m^3									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
SCAT															
Nearshore vessel						1	1	1	1	3	5	5	VoO	VoO	Vessels of Opportunity
Vehicle 4WD						2	2	2	2	6	10	10	Vehicle	Vehicle	4WD hire
Small vessel						2	2	2	2	6	10	10	VoO	VoO	Vessels of Opportunity
Drone						2	2	2	2	6	10	10	EOG Contractor	EOG Contractor	EOG Contractor

Response Strategy Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Shoreline Clean-up															
Vehicle 4WD									2	6	10	16	Vehicle	Vehicle	4WD hire
Small vessel									2	6	10	16	VoO	VoO	Vessels of Opportunity
Landing barge									1	2	3	5	VoO	VoO	Vessels of Opportunity
Shoreline response kits									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Manual oil collection equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Machinery/plant									1	2	3	5	Plant	Plant	Plant operator
Waste collection and containment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Zoning equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
OSM															
Nearshore Vessel					2	2	2	2	3	4	4	4	VoO	VoO	Vessels of Opportunity
Offshore Vessel					1	1	1	1	4	6	6	6	VoO	VoO	Vessels of Opportunity
Small vessel					1	1	1	1	2	3	3	3	VoO	VoO	Vessels of Opportunity
Fixed wing aircraft					**2**	**2**	**2**	**2**	**2**	**3**	**3**	**3**	AMOSC	AMOSC	AMOSC supplementary contract
Oiled Wildlife Response															
Vehicle 4WD									1	3	5	10	Vehicle	Vehicle	4WD hire
Small vessel									1	3	5	10	VoO	VoO	Vessels of Opportunity
Primary Care Facility (PCF) vessel										1	1	2	VoO	VoO	Vessels of Opportunity
Landing barge									1	2	3	5	VoO	VoO	Vessels of Opportunity
1st strike equipment cache									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
Wildlife response container									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
OWR Rehabilitation centre										1	1	1	OSRO	OSRO	AMOSC/OSRL membership
Forward Operations															
Accommodation vessel (250 pax)									1	2	2	2	VoO	VoO	Vessels of Opportunity
Helicopter				1	1	1	1	1	2	3	4	5	Helicopter	Helicopter	Helicopter contractor
Transfer vessel				1	1	1	1	1	1	2	2	2	VoO	VoO	Vessels of Opportunity
Waste Management															
Tanker								1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Very large barge								1	1	1	1	1	VoO	VoO	Vessels of Opportunity

Table 7.6 Equipment and Resource Requirements by Type

Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Aircraft Requirements															
Fixed wing aircraft			1	1	3	3	3	3	4	5	5	5	AMOSC	AMOSC	AMOSC supplementary contract
Helicopter				1	1	1	1	1	2	3	4	5	Helicopter	Helicopter	Helicopter contractor
Total aircraft required			**1**	**2**	**4**	**4**	**4**	**4**	**6**	**8**	**9**	**10**			
Vessel Requirements															
Dispersant vessel				2	2	4	4	4	4	4	4	4	VoO	VoO	Vessels of Opportunity
C&R vessel			4	4	4	4	4	8	8	8	8	8	VoO	VoO	Vessels of Opportunity
Nearshore vessel					2	3	3	3	6	13	19	19	VoO	VoO	Vessels of Opportunity
Offshore Vessel					1	1	1	1	4	6	6	6	VoO	VoO	Vessels of Opportunity
Small vessel					1	3	3	3	7	18	28	39	VoO	VoO	Vessels of Opportunity
Landing barge									2	4	6	10	VoO	VoO	Vessels of Opportunity
Primary Care Facility (PCF) vessel										1	1	2	VoO	VoO	Vessels of Opportunity
Accommodation vessel (250 pax)									1	2	2	2	VoO	VoO	Vessels of Opportunity
Transfer vessel				1	1	1	1	1	1	2	2	2	VoO	VoO	Vessels of Opportunity
Tanker								1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Very large barge								1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Total vessels required			**4**	**7**	**11**	**16**	**16**	**22**	**35**	**60**	**78**	**94**			
Vehicle/Drone Requirements															
Vehicle 4WD						**2**	**2**	**2**	**5**	**15**	**25**	**36**	Vehicle	Vehicle	4WD hire
Drone						2	2	2	2	6	10	10	EOG Contractor	EOG Contractor	EOG Contractor
Dispersant Requirements - m^3															
Daily requirements		24	24	102	102	108	108	108	108	126	126	126			
Cumulative requirements		**24**	**48**	**150**	**252**	**360**	**468**	**576**	**792**	**2,538**	**4,932**	**5,940**			**11,862 m^3 over 98 days**
M&E Requirements															
Grab bag			1	1	1	1	1	1	2	2	2	**2**	AMOSC	AMOSC	AMOSC membership
ESTB (approx. every 5 days)	1				1				1	1	1	1	AMOSC	AMOSC	Approx. 20 over 98 days
AMOSC/OSRL contract (satellite imagery)													–	–	AMOSC/OSRL membership
Shake-jar test kit		1	1	1									AMOSC	AMOSC	AMOSC supplementary contract
Offshore requirements															
Application equipment (SDA)				2	2	4	4	4	4	4	4	4	AMOSC	AMOSC	AMOSC membership
Boom (C&R)			2	2	2	2	2	4	4	4	4	**4**	AMOSC	AMOSC	AMOSC membership
High-capacity skimming system (C&R)			2	2	2	2	2	4	4	4	4	**4**	AMOSC	AMOSC	AMOSC membership
Shoreline Operations															
50 m shore seal boom									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
50 m near shore boom									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Shoreline skimming system									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Waste capacity min 10 m3									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Shoreline response kits									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Manual oil collection equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Machinery/plant									1	2	3	5	Plant	Plant	Plant operator

Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Waste collection and containment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Zoning equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Oiled Wildlife Response															
1st strike equipment cache									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
Wildlife response container									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
OWR Rehabilitation centre										1	1	1	OSRO	OSRO	AMOSC/OSRL membership
Primary Care Facility (PCF)										1	1	2	OSRO	OSRO	AMOSC/OSRL membership

8 Competency and Training Requirements

The competency and training requirements described below were prepared by AMOSC a s part of their Capability Justification.

EOG will ensure that all staff, contractors and remote third parties have the requisite skills and knowledge for their prescribed role in the company's response structures. Training will be a mix of incident management system/process training, and Introduction to Oil Spill Prevention and Response (OSPR) training specific to the Beehive-1 OPEP, particular to the requirements of the role. EOG will use the drills and exercises programme as outlined in Section 8.2 of the OPEP to assist assure, test and train those who will be on the Operations Team roster. Table 8.1 identifies the training requirements for operational personnel.

8.1 Introduction to OSPR Training

The introduction to OSPR describes the purpose and use of the OPEP; the relevant legislative settings of OSPR response for Beehive-1; the baseline characteristics of Beehive-1 Crude and its behaviours/fates; oil spill response strategies; the environmental consequences of the spill; the relationships EOG has with organisations providing resources to the DIMT and Operational Teams; and how these will operate together to execute the response. The training will be aligned with Table 2 of the AEP *Guidance Document: Incident Management Teams – Knowledge Requirements for Responding to Marine Oil Spills*, *V08* (APPEA, 2021).

8.2 IMO Level I (or equivalent) Training

The Course in Oil Spill Response Operations (IMO I) provides training in the safe and effective operation of offshore, nearshore and shoreline oil spill response equipment for individuals and team leaders.

8.3 IMO Level II (or equivalent) Training

For the leadership roles that have specific responsibilities for executing and implementing the process, a higher level of Incident Management System (IMS) training is required to successfully lead and execute the process. Staff fulfilling these roles are also required to be technically competent in oil spill response in order for the hazard specific elements of Spill Response to be successfully implemented within the DIMT.

IMO Level II Training (or equivalent) includes the roles and responsibilities of a multi-disciplinary oil spill management team in an oil spill response centre; the use of a defined structure (ICS) to develop and execute an oil spill IAP; the intelligence and environmental functions critical for oil spill response (fates, weathering, NEBA) and the logistics required to mount a response.

8.4 IMO Level III (or equivalent) Training

Those undertaking an IC/Deputy IC role will require IMO Level III Training (or equivalent). This includes elements under the IMO II equivalent training, with additional training around leadership and management of the DIMT; the legislative and political settings for an oil spill IMT; media and communications; interfacing with the CRT and Senior Government stakeholders; and managing a multi-agency response.

8.5 Function Specific Training

Function specific training will be aligned with Table 3 of the AEP *Guidance Document: Incident Management Teams – Knowledge Requirements for Responding to Marine Oil Spills*, *V08* (APPEA, 2021).

8.6 Recommended Qualifications, Skills or Experience

Some roles require trade or tertiary qualifications, or workplace experience that aligns with the duty role being requested of the individual. Table 8.2 outlines the recommended qualifications, skills or experience for these positions.

Table 8.1 Personnel Training Requirements

Position	OSPR Intro.	IMO I (or equivalent)	IMO II (or equivalent)	IMO III (or equivalent)	Function specific
FOB Leader			Yes		
Deputy Fob			Yes		
Safety Officer			Yes		
Aerial Base Manager	Yes		Yes		Yes
Aerial Observer - Oil monitoring					Yes
Marine Base Manager	Yes	Yes			
C&R Team Leads		Yes			
C&R Team workers		Yes			Yes
Shoreline Ops Manager	Yes	Yes			
SCAT team leads		Yes			
SCAT Team					Yes
Shoreline response Team Leads	Yes	Yes			Yes
Shoreline Response Team workers					Yes
Shoreline Response Operators					Yes
Waste Management Coordinator					Yes
Waste management responders					Yes
OW Coordinator	Yes				Yes
Reconnaissance Manager					Yes
Rescue and Transport Manager					Yes
Staging and Holding Manager					Yes
Rehabilitation Manager					Yes
Rehabilitation Facilities Management					Yes
Responders					Yes
Specialist support					Yes

Table 8.2 Recommended Qualifications, Skills or Experience

Position	Recommended qualifications, skills or experience
FOB Leader	3+ years experience in management of response operations for the oil and gas industry. Familiarity with the requirements for each of the response strategies
Deputy Fob	
Safety Officer	Industry qualification in the application of safety/WHS systems with 5+ years experience.
Aerial Base Manager	3+ years experience in air base operations and completion of the following courses AIIMS Air Base Manager, Firebombing Load Supervisor, PUAFIR408B - Plan Aircraft Operations, PUAFIR313B - Operate Aviation Support Equipment, PUAFIR209B - Work Safely Around Aircraft
Aerial Observer - Oil monitoring	Training and experience in the application of the skills required for observing and quantifying spills and calculating volumes from aircraft.
Marine Base Manager	3+ years experience in the development and implementation of marine operations in the Australian upstream O&G environment; or equivalent experience demonstrated through civilian or defence marine command and control operations.
C&R Team Leads	3+ years experience leading response teams in the implementation of Offshore C&R equipment from vessels.
Shoreline Ops Manager	3+ years experience developing and managing shoreline operational activities within an oil spill response environment.
Scat team leads	3+ years experience leading SCAT operations for a response to an incident.
TRP team leads	3+ years experience managing on ground operations associated with spill response activities, particularly shoreline response activities.
Shoreline response Team Leads	3+ years experience managing shoreline operations associated with spill response activities
Waste Management Coordinator	Qualifications and experience associated with the appropriate management and disposal of waste generated by an oil spill response activity.
OW Coordinator	3 + years experience in the management of operations associated with the deployment of an oiled wildlife response
Rehabilitation Facilities Management	Specialist experience in the establishment and management of an efficient and effective oiled wildlife response facility

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Appendix B-1 Strategic NEBA: Shoreline Clean-up

General drawbacks (Cons) of technique

General drawbacks (Cons) of technique
1. Natural cleaning
Perceived lack of response (for small releases) resulting in community dissatisfaction. Some hydrocarbon may remain on shoreline surfaces, e.g. in crevices, embedded within gravel, particularly in low energy environments. Persistent crude oils may take a significant period to degrade. May be inappropriate for areas used by high numbers of people, mobile animals (birds, marine mammals) or endangered species.
2. Flushing (High pressure / low pressure)
Health and safety risks in slippery, unstable environment in remote area. Access is difficult in certain circumstances. Unable to recover hydrocarbon from high-energy shores. Habitat and vegetation disturbance due to tramping, heavy machinery and waste collection facilities. Disruption of bottom sediments and submerged aquatic vegetation. Can contribute to erosion.
3. Ploughing / harrowing
Health and safety risks in remote area. Access is difficult in certain circumstances. Spread of contaminated material by vehicles, equipment and poor waste management. Habitat and vegetation disturbance due to tramping, equipment and waste collection facilities. Can contribute to erosion.
4. Adsorbents
Involves extensive manual handling and resource intensive. Access may be limited and dangerous in certain circumstances. Health and safety risks in remote area. Generates significant amounts of waste and potential for litter. Uncollected particulate sorbents can be digested by mammals and birds. Foot traffic and vessel operations may disturb sediment and affect organisms. Unless using snares, only useful on very low viscosity fluids and effective on minor quantities.
5. Manual collection
Is labour intensive and involves extensive manual handling. Access may be limited and dangerous in certain circumstances. Exposes large numbers of clean-up crews to the elements for extended periods, potentially in isolated locations. Potential to increase physical disturbance associated with clean-up crew and traffic. Generates waste.
6. Sandblasting / steam cleaning
Health and safety risks of equipment and slippery, unstable environment. Access is generally difficult. Spread of oil and contaminated blast materials if not contained. Habitat and vegetation disturbance due to tramping, heavy machinery and waste collection facilities. Disruption of bottom sediments and submerged aquatic vegetation. Can contribute to erosion. Not considered viable.

General drawbacks (Cons) of technique
7. Mechanical collection
Habitat and vegetation disturbance due to tramping, heavy machinery. Impact on sensitive supralittoral environment behind beach for access, staging area, waste and fuel transfers, decontamination. Can be restricted by limited accessibility. Generates significant quantities of waste.
8. Chemical dispersants (shoreline application)
Reduces effectiveness of containment and deflection booms and oleophilic surface recovery. Reduces natural degradation of hydrocarbon. Not considered viable.
9. Vegetation removal
Directly contributes to short-term loss of vegetation cover and associated habitat. May contribute to erosion due to loss of vegetation. Generates waste.

Shoreline Clean-up Techniques NEBA

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Macroalgae (kelp) and seagrass Sensitivity: M	Avoids disturbance of highly productive macrophytic communities, benthos and coastal vegetation associated with responder activity. Surface oil will float over submerged macrophytes in low energy environments and avoid direct contact. Direct contact of emergent or intertidal macrophytes in high-energy environments is limited due to the dynamic nature of the environment. Avoids the release of additional chemicals to the environment. Avoids exposing responders to in-field environmental risks.	Low wave action macrophyte environments result in hydrocarbon persisting on the surface for extended period. Emergent vegetation will continue to be exposed to reactivated hydrocarbon. Contact with oil and residues result in health impacts on macrophyte communities.	Low pressure flushing can be effective in mobilising free oil from some macrophyte communities into boom for recovery	Disturbance of shoreline stability and benthic habitat or increased turbidity in inshore waters with resultant acute or chronic effects. Limited effectiveness. Distributes oil amongst seagrass and kelp. Unable to recover oil.	Not applicable for this environment.	Not applicable for this environment.	Removes oil from the environment with a resultant reduction in the associated effects of smothering and chronic or acute toxicity.	Damage to macrophytes/ seagrass by spill responders, absorbent booms or boat activity generating turbulence and increased turbidity. Disturbance of benthic habitat in inshore waters with resultant acute or chronic effects.	Removes oil from the environment with a resultant reduction in the associated effects of smothering and chronic or acute toxicity. Limits the potential generation of waste.	Damage to macrophytes by spill responders, absorbent booms or boat activity generating turbulence and increased turbidity. Disturbance of benthic habitat in inshore waters with resultant acute or chronic effects.
Predicted outcomes	Positive		Negative		Not applicable		Positive (when used to protect/deflect)		Positive (where physical damage to macrophytes is limited)	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Marine Fauna – Turtles and birds on shore Sensitivity: H – VH	Avoids disturbance of wildlife and coastal habitat associated with responder activity. Avoids the release of additional chemicals to the environment. Avoids exposing responders to in-field environmental risks.	Oil and residues remain on the shoreline or remobilise resulting in health impacts on turtles, birds, and benthic communities.	Low pressure, large volume flushing (not fresh or hot water) removes hydrocarbon from the immediate wash zone, minimizing potential for oiling of turtles, birds, and benthic communities on shore. Is most effective when oil is fresh and liquid.	Unable to recover hydrocarbon from high-energy shores. Oily effluents can impact biologically rich lower tidal levels if not contained.	Helps to break down hydrocarbon and remove oil from shorelines that would otherwise come into contact with onshore wildlife.	Disturbance of nesting, resting, feeding or breeding populations. Loss of shorebird prey species from physical disturbance of shoreline e.g. crustaceans, nematodes and other infauna resulting in secondary impacts on feeding migratory bird species.	By removing oil from shorelines, minimises direct contact of oil with resting, feeding or breeding shorebirds, and with turtles as they haul out onto shore. Can be used to protect targeted resources from oiling.	Disturbance of nesting, resting, feeding or breeding populations. Loss of shorebird prey species from physical clean-up activities e.g. crustaceans, nematodes and other infauna resulting in secondary impacts on feeding migratory bird species.	By removing oil from shorelines, minimises direct contact of oil with resting, feeding or breeding shorebirds, and with turtles as they haul out onto shore. Limits the potential generation of waste.	Disturbance of nesting, resting, feeding or breeding populations. Loss of shorebird prey species from physical clean-up activities e.g. crustaceans, nematodes and other infauna resulting in secondary impacts on feeding migratory bird species.
Predicted outcomes	Positive (for low level oiling)		Positive (where it can reduce direct oiling of pinnipeds with minimal disturbance.)		Negative		Positive (when used to protect/deflect)		Positive	

Social infrastructure – Tourism and recreation Note: other social infrastructure items are addressed below under *Man-made structures* Sensitivity: M	Avoids interference with tourism and recreation associated with responder activity. Avoids the release of additional chemicals to the environment. Avoids exposing responders to in-field environmental risks.	Oily residues could persist on shorelines in low energy environments for extended periods and impact on tourism and recreational activities. Residues could remobilize to more sensitive shorelines. Community dissatisfaction with apparent lack of response.	Dislodges debris and hydrocarbon from targeted wash zone. Increases opportunity to recover hydrocarbon and debris.	Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. High pressure dislodges and hot water harms sessile fauna and other marine organisms on natural and artificial substrates.	Helps to break down hydrocarbon that would otherwise interfere with tourism and recreational activities.	Clean-up activities can interfere with tourism and recreation activities. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment and waste collection facilities.	Removes oil from the environment. Can be used to protect targeted resources from oiling.	Clean-up activities can interfere with tourism and recreation activities. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment and waste collection facilities.	Removes oil from the environment. Limits the potential generation of waste.	Clean-up activities can interfere with tourism and recreation activities. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment and waste collection facilities.
Predicted outcomes	Positive (for low level oiling)		Positive		Positive		Positive		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Cultural Values Sensitivity: H	Avoids interference with coastal heritage sites and cultural values from responder activities. Avoids the release of additional chemicals to the environment. Avoids exposing responders to in-field environmental risks.	Oily residues could persist on shorelines in low energy environments for extended periods and impact heritage sites or other land use rights. Residues could remobilize to more sensitive shorelines. Community dissatisfaction with apparent lack of response.	Dislodges debris and hydrocarbon from targeted wash zone. Increases opportunity to recover hydrocarbon and debris.	Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. High pressure and hot water could damage vulnerable heritage sites e.g. emergent shipwrecks.	Helps to break down hydrocarbon that would otherwise interfere with coastal heritage sites and cultural values.	Clean-up activities can interfere with coastal heritage sites and cultural values. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment, and waste collection facilities.	Removes oil from the environment that might otherwise interfere with coastal heritage sites and cultural values.	Clean-up activities can interfere with coastal heritage sites and cultural values. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment, and waste collection facilities.	Removes oil from the environment that might otherwise interfere with coastal heritage sites and cultural values. Limits the potential generation of waste.	Clean-up activities can interfere with coastal heritage sites and cultural values. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment, and waste collection facilities.
Predicted outcomes	Positive (for low level oiling)		Positive		Positive		Positive		Positive	
Exposed rocky shores and scarps Sensitivity: L	Wave reflections can help to keep oil offshore and high-energy environment will facilitate rock cleaning naturally. Wave energy breaks down stranded oil into tiny particles. Avoids exposing responders to in-field environmental risks (e.g., high-energy waves and slippery surfaces). Avoids interference from responder activities with coastal habitats. Avoids the release of additional chemicals to the environment.	Some oil could remain in crevices. Residues could remobilize to more sensitive shorelines.	Low pressure, large volume flushing (not fresh or hot water) removes hydrocarbon from the immediate wash zone and facilitates natural cleaning by high-energy waves. Is most effective when oil is fresh and liquid.	Oil could remobilize to more sensitive shorelines. Unable to recover hydrocarbon from high-energy shores. Oily effluents can impact biologically rich lower tidal levels if not contained. High pressure dislodges and hot water harms sessile fauna and other marine organisms on rocky substrates. Exposes spill responders to in-field environmental risks (e.g., high energy waves and slippery surfaces with heavy equipment).	Not applicable to this shoreline type.	Not applicable to this shoreline type.	Limited access would only be available at low tide. Where access is possible, removes oil from the environment.	Exposes spill responders to environmental risks (e.g., high energy waves and slippery surfaces and manual handling risks).	Limited access would only be available at low tide. Where access is possible, removes oil from the environment. Limits the potential generation of waste.	Exposes spill responders to environmental risks (e.g., high energy waves and slippery surfaces and manual handling risks).
Predicted outcomes	Positive		Negative		Not applicable		Negative		Negative	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Fine to medium grained sand beaches Sensitivity: L	Avoids disturbance of bird nesting sites and sensitive supralittoral habitats from responder activity. Restricts spread of contamination by other traffic. High-energy environment can facilitate beach cleaning.	Residues could accumulate and remain buried in the sand or remobilize to more sensitive shorelines. Extends the duration of potential exposure to oil for benthic communities, coastal birds, turtles, and other beach users rather than if other shoreline clean-up tactics were deployed. May require the introduction of exclusion zones until oil degrades naturally.	Low pressure, large volume flushing (not fresh or hot water) removes hydrocarbon from the immediate wash zone and facilitates natural cleaning by high-energy waves. Is most effective when oil is fresh and liquid.	High pressure will wash away sand. High pressure may also direct oil further into substrates. Unlikely that oil can be recovered. Oil may be removed from beach but remobilize to more sensitive shorelines. Exposes responders to environmental risks (heat, bites) in remote area	Helps to break down hydrocarbon and remove oil from shorelines that would otherwise come into contact with onshore wildlife.	Disturbance of turtle and bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon. and waste collection facilities. Altering of sand profile leading to erosion and changes in sand dynamics i.e. deposition and removal by waves and tides. Hydrocarbon can get driven further into sand. Exposes responders to environmental risks (heat, bites) in remote area	Removes oil from the environment. Targeted clean up activity.	Limited effectiveness unless on very low viscosity fluids. Disturbance of turtle and bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon. and waste collection facilities. Potential spread of contamination by collecting, transferring, and transporting oily absorbent material. Exposes responders to environmental risks (heat, bites) in remote area	Removes oil from the environment. Targeted clean up activity. Limits the potential generation of waste.	Disturbance of turtle and bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon and waste collection facilities. Potential spread of contamination by collecting, transferring, and transporting oily wastes. Exposes responders to environmental risks (heat, bites) in remote area
Predicted outcomes	Positive		Positive		Positive		Negative		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Coarse grained sand – gravel beaches Sensitivity: M	Avoids disturbance of sensitive supralittoral habitats from responder activity. Restricts spread of contamination by personnel and traffic. High-energy environment can facilitate beach cleaning.	Oil may penetrate coarse-grained sand rapidly (up to 30 cm). Extends the duration of potential exposure to oil for benthic communities, coastal birds, turtles and other beach users rather than if other shoreline Clean-up tactics were deployed. Morbidity of low densities of animals and plants. May require the introduction of exclusion zones until oil degrades naturally.	Low-pressure flushing can be used to float oil away from sediments for recovery by skimmers or sorbents in calm conditions.	High-pressure spraying has potential to transport contaminated finer sediments (sand) to the lower intertidal or subtidal zones. High pressure may also direct oil further into substrates. Exposes responders to environmental risks (heat, bites) in remote area	Helps to break down hydrocarbon and remove oil from shorelines that would otherwise come into contact with onshore wildlife.	Not suitable for all gravel shorelines. Disturbance of turtle and bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon and waste collection facilities. Altering of sand/gravel profile leading to erosion and changes in sand dynamics i.e. deposition and removal by waves and tides. Exposes responders to environmental risks (heat, bites) in remote area	Removes oil from the environment. Targeted clean up activity.	Limited effectives unless on very low viscosity fluids. Disturbance of turtle and bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon and waste collection facilities. Potential spread of contamination by collecting, transferring and transporting oily absorbent material. Exposes responders to environmental risks (heat, bites) in remote area	Removes oil from the environment. Targeted clean up activity. Limits the potential generation of waste.	Disturbance of turtle and bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon and waste collection facilities. Potential spread of contamination by collecting, transferring and transporting oily wastes. Exposes responders to environmental risks (heat, bites) in remote area
Predicted outcomes	Positive		Positive		Not applicable		Positive		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Exposed tidal flats Sensitivity: M	Avoids disturbance of sensitive supralittoral habitats from responder activity. Restricts spread of contamination by personnel and traffic. Currents and waves can be very effective in natural removal of the oil.	Extends the duration of potential oil exposure for high density of infauna, roosting and foraging birds and foraging fish. Biological damage may be severe, primarily to infauna, thereby reducing food sources for birds and other predators. May require the introduction of exclusion zones until oil degrades naturally. Residues could remobilize to even higher sensitive shorelines.	Removes oil from the targeted wash zone and facilitates natural cleaning by high-energy waves. Only low-pressure flushing is suitable.	High-pressure spraying has potential to transport contaminated finer sediments to the lower intertidal or subtidal zones or direct oil further into substrates. If not contained, dislodged oil and debris may spread to otherwise non-affected areas. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates. Exposes responders to environmental risks (heat, bites) in remote area	Helps to break down hydrocarbon and remove oil from shorelines that would otherwise come into contact with onshore wildlife.	Heavy equipment not suitable for all soft substrate shorelines. Disturbance of bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon and waste collection facilities. Altering of mud profile leading to erosion and changes in shoreline dynamics i.e. deposition and removal by waves and tides. Potential to force oil into substrate. Exposes responders to environmental risks (heat, bites) in remote area	Removes oil from the environment. Targeted clean up activity.	Limited effectives unless on very low viscosity fluids. Clean-up can be done only during low tide, thus there is a narrow window of opportunity. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates. Exposes responders to environmental risks (heat, bites) in remote area	Removes oil from the environment. Targeted clean up activity. Limits the potential generation of waste.	Clean-up can be done only during low tide, thus there is a narrow window of opportunity. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates. Potential to force oil into substrate. Exposes responders to environmental risks (heat, bites) in remote area
Predicted outcomes	Positive		Positive (low pressure only)		Negative		Negative		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Sheltered scarps and rocky shores, Man-made structures and Social infrastructure Sensitivity: M	Oil is unlikely to adhere to wet substrates but may be held offshore by waves reflecting off steep, hard surfaces in exposed settings. Restricts spread of contamination by other traffic. Avoids the release of additional chemicals to the environment. Avoids exposing responders to in-field environmental risks. Avoids the release of additional chemicals to the environment.	Infrastructure in low energy environments could remain oiled for extended periods. Oil may adhere to the dry, rough surfaces. Resistant oil may remain as a patchy band at or above the high-tide line. Residues could remobilize to more sensitive shorelines. Community dissatisfaction with apparent lack of response.	Dislodges debris and hydrocarbon from port/jetty and riprap structures. Increases opportunity to recover hydrocarbon and debris.	Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. High pressure dislodges and hot water harms sessile fauna and other marine organisms on natural and artificial substrates.	Not applicable.	Not applicable.	Removes oil from the environment. Targeted clean up activity. Can be used to protect targeted resources from oiling.	Limited effectiveness. Clean-up activities can interfere with users of social infrastructure. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment and waste collection facilities.	Removes oil from the environment. Targeted clean up activity. Limits the potential generation of waste.	Clean-up activities can interfere with users of social infrastructure. Disturbance of local amenity and sensitive coastal flora by spill responders, traffic, vessel operations, equipment and waste collection facilities.
Predicted outcomes	Positive		Positive		Not applicable		Positive		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Sheltered tidal flats Sensitivity: M	Soft sediments cannot support even light foot traffic in many areas.	High sedimentation rate incorporates oil into sediment. Extends the duration of potential oil exposure for bivalves, worms and other invertebrates in the sediments. Extends the duration of exposure allowing oil to penetrate into burrows, desiccation cracks and crevices in muddy sediments.	Removes hydrocarbon from the immediate wash zone. Low-pressure flushing may be suitable in calm areas where oil can be captured	Potential to drive hydrocarbon into the sediment. If not contained, dislodged oil and debris may spread to otherwise non-affected areas. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates.	Not applicable.	Heavy equipment not suitable for all soft substrate shorelines. Disturbance of bird nesting sites and sensitive supralittoral habitats from responder activity, vehicles, equipment, decon and waste collection facilities. Altering of mud profile leading to erosion and changes in shoreline dynamics i.e. deposition and removal by waves and tides.	Removes oil from the environment. Targeted clean up activity.	Clean-up can be done only during low tide, thus there is a narrow window of opportunity. Limited effectiveness. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates.	Removes oil from the environment. Targeted clean up activity. Limits the potential generation of waste.	Clean-up can be done only during low tide, thus there is a narrow window of opportunity. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates. Potential to force oil into substrate.
Predicted outcomes	Positive		Positive (low pressure only)		Negative		Positive		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	1. Natural cleaning		2. Flushing (High pressure / low pressure)		3. Ploughing / harrowing		4. Adsorbents		5. Manual collection	
	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Marshes and mangroves Sensitivity: H	Avoids disturbance of sensitive high use habitats from responder activity i.e. trampling of plants, disturbance of soft sediment substrate, and mixing oil deeper into sediments. Clean-up may cause more harm than good. Avoids personnel exposure to environmental hazards in difficult to access locations and hazards associated with boat operations. Restricts spread of contamination by personnel and traffic.	Extends the duration of oil exposure for abundant resident flora, fauna due to high use by birds, fish, and shellfish. Large slicks will persist through multiple tidal cycles and will coat the entire stem from the high-tide line to the base. Heavy and emulsified oil can be trapped in thickets of mangrove prop roots or dense young trees. Re-oiling from re-suspended or released oil residues may cause additional injury over time.	Potential to drive hydrocarbon into the sediment.	Unable to recover hydrocarbon / wash water. Disturbance and damage to vegetation (including root systems) and invertebrates/ fish/ wader habitats.	Not applicable for this habitat type.	Not applicable for this habitat type.	Removes oil from the environment. Can reduce direct wildlife contact with hydrocarbon / residues. Can be used to protect targeted resources from oiling.	Limited access. Limited effectiveness on fringes. Damage to root systems and invertebrates/ fish. Physical disturbance to vegetation and high value habitat due to hydrocarbon removal activities, equipment movements, and personal, vessel and vehicular traffic. Disturbance of wildlife due to noisy activity.	Removes oil from the environment. Targeted clean up activity. Can reduce direct wildlife contact with hydrocarbon / residues. Limits the potential generation of waste.	Limited access. Damage to root systems and invertebrates/ fish. Physical disturbance to vegetation and high value habitat due to hydrocarbon removal activities, equipment movements, and personal, vessel and vehicular traffic. Disturbance of wildlife due to noisy activity. Potential to force oil into substrate.
Predicted outcomes	Positive		Negative		Not applicable		Positive (where damage to vegetation and substrate is limited)		Positive (where damage to vegetation and substrate is limited)	

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Macroalgae (kelp) and seagrass Sensitivity: M	None.	Disturbance of shoreline stability and benthic habitat or increased turbidity in inshore waters with resultant acute or chronic effects. Limited effectiveness. Distributes oil amongst seagrass and kelp. Unable to recover oil and contaminated blast material.	Removes debris and hydrocarbon from the environment.	Access may be limited. Equipment not suitable for soft substrate types and would increase damage to macrophytes (by physical disturbance) if used on intertidal habitat.	Helps to break down hydrocarbon.	Exposes macrophytes and inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Some emergent macrophytes may respond positively to cutting below the water surface to avoid direct contact with oil on the water surface	Involves significant physical disturbance to vegetation due to inaccessibility and handling of vegetation. May disturb and remove sediment dwelling organisms and other wildlife. Heavy foot traffic may cause root damage and delayed recovery.
Predicted outcomes	Negative		Negative		Negative		Positive (for some vegetation types)	

Marine Fauna – Turtles and birds on shore Sensitivity: H – VH	Dislodges hydrocarbon from the immediate target zone, minimizing potential for oiling of turtles, birds, and benthic communities on shore.	Disturbance of nesting, resting, feeding or breeding populations. Harm to prey species and habitat from blast and steam. Unable to recover hydrocarbon and blast material from high energy shores. Oily effluents and blast material can impact biologically rich lower tidal levels if not contained.	By removing oil from shorelines, minimises direct contact of oil with nesting, resting, feeding or breeding shorebirds, and with turtles as they haul out onto shore.	Disturbance of resting, feeding or breeding populations. Loss of shorebird prey species from physical clean-up activities e.g. crustaceans, nematodes and other infauna resulting in secondary impacts on feeding migratory bird species.	Helps to break down hydrocarbon and remove oil from shorelines that would otherwise come into contact with onshore wildlife.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants. Incidental contact of wildlife with dispersant increases wettability of fur and feathers resulting in hypothermia or toxic impacts from ingestion during preening.	Can reduce direct wildlife contact with hydrocarbon / residues.	Disturbance of resting, feeding or breeding populations.
Predicted outcomes	Negative		Negative		Negative		Positive (where disturbance to pinnipeds is minimal)	

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Tourism and recreation Sensitivity: M	Dislodges debris and hydrocarbon from targeted wash zone. Increases opportunity to recover hydrocarbon and debris.	Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. Harm to prey species, sessile fauna and other marine organisms on natural and artificial substrates from blast and steam.	Removes oil from the environment.	Clean-up activities can interfere with tourism and recreation activities. Disturbance of local amenity and sensitive coastal flora by spill responders, heavy machinery, traffic, equipment and waste collection facilities. Spread of contaminated material by vehicles and poor waste management.	Helps to break down hydrocarbon so may reduce duration of restrictions on tourism and recreation activities.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Removes hydrocarbon from the environment allowing remaining vegetation to recover.	Clean-up activities can interfere with tourism and recreation activities. Disturbance of local amenity and sensitive coastal flora by spill responders, heavy machinery, traffic, equipment and waste collection facilities. Spread of contaminated material by vehicles and poor waste management.
Predicted outcomes	Negative		Positive		Negative		Positive	

Cultural Values Sensitivity: H	Dislodges debris and hydrocarbon from targeted wash zone. Increases opportunity to recover hydrocarbon and debris.	Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. Harm to prey species, sessile fauna and other marine organisms on natural and artificial substrates from blast and steam. Blast and steam could damage vulnerable heritage sites e.g. emergency shipwrecks.	Not suitable for soft sandy or muddy beaches. Accessibility issues.	Potential damage to sites of cultural significance. Change in stability around these sites due to compaction or altering of substrate profile. Spread of contaminated material by vehicles and poor waste management.	Helps to break down hydrocarbon so may reduce duration of restrictions on access to heritage sites and impacts on cultural values.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Removes hydrocarbon from the environment allowing remaining vegetation to recover.	Potential damage to sites of cultural significance. Spread of contaminated material by vehicles and poor waste management.
Predicted outcomes	Negative		Positive		Negative		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Exposed rocky shores and scarps Sensitivity: L	Dislodges debris and hydrocarbon from targeted wash zone. Increases opportunity to recover hydrocarbon and debris	Disturbance of resting, feeding or breeding populations. Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. Harm to prey species, sessile fauna and other marine organisms on natural and artificial substrates from blast and steam. Exposes spill responders to in-field environmental risks (e.g., high-energy waves and slippery surfaces with heavy noisy equipment).	Removes debris and hydrocarbon from the environment.	Health and safety risks in slippery, unstable environment and dangers associated with high-energy dynamic environment. Access in these environments may be limited. Physical disturbance of wildlife, vegetation and habitat due to hydrocarbon removal activities, equipment movements, and personal and vehicular traffic. May remove shallow burrowing organisms.	Helps to break down hydrocarbon.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Not applicable due to limited vegetation in this dynamic environment.	Not applicable.
Predicted outcomes	Negative		Negative		Negative		Negative	

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Fine to medium grained sand beaches Sensitivity: L	Dislodges debris and hydrocarbon from targeted wash zone. Increases opportunity to recover hydrocarbon and debris	Disturbance of resting, feeding or breeding populations. Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. Harm to prey species, sessile fauna and other marine organisms on sandy substrates from blast and steam.	Removes bulk oil and debris from the environment when properly managed.	Equipment not suitable on soft sandy beaches. Removes bulk sand and debris, some of which may not be oiled. Altering of sand profile leading to erosion and changes in sand dynamics i.e. deposition and removal by waves and tides. Potential spread of contaminated material by vehicles and poor waste management. Potential for hydrocarbon to be driven further into sand	Helps to break down hydrocarbon.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Generally not applicable due to limited vegetation in this dynamic environment. May be considered for vegetation oiled as a result of King tide and spray drift.	Direct impacts on sensitive coastal species that can be slow to recover. May reduce dune stability.
Predicted outcomes	Negative		Positive		Negative		Positive	

Coarse grained sand – gravel beaches Sensitivity: L	Dislodges debris and hydrocarbon from targeted wash zone. Increases opportunity to recover hydrocarbon and debris	Disturbance of resting, feeding or breeding populations. Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. Harm to prey species, sessile fauna and other marine organisms on sand/gravel substrates from blast and steam.	Removes bulk oil and debris from the environment.	Removes bulk sand, gravel and debris, some of which may not be oiled. Altering of sand/gravel profile and compaction leading to erosion and changes in dynamics i.e. deposition and removal by waves and tides. Spread of contaminated material by vehicles and poor waste management. Hydrocarbon gets driven further into sand/gravel.	Helps to break down hydrocarbon.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Generally not applicable due to limited vegetation in this environment. May be considered for vegetation oiled as a result of king tide and spray drift.	Direct impacts on sensitive coastal species that can be slow to recover. May reduce dune stability.

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Predicted outcomes	Negative		Negative		Negative		Positive	

Exposed tidal flats Sensitivity: M	Removes oil from the targeted wash zone and facilitates natural cleaning by high-energy waves.	Disturbance of resting, feeding or breeding populations. Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. Harm to prey species, sessile fauna and other marine organisms on sand/gravel substrates from blast and steam. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates. Exposes spill responders to in-field environmental risks e.g. high energy waves and slippery surfaces with heavy noisy equipment.	Removes bulk oil and debris from the environment.	Equipment not suitable on soft mud substrate. Removes bulk sand and debris, some of which may not be oiled. Will remove shallow burrowing organisms. Secondary impacts on waders due to loss of food source. Disturbance of wildlife and feeding opportunity due to noise and activity. Altering of shoreline profile leading to erosion and changes in sand dynamics i.e. deposition and removal by waves and tides. Spread of contaminated material by vehicles and poor waste management. Hydrocarbon gets driven further into sand.	Helps to break down hydrocarbon.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Removes hydrocarbon from the environment allowing remaining vegetation to recover.	Heavy foot traffic or vessel movement may cause root damage and delayed recovery of soft substrate habitat. May disturb sediment dwelling organisms, fish nurseries and other wildlife in this high value habitat. May contribute to erosion due to loss of vegetation.
Predicted outcomes	Negative		Negative		Negative		Positive	

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Sheltered scarps and rocky shores, Man-made structures and Social infrastructure Sensitivity: M	Dislodges debris and hydrocarbon from port/jetty and riprap structures. Increases opportunity to recover hydrocarbon and debris.	Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. High pressure dislodges and hot water harms sessile fauna and other marine organisms on natural and artificial substrates.	Not applicable.	Not applicable.	Helps to break down hydrocarbon.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Not applicable due to limited vegetation in this environment.	Not applicable
Predicted outcomes	Negative		Not applicable		Positive (in limited applications where oil/dispersant mix does not present risk)		Not applicable	

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Sheltered tidal flats Sensitivity: M	Removes hydrocarbon from the immediate wash zone. Low-pressure flushing may be suitable in calm areas where oil can be captured	Disturbance of resting, feeding or breeding populations. Oil could remobilize to more sensitive shorelines. Oily effluents can impact biologically rich lower tidal levels if not contained. Harm to prey species, sessile fauna and other marine organisms on soft mud substrates from blast and steam. Disturbance and damage to vegetation and invertebrates/ fish/ wader habitats resulting from access over soft substrates.	Removes bulk oil and debris from the environment.	Equipment not suitable on soft mud substrate. Removes bulk sand and debris, some of which may not be oiled. Will remove shallow burrowing organisms and prey species. Secondary impacts on waders due to loss of food source. Disturbance of wildlife and feeding opportunity due to noise and activity. Altering of sand profile leading to erosion and changes in sand dynamics i.e. deposition and removal by waves and tides. Spread of contaminated material by vehicles and poor waste management. Hydrocarbon gets driven further into sand.	Helps to break down hydrocarbon.	Exposes inshore marine organisms to toxic components of entrained hydrocarbons and surfactants.	Removes hydrocarbon from the environment allowing remaining vegetation to recover.	Involves significant physical disturbance to vegetation due to inaccessibility and handling of vegetation. Heavy foot traffic or vessel movement may cause root damage and delayed recovery of soft substrate habitat. May disturb sediment dwelling organisms, fish nurseries and other wildlife in this high value habitat. May contribute to erosion due to loss of vegetation.
Predicted outcomes	Negative		Negative		Negative		Positive (where access does not cause greater damage)	

Receptor & sensitivity ranking (L, M, H, VH)	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts	Benefits (pros)	Direct / indirect impacts
Marshes and mangroves Sensitivity: H	Dislodges oil.	Damage to vegetation (including root systems) and invertebrates/ fish/ wader habitats.	Removes large volumes of hydrocarbon and debris from the environment	Limited access. Damage to root systems and invertebrates/ fish. High degree of physical disturbance to vegetation, high value habitat due to hydrocarbon removal activities, equipment movements, and personal, vessel and vehicular traffic. Disturbance of wildlife due to machinery operation (noise, fumes and activity).	Helps to break down hydrocarbon. Can reduce direct wildlife contact with hydrocarbon / residues.	Increases exposure of marshes, mangroves and inshore marine organisms to toxic components of entrained hydrocarbons and dispersant.	Removes hydrocarbon from the environment allowing remaining vegetation to recover. Mangroves may be slow to recover. Can reduce direct wildlife contact with hydrocarbon / residues.	Limited access. Involves significant physical disturbance to vegetation due to inaccessibility and handling of vegetation. Heavy foot traffic or vessel movement may cause root damage and delayed recovery. May disturb sediment dwelling organisms, fish nurseries and other wildlife in this high value habitat. May contribute to erosion due to loss of vegetation.
Predicted outcomes	Negative		Negative		Negative		Positive (where access does not cause greater damage)	

# Appendix C	Operational and Scientific Monitoring (OSM) Bridging Implementation Plan (BIP)

OPEP Appendix C: Operational and Scientific Monitoring Bridging Implementation Plan

Beehive-1 Exploration Drilling

WA-488-P

16 December 2024

Rev 6

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DOCUMENT CONTROL

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0	29/04/2022	Issued for use	CR	GP, JC, NP	NG, PW
A	27/04/2022	Issued for client review	CR	GP	GP

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APPENDICES

FIGURES

TABLES

Part A – Preparedness

This Plan is presented in two parts. Part A outlines the relationship between EOG's environmental management document framework and the Joint Industry Operational and Scientific Monitoring (OSM) Framework (APPEA, 2021). Part B provides operationally focussed guidance for EOG personnel and OSM Service Providers to coordinate the implementation of monitoring plans.

1 Introduction

EOG has elected to use the Joint Industry OSM Framework and supporting OMPs and SMPs as the foundation of its OSM approach. The Joint Industry OSM Framework is available on the AEP Environment Publications Webpage. Use of the Joint Industry OSM Framework requires EOG to develop a Bridging Implementation Plan (this plan) which fully describes how the Framework interfaces with EOG's activities, spill risks and internal management systems.

The OMPs and SMPs which form part of the Joint Industry OSM Framework are listed in Table 1.1 along with information on which are applicable to EOG's activities, and the responsibility for implementing them. RPS AAP Consulting Pty Ltd (RPS) are the nominated OSM service provider for this OSM Bridging Implementation Plan (OSM BIP).

Table 1.1 Monitoring plans applicable to EOG's activities

Plan	Applicable?	Responsibility
Operational Monitoring Plans		
OMP 01 - Air Quality Modelling (Responder health and safety)	Yes	DIMT (AMOSC)
OMP 02 - Hydrocarbon Properties and Weathering Behaviour	Yes	RPS
OMP 03 - Marine Fauna Assessment - Reptiles	Yes	RPS
OMP 04 - Marine Fauna Assessment- Cetaceans	Yes	RPS
OMP 05 - Marine Fauna Assessment- Dugongs	Yes	RPS
OMP 06 - Marine Fauna Assessment- Fish	Yes	RPS
OMP - Marine Fauna Assessment- Pinnipeds	No	-
OMP 07 - Marine Fauna Assessment- Seabirds and shorebirds	Yes	RPS
OMP 08 - Oil Spill Modelling Assessment	Yes	DIMT (AMOSC)
OMP 09 - Pre-emptive desktop assessment of sensitive receptors at risk	Yes	DIMT (Environment Unit)
OMP 10 - Sediment Quality Assessment	Yes	RPS
OMP 11 - Shoreline Clean-up Assessment Technique	Yes	DIMT
OMP - Subsea Dispersant Injection Effectiveness Assessment	No	-
OMP 12 - Surface Chemical Dispersant Fate and Effectiveness Assessment	Yes	RPS
OMP 13 - Water Quality Assessment	Yes	RPS
Scientific Monitoring Plans		
SMP 01 - Benthic Habitat Assessment	Yes	RPS
SMP 02 - Commercial and Recreational Fisheries Impact Assessment	Yes	RPS
SMP 03 - Heritage Features Assessment	Yes	RPS (shipwrecks and aircraft only)/Xenith (cultural heritage)

Plan	Applicable?	Responsibility
SMP 04 - Intertidal and Coastal Habitat Assessment	Yes	RPS
SMP 05 - Marine Fish and Elasmobranch Assemblages Assessment	Yes	RPS
SMP - Marine Megafauna - Pinnipeds	No	-
SMP 06 - Marine Megafauna - Reptiles	Yes	RPS
SMP 07 - Marine Megafauna - Whale Shark, Dugong and Cetaceans	Yes	RPS
SMP 08 - Seabirds and Shorebirds	Yes	RPS
SMP 09 - Sediment Quality Impact Assessment	Yes	RPS
SMP 10 - Social Impact Assessment	Yes	RPS (shipwrecks and aircraft only)/Xenith (cultural heritage)
SMP 11 - Water Quality Impact Assessment	Yes	RPS

Table 1.2 describes key documents that form EOG's environmental management document framework.

Table 1.2 Key documents in EOG's environmental management framework

Document	Description
Beehive-1 Drilling Environment Plan (EP) (996161-2022-Beehive#1-Drilling-EP)	These plans describe the activity and the location, the environment, the risks to the environment as a result of each activity and the associated management controls. Of particular relevance to these plans, they identify sensitive receptors, potential impacts from hydrocarbon spills and the environment that may be affected (EMBA).
Beehive Multi-Well Exploration Drilling Environment Plan (EP) (996161-2024-Beehive-MW-Drilling-EP)	
Beehive-1 Drilling Oil Pollution Emergency Plan (OPEP) (996161-2022-Beehive#1-Drilling-OPEP)	This plan provides the activation and response process for the credible spill scenarios, including incident management, net environmental benefit analysis (NEBA) process and detailed implementation guidance for individual response options. Of particular relevance to this plan, it identifies the credible spill scenarios and protection priorities.
LPM Drilling Emergency Response Plan (ERP)	EOG has contracted Labrador Petro-Management Pty Ltd (LPM) to provide integrated operations project management services for the Beehive-1 Drilling Program, including emergency response and incident management support. LPM will supply the majority of the Drilling Incident Management Team (DIMT) and a Drilling Supervisor (DSV) onboard the MODU. The LPM ERP describes their organisational responsibilities, actions, reporting requirements and resources required to manage crises and emergencies.
Beehive-1 Drilling Bridging ERP	Overarching ERP to link the emergency response protocols of EOG, LPM, the MODU contractor and vessel contractor/s. Describes roles and responsibilities of the DIMT in response to an emergency, with the

Document	Description
	exception of OSM roles which are detailed in this plan. This plan will be developed at least 12 weeks prior to the activity commencing.
Management Contacts (Appendix to the Beehive-1 Drilling Bridging ERP)	This document contains all relevant contact and communications information to enable effective communication amongst the response personnel and external stakeholders, including relevant OSM contacts. The Emergency Management Contacts Directory will be reviewed on a weekly basis and updated as required.

2 EMBA and Monitoring Priorities

The EMBA by a loss of well control (LoWC) event during the Beehive-1 drilling activity was determined using the combined stochastic results of oil spill trajectory modelling (OSTM) (RPS, 2022) from 100 simulations per season (summer, winter, transitional) and applying the following thresholds:

- 1 g/m^2 floating oil thickness, which is considered to be below levels which would cause environmental harm and is more indicative of the areas perceived to be affected due to its visibility on the sea-surface
- 10 g/m^2 for accumulated (shoreline) oil, which represents the area visibly contacted by the spill
- 10 ppb for dissolved hydrocarbons corresponds generally with potential for exceedance of water quality triggers
- 10 ppb entrained hydrocarbons represents the low exposure zone and corresponds generally with potential for exceedance of water quality triggers.

The parameters used in the OSTM for Beehive-1 are the same as those for the multi-well drilling campaign, and therefore the Beehive-1 OSTM results apply to the multi-well campaign, as do the monitoring priorities as outlined in this document.

Monitoring priorities have been drawn from the protection priorities identified in the Beehive-1 Drilling EP and OPEP. These priorities were identified through analysis of hydrocarbon spill modelling results against the location of key sensitive receptors with high conservation value; including habitat, species (e.g. State/Territory/Commonwealth protected areas, protected species), the sensitivity and/or recoverability of receptors to hydrocarbon impacts, and important socio-economic/heritage values.

Detailed information on the spill risks, modelling analysis of scenarios and protection priorities is provided in the Beehive-1 EP and OPEP. The following tables provide a summary of the locations, key receptors, and spill modelling results for the worst-case scenario from the Beehive-1 Drilling OPEP and EP. Table 2.1 presents the results for floating oil, including probability and time to contact at the low threshold, as described above. Table 2.2 presents the entrained oil results, understanding that 10 ppb aligns with the lowest trigger levels also described above.

The shoreline cells used in the Western Australia Marine Pollution Risk Assessment (WAMOPRA) web map application (WAMOPRA (navigatusconsulting.com)) have been used throughout the OSM BIP.

Using OSTM to help prioritise resources to implement monitoring programs, (including the collection of baseline data) can be useful. For example, sensitive locations with a high probability of rapid contact with an oil spill will be the priority of a monitoring program, compared to similar locations with a lower probability and longer time for contact following a spill, where time may permit the collection of reactive (post-spill but pre-contact) baseline data.

These results have been used to determine the priority monitoring locations and receptors within the EMBA. The priorities vary according to each spill scenario (i.e., season), although the summer scenario typically presents the worst-case time to contact and probabilities for floating oil and highest probabilities for entrained oil.

Table 2.1 Monitoring priorities based on floating oil[1]

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Cox-Finniss				16	24.79	1	95.71	-	-
	Fog Bay (Finniss River)	Nationally Important Wetland (Finniss Floodplain and Fog Bay Systems) Largetooth sawfish pupping known to occur	Mangrove, rock, sand						
	Dundee Beach	Holiday park and accommodation Flatback turtle inter-nesting BIA Olive Ridley turtle inter-nesting BIA Largetooth sawfish likely to occur in wet season	Sand						
	Peron Island North	Flatback turtle inter-nesting BIA	Mangrove, rock, sand	19	17.38	2	91.71	-	-
	Peron Island South			6	22.71	-	-	-	-
Daly				35	15.33	-	-	1	80.5
	Daly River mouth	Nationally Important Wetland (Daly-Reynolds Floodplain-Estuary System) Flatback turtle inter-nesting BIA	Mangroves						
	Headland SW of Daly River	Estuary system	Mangroves, sand						
Thamarrurr				71	14.5	40	22.79	29	42.63
	Nemarluk estuaries	Estuary system	Mangroves, mudflats						
	Thamarrurr	Estuary system	Mangroves, mudflats, sand						
	Moyle River	Nationally Important Wetland (Moyle Floodplain and Hyland Bay System) Juvenile largetooth sawfish likely to occur in wet season	Mangroves, sand, mudflats						
	Dorcherty Island	Turtles	Mangroves, sand, mudflats	55	17.29	13	23.71	19	35.88
	River at Ditchi/Yelcher Beach (south of Wadeye)	Estuary system	Mangroves, sand						
	Kumbunbar Creek (and creek north of it)	Estuary system	Mangroves, mudflats						
	Whale Flat	Estuary system		33	21.54	22	29.79	13	54.75
	Emu Reefs	Reefs		59	6.96	8	65.04	11	31.46
Victoria-Daly				67	18.08	36	14.29	48	14.92
	Fitzmaurice River (and surrounds)	Estuary system	Mangroves, mudflats						
	Victoria River (and surrounds)	Estuary system	Mangroves, mudflats						
	Forsyth Creek	Water intake for Seafarms prawn farm	Mangroves, mudflats						
	Keep River estuary/Turtle Point	Turtles	Sand, mangroves, mudflats	37	23.5	16	29.33	27	14.92
	Baines River (and surrounds)	Nationally Important Wetland (Legune Wetlands) Largetooth sawfish pupping known to occur	Mangroves, mudflats						
	Clump Island			25	18.13	15	31.46	5	65.08
	Quoin Island			33	18	29	27.75	29	41.33

1 Prob. Probability (%) of floating oil contact at ≥ 1.0 g/m^2
Min. time Minimum time to floating oil contact (days) at ≥ 1.0 g/m^2

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Wyndham-East Kimberley				70	14.92	77	14.5	93	9.46
	North Kimberley MP Shoreline cells (SC) 1	King Shoals Sanctuary Zone/Cape Domett Special Purpose Zone		91	5.63	90	7.33	98	8.08
	Cambridge Gulf (mouth is 21 km wide) SC: 2 3	West Kimberley National Heritage coast (west side of gulf) Flatback turtle inter-nesting BIA Largetooth sawfish pupping known to occur	Mangroves, mudflats, rocky (western side)						
	Cape Domett and Lacrosse Island (entrance to Cambridge Gulf) SC: 8	Flatback turtle nesting BIA (all year, peak July-Sept)	Sand, mangroves, mudflats						
	Ord River Floodplain (northern area) SC: 4 5 6 7	The West Kimberley National Heritage coast North Kimberley Marine Park Ramsar wetland Nationally Important Wetland (Ord Estuary System) Flatback turtle inter-nesting BIA	Mangroves, mudflats	12	28.71	13	46.08	8	47.33
	Drysdale River (east of Kalumburu, near northern tip of WA) SC: 0	The West Kimberley National Heritage coast North Kimberley Marine Park Largetooth sawfish pupping likely to occur Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Mangroves, rock, sand						
	Berkley River SC: 10 11 12 13 14	The West Kimberley National Heritage coast North Kimberley Marine Park Tourist lodge (landing strip here) Lesser crested tern breeding BIA	Sand, rock, mangroves						
	Sir Graham Moore Island (north of Kalumburu) SC: 15 16 17 18	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding	Sand, rock, mangroves						
Mitchell River				70	14.92	77	14.5	93	9.46
	Cassini Island Holothuria Banks SC: 282 283 284 285	The West Kimberley National Heritage coast North Kimberley Marine Park Green turtle nesting Green turtle inter-nesting BIA Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Rocky cliff, sand	40	19.29	53	13	61	17.38
	Islands west of Kalumburu, north of Mitchell River Tait Bank SC: 19 20 21 22 23 24 25 26 27 28 29	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding Lesser frigatebird breeding (Mar-Sept)	Sand, rock, mangroves	29	37	38	29.17	33	19.88
	Bigge Island Robroy Reefs SC: 30 31	The West Kimberley National Heritage coast North Kimberley Marine Park Indo-Pacific humpback dolphin BIA (calving, foraging) Lesser crested tern breeding BIA	Rock, mangroves, sand	10	64.5	12	39.13	3	50.33

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Ashmore Reef/Cartier Island									
	Cartier Island	Australian Marine Park Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA Lesser frigatebird breeding BIA (Mar-Sept) Red-footed booby breeding BIA Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Lesser sand-plovers Eastern reef egrets Ruddy turnstones Crested terns Bridled terns Roseate terns	Sand (surrounded by coral reef flats in lagoon)	-	-	-	-	2	66.75
	Ashmore Reef	Australian Marine Park Ramsar wetland Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate tern breeding Lesser frigatebird breeding (Mar-Sept) Greater frigatebird breeding Lesser crested tern breeding BIA Red-footed booby breeding BIA Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Common noddies (second largest colony in Australia) Sooty terns (largest colony in WA) Crested terns	Sand (surrounded by coral reef in lagoon)	-	-	-	-	1	80.79

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Prob.	Min. time	Prob.	Min. time	Prob.	Min. time
Scott Reef/ Browse Island									
	Browse Island SC: 302	Green turtle nesting Flatback turtle nesting Crested tern breeding BIA (western side) Eastern reef egrets Ruddy turnstones Sooty terns	Coral reef, sand	13	50.96	14	47.79	4	62.17
	Scott Reef NR	Green turtle inter-nesting BIA (genetically distinct breeding population) Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate terns Lesser frigatebirds Brown boobies Spinner dolphins	Coral reef	3	69.92	-	-	-	-
	Scott Reef North (SC:306)			2	63.67	-	-	-	-
	Scott Reef South (SC:307)			4	63.75	-	-	-	-

Table 2.2 Monitoring priorities based on entrained oil[2]

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Max.	Prob,	Max.	Prob,	Max.	Prob,
Cox-Finniss				4,105	57	2,527	4	6	-
	Fog Bay (Finniss River)	Nationally Important Wetland (Finniss Floodplain and Fog Bay Systems) Largetooth sawfish pupping known to occur	Mangrove, rock, sand						
	Dundee Beach	Holiday park and accommodation Flatback turtle inter-nesting BIA Olive Ridley turtle inter-nesting BIA Largetooth sawfish likely to occur in wet season	Sand						
	Peron Island North	Flatback turtle inter-nesting BIA	Mangrove, rock, sand	3,934	59	1,333	5	10	1
	Peron Island South			2,769	58	1,261	4	6	-
Daly				5,442	73	3,227	23	739	21
	Daly River mouth	Nationally Important Wetland (Daly-Reynolds Floodplain-Estuary System) Flatback turtle inter-nesting BIA	Mangroves						
	Headland SW of Daly River	Estuary system	Mangroves, sand						
Thamarrurr				13,795	82	16,021	57	15,790	59
	Nemarluk estuaries	Estuary system	Mangroves, mudflats						
	Thamarrurr	Estuary system	Mangroves, mudflats, sand						
	Moyle River	Nationally Important Wetland (Moyle Floodplain and Hyland Bay System) Juvenile largetooth sawfish likely to occur in wet season	Mangroves, sand, mudflats						
	Dorcherty Island	Turtles	Mangroves, sand, mudflats	9,502	82	11,379	52	11,284	41
	River at Ditchi/Yelcher Beach (south of Wadeye)	Estuary system	Mangroves, sand						
	Kumbunbar Creek (and creek north of it)	Estuary system	Mangroves, mudflats						
	Whale Flat	Estuary system		4,419	74	4,431	47	4,196	52
	Emu Reefs	Reefs		9,285	84	6,442	53	4,607	34
Victoria-Daly				9,021	80	9,459	53	9,153	60
	Fitzmaurice River (and surrounds)	Estuary system	Mangroves, mudflats						
	Victoria River (and surrounds)	Estuary system	Mangroves, mudflats						
	Forsyth Creek	Water intake for Seafarms prawn farm	Mangroves, mudflats						
	Keep River estuary/Turtle Point	Turtles	Sand, mangroves, mudflats	3,687	77	3,766	51	4,962	60
	Baines River (and surrounds)	Nationally Important Wetland (Legune Wetlands) Largetooth sawfish pupping known to occur	Mangroves, mudflats						
	Clump Island			9,454	75	9,459	48	7,823	56
	Quoin Island			9,021	75	8,841	49	8,554	58

2 Prob. Probability (%) of instantaneous entrained oil exposure at ≥ 10 ppb
Max. Maximum instantaneous entrained oil exposure (ppb)

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Max.	Prob,	Max.	Prob,	Max.	Prob,
Wyndham-East Kimberley				13,432	82	13,506	86	16,868	97
	North Kimberley MP Shoreline cells (SC) 1			14,706	86	15,425	86	17,327	98
	Cambridge Gulf (mouth is 21 km wide) SC: 2 3	West Kimberley National Heritage coast (west side of gulf) Flatback turtle inter-nesting BIA Largetooth sawfish pupping known to occur	Mangroves, mudflats, rocky (western side)						
	Cape Domett and Lacrosse Island (entrance to Cambridge Gulf) SC: 8	Flatback turtle nesting BIA (all year, peak July-Sept)	Sand, mangroves, mudflats						
	Ord River Floodplain (northern area) SC: 4 5 6 7	The West Kimberley National Heritage coast North Kimberley Marine Park Ramsar wetland Nationally Important Wetland (Ord Estuary System) Flatback turtle inter-nesting BIA	Mangroves, mudflats	2,197	67	2,812	45	2,570	68
	Drysdale River (east of Kalumburu, near northern tip of WA) SC: 0	The West Kimberley National Heritage coast North Kimberley Marine Park Largetooth sawfish pupping likely to occur Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Mangroves, rock, sand						
	Berkley River SC: 10 11 12 13 14	The West Kimberley National Heritage coast North Kimberley Marine Park Tourist lodge (landing strip here) Lesser crested tern breeding BIA	Sand, rock, mangroves						
	Sir Graham Moore Island (north of Kalumburu) SC: 15 16 17 18	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding	Sand, rock, mangroves						
Mitchell River				13,432	82	13,506	86	16,868	97
	Cassini Island Holothuria Banks SC: 282 283 284 285	The West Kimberley National Heritage coast North Kimberley Marine Park Green turtle nesting Green turtle inter-nesting BIA Indo-Pacific humpback dolphin BIA (foraging, significant habitat)	Rocky cliff, sand	8,579	51	9,350	68	6,061	90
	Islands west of Kalumburu, north of Mitchell River Tait Bank SC: 19 20 21 22 23 24 25 26 27 28 29	The West Kimberley National Heritage coast North Kimberley Marine Park Roseate tern breeding Lesser frigatebird breeding (Mar-Sept)	Sand, rock, mangroves	5,389	50	5,573	68	6,143	93
	Bigge Island Robroy Reefs SC: 30 31	The West Kimberley National Heritage coast North Kimberley Marine Park Indo-Pacific humpback dolphin BIA (calving, foraging) Lesser crested tern breeding BIA	Rock, mangroves, sand	2,091	33	2,099	60	2,163	66
Ashmore Reef/Cartier Island									
	Cartier Island	Australian Marine Park Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA	Sand (surrounded by coral reef flats in lagoon)	-	-	2	-	266	31

Map sector	Location	Key sensitivities	Shoreline types	Summer		Transitional		Winter	
				Max.	Prob,	Max.	Prob,	Max.	Prob,
		Lesser frigatebird breeding BIA (Mar-Sept) Red-footed booby breeding BIA Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Lesser sand-plovers Eastern reef egrets Ruddy turnstones Crested terns Bridled terns Roseate terns							
	Ashmore Reef	Australian Marine Park Ramsar wetland Green turtle inter-nesting BIA (all year, peak in Dec-Jan) Hawksbill turtle foraging BIA Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate tern breeding Lesser frigatebird breeding (Mar-Sept) Greater frigatebird breeding Lesser crested tern breeding BIA Red-footed booby breeding BIA Wedge-tailed shearwater breeding BIA White-tailed tropicbird breeding BIA Common noddies (second largest colony in Australia) Sooty terns (largest colony in WA) Crested terns	Sand (surrounded by coral reef in lagoon)	-	-	4	-	643	25
Scott Reef/ Browse Island									
	Browse Island SC: 302	Green turtle nesting Flatback turtle nesting Crested tern breeding BIA (western side) Eastern reef egrets Ruddy turnstones Sooty terns	Coral reef, sand	3,042	24	1,542	52	954	45
	Scott Reef NR	Green turtle inter-nesting BIA (genetically distinct breeding population) Hawksbill turtle inter-nesting BIA Hawksbill turtle nesting BIA Roseate terns Lesser frigatebirds Brown boobies Spinner dolphins	Coral reef	628	13	189	5	175	15
	Scott Reef North (SC:306)			428	13	151	6	206	12
	Scott Reef South (SC:307)			688	13	238	6	196	17

The risk assessment for a LoWC (Section 8.7 of the EP) identified a number of locations which are particularly sensitive and have relatively short times to oil accumulating on shorelines. Tactical response plans (TRPs) will be developed for these locations, including:

- Moyle River Estuary
- Victoria River Estuary
- Forsyth Creek
- Keep River Estuary/Turtle Point
- Cape Domett (SC: 1&2)
- Cambridge Gulf/Lacrosse Island (SC: 3)
- Berkeley River (SC: 10)
- King George River (SC: 13)

In addition to these locations, there are receptors that are transient (i.e. cetaceans, seabirds) and others that are broadscale, such as managed fisheries with large spatial extents, Key Ecological Features (KEF) and Biologically Important Areas (BIAs). These receptors are described in detail in Appendix 5 of the Beehive-1 EP.

A number of broadscale KEFs not listed above include:

- Carbonate bank and terrace system of the Sahul Shelf;
- Pinnacles of the Bonaparte Basin;
- Carbonate bank and terrace system of Van Diemen Rise;
- Ancient Coastline at 125 m depth contour;
- Continental slope demersal fish communities;
- Glomar Shoals;
- Mermaid Reef and Commonwealth waters including Rowley Shoals;
- Ashmore Reef and Cartier Island and surrounding Commonwealth waters;
- Canyons linking the Argo Abyssal Plain with the Scott Plateau;
- Seringapatam Reef and Commonwealth waters in the Scott Reef complex;
- Shelf break and slope of the Arafura Shelf; and
- Tributary canyons of the Arafura Depression.

The relationship between exposure levels and degree of impact will be considered when finalising the monitoring design. Of notes is that the monitoring priorities provided in Table 2.1 and Table 2.2 are listed for planning purposes. EOG will work with its monitoring providers and key stakeholders in the initial stages of the spill regarding priority receptors and to assist in the finalisation of the monitoring design. This process is outlined in Section 13.

3 Relevant Existing Baseline Information Sources

EOG has compiled a preliminary list of baseline data relevant to the high value receptors in the EMBA (Appendix C-1). EOG also has access to a number of different baseline data sources that are relevant to the high value receptors in the EMBA, as listed in Section 7 of the Joint Industry OSM Framework. Table 3.1 provides links to these online resources.

Table 3.1 Existing baseline data sources

Data Source	Access
Industry-Government Environmental Metadata System (I-GEMS)	I-GEMS metadata can be accessed via the Index of Marine Surveys for Assessments (link)
Australian Ocean Data Network (AODN)	Access is via the following link: (link)
WA Oil Spill Response Atlas (WA OSRA)	Access is via the following link: (link)
The Atlas of Living Australia (ALA)	Access is via the following link: (link)

There are a number of receptors in the EMBA covered by government management plans that identify the current condition of key receptors being managed for protection. Additionally, there are numerous protected species and an ecological community in the EMBA covered by species recovery plans. Appendix C-2 lists these plans along with key information relevant to monitoring.

Further information on protected matters is provided in Section 14. More information on protected species can be found here: http://www.environment.gov.au/cgi-bin/sprat/public/publicshowallrps.pl

4 Baseline Data Review

EOG has compiled a list of baseline data relevant to the high value receptors in the EMBA (Appendix C-1). EOG also engaged RPS to conduct a detailed baseline analysis to identify additional data sources and to undertake a review to assess the spatial and temporal relevance of this data and comparison of methods and parameters to those outlined in the Joint Industry SMPs. Following this review, RPS prepared a report (RPS 2022a, b, c) focusing on priority monitoring locations with minimum hydrocarbon contact timeframes so as to gain a better understanding of the response requirements for the OSM. RPS identified the following locations:

- Joseph Bonaparte Gulf AMP based upon a predicted 100% probability of low threshold floating oil exposure and 47% of moderate threshold exposure within 1.88 days and 3.13 days for summer respectively.
- Emu Reefs based upon a minimum time to contact of floating oil of 6.96 days in summer. This area is within N.T. jurisdiction.
- North Kimberley MP based upon a minimum time to contact of floating oil of 5.63 days in summer, 7.33 days in transitional, and 8.08 days in winter. Key sensitivities for this location include King Shoals Sanctuary Zone and Cape Domett Special Purpose Zone. This area is adjacent to Western Australian Department of Transport (WA DoT) shoreline cell #1.
- Cambridge Gulf based upon the earliest predicted time frame for moderate shoreline exposure of 12.79 days in the transitional period. Key sensitivities for this location West Kimberley Heritage Coast (west side of gulf), Flatback turtle nesting BIA, and Large-tooth sawfish pupping known to occur. The area is comprised of mangroves and mudflats with some rocky shoreline on the western side. This area is covered by WA DoT shoreline cell #'s 2 and 3.

Table 4.1 outlines the criteria used during the baseline data review and provides resources for these locations.

Table 4.1 Assessment of baseline data

Location/Receptor	Year of most recent data capture	Duration of monitoring program	Frequency of data capture	Similarity of methods to Joint Industry SMP	Similarity of parameters to Joint Industry SMP
Assessment criteria	High = 2017–2022	High = > 4 years	High = 4+ trips per year	High	High
	Medium = 2011–2016	Medium = 2–4 years	Medium = 2-3 trips per year	Medium	Medium
	Low = <2011	Low = <2 years	Low = one-off trip	Low	Low
Joseph Bonaparte AMP Emu Reefs https://parksaustralia.gov.au/marine/parks/north/joseph-bonaparte-gulf/ https://atlas.parksaustralia.gov.au/amps?featureId=AMP_N_JBG https://parksaustralia.gov.au/marine/news/indigenous-rangers-monitoring-marine-park-health-in-australias-top-end/ https://atlas.parksaustralia.gov.au/amps/research/JBG-review-of-the-science?rsid=27184&featureId=AMP_N_JBG https://seamapaustralia.org/ https://espace.curtin.edu.au/handle/20.500.11937/43184	High	High	High	High	High
North Kimberley MP https://parksaustralia.gov.au/marine/parks/north/plans/ https://parksaustralia.gov.au/marine/pub/plans/north-management-plan-2018.pdf https://parksaustralia.gov.au/marine/pub/plans/north-foundation-implementation-plan-2018.pdf https://seamapaustralia.org/ https://wamsi.org.au/research/programs/kimberley-marine-research-program/	High	High	High	Medium	Medium
Cambridge Gulf https://seamapaustralia.org/ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66182 http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59257 https://wamsi.org.au/project/marine-turtles/ https://researchdata.edu.au/ord-river-cambridge-western-australia/681650 https://researchdata.edu.au/seagrass-presence-absence-australia-aceas/1330534 https://www.dcceew.gov.au/water/wetlands/publications/ris-ord-river-floodplain	High	High	High	Medium	Medium
Legune Grow-out Facility Forsyth Creek / Victoria River / Keep River https://ntepa.nt.gov.au/your-business/public-registers/environmental-impact-assessments-register/completed-assessments/register/legune-growout/draft-eis	High	High	High	High	High
Additional baseline data assessed: Beehive Operational Area and EMBA https://www.ala.org.au/ https://birdata.birdlife.org.au/explore https://www.inaturalist.org/observations https://www.dcceew.gov.au/environment/marine/marine-bioregional-plans/conservation-values-atlas https://www.dcceew.gov.au/sites/default/files/documents/sawfish-river-sharks-multispecies-recovery-plan.pdf https://www.dcceew.gov.au/sites/default/files/documents/recovery-plan-marine-turtles-2017.pdf https://www.dcceew.gov.au/sites/default/files/env/pages/1670366b-988b-4201-94a1-1f29175a4d65/files/north-west-marine-plan.pdf https://www.dcceew.gov.au/sites/default/files/env/pages/1670366b-988b-4201-94a1-1f29175a4d65/files/north-west-marine-plan.pdf https://www.researchgate.net/profile/Vic_Semeniuk/publication/286391664_The_coastal_habitats_and_vegetation_of_the_Kimberley_region/links/5793f5fb08ae33e89f8d142b/The-coastal-habitats-and-vegetation-of-the-Kimberley-region.pdf https://www.frontiersin.org/articles/10.3389/fmars.2020.614852/full?field=	Medium	Medium			

Location/Receptor	Year of most recent data capture	Duration of monitoring program	Frequency of data capture	Similarity of methods to Joint Industry SMP	Similarity of parameters to Joint Industry SMP
https://www.nespmarine.edu.au/system/files/Shark_Action_Plan_FINAL_Sept7_2021_WEB_RGB.pdf http://www.yawuru.org.au/wp-content/uploads/2021/12/ISWAG-Kimberley-Indigenous-Turtle-and-Dugong-Initiative_Implementation-Plan-2022-to-2032-_-complete.-pdf.pdf https://wamsi.org.au/wp-content/uploads/bsk-pdf-manager/2021/01/Node-3.2.1-Diversity-abundance-and-habitat-utilisation-of-sharks-and-rays.pdf https://wamsi.org.au/wp-content/uploads/bsk-pdf-manager/2021/01/Marine-Turtles-in-the-Kimberley_WAMSI-KMRP-Report-1_2_2_Whiting-et-al-2018r.pdf https://museum.wa.gov.au/sites/default/files/SuppWAMuseum_2014_84_1to18_WILSON.pdf https://catalogue.data.wa.gov.au/dataset/wamsi-kimberley-aerial-photo-data-21st-september-2008_a7d8					

This information was used to determine if the available baseline data could be used to detect change in receptors at priority monitoring locations in the event of a significant impact. RPS incorporated the Australian Energy Producers (AEP) OSM Framework guidelines and the WA DoT protection priorities assessment criteria in Table 4.2 to complete Table 4.3 which compares priority monitoring locations and receptors, and provides guidance on where post-spill, pre-impact monitoring will be prioritised.

The different categories from the AEP OSM Framework guidelines listed in Table 4.3 include:

- Not applicable (N/A) – this receptor and relevant SMP is not applicable to the priority monitoring location (i.e., shoreline habitat not present at submerged shoals);
- Survey – current monitoring/knowledge is considered sufficient (i.e., could be used to detect level of change in the event of a significant impact) and is considered a lower priority for post-spill, pre-impact data collection; and
- Priority survey – current monitoring/knowledge is not in place, not suitable or not practicable; and post-spill pre-impact baseline data collection will be prioritised.

It is noted that it is difficult to obtain absolute statistical proof of oil spill impacts, due to the variability (spatially and temporally) of the natural environment, the lack of experimental control due to the nature of spills and because suitable baseline data may not be available (Kirby et al., 2018). Alternative approaches exist for detecting impacts where post-spill, pre-impact monitoring is not be feasible. These include impact versus control design approaches and/or a gradient approach. The Joint Industry OSM Framework provides guidance and considerations for survey designs to enable the acquisition of sufficiently powerful data during SMP implementation.

Once SMP monitoring reports are drafted (post-spill) they will be peer reviewed by an expert panel (Refer to Section 10.10 of the Joint Industry OSM Framework).

Table 4.2 WA DoT decision matrix

		SMP Categories							
		Water quality	Sediment quality	Intertidal and coastal habitat	Seabirds and shorebirds	Reptiles	Whale sharks, dugong and cetaceans	Benthic habitat	Marine fish and elasmobranch assemblages
DoT cell protection ratings	Protected Fauna (overall rating)				Apply	Apply	Apply		
	Protected Areas (overall rating)			Apply				Apply	
	Floating (overall rating)	Apply							
	Dissolved (overall rating		Apply						
	Economic								Apply

Table 4.3 Recommended priority monitoring locations versus SMPs

Map Sector/Location	DoT cell ref.	SMP									
		Water quality	Sediment quality	Intertidal and coastal habitat	Seabirds and shorebirds	Reptiles	Whale sharks, dugong and cetaceans	Benthic habitat	Marine fish and elasmobranch assemblages	Fisheries	Heritage and social
Australian Marine Parks										Priority survey (Locations to be determined in consultation with key stakeholders to reflect current fishing zones/effort)	Priority survey (Locations to be determined in consultation with key stakeholders)
Joseph Bonaparte Gulf (open waters)	N/A	Priority Survey	Priority Survey	N/A	Survey	Survey	Survey	Survey	Survey		
Thamarrurr											
Emu Reefs (submerged receptor)	NT	Priority Survey	Priority Survey	N/A	N/A	Survey	Survey	Survey	Survey		
Wyndham East Kimberley (AEP OSM Framework)											
North Kimberley MP	1	Priority Survey	Priority Survey	Priority Survey	Priority Survey	Survey	Survey	Survey	Survey		
Cambridge Gulf (mouth is 21 km wide)	2, 3*	Priority Survey	Priority Survey	Priority Survey	Priority Survey	Survey	Survey	Survey	Survey		
Cape Dommett and Lacrosse Island	8	Priority Survey	Priority Survey	Priority Survey	Survey	Survey	Survey	Survey	Survey		
Ord River Floodplain (northern area)	4, 5, 6, 7*	Priority Survey	Priority Survey	Priority Survey	Priority Survey	Survey	Survey	Priority Survey	Survey		
Wyndham-East Kimberley (WA DoT Priorities)											
North Kimberley MP	1	High	High	High	High	High	High	High	Very Low		
Cambridge Gulf (mouth is 21 km wide)	2, 3*	High	High	Very High	High	High	High	High	Very Low		
Cape Dommett and Lacrosse Island	8	High	High	Moderate	Moderate	Moderate	Moderate	Moderate	Very Low		
Ord River Floodplain (northern area)	4, 5, 6, 7*	Very High	High	Very High	High	High	High	Very High	Very Low		
Drysdale River (east of Kalumburu)	9	High	High	High	Moderate	Moderate	Moderate	High	Very Low		
Berkley River	10, 11, 12, 13, 14*	High	High	High	High	High	High	High	Very Low		
Sir Graham Moore Island	15, 16, 17, 18*	Very High	High	High	Very High	Very High	Very High	High	Moderate		
Mitchell River											
Cassini Island	284, 285*	High	High	High	Moderate	Moderate	Moderate	High	Very Low		
Holothuria Banks	282, 283*	High	High	High	High	High	High	High	Very Low		

Map Sector/Location	DoT cell ref.	SMP									
		Water quality	Sediment quality	Intertidal and coastal habitat	Seabirds and shorebirds	Reptiles	Whale sharks, dugong and	Benthic habitat	Marine fish and elasmobranch	Fisheries	Heritage and social
Islands west of Kalumburu	19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29*	Very High	High	High	Very High	Very High	Very High	High	Moderate		
Tait Bank		Very High	High	High	Very High	Very High	Very High	High	Moderate		
Bigge Island	30	High	High	High	High	High	High	High	Very Low		
Robroy Reefs	31	High	High	High	High	High	High	High	Very Low		
Scott Reef/ Browse Island											
Browse Island	302	High	Moderate	High	Moderate	Moderate	Moderate	High	Very Low		
Scott Reef North	306	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Very Low		
Scott Reef South	307	High	High	High	Moderate	Moderate	High	High	Very Low		

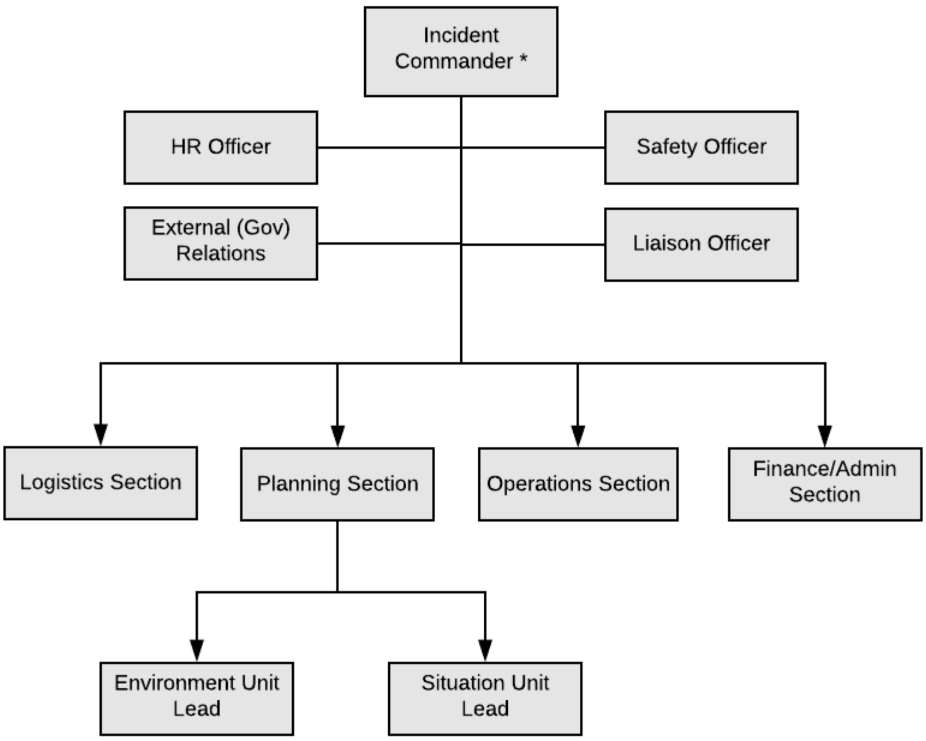
5 OSM Organisational Structure

5.1 Integration with the DIMT

EOG uses the Incident Command System (ICS) to respond to incidents and therefore adopts the key roles and responsibilities used in this system, as described in the Beehive-1 Drilling EP and OPEP. The DIMT will be responsible for coordinating OSM activities, which will be led by the Planning Section within the DIMT, with support from each Section, in particular the Operations Section.

Figure 5.1 shows EOG's DIMT structure. Where the WA DoT and/or the NT DEWPS is the Control Agency, the DIMT will be managed through coordinated command and EOG will still be expected to continue monitoring activities in WA and/or NT waters, with oversight from the WA DoT and/or the NT IMT.

Figure 5.2 illustrates the structure of the OSM Management Team during the response phase. The DIMT Incident Commander (IC) is ultimately accountable for managing the response operation, which includes this plan. Depending on the scale of the event, individual people may perform multiple roles; similarly, multiple people may share the same role.



* In Level 2 and 3 spills where the WA DoT and/or the NT IMT is activated as the Control Agency for WA and/or NT waters response, the DIMT will be managed through coordinated command (i.e., WA DoT and/or the NT IMT is Control Agency in WA and/or NT waters; EOG is Control Agency in Commonwealth waters)

Figure 5.1 EOG's DIMT Structure

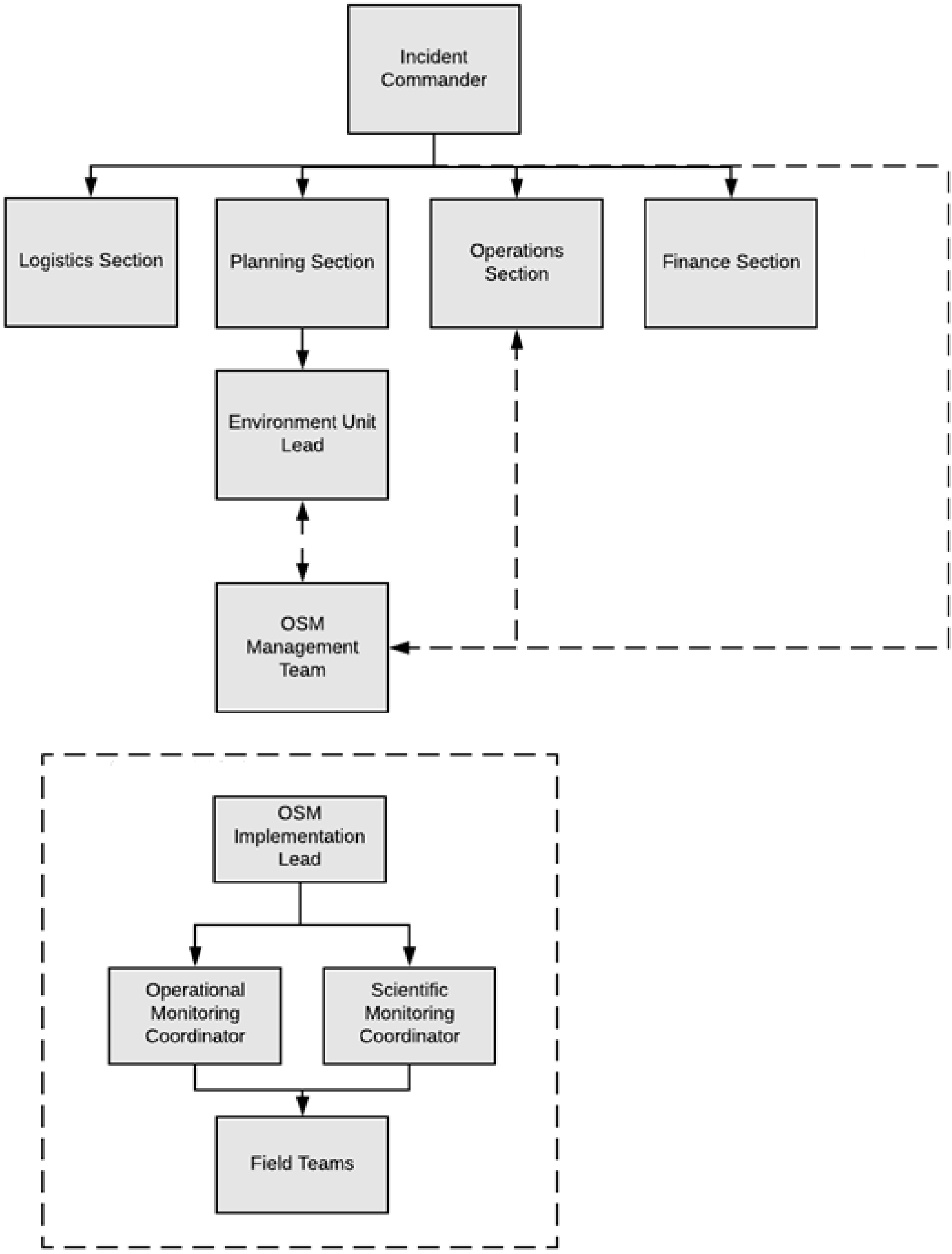


Figure 5.2 EOG's DIMT Structure with OSM Team

5.2 Response Organisation

Many of the monitoring plans can be categorised by their requirements for similar (or the same) expert personnel, equipment and/or resources, or by other factors (e.g. offshore or nearshore operations, requirement for vessel or aerial support). Many of the OMPs either transition to SMPs, or could be easily modified to SMPs, depending on the location of the sampling. Table 5.1 shows the grouping of the AEP OSM plans by response teams.

Table 5.1 Grouping of OSM plans and Monitoring Teams

Groups of OSM Plans	Response Teams
Water Quality, Sediment Quality and Benthic Habitats (WQSQBH)	**Offshore and Nearshore Teams**
OMP - Hydrocarbon Properties and Weathering Behaviour OMP - Sediment Quality Assessment OMP - Surface Chemical Dispersant Fate and Effectiveness Assessment OMP - Water Quality Assessment SMP - Sediment Quality Impact Assessment SMP - Water Quality Impact Assessment SMP - Benthic Habitat Assessment	The OMPs and the SMPs for sediment and water quality in this group would all be initiated within five days. The skills and knowledge required to implement these plans overlap (e.g. sampling, CoC), and they have many of the same equipment/support requirements (e.g. A-frames, fridges). Larger vessels are (generally) required for offshore areas to meet vessel class and service category requirements and to allow for additional space for the accommodation and support of the various monitoring activities. This plan includes 2 x offshore teams and 3 x nearshore teams. Each team consists of a lead scientist, support scientist, trained member of the deck crew, and 1 MFO. Both nearshore and offshore monitoring teams would conduct oil spill modelling validation/characterisation of surface and subsurface oil spill trajectory, pre-impact (SMP) baseline water quality and sediment sampling, and benthic habitat assessments. Water and sediment samples would be collected simultaneously or as per the sampling plan.
Marine Megafauna	**Aerial, Vessel and Shoreline Teams**
OMP - Marine Fauna Assessment - Reptiles OMP - Marine Fauna Assessment- Cetaceans OMP - Marine Fauna Assessment- Dugongs SMP - Marine Megafauna - Reptiles SMP - Marine Megafauna - Whale Shark, Dugong and Cetaceans	The personnel, equipment, aircraft and vessel requirements for these plans are similar and/or overlap. The OMPs transition to SMPs. Shoreline access may be required for turtle monitoring – this could be supported by remotely operated monitoring equipment, especially where access is limited and/or unsafe. This plan includes 2 x aerial teams and 5 x MFOs attached to the WQSQBH teams.
Fish	**Fisheries Scientists and Commercial Fishers**
OMP - Marine Fauna Assessment- Fish SMP - Marine Fish and Elasmobranch Assemblages Assessment SMP - Commercial and Recreational Fisheries Impact Assessment	These plans are all likely to require significant input from both scientists and fishers. This plan includes 2 x teams.
Seabirds and Shorebirds	**Aerial, Vessel and Shoreline Teams**
OMP - Marine Fauna Assessment- Seabirds and shorebirds SMP - Seabirds and Shorebirds	Requirements for these plans are similar and/or overlap. The OMPs transition to SMPs –supported by remotely operated monitoring equipment. This plan includes 3 x teams.
Intertidal and Coastal Habitat	
SMP - Intertidal and Coastal Habitat Assessment	1 team. Supported by remotely operated monitoring equipment, especially where access is limited and/or unsafe.
Social and Heritage (shipwrecks and aircraft only)	**Desktop and Field**
SMP - Heritage Features Assessment SMP - Social Impact Assessment	1 team. Initially able to be performed by same team.

6 OSM Roles and Responsibilities

OSM roles and responsibilities are listed in Section 10.13.2 of the Joint Industry OSM Framework. Table 6.1 outlines the roles held by EOG and the OSM Services Provider.

During the post-response phase, the Environment Unit Lead (EUL) and the OSM Services Provider OSM Implementation Lead will continue to be responsible for the coordination and delivery of monitoring plans.

Table 6.1 Roles and responsibilities for OSM

Role	Held by
EUL Team	EOG's DIMT and/or Environmental Consultants
OSM Implementation Lead	OSM Service Provider
Operational Monitoring Coordinator and Scientific Monitoring Coordinator	OSM Service Provider
OSM Field Operations Manager	OSM Service Provider
OSM Field Teams	OSM Service Provider

7 Mobilisation and Timing of OMP and SMP implementation

Table 7.1 provides an indicative implementation schedule aligned to the AEP framework for Operational Monitoring Plans (OMPs) and SMPs in the EMBA and adjacent waters. The locations listed are aligned to the initial monitoring priorities described in Section 2.

The timing of the implementation and ramp-up was determined using the same methodology as for the response strategies (see Appendix B of the OPEP, Sections 4, 7.3.3 and 7.8). The basis of design is the maximum daily surface area (km^2) of dissolved oil above 10 ppb (see Appendix B, Table 4.5). This can be summarised as:

- Approx. 700-850 km^2 between Day 10 and Day 25.
- Approx. 1,200-1,600 km^2 between Day 27 and Day 46.
- Peak of approx. 2,600 km^2 at Day 53.

As discussed in Section 5.2, the OSM response is structured by response teams. Using the structure shown in Table 5.1 the following timeframes were applied:

- OSM Management:
    - One OSM Implementation Lead (included in DIMT), one OM Coordinator, one SM Coordinator and one Field Operations Manager active within one day of spill event.
    - Additional Field Operations Manager Field Operations within 24 days
- Water Quality, Sediment Quality and Benthic Habitats (WQSQBH):
    - One Offshore and one Nearshore team within 5 days
    - Two Offshore and two Nearshore teams within 10 days
    - Two Offshore and three Nearshore teams within 24 days
    - 5 teams in total
    - Each team comprises a lead scientist, a support scientist, a MFO and a trained deck crew member[3]
- Marine Megafauna:
    - One Aerial team within 5 days
    - Two Aerial team within 24 days
    - 5 MFOs attached to the WQSQBH teams (as per timeframes above).
- Fish
    - One team within 8 days
    - Two teams within 24 days
    - Each team comprises a lead scientist and a support scientist.

[3] The trained deck crew will initially act in support roles. By Day 24 they will have received sufficient training to take on the role of support scientist

- Seabirds and Shorebirds (Birds)
  - One team within 5 days
  - Two teams within 10 days
  - Three teams within 24 days
  - Each team comprises a lead scientist and a support scientist.
- Intertidal and Coastal Habitat (IT&C)
  - 1 team within 5 days
  - Team comprises a lead scientist and a support scientist.
- Social and Heritage (shipwrecks and aircraft only)
  - 1 social team and 1 heritage team within 10 days
  - Each team comprises a lead scientist and a support scientist.

RPS's assumptions for the mobilisation of OSM resources is based on the following:

- The point of staging or departure refers to airports at major capital cities, namely, Perth, Melbourne, Sydney and/or Brisbane.
- EOG DIMT responsible for engaging RPS to initiate activation of OSM support.
- RPS responsible for consolidation of RPS monitoring / sampling equipment at RPS warehouse (Perth).
- EOG DIMT (Logistics Coordinator) responsible for transport of monitoring equipment not able to be carried in hand luggage from RPS warehouse (Perth).
- EOG DIMT (Logistics Coordinator) responsible for chartering flights from point of departure to Darwin for first-strike responders and equipment.
- RPS responsible for travel arrangements for monitoring personnel from major capital cities to Darwin Airport only after initial first-strike deployment, all accommodation and field logistics i.e., from point of arrival at Darwin Airport remains the responsibility of EOG DIMT (Logistics Coordinator).

Table 7.1 Indicative OMP and SMP implementation[4] schedule for OSM activities if initiation criteria are met

Proximity to spill source	Monitoring type	0–6 hours from OSM activation	0–48 hours from OSM activation	Within 72 hours of OSM activation	~7 days from OSM activation	>Two weeks from OSM activation
Spill site and surrounding waters	OM	• Activation of OSM Imp. Lead. • Activation of OM Coordinator	• Activation of OMP Team Leads. • Finalise OMPs. • Commence activation and mobilisation of OM personnel. • OMP: Air quality modelling (responder health and safety) • OMP: Surface Chemical Dispersant Effectiveness: In water shaker tests mobilised from Darwin (not within RPS SoW). • OMP: Surface Chemical Dispersant Effectiveness: Fluorometry equipment and personnel sourced under RPS contract.	• OMP: Hydrocarbon Properties and Weathering Behaviour, where resources are available (e.g., Supply Vessel with onboard sampling equipment). • Continue to finalise OMPs. • Continue to activate and mobilise OM personnel. • OMP: Surface Chemical Dispersant Effectiveness	• OMP: Water Quality Assessment • OMP: Sediment Quality Assessment • OMP: Air Quality Modelling • OMP: Marine Fauna Assessments	As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill.
	SM	• Activation of OSM Imp. Lead. • Activation of SM Coordinator	• Commence activation and mobilisation process. • Activation of SMP Team Leads.	• Continue to activate and mobilise personnel. • Work on finalising SMPs.	• SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine fish and elasmobranch assemblages assessment	Continue SMP monitoring until termination criteria are met

Sensitive receptors: All locations listed in Table 2.1	OM	• Activation of OSM Imp. Lead.
		• Activation of OM Coordinator
			• Activation of OMP Team Leads.
			• Finalise OMPs.
			• Commence activation and mobilisation of OM personnel.
				• OMP: Oil properties and weathering behaviour at sea
				• Continue to finalise OMPs.
				• Continue to activate and mobilise OM personnel.
					• OMP: Water quality assessment
					• OMP: Sediment quality assessment OMP: Shoreline clean-up assessment
					• OMP: Marine fauna assessment
					  • Reptiles
					  • Cetaceans
					  • Dugongs
					  • Seabirds and shorebirds
					  • Fish
						As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met

	SM	• Activation of OSM Imp. Lead. • Activation of SM Coordinator	• Activation of SMP Team Leads and finalisation of SMPs requiring reactive baseline monitoring data to be obtained pre-impact.	• Implementation of reactive baseline data monitoring (if applicable). • Finalisation of the remaining SMPs (where individual SMP initiation criteria are met).	• Relevant SMPs are being implemented, where resources are deployed.	Continue SMP implementation.

Sensitive receptors: All other locations	OM	• Activation of OSM Imp. Lead.
		• Activation of OM Coordinator
				• Activation of OMP Team Leads.
				• Finalise OMPs.
				• Commence activation and mobilisation of OM personnel.
					• Continue to finalise OMPs.
					• Continue to activate and mobilise OM personnel.
					• OMP: Oil properties and weathering behaviour at sea
					• OMP: Water quality assessment
					• OMP: Sediment quality assessment
					• OMP: Shoreline clean-up assessment
					• OMP: Marine fauna assessment
					  ○ Reptiles
					  ○ Dugongs
					  ○ Seabirds and shorebirds
						As results from implemented OMPs are available, data are provided to relevant personnel in DIMT (Situation Unit Lead) and used in the Incident Action Planning process for the next operational period. OMP is redesigned or reallocated according to the specifics of the actual spill until termination criteria are met

[4] Implementation' of an OMP/SMP is defined as being ready, at the point of staging or departure, to mobilise for monitoring. If the Monitoring Plan is desktop-based, implementation is defined as commencing the work (e.g., computer model inputs) (APPEA. 2021).

Proximity to spill source	Monitoring type	0–6 hours from OSM activation	0–48 hours from OSM activation	Within 72 hours of OSM activation	~7 days from OSM activation	>Two weeks from OSM activation
					○ Fish	
	SM	• Activation of OSM Imp. Lead. • Activation of SM Coordinator			• Commence activation and mobilisation process • Activation of SMP Team Leads and finalisation of SMPs	Continue SMP monitoring until termination criteria are met • SMP: Water quality impact assessment • SMP: Sediment quality impact assessment • SMP: Marine mega-fauna assessment -reptiles • SMP: Marine fish and elasmobranch assemblages assessment • SMP: Intertidal and coastal habitat assessment • SMP: Seabirds and shorebirds • SMP: Benthic habitat assessment • SMP: Commercial and recreational fisheries impact assessment

8 Resource Requirements

Table 8.1 outlines the resources required to assist the DIMT in the coordination and management of OSM. The resources required to implement operational and scientific monitoring components are presented in Table 8.2 and Table 8.3 respectively, which is based on the monitoring priorities in Section 2, the response organisation in Table 5.1 and implementation schedule outlined in Section 7.

Table 8.4 presents an assessment based on Appendix B of the OPEP (Sections 4, 7.3.3 and 7.8) using the worst-case deterministic analyses (without dispersant use) and the maximum daily surface area (km^2) of dissolved oil above 10 ppb as the basis of design (see Appendix B, Table 4.5). It should be noted that Table 7.1 lists receptors and locations based on the cumulative outcomes of stochastic modelling whereas the resources presented in Table 8.4 are based on requirements for single deterministic spills. In the event of a spill, predictive modelling would be undertaken to determine particular areas which would require monitoring.

The resources described in Table 8.4 refer to active field teams; additional resources will be sourced to allow for rotation of field staff as part of fatigue management planning, and where necessary, to allow for natural attrition during a prolonged response. Additional equipment resources will be sourced and mobilised to ports of mobilisation to allow for wear and tear during survey operations.

Table 8.1 Resources Required for Key OSM Coordination Roles

Role	Day 5 (total)	Day10 (total)	Day 24 (total) onwards	Arrangement
OSM Implementation Lead	1 x Principal Scientist	1 x Principal Scientist	1 x Principal Scientist	RPS
OM Coordinator	1 x Principal Scientist	1 x Principal Scientist	1 x Principal Scientist	RPS
SM Coordinator	1 x Principal Scientist	1 x Principal Scientist	1 x Principal Scientist	RPS
OSM Field Operations Manager	1 x Senior Scientist	1 x Senior Scientist	2 x Senior Scientists	RPS

Table 8.2 Resources Required for Implementing Operational Monitoring Plans

OMP	Day 5 (total)	Day10 (total)	Day 24 (total) onwards	Arrangement
WQSQBH OMP - Hydrocarbon Properties and Weathering Behaviour OMP - Sediment Quality Assessment OMP - Surface Chemical Dispersant Fate and Effectiveness Assessment OMP - Water Quality Assessment	1 offshore team (spill site and surrounds) 1 nearshore team (other locations) Total 2 team leaders and 6 team members including support scientist, MFO and trained vessel crew (4 per team)	2 offshore teams (spill site and surrounds) 2 nearshore teams (other locations) Total 4 team leaders and 12 team members including support scientist, MFO and trained vessel crew (4 per team) Note: these resources may not be required or may transition to SM activities if relevant scientific monitoring components initiation criteria have been triggered.	2 offshore teams (spill site and surrounds) 3 nearshore teams (other locations) Total 5 team leaders and 15 team members including support scientist, MFO and trained vessel crew (4 per team) Note: these resources may not be required or may transition to SM activities if relevant scientific monitoring components initiation criteria have been triggered.	RPS (includes provision and/or identification of sampling equipment). ** RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order). Other arrangements as detailed in the Beehive-1 OPEP. Note: Surface chemical dispersant effectiveness and fate: In water shaker tests not within RPS scope. AMOSC (AMOSPlan)
Marine Megafauna * OMP - Marine Fauna Assessment - Reptiles OMP - Marine Fauna Assessment- Cetaceans OMP - Marine Fauna Assessment- Dugongs	1 team to conduct initial aerial surveys for spill site. (1 MFO per aircraft) 2 MFOs co-mobilised with WQSQBH teams Total 3 MFOs 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/AMOSC) ***	1 aerial team. (1 MFO per aircraft) 4 MFOs co-mobilised with WQSQBH teams Total 5 MFOs 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/AMOSC) ***	2 aerial teams. (1 MFO per aircraft) 5 MFOs co-mobilised with WQSQBH teams Total 7 MFOs 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/AMOSC) ***	RPS (includes provision of sampling equipment). ** RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order). RPS supported by Subcontractor #2 (pending contract agreement and issue of Service Order). Note: these resources may not be required or may transition to SM activities if relevant scientific monitoring components initiation criteria have been triggered.
Fish OMP - Marine Fauna Assessment- Fish		1 team (spill site and surrounds). Total 1 team leader and 1 team members (2 per team)	1 team (spill site and surrounds); 1 team (other locations). Total 2 team leaders and 2 team members (2 per team)	RPS (includes provision of sampling equipment). ** RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order).
Seabirds and Shorebirds OMP - Marine Fauna Assessment- Seabirds and shorebirds	1 aerial team (spill site and surrounds) Total 1 team leader and 1 team members (2 per team)	1 aerial team (spill site and surrounds) 1 team (other locations) Total 2 team leaders and 2 team members (2 per team) 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/AMOSC) ***	1 aerial team (spill site and surrounds) 2 teams (other locations) Total 3 team leaders and 3 team members (2 per team) 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/AMOSC) ***	RPS (includes provision and/or identification of sampling equipment). ** RPS supported by Subcontractor #2 (pending contract agreement and issue of Service Order). RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order). RPS supported by Subcontractor #3 (pending contract agreement and issue of Service Order).

** *An equipment register to be finalised at least 4-6 weeks prior to mobilisation of the Beehive-1 drilling activity.*

*** *Note: veterinary pathologists are required separately as part of the Oiled Wildlife Response as advised by DBCA.*

Table 8.3 Resources Required for Implementing Scientific Monitoring Plans

SMP	Day 5 (total)	Day10 (total)	Day 24 (total) onwards	Arrangement
WQSQBH SMP - Sediment Quality Impact Assessment SMP - Water Quality Impact Assessment SMP - Benthic Habitat Assessment	1 offshore team (spill site and surrounds) 1 nearshore team (other locations) Total 2 team leaders and 6 team members including support scientist, MFO and trained vessel crew (4 per team)	2 offshore teams (spill site and surrounds) 2 nearshore teams (other locations) Total 4 team leaders and 12 team members including support scientist, MFO and trained vessel crew (4 per team)	2 offshore teams (spill site and surrounds) 3 nearshore teams (other locations) Total 5 team leaders and 15 team members including support scientist, MFO and trained vessel crew (4 per team)	RPS (includes provision and/or identification of sampling equipment). ** RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order). Other arrangements as detailed in the Beehive-1 OPEP.
Marine Megafauna * SMP - Marine Megafauna - Reptiles SMP - Marine Megafauna - Whale Shark, Dugong and Cetaceans	1 team to conduct initial aerial surveys for spill site. (1 MFO per aircraft) 2 MFOs co-mobilised with WQSQBH teams Total 3 MFOs 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/AMOSC) ***	1 aerial team. (1 MFO per aircraft) 4 MFOs co-mobilised with WQSQBH teams Total 5 MFOs 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/ AMOSC) ***	2 aerial teams. (1 MFO per aircraft) 5 MFOs co-mobilised with WQSQBH teams Total 7 MFOs 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/ AMOSC) ***	RPS (includes provision of sampling equipment). ** RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order). RPS supported by Subcontractor #2 (pending contract agreement and issue of Service Order). Other arrangements as detailed in the Beehive-1 OPEP.
Fish SMP - Marine Fish and Elasmobranch Assemblages Assessment SMP - Commercial and Recreational Fisheries Impact Assessment		1 team (spill site and surrounds). Total 1 team leader and 1 team members (2 per team) <u>Note</u>: can initially be performed by the same team as the relevant OMP - Marine Fauna Assessment- Fish. This SMP may replace the relevant OMP if the OMP termination criteria are triggered	1 team (spill site and surrounds); 1 team (other locations). Total 2 team leaders and 2 team members (2 per team)	RPS (includes provision of sampling equipment). ** RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order).
Seabirds & Shorebirds SMP - Seabirds and Shorebirds	1 aerial team (spill site and surrounds) Total 1 team leader and 1 team members (2 per team) <u>Note</u>: can initially be performed by the same team as OMP: Marine fauna assessment – seabirds and shorebirds. This SMP may replace OMP if the OMP termination criteria are triggered. 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/ AMOSC) ***	1 aerial team (spill site and surrounds); 1 other team (other locations) Total 2 team leaders and 2 team members (2 per team) 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/ AMOSC) ***	1 aerial team (spill site and surrounds) 2 other teams (other locations) Total 3 team leaders and 3 team members (2 per team) 1 veterinary pathologist(s)/wildlife veterinarian(s), or suitably qualified person, required to carry out necropsies (through OWR team/ AMOSC) ***	RPS (includes provision and/or identification of sampling equipment). ** RPS supported by Subcontractor #2 (pending contract agreement and issue of Service Order). RPS supplemented via Subcontractor #1 (pending contract agreement and issue of Service Order). RPS supported by Subcontractor #3 (pending contract agreement and issue of Service Order).
Intertidal & Coastal Habitat SMP - Intertidal and Coastal Habitat Assessment	1 team Total 1 team leaders and 1 team members (2 per team).	1 team Total 1 team leaders and 1 team members (2 per team)	1 team Total 1 team leaders and 1 team members (2 per team)	RPS (includes provision and/or identification of sampling equipment). ** Other arrangements as detailed in the Beehive-1 OPEP.
Social & Heritage **** SMP - Heritage Features Assessment SMP - Social Impact Assessment		1 Social team and 1 Heritage team Total 2 team leader and 2 team members (2 per team)	1 Social team and 1 Heritage team Total 2 team leader and 2 team members (2 per team)	RPS (includes provision of sampling equipment). ** RPS supplemented via sub-contractor (pending contract agreement and issue of Service Order).

** *An equipment register to be finalised at least 4-6 weeks prior to mobilisation of the Beehive-1 drilling activity.*
*** *Note: veterinary pathologists are required separately as part of the Oiled Wildlife Response as advised by DBCA.*
**** *Shipwrecks and aircraft only*

Table 8.4 Resource Requirements as per Basis of Design (Appendix B of the OPEPRPS)

OSM Requirements	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 19	Day 24	Day 43	Day 51 (peak)	Nominated resource	Notes/Comments
OSM Management															
Functions/Positions															
OSM Implementation Lead (included in DIMT)														RPS	
OM Coordinator	1	1	1	1	1	1	1	1	1	1	1	1	1	RPS	
SM Coordinator	1	1	1	1	1	1	1	1	1	1	1	1	1	RPS	
Field Operations Manager	1	1	1	1	1	1	1	1	1	1	2	2	2	RPS	
WQSQBH - Offshore															
Functions/Positions															
Lead Scientist (WQSQBH)					1	1	1	1	2	2	2	2	2	RPS	
Support Scientist (WQSQBH)					1	1	1	1	2	2	2	2	2	RPS	
Trained Deck Crew (WQSQBH)					1	1	1	1	2	2	2	2	2	Marine Labour Hire	
MFO - vessel					1	1	1	1	2	2	2	2	2	RPS	
Equipment/Resources															
Offshore vessel					1	1	1	1	2	2	2	2	2	Vessels of Opportunity	
Fluorometer					1	1	1	1	2	2	2	2	2	RPS	
WQ monitoring equipment					1	1	1	1	2	2	2	2	2	RPS	
SQ monitoring equipment					1	1	1	1	2	2	2	2	2	RPS	
BH monitoring equipment					1	1	1	1	2	2	2	2	2	RPS	
WQSQBH - Nearshore															
Functions/Positions															
Lead Scientist (WQSQBH)					1	1	1	1	2	2	3	3	3	RPS	
Support Scientist (WQSQBH)					1	1	1	1	2	2	3	3	3	RPS	
Trained Deck Crew (WQSQBH)					1	1	1	1	2	2	3	3	3	Marine Labour Hire	
MFO - vessel					1	1	1	1	2	2	3	3	3	RPS	
Equipment/Resources															
Nearshore vessel					1	1	1	1	2	2	3	3	3	Vessels of Opportunity	
Fluorometer					1	1	1	1	2	2	3	3	3	RPS	
WQ monitoring equipment					1	1	1	1	2	2	3	3	3	RPS	
SQ monitoring equipment					1	1	1	1	2	2	3	3	3	RPS	
BH monitoring equipment					1	1	1	1	2	2	3	3	3	RPS	
Marine Megafauna															
Functions/Positions															
MFO - aerial					1	1	1	1	1	1	2	2	2	RPS	
Equipment/Resources															
Fixed-wing Aircraft					1	1	1	1	2	2	2	2	2	AMOSC	AMOSC supplementary contract

OSM Requirements	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 19	Day 24	Day 43	Day 51 (peak)	Nominated resource	Notes/Comments
Fish															
Functions/Positions															
Lead Scientist (Fish)									1	1	2	2	2	RPS/Subcontractor #1	
Support Scientist (Fish)									1	1	2	2	2	RPS/Subcontractor #1	
Equipment/Resources															
Offshore Vessel									1	1	2	2	2	Vessels of Opportunity	Provided by DIMT
Fish monitoring/sampling equipment									1	1	2	2	2	RPS	
Seabirds and Shorebirds															
Functions/Positions															
Lead Scientist (Birds)					1	1	1	1	2	2	3	3	3	RPS/Subcontractors #1, #2, #3	
Support Scientist (Birds)					1	1	1	1	2	2	3	3	3	RPS/ Subcontractors #1, #2, #3	
Equipment/Resources															
Fixed-wing Aircraft					1	1	1	1	1	1	1	1	1	AMOSC	AMOSC supplementary contract
Offshore Vessel									1	1	2	2	2	Vessels of Opportunity	Provided by DIMT
Small Vessel									1	1	2	2	2	Vessels of Opportunity	Provided by DIMT
Birds monitoring/sampling equipment									1	1	2	2	2	RPS	
Intertidal and Coastal Assessment															
Functions/Positions															
Lead Scientist (IT&C)					1	1	1	1	1	1	1	1	1	RPS	
Support Scientist (IT&C)					1	1	1	1	1	1	1	1	1	RPS	
Equipment/Resources															
Nearshore Vessel					1	1	1	1	1	1	1	1	1	Vessels of Opportunity	Provided by DIMT
IT&C monitoring/sampling equipment					1	1	1	1	1	1	1	1	1	RPS	
Social and Heritage															
Functions/Positions															
Lead Scientist (Social)									1	1	1	1	1	RPS/Subcontractor	
Support Scientist (Social)									1	1	1	1	1	RPS	
Lead Scientist (Heritage)									1	1	1	1	1	RPS	
Support Scientist (Heritage)									1	1	1	1	1	RPS	

Functions/positions and equipment/resources highlighted in red are provided by the DIMT and their requirements are included in Appendix B of the OPEP. They are not included in the overall requirements for RPS. Appendix D of the OPEP describes the capability arrangements for these resources.

9 Capability Arrangements

EOG has contracted RPS to provide standby OSM response and implementation services, which includes lead contract, logistics and reporting. As part of the scope of works, RPS will prepare a resource register to identify sources and contact details for sufficient equipment and suitably trained and experienced personnel commensurate with the nature and scale of the response. This resource register will be completed at least two weeks prior to the mobilisation of the Beehive-1 drilling activity. The register will identify the resource, the OSM it pertains to, and the contact details for the subcontractor/supplier. RPS will engage with potential subcontractors and mediate memoranda of understanding as appropriate.

Table 9.1 provides details of OSM services, including RPS' evaluation of their capability to implement these services.

The OSM Services Provider will be contracted to provide EOG with a monthly Standby Capability and Competency Report, which details personnel requirements for OMPs/SMPs, numbers of available personnel and competencies for service provider and sub-contracted personnel.

Key personnel listed on the readiness report update will be contactable via mobile phone during this period and accessible to airport (e.g. Perth, Melbourne, Sydney, Brisbane) within 72 hours of EOG's initial activation of OSM Services.

Table 9.1 OSM services provider standby and implementation services

Standby	Implementation	RPS Evaluation
24/7 monitoring support accessed through 24 hr. call out number	Provision (virtual/remote) of an OSM Implementation Lead to the EOG DIMT within 12 hours of notification	Standby: Refer to RPS monthly report (see below). Implementation: Activation of OSM Implementation Lead within 0-6 hours as per Table 12.1 RPS OSM Implementation Lead to be available to EOG DIMT within 12 hours of notification (remote communications only if DIMT not located in Perth).
Provision of a suitably trained personnel, which includes support from RPS and its subcontractors and suppliers	Provision of a first-strike scientific team within 72 hours of notification, available in Perth and ready to deploy	Standby: Refer to RPS monthly report (see below). Implementation: Primary first strike responders (water and sediment quality only) available to mobilise from Perth within 72 hours of notification. Water and sediment quality analysis equipment ready to deploy from RPS Perth storage facility within 72 hours of notification.
Monthly reports on personnel and equipment availability	Development of scientific response and sampling plans (based on modelled hydrocarbon spill scenario)	Standby: Monthly reports supplied 2 months prior to and during drilling operation only. Monthly report to confirm RPS OSM Implementation Lead contact details and availability for upcoming month, the number and location of trained and competent personnel availability and location, and equipment readiness for each relevant strategy. Implementation: Draft SAPs in place 2 months prior to drilling. SAPs to be reviewed upon initiation of response and prior to implementation.
Access to RPS' regional network of scientific and engineering consulting expertise	Provision of a second-strike scientific team within 96 hours of notification, available in Perth / Melbourne / Sydney / Brisbane and ready to deploy	Standby: Refer PO acceptance and expiry dates. Implementation: Second strike responders available to mobilise from Perth / Melbourne / Sydney / Brisbane within 96 hours of notification.

Standby	Implementation	RPS Evaluation
Access to RPS' local network of consultants, laboratories and field service providers	Priority access to RPS' staff and equipment	Standby: Pending issue of project-specific Service Order. N.B. RPS subcontracts laboratory services – no in-house laboratory. Implementation: Priority but not exclusive. Personnel and equipment stated within monthly report available – additional services available upon request, but not guaranteed.
Blue Ocean Marine	Provision of AUV and glider platforms for oil spill responses relevant to oil spill monitoring within 2 weeks of notification	Standby: N/A Implementation: See Appendix C-4
Subcontractor #1	Provision of personnel/equipment as per Table 8.2 and Table 8.3	Standby/Implementation: Pending issue of project-specific Service Order
Subcontractor #2		Standby/Implementation: Pending issue of project-specific Service Order
Subcontractor #3		Standby/Implementation: Pending issue of project-specific Service Order

9.1 Personnel Competencies

EOG's OSM Service Contract specifies the competency requirements for key OSM personnel as per Section 11.3 of the Joint Industry OSM Framework (outlined in Table 9.2). In addition, and where practicable, EOG will engage its most qualified local environmental advisors in the initial stages of the monitoring program to help activate and mobilise monitoring teams and support the OSM Services Provider in the finalisation of monitoring designs.

Table 9.2 Minimum competencies required for key OSM roles

Role	Competencies
EUL Team*	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 10 years' experience in environmental management. • Completed an accredited course in managing incident response. • Completed an accredited course in oil spill management. • Participation in one incident management exercise every two years. • Operational and scientific monitoring plan awareness training.
OSM Implementation Lead	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 10 years' experience in environmental management. • Completed an accredited course in managing incident response. • Completed an accredited course in oil spill management. • Participation in one incident management exercise per year. • Operational and scientific monitoring plan awareness training, including understanding of how to activate external OSM providers.
Operational Monitoring Coordinator and Scientific Monitoring Coordinator	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience in environmental management. • Completed an accredited course in managing incident response. • Completed an accredited course in oil spill management. • Participation in one incident management exercise per year. • Operational and scientific monitoring plan awareness training. • Working knowledge of processes to engage additional support contracts and personnel (if required).
OSM Field Operations Manager	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience in environmental management. • Completed an accredited course in managing incident response. • Completed an accredited course in oil spill management. • Participation in one incident management exercise per year. • Operational and scientific monitoring plan awareness training. • Working knowledge of processes to engage additional support contracts and personnel (if required).
OSM Field Teams	See Table 9.3.

**If the appointed EUL does not meet this competency requirement, then for OSM decision-making and implementation they must be supported by another person who does meet this level of competency and can sign off each Operational and Scientific Monitoring IAP Sub-plan and approve finalised OMPs and SMPs. This may include someone appointed via Monitoring Service Provider or mutual aid.*

Table 9.3 outlines the minimum competencies required for OSM field teams in accordance with Appendix D of the Joint Industry OSM Framework.

Table 9.3 Minimum competencies required for OSM field teams

SMP	Monitoring Personnel	Competencies
Water quality impact assessment (SMP 11)	1 team leader	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors.
	1-2 team members	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
Sediment quality impact assessment (SMP 09)	1 team leader	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors.
	1–2 team members	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
Intertidal and coastal	1 team leader	• Bachelor's degree in environmental

SMP	Monitoring Personnel	Competencies
habitat assessment (SMP 04)		management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors.
	1 team member	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
Seabirds and shorebirds (SMP 08)	Aerial survey: 2 observers per aircraft	• Experienced marine fauna aerial-observer, with experience using proposed sampling equipment and as a Marine Fauna Observer (MFO).
	Vessel-based survey: 1 team leader	• Experienced ornithologist with great than 5 years' experience implementing field monitoring.
	1 team member	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors.
Marine megafauna assessment: • Reptiles (SMP 06) • Pinnipeds • Whale sharks, dugongs and cetaceans (SMP 07)	Ground and vessel surveys: 1 team leader	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors.
	2–3 team members	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (s) to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
	Aerial survey: 2	• Experienced marine fauna aerial-observer, with

SMP	Monitoring Personnel	Competencies
	observers per aircraft	experience using proposed sampling equipment and as a MFO.
Benthic habitat assessment (SMP 01)	1 team leader	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors.
	1–2 team members	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
Marine fish and elasmobranch assemblages assessment (SMP 05)	1 team leader	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors. • Video survey sampling experience.
	1–2 team members	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
Fisheries impact assessment (SMP 02)	1 team leader	• Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors.

SMP	Monitoring Personnel	Competencies
	1–2 team members	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in environmental management/science from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
Heritage features assessment (SMP 03)	1 team leader	• Bachelor's degree in environmental management/science and/or archaeology from a recognised institution or equivalent tertiary study in technical area. • Greater than 5 years' experience implementing field monitoring on relevant receptors.
	1–2 team members	One team member to possess, as a minimum: • Bachelor's degree in environmental management/science and/or archaeology from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience implementing field monitoring on relevant receptors. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in environmental management/science and/or archaeology from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience implementing field monitoring on relevant receptors.
Social impact assessment (SMP 10)	1 team leader	• Bachelor's degree or post-graduate qualifications in social impact from a recognised institution or equivalent tertiary study in technical area. • Knowledge of socio-economic receptors of region. • Greater than 5 years' experience in social and/or economic impact analysis and/or ecosystem-based valuation methods.
	1–2 team members	One team member to possess, as a minimum: • Bachelor's degree in social impact from a recognised institution or equivalent tertiary study in technical area. • Greater than 3 years' experience in social and/or

SMP	Monitoring Personnel	Competencies
		economic impact analysis and/or ecosystem-based valuation methods. The remaining team member (if required) to possess, as a minimum: • Bachelor's degree in social impact from a recognised institution or equivalent tertiary study in technical area. • At least 1-2 years' experience in social and/or economic impact analysis and/or ecosystem-based valuation methods.

9.2 Equipment

Equipment requirements are listed in the individual OMPs and SMPs. Table 9.4 lists a generalised breakdown of equipment types and the source.

In accordance with the OSM services contract, the OSM Services Provider will provide all specialised field monitoring equipment to implement individual OMPs and SMPs. EOG will remain responsible for support and field logistics, including monitoring platforms (e.g. vessels, vehicles and aircraft), flights and accommodation for personnel and transportation/couriers for samples to be sent back to laboratories.

Capability for autonomous underwater vessels (AUVs), long-range gliders (with water quality and hydrocarbon sensors), autonomous surface vessels (ASVs), unmanned aerial vehicles (UAVs), metocean monitoring equipment and remotely operated vehicles (ROVs) can be sourced from Blue Ocean Marine Services (BOM) and Intervention ROV, both based in Perth. BOM has advised that the lead time for autonomous equipment would be likely within two weeks of being requested.

Availability of field equipment will be listed in the OSM Services Provider's Standby Capability and Competency Report. A preliminary report is contained in Appendix C-3.

Table 9.4 OSM equipment

Equipment type	Source
Desktop equipment (e.g., OSRA, Geographic Information System [GIS])	Coordinated through DIMT GIS Team
In-field specialised monitoring equipment (e.g., fluorometers, sample bottles, remotely operated vehicles [ROVs])	Coordinated through the OSM Services Provider's standby OSM response and implementation services
Logistical equipment (e.g., in-field accommodation, vessels, aircraft)	Refer to Section 6 of the Beehive-1 Drilling OPEP

9.2.1 Vessels and Aircraft

The DIMT will provide the vessels and aircraft for OSM:

- **Light aircraft for marine fauna monitoring**
  Two twin-engine, 4-seater, fixed high wing aircraft (flown at an altitude of 500ft for marine fauna spotting).

- **Survey vessels – water and sediment quality / fish surveys / seabirds / intertidal**
  Survey vessels fitted out so they can deploy the sediment grab / Niskin bottle / seabird water profiler. Also a davit / winch wire / a-frame or suitable crane set-up will be required for the operation. In addition, enough deck space is needed to complete the different scopes – water filtrations, homogenising sediment samples for processing etc. and anything else required for the surveys. For instance – fish surveys are likely to involve BRUVs or processing deceased specimens on board. Vessel similar to Lauri J vessel which has previously been used as a survey vessel in Darwin or the MAFRL pelagic vessel. Vessels will provide accommodation for survey teams.
- **Small vessels – benthic habitat / shorebirds / turtles**
  Small vessels for benthic, nearshore and shoreline habitat surveys assuming towed video would need to be carried out. 5 m stabicraft with 3 persons on board or similar suitable to deploy underwater cameras/complete dolphin surveys etc. Another option could be RIBs, such as the RV Beluga. Ideal size 5-8m in length. Tender vessels (from the survey vessels) may also be used.

Appendix D of the OPEP details the capability arrangements for vessels and aircraft.

9.3 Exercises

EOG maintains an OPEP Testing Schedule as detailed in Section 8.2 of the Beehive-1 Drilling OPEP to ensure its competency in responding to and managing major incidents, including oil spills.

EOG will test its standby arrangements and activation process with its OSM contractors prior to the activity commencing, to ensure DIMT roles and key OSM Services Provider personnel are familiar with the activation process and to check the OSM Services Provider’s Standby Capability and Competency Report.

10 Capability Assessment

10.1 Personnel

The analysis of personnel requirements to fully implement the OSM adapted the following assumptions:

- All OMPs and SMPs are fully implemented.
- All identified functions/positions are stood up over the response.
- Response maintained for at least 20 weeks.
- 2 x 12-hour operational periods per day.
- Rotations are based on rosters with 2 weeks on / 2 weeks off.
- Second swing for OSM Management roles (conservatively) commences on Day 10.
- Second swing for the study groups starting on Day 5 commences on Day 19.
- Second swing for the study groups starting on Day 10 commences on Day 24.

Table 10.1 provides the total function/position requirements as identified in Table 8.4 including the ramp-up to peak requirements on Day 24, when 37 RPS functions/positions are required.[5]

Table 10.2 provides the total personnel requirements inclusive of 2 weeks on/2 weeks off rotations from Day 10 (highlighted in blue). Thirty-one personnel are required on Day 10 when rotations begin and fifty on day 19. At peak (Day 24), 74 personnel will be required to staff the identified 37 functions/positions.

Table 10.2 also shows the personnel available from RPS and its subcontractors for these requirements.

[5] Note that the OSM Implementation Lead (included in DIMT) and functions/positions coloured red in Table 8.4 are not included in the total RPS requirements for the OSM BIP.

Table 10.1 Function/position requirements (from Table 8.4)

OSM Requirements	Day 1	Day 5	Day 10	Day 19	Day 24	Day 43	Day 51 (peak)
OM Coordinator	1	1	1	1	1	1	1
SM Coordinator	1	1	1	1	1	1	1
Field Operations Manager	1	1	1	1	2	2	2
Lead Scientist (WQSQBH)		2	4	4	5	5	5
Support Scientist (WQSQBH)		2	4	4	5	5	5
MFO - vessel		2	4	4	5	5	5
MFO - aerial		1	1	1	2	2	2
Lead Scientist (Fish)			1	1	2	2	2
Support Scientist (Fish)			1	1	2	2	2
Lead Scientist (Birds)		1	2	2	3	3	3
Support Scientist (Birds)		1	2	2	3	3	3
Lead Scientist (IT&C)		1	1	1	1	1	1
Support Scientist (IT&C)		1	1	1	1	1	1
Lead Scientist (Social)			1	1	1	1	1
Support Scientist (Social)			1	1	1	1	1
Lead Scientist (Heritage)			1	1	1	1	1
Support Scientist (Heritage)			1	1	1	1	1
Total	**3**	**14**	**28**	**28**	**37**	**37**	**37**

Table 10.2 Personnel Requirements (incl. 2 on/2 off rotations)

OSM Requirements	Day 1	Day 5	Day 10	Day 19	Day 24	Day 43	Day 51 (peak)	Personnel Available		
								RPS	Subcontractors	
OM Coordinator	1	1	2	2	2	2	2	2		
SM Coordinator	1	1	2	2	2	2	2	2		
Field Operations Manager	1	1	2	2	4	4	4	4		
Lead Scientist (WQSQBH)		2	4	8	10	10	10	10		
Support Scientist (WQSQBH)		2	4	8	10	10	10	10		
MFO - vessel		2	4	8	10	10	10	10		
MFO - aerial		1	1	2	4	4	4	4		
Lead Scientist (Fish)			1	1	4	4	4	2	2	
Support Scientist (Fish)			1	1	4	4	4	2	2	
Lead Scientist (Birds)		1	2	4	6	6	6	3	3	
Support Scientist (Birds)		1	2	4	6	6	6	6		
Lead Scientist (IT&C)		1	1	2	2	2	2	2		
Support Scientist (IT&C)		1	1	2	2	2	2	2		
Lead Scientist (Social)			1	1	2	2	2	1	1	
Support Scientist (Social)			1	1	2	2	2	2		
Lead Scientist (Heritage)			1	1	2	2	2	2		
Support Scientist (Heritage)			1	1	2	2	2	2		
Total	**3**	**14**	**31**	**50**	**74**	**74**	**74**	**66**	**8**	

At the time of writing (20 February 2024), RPS advised that they have 60 personnel (both internal RPS staff and external service providers) on their OSM resource register who have confirmed their potential availability to implement OSM response activities for this OSM BIP. Following the first strike activation of resources to implement chemical dispersant efficacy (non-RPS) within 48 hours of notification from Darwin Harbour; primary RPS resources would be ready to deploy within 72 hours and secondary RPS resources ready to deploy within 96 hrs pending logistics and flight availability. Additional RPS personnel (or personnel from affiliate companies) could potentially be sourced from the UK and USA, if required, within 2-4 weeks of a request being issued.

RPS also has subcontracts with several consultancies to provide personnel and support for OSM activities on a best-endeavours basis. However, project-specific Service Orders would be required with all subcontractors and agreed with EOG before these services can be validated or called upon. At the time of writing, the subcontractors have advised RPS that they have up to 25 lead and support scientists with a range of experience to support marine turtle, seabird/shorebird, water and sediment quality, fisheries impacts and various other monitoring scopes.

The WQSQBH teams include deck crew as part of the arrangements. During the initial deployments, the Lead and Support Scientists would train the deck crew to perform the support scientist supporting roles. The Lead Scientist would also train the Support Scientist to perform the Lead Scientist role for future rotations, thereby enabling potential expansion of monitoring teams if required.

These arrangements demonstrate that EOG has the capability to implement the OSM within the timeframes specified. The additional personnel available through RPS, subcontractors, industry and academic networks and trained deck crew allow for scalability to increase the OSM response, if required.

10.2 Equipment

Table 10.3 provides the key equipment requirements (excluding vessels and aircraft) as identified in Table 8.4 including the ramp-up to peak requirements on Day 24. Appendix C-3 provides more detailed information on the equipment requirements for each OMP and SMP, including availability and suppliers.

Monitoring equipment set out within each of the AEP OMPs and SMPs is required in sufficient numbers to effectively undertake each of the monitoring strategies. Sampling and Analysis Plans (SAPs) will be in place, where required, to ensure OMPs (and SMPs) are consistent with the 'Design Considerations' (Section 4.1) of the AEP OMP documents, including mobilisation and deployment requirements and Standard Operating Procedures (SOPs) consistent with industry good practice.

Autonomous and remotely operated vehicles would be used to inform, support and supplement monitoring activities and field monitoring teams:

- Autonomous underwater vehicles (AUVs) would be deployed to support near-field water column and seabed assessments. AUVs could be fitted with a range of water quality sensors (including fluorometry), side-scan sonar, multibeam echosounders, still and video cameras. AUVs can replicate and time-sequence surveys according to GIS.

- Long-range gliders would be deployed to undertake for-field water column and seabed assessments. Gliders produce and relay data in near real-time, and depending on environmental conditions and the type of analysis undertaken, can operate for 30-60 days and cover up to 1400km in a single mission. As with other AUVs, gliders can be fitted with a range of water quality sensors (including fluorometry). Gliders would be used to monitor the leading edge of a spill over large distances and assist in informing targeted in-field sampling programs.

- Autonomous surface vessels (ASVs) can be deployed from shoreline of vessel and would support near field water column and seabed assessments. ASVs would be deployed to support benthic habitat analysis.
- Unmanned aerial vehicles (UAVs) fixed with still or video cameras have a range of 5-10km per mission, and would support intertidal and coastal habitat assessment, shorebird, marine turtle and other marine marine fauna assessment.
- Remotely operated vehicles (ROVs) would be deployed for near field evaluations, including the deployment of CTD and fluorometry equipment to support hydrocarbon properties and weathering behaviour and surface chemical fate and effectiveness assessment. ROVs would also be deployed from vessels to support water and sediment quality sampling.

Capability for the above equipment can be sourced from Blue Ocean Marine Services (BOM) and Intervention ROV, both based in Perth. BOM has advised that the lead time for autonomous equipment would be likely within two weeks of being requested.

Table 10.3 Key Equipment Requirements (excluding Vessels and Aircraft)[6]

OSM Requirements	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 19	Day 24	Day 43	Day 51 (peak)
WQSQBH													
Fluorometer					2	2	2	2	4	4	5	5	5
WQ monitoring equipment					2	2	2	2	4	4	5	5	5
SQ monitoring equipment					2	2	2	2	4	4	5	5	5
BH monitoring equipment					2	2	2	2	4	4	5	5	5
Fish													
Fish monitoring/sampling equipment								1	1	1	2	2	2
Seabirds and Shorebirds													
Birds monitoring/sampling equipment									1	1	2	2	2
Intertidal and Coastal Assessment													
IT&C monitoring/sampling equipment					1	1	1	1	1	1	1	1	1

[6] Vessel and aircraft requirements are included in Appendix B of the OPEP.

11 Review of Plan

This OSM BIP will be reviewed on an annual basis to reflect the Regulatory Advice Statement on the Joint Industry OSM Framework (August 2021) and the Operational and Scientific Monitoring Bridging Implementation Plan Template., Modifications to this OSM BIP could be in response to one or more of the following:

- The annual review;
- When major changes have occurred that affect operational and/or scientific monitoring coordination or capabilities (e.g., change of service provider/s);
- Changes to the activity that affect operational and/or scientific monitoring coordination or capabilities (e.g., a significant increase in spill risk);
- Changes to legislative context related to operational and/or scientific monitoring (e.g., EPBC Act protected maters requirements);
- Following routine testing of the OSM if improvements or corrections are identified; or
- After a Level 2/3 spill incident.

Any modifications required to the plan will be undertaken with due regard to the Management of Change Procedure in EOG's Australian Projects Health, Safety, and Environment (HSE) Management Plan. The extent of changes made to this OSM BIP and resultant requirements for regulatory resubmission will be informed by the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS(E)).

Part B – Implementation

12 Activation Process

EOG's DIMT EUL is responsible for activating OSM components, subject to approval from the IC. Table 12.1 outlines EOG's OSM activation process.

Table 12.1 OSM activation process

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

13 Monitoring Priorities

As described in Section 2, the available OSTM has been analysed to understand the likely initial monitoring priorities for its activities in the EMBA. In addition, Table 4.2 lists comparability of available baseline data for receptors, to assist in identifying where post-spill, pre-impact monitoring will be prioritised. The monitoring priorities provided in Section 2 and Table 4.2 are to be used for guidance when confirming monitoring priorities in consultation with key stakeholders and monitoring service providers (including subject matter experts, where available) at the time of the spill. Table 13.1 provides a checklist to assist in the confirmation of monitoring priorities for individual spills.

Table 13.1 Checklist for determining monitoring priorities

Responsibility	Task	Timeframe	Complete
OSM Services Provider with input from EUL	Confirm monitoring locations for activated OMPs and SMPs based on: • Current monitor and evaluate data (i.e., situational awareness data, including predicted time to receptor impact, aerial/vessel surveillance observations, tracking buoy data, satellite data); • Nature of hydrocarbon spill (i.e., subsea blow out, surface release, hydrocarbon characteristics, volume, expected duration of release); • Seasonality and presence of receptors impacted or at risk of being impacted; • Current information on transient and broadscale receptors (surface and subsea); • Current operational considerations (e.g., weather, logistics); • Nature of hydrocarbon spill (i.e., subsea blow out, surface release, hydrocarbon characteristics, volume, expected duration of release); • Monitoring priorities identified in Section 2; and • Existing literature, baseline data, and monitoring programs.	Within 12 hours of monitor and evaluate data being received from DIMT	
	Evaluate monitoring priorities in consultation with key stakeholders, including the appointed State/Territory Environment and Science Coordinator	Within 12 hours of monitor and evaluate data being received from DIMT	
	Using the results of the baseline data analysis in Table 4.2 and the information above, determine priority locations for post-spill, pre-impact monitoring	Within 12 hours of monitor and evaluate data being received from DIMT	
	Confirm the need for any additional reactive baseline monitoring data for SMPs and determine suitable locations, noting that suitable control or reference sites may be outside of the EMBA	Within 12 hours of monitor and evaluate data being received from DIMT	
	Continually re-evaluate monitoring priorities in consultation with EUL and relevant key stakeholders throughout spill response	Ongoing	

14 Protected Matters Requirements

Table 14.1 provides a checklist to ensure monitoring personnel consider protected matters requirements in the finalisation of OMPs and SMPs.

Appendix C-2 outlines the management plans, recovery plans and conservation advice statements relevant for the protected matters within the EMBA that are likely to be relevant to the final design of the OMPs and SMPs. Appendix C-2 also includes relevant priority monitoring locations where these receptors are known to occur in order to expedite consideration of relevant information into finalised monitoring designs.

Table 14.1 Checklist for inclusion of protected matters into monitoring designs

Responsibility	Task	Complete
OSM Services Provider with input from EUL	Review Monitoring, Evaluation and Surveillance data and available OMP data to determine likely presence and encounter of protected species in predicted trajectory of the spill	
	Review the relevant recovery plan/conservation advice/management plan in Appendix C-2 and determine if there have been any updates to the relevant conservation threats/actions. Integrate relevant considerations into the final monitoring design for affected OMPs and SMPs	
	Review restrictions on marine mammal buffer distances in SMP: Marine mega-fauna and ensure this is included in all relevant response and monitoring IAPs (e.g., Shoreline Protection Plan, Shoreline Clean-up Plan, OSM Plan), so that response and monitoring field teams maintain required buffer distances from fauna during operations	

15 Finalising Monitoring Design

The methods presented in the Joint Industry OMPs and SMPs are designed to allow Monitoring Providers with the flexibility to modify the SOPs, so that the latest research, technologies, equipment, sampling methods and variables will be used. Monitoring designs may also be varied in-situ, according to the factors presented in Section 10.6 of the Joint Industry OSM Framework.

Table 15.1 provides EOG's checklist for finalising monitoring designs post-spill. The OSM Implementation Lead will be responsible for approving the finalised monitoring design used in the OMPs and SMPs.

Table 15.1 Checklist for finalising monitoring design

Responsibility	Task	Timeframe	Complete
OSM Services Provider	Confirm survey objectives, sampling technique, for each initiated OMP and SMP	Within 48 hours of initial monitoring priorities being confirmed by DIMT	
	Determine suitable sampling frequency	Within 48 hours of initial monitoring priorities being confirmed by DIMT	
	Finalise SOPs	Within 48 hours of initial monitoring priorities being confirmed by DIMT	
	Scientific monitoring: • Establish benchmarks and guidelines to be used • Confirm indicator species • Confirm parameters and metrics	Within 96 hours of initial monitoring priorities being confirmed by DIMT	

16 Mobilisation

When the monitoring design has been finalised for each OMP and SMP, the OSM Services Provider shall work in conjunction with EOG to develop and execute a monitoring mobilisation plan, which will be incorporated into the IAP process.

The OSM Services Provider will be required to coordinate the availability of personnel and equipment for all monitoring programs. EOG will be responsible for flights, accommodation and victualing for field personnel. EOG will also be required to procure all vessels, aerial platforms and vehicles for OMP and SMP implementation.

Table 16.1 provides a checklist for mobilising monitoring teams.

Note: OMP: Air quality modelling is a desk top assessment and will be mobilised as soon as practicable as it is not reliant on any mobilisation of field personnel.

Table 16.1 Checklist for mobilisation of monitoring teams

Responsibility	Task	Complete
OSM Services Provider with input from EUL	Confirm availability of all monitoring personnel (noting required competencies in Section 9.1 and individual OMPs/SMPs)	
	Allocate number of teams, personnel, equipment and supporting resource requirements	
	Undertake HAZIDs as required and consolidate/review field documentation including safety plans, ERPs, and daily field reports	
	Develop site-specific health and safety plans which is compliant with health safety and environment systems (including call in timing and procedures)	
	Conduct pre-mobilisation meeting with monitoring team/s on survey objectives, logistics, safety issues, reporting requirements and data management collection requirements	
	Determine data management delivery needs of the DIMT and process requirements, including data transfer approach and frequency/timing	
	Confirm data formats and metadata requirements with personnel receiving data	
	Logistics	
	Confirm flights, accommodation, and car hire arrangements are in place	
	Develop field survey schedules, detailing staff rotation	
	Equipment	
	Arrange survey platform (vessel, vehicle, aircraft) as required to survey or access survey sites and ensure they are equipped with appropriate fridge and freezer space for transportation of samples (and carcasses if collecting)	
	Ensure vessels have correct fit-out specifications (e.g., winches, Geographic Positioning System [GPS], satellite, HIAB, sufficient deck space, water supplies (fresh and/or salt), accommodation)	
	Confirm consumables (including personal protective equipment [PPE]) have been purchased and will be delivered to required location	
	Liaise with NATA-accredited laboratories to confirm availability, limits of detection, sampling holding times, transportation, obtain sample analysis	

Responsibility	Task	Complete
	quotes and arrange provision of appropriate sample containers, Chain of Custody (CoC) forms and suitable storage options for all samples. Make arrangements for couriers (if necessary)	
	Confirm specialist equipment requirements and availability (including redundancy)	
	Check GPS units and digital cameras are working and that sufficient spare batteries and memory cards are available	
	Confirm sufficient equipment to allow integration of survey software and navigational systems (e.g., GPS, additional equipment and adaptors), and additional GPS units prepared	
	Confirm GPS survey positions (where available) have been QA/QC checked and pre-loaded into navigation software/positioning system	
	Check field laptops, ensuring they have batteries (including spares), power cable, and are functional	
	Check if a first aid kit or specialist PPE is required	
	Confirm arrangements for freight to mobilisation port is in place	

17 Permits and Access Requirements

Permit and access requirements apply to Marine Parks, Marine Protected Areas, restricted heritage areas, operational areas of industrial sites, defence locations, certain fauna and managed fisheries. Table 17.1 lists relevant protected areas within the EMBA and the jurisdictional authority to be contacted to obtain the necessary permit or access permission.

The DEPWS minutes of a meeting held on 20 June 2023 to discuss ‘cross jurisdictional arrangements’ notes that the NT government be developing oil spill response plans across all shorelines over next two years. The minutes also note that working with traditional owners will be a major part of developing the plans with 80% of NT coastline held and managed by traditional custodians. The NT government has arrangements for obtaining “just in time” Authority Certificates from the Aboriginal Areas Protection Authority, which will be formalised in the NT Oil Spill Contingency Plan and response plans.

The OSM Services Provider is responsible for submitting access and permit applications to all relevant Jurisdictional Authorities to conduct monitoring for OMPs and SMPs.

Table 17.1 Permits required in EMBA

Receptor	Location	Jurisdictional Authority	Relevant information on permits
Permits for monitoring fauna	N/A	State/Territory government department with jurisdiction for fauna Department of Agriculture, Water and the Environment	Any interactions involving nationally listed threatened fauna may require approval from DCCEEW (http://www.environment.gov.au/biodiversity/threatened/permits) WA- appropriate permits can be found at: https://www.dpaw.wa.gov.au/plants-and-animals/licences-and-authorities?showall=&start=4 NT- permits can be found at: https://nt.gov.au/environment/animals/wildlife-permits/permits-take-interfere-with-wildlife
State/Territory Marine Protected Areas; Fish Habitat Protection Areas	• Lalang-garram / Camden Sound • Lalang-garram/Horizontal Falls and North Lalang-garram • North Kimberley • Rowley Shoals • Montebello/Barrow Islands • Cobourg Marine Park	State/Territory government department with jurisdiction for parks and wildlife State/Territory government department with jurisdiction for fisheries	No specific permitting requirements exist for monitoring in WA marine protected areas, but additional information is available at: https://www.dpaw.wa.gov.au/management/marine , https://www.dpaw.wa.gov.au/management/marine/marine-parks-and-reserves and https://www.fish.wa.gov.au/Sustainability-and-Environment/Aquatic-Biodiversity/Marine-Protected-Areas/Pages/default.aspx No specific permitting requirements exist for monitoring in NT fish protection areas, but zones are described here: https://nt.gov.au/marine/recreational-fishing/when-and-where-to-fish/reef-fish-protection-areas
Ramsar wetland	• Ashmore Reef National Nature Reserve Ramsar site • Cobourg Peninsula Ramsar site • Ord River Floodplain Ramsar site • Kakadu National Park Ramsar site	Department of Climate Change, Energy, the Environment and Water (DCCEEW)	Additional information on Ramsar wetlands and how they are protected as a matter of national environmental significance under the EPBC Act is available at: https://www.environment.gov.au/epbc/what-is-protected/wetlands
Australian (Commonwealth) Marine Parks	• Oceanic Shoals • Arafura	Parks Australia	Permit and licence application information for Marine Protected Areas (including monitoring) can be found at: https://onlineservices.environment.gov.au/parks/australian-marine-parks and https://onlineservices.environment.gov.au/parks/australian-marine-parks/permits

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	• Arnhem • Agro-Rowley Terrace • Kimberley • Cartier Island • Mermaid Reef • Joseph Bonaparte Gulf • Montebello		Additional information on permitting requirements in AMPs can be obtained through Parks Australia via email marineparks@environment.gov.au or phone 1800 069 352 Information on permits to access biological resources in Commonwealth areas can be found at: http://www.environment.gov.au/topics/science-and-research/australias-biological-resources/access-biological-resources-commonwealth
State/Territory Managed Fisheries	WA • Mackerel Managed Fisheries (MMF) • Northern Demersal Scalefish Managed Fishery • Pearl Oyster Managed Fishery • Abalone Managed Fishery • Kimberley Crab Managed Fishery (North Coast Crab Fishery) • Kimberly Prawn Managed Fishery • Kimberley Gillnet and Barramundi Managed Fishery • Broome Prawn Managed Fishery • Nickol Bay Prawn Managed Fishery • Onslow Prawn	State/Territory government department with jurisdiction for fisheries	No specific permitting requirements exist for WA Fisheries, but additional information is available at – https://www.fish.wa.gov.au/Fishing-and-Aquaculture/Pages/default.aspx No specific permitting requirements exist for NT Fisheries, but additional information is available at –- https://dpir.nt.gov.au/fisheries

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	Managed Fishery • Specimen Shell Fishery • Marine Aquarium Fish Managed Fishery • Pilbara Demersal Scalefish Fishery • Pilbara Crab Managed Fishery • West Coast Deep Sea Crustacean Managed Fishery NT • Spanish Mackerel Fishery • Barramundi Fishery • Coastal line Fishery • Timor Reef Fishery • Offshore Net and Line Fishery • Demersal Fishery		
Commonwealth Managed Fisheries	• Western Tuna and Billfish Fishery • Western Skipjack Fishery • Southern Bluefin Tuna Fishery • North West Slope Trawl Fishery • Northern Prawn Fishery • Western Deepwater	Australian Fishing Management Authority	Commonwealth Managed Fisheries (scientific permit for research/monitoring in an Australian Fishing Zone) https://www.afma.gov.au/fisheries-services/fishing-rights-permits

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	Trawl Fishery		
Indigenous Cultural Heritage	Sites are located throughout EMBA	State/Territory government department with jurisdiction for indigenous heritage	Entry access permits to Aboriginal Lands in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-heritage-conservation/apply-permit-access-or-travel-through-aboriginal-land Aboriginal heritage sites in WA: https://www.wa.gov.au/service/aboriginal-affairs/aboriginal-cultural-heritage/search-aboriginal-sites-or-heritage-places Indigenous heritage information in NT: https://nt.gov.au/leisure/arts-culture-heritage/visit-a-cultural-or-heritage-site/indigenous-heritage-information
Defence/restricted military area	North Australian Exercise Area (NAXA) offshore training area and the Browse Basin and Northern Carnarvon Basin offshore air-to-air weapons ranges (maritime military zones) Yampi Sound Training Area, Bradshaw Field Training Area and Kangaroo Flats Training Area	Department of Defence	Unexploded Ordnances (mapping information): https://www.defence.gov.au/UXO/default.asp Maritime military firing practice and exercise areas: https://www.hydro.gov.au/factsheets/FS_Navigation-Firing_Practice_and_Exercise_Areas.pdf
Industry (e.g., operational zone of offshore oil or gas platform)	• Montara FPSO Facility (Jadestone) • Ichthys Facility (INPEX) • Blacktip Gas Field (ENI Australia) • Other operators in the EMBA include ENI Australia, Woodside Energy Limited, Melbana Energy, Neptune Energy Bonaparte Pty Ltd,	Operating company	Safety zones (up to 500 m from outer edge of well or equipment) – https://www.nopsema.gov.au/safety/safety-zones/

Receptor	Location	Jurisdictional Authority	Relevant information on permits
	Santos Ltd, BP Developments Australia Pty Ltd, Chevron Australia Pty Ltd and Kufpec		
Shipwrecks	• A number of unnamed Indonesian fishing vessels and the *Sinar Bonerate* are known to be in the vicinity of Ashmore Reef and Cartier Island • The *Unident* and *Selina* are known to be in the vicinity of Browse Island • There are 178 shipwrecks identified within the EMBA; 106 located in off the WA coast and 72 located off the NT coast.	State/Territory or Commonwealth government department with jurisdiction for maritime cultural heritage/ archaeology	Underwater heritage protected zones (Commonwealth): www.environment.gov.au/heritage/underwater-heritage/protected-zones NT protected zones: https://nt.gov.au/leisure/arts-culture-heritage/visit-a-cultural-or-heritage-site/maritime-heritage

18 Use of Data in Response Decision-making

18.1 Operational Monitoring to Inform Response Activities

The OSM Services Provider is responsible for the collection of data by field teams, which shall be QA/QC checked by the Field Team Lead in accordance with the requirements listed in the finalised OMPs and SMPs (where applicable). The Team Lead will be responsible for communicating data back to the OSM Management Team (led by the OSM Services Provider) via field reporting forms, debriefs and reports. Laboratory analysis reports will also be directed to the OSM Management Team.

The OSM Management Team is responsible for the interpretation and analysis of data. OMP data will be analysed rapidly so that it can be used to inform response planning and decisions in the current and/or next operating period. SMP data is designed to be more scientifically robust and long-term in nature and is not relied upon by the DIMT for decision-making. Therefore, SMP data will be analysed more thoroughly by the OSM Management Team.

Once data is analysed and checked by the Field Team Lead, it will be provided to the DIMT Situation Unit Lead, who will then distribute the data from each monitoring component to the relevant DIMT Unit and/or Section. Table 18.1 provides guidance on the type of data generated from each OMP, which DIMT Section/Unit requires the data and how the data can be used during a response. All SMP data received during a response will be received by the DIMT Situation Unit Lead and DIMT EUL simultaneously.

Analysed data will then be incorporated into the Common Operating Picture (managed by the Situation Unit Lead) and used by the EUL during development of the operational NEBA, which would be included in the IAP for the current or next operating period.

As ultimately responsible for the IAPs, the Planning Section Chief will be required to determine if the response options can be commenced, continued, escalated, terminated, or if controls need to be put in place to manage impacts of the response activities. These decisions will be communicated to the broader DIMT during regular situation debriefs.

Note that *OMP: Subsea dispersant injection monitoring* is not included in Table 18.1 as this has not been selected as a response strategy in the OPEP.

Table 18.1 Data generated from each OMP and how this may be used by DIMT in decision-making

OMP	Data generated[7]	DIMT Section requiring data	How data may be used by DIMT
Hydrocarbon properties and weathering behaviour at sea	Hydrocarbon physical characteristics (e.g., viscosity, asphaltene content, fingerprinting, weathering ratios of hydrocarbon chains).	Planning Section to aid in response option selection / modification.	Changes to the hydrocarbon properties will affect the window of opportunity for particular responses and the associated logistical requirements of these responses, such as use of chemical dispersants, recovery and pumping equipment suitability, hydrocarbon storage and hydrocarbon disposal requirements.
Shoreline clean-up assessment	Assessment of shoreline character; assessment of shoreline oiling; recommendations for response activities; post-treatment surveys.	Planning Section to aid in IAP development and response option selection / modification.	Confirmation of shoreline character, habitats and fauna present which influences selection of response tactics (e.g., no mechanical recovery if turtles are known to be nesting); Oil deposition and/or removal rate for a shoreline sector will help determine effectiveness of relevant tactics (e.g., shoreline protection and/or clean-up operations); Assessment teams provide ground truthing of sites that are not possible via satellite imagery, therefore the DIMT can rely on the recommendations of Assessment Teams (e.g., flagging access issues, suitable tactics, likely resourcing needs).
Surface chemical dispersant effectiveness and fate	Visual observations of dispersant efficacy; concentration of hydrocarbons in water column (see also water quality assessment).	Environment Unit for use in operational NEBA; Planning Section to aid in IAP development; Operations Section to confirm dispersant effectiveness for decision-making purposes in current operations period.	Determine the effectiveness of dispersant in removing oil from sea surface and how dispersed oil is being distributed through the water column. This information can be used in NEBA to help decide if dispersants are being effective at treating high value receptors (NEBA to evaluate any trade-offs between receptors).
Water quality assessment	Distribution of oil in water column and change in hydrocarbon concentrations (e.g., total recoverable hydrocarbons, BETEXN, PAH), physio-chemical parameters and dispersant detection.	Situation Unit Lead to validate surveillance and modelling data; Planning Section for use in IAP.	Confirm spatial extent of spill within the water column and verify spill modelling and surveillance data; extent of spill can in turn influence location of other OMP and SMP monitoring components and sites. Data can also influence ongoing use of dispersant through ongoing operational NEBA.
Sediment quality	Distribution of oil in sediment and	Situation Unit Lead to validate	Confirm spatial extent of spill; extent of spill can in turn influence

[7] Summary only. For additional detail, please refer to individual OMPs. Also note data outputs will be reliant on finalised monitoring design.

OMP	Data generated[7]	DIMT Section requiring data	How data may be used by DIMT
assessment	change in hydrocarbon concentrations (e.g. Total recoverable hydrocarbons, BETEXN, PAH).	surveillance and modelling data; Planning Section for use in IAP.	location of other OMP and SMP monitoring components and sites.
Marine fauna assessment • Reptiles • Cetaceans (observational only) • Dugongs • Seabirds and shorebirds • Fish	Rapid assessment of presence and distribution of marine fauna; evaluate impact of spill and response activities on fauna.	Planning Section for use in IAP; Oiled Wildlife Unit/Division to help in developing Wildlife Response Sub-plan.	Understanding of species, populations and geographical locations at greatest risk from spill impacts. DIMT can use this information to help qualify locations with highest level of protection priority (e.g. dugong nursery area is at risk of high contact therefore dispersant use closest to spill source is a preferred option); understanding the impacts of spill response activities can help DIMT to modify or terminate activities if they are assessed as creating more harm than the oil alone (e.g., large shoreline clean-up teams and staging areas may disturb shorebird nesting resulting in adults abandoning chicks).
Air quality modelling (responder health and safety)	Modelled outputs of airborne hydrocarbons, gases and chemicals and their predicted distribution .	Operations Section to help determine safe zones in close vicinity of spill; Planning Section for use in IAP.	Determine safe distances from spill source for response personnel; determine the presence and persistence of volatile organic compounds to know if response areas are safe for personnel.

18.2 Impacts from Response Activities

Table 10-4 of the Joint Industry OSM Framework outlines the potential impacts from response activities and the relevant OMP/SMP for monitoring impacts. For example, if shoreline clean-up was being considered as a response option, then possible impacts resulting from that activity could include physical presence, ground disturbance, water/sediment quality decline and lighting/noise impacts to fauna.

When finalising monitoring designs, the OSM Implementation Lead shall review Table 10-4 of the Joint Industry OSM Framework to ensure potential impacts from response activities are considered and incorporated into relevant OMP/SMP designs.

18.3 Monitoring of Effectiveness of Control Measures and to Ensure EPS are Met

When finalising monitoring designs, the OSM Implementation Lead and EUL (or delegate) shall review the Environmental Performance Standards (EPS) listed in Appendix C-5 and integrate checks into the monitoring design that will help determine if relevant EPS are being met.

19 Data Management

Minimum standards for data management are provided in Section 10.11 of the Joint Industry OSM Framework.

20 Quality Assurance and Quality Control

Refer to Section 10.11 of the Joint Industry OSM Framework for QA/QC minimum standards.

21 Communication Protocols

21.1 OSM Services Provider/s

Communication protocols between EOG and its OSM Services Provider with respect to delivery of the OMPs and SMPs (during both preparedness and implementation) are intentionally defined to ensure clear and consistent information is provided in both directions.

The following communication protocols must be observed:

- Communication between EOG and its OSM Services Provider during the preparedness phase (pre-spill) and during activation (prior to deployment) will be between the EUL (or delegate) and the OSM Services Provider Lead respectively.
- During implementation (post deployment), primary communication occurs via two pathways:
    - EUL and the OSM Services Provider Lead for contractual, management, scientific and general direction matters; and
    - EOG's On-Scene Commander and the OSM Services Provider's Field Operations Manager for on-site matters.
- All OSM operational decisions will be logged in an OSM decision log by key personnel.
- All OSM tasks, actions and requirements will be documented in an IAP during the response phase of the spill.
- The EOG EUL will keep the Operations Section Chief, Logistics Section Chief and Planning Section Chief briefed of the OSM status as required.
- All correspondence (copies of emails and records of phone calls) between EOG and the OSM Services Provider during a response will be recorded and kept on file.
- All communication received by OSM Services Provider not in line with these protocols will be reported to the EUL who will seek guidance on the accuracy of the information received.
- Unless related to safety (e.g., evacuation), any direction or instruction received by the OSM Services Provider outside of these protocols will be confirmed via the EOG EUL or On-Scene Commander prior to implementation.

During the post-response phase, all communications will be between the EOG Environment Advisor and the OSM Services Provider OSM Implementation Lead.

21.2 External Stakeholders

Results of OMPs and SMPs will be discussed with relevant stakeholders. Information will be shared with regulatory agencies/authorities as required and inputs received from stakeholders will be evaluated and where practicable, will be used to refine the ongoing spill response and/or ongoing operational and/or scientific monitoring.

EOG's DIMT Public Information Officer and/or Liaison Officer (initially be will same individual) will be the focal point for external engagement during the response operation. Stakeholder communications post-response will be managed by EOG's External (Government) Relations Team.

22 Stand Down Process

Monitoring for each component will continue until termination criteria for individual components are reached. Typically, OMPs will terminate when agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response or a relevant SMP has been activated. SMPs will continue after the spill response has been terminated and until such time as their termination criteria are also reached. A list of criteria is provided in the OSM Framework.

After OMPs are terminated, the OMP monitoring teams will be advised to stand down. Following this stage, the OSM Services Provider will run a lessons-learnt meeting between EOG, all monitoring providers and other relevant stakeholders. It is the responsibility of EOG to ensure that lessons learnt are communicated to the relevant stakeholder groups. The lessons discussed will include both positive actions to be reinforced and lessons for actions that could be improved in future standby or response campaigns.

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Appendix C-1 Baseline Data Sources

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
General	WAMSI Kimberley Marine Research Program	WAMSI (link)	WA Kimberley
General	North West Atlas. Contains map layers and links to data and metadata for a range of baseline measures, including water and sediment quality.	North West Atlas (link)	North-western Australia
Water and sediment quality	Hydrocarbon abundance and distribution (including natural seeps) in the vicinity of the Prelude/Ichthys fields of the Browse Basin	CSIRO/AIMS (Link to report)	East Browse Basin
	McAlpine, KW, Sim, CB, Masini, RJ and Daly, T 2010, Baseline petroleum hydrocarbon content of marine water, shoreline sediment and intertidal biota at selected sites in the Kimberley bioregion, Western Australia. Marine Technical Report Series No. MTR3, Office of the Environmental Protection Authority (OEPA), Perth, Western Australia.	WA EPA (Link to report)	Kimberley bioregion (16 shoreline sites, mainland and islands, spanning 340 km)
	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment (also described in Ecological studies of the Bonaparte Archipelago and Browse Basin – Cetacean survey – additional detail on a 2006 aerial survey in contained in this report)	INPEX (Link to report)	Browse Basin Region (Ichthys Field to Echuca Shoal)
	Montara Reports 'Control site water quality data' (Operational Monitoring Study O2 – Monitoring of Oil Character, Fate and Effects, Report 02 Water Quality and Monitoring of Oil Character, Fate and Effects, Report 03 Dispersant Treated Oil Distribution)	PTTEP (Link to report)	Broome to Darwin (Mainland) Islands – Browse, Ashmore, Cartier, Hibernia Reef
Shorelines and intertidal habitats	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment	INPEX (Link to report)	Browse Island
	Montara Reports: Shoreline Ecological Assessment Aerial and Ground Surveys 7–19 November 2009 (Kimberley Coast)	PTTEP (Link to report)	Kimberley Coast
	Shoreline Assessment Ground Survey: An operational component of the Monitoring Plan for the Montara Well Release Timor Sea (Ashmore, Cartier and Hibernia Islands).	PTTEP (Link to report)	Ashmore, Cartier and Hibernia Islands
Benthic communities and fish assemblages	Scott Reef Research Project – Long-term monitoring of shallow water coral and fish communities at Scott Reef	AIMS (Link to reports)	Scott Reef (South Reef, North Reef and Seringapatam Reef)
	The composition and structure of shallow benthic reef communities in the Kimberley, north-west Australia	WA Museum (Link to report)	Kimberley Region
	Montara: Vulcan, Barracouta East and Goeree Shoals Survey 2013; Heyward et al 2013; Report for PTTEP Australasia (Ashmore Cartier) Pty Ltd. Australian Institute of Marine Science, Perth.	PTTEP (Link to report)	Barracouta, Goeree and Vulcan Shoals
	Montara: Barracouta, Goeree and Vulcan Shoals Survey 2016 Report for PTTEP Australasia (Ashmore Cartier) Pty Ltd. Australian Institute of Marine Science, Townsville.	PTTEP (Link to report)	Barracouta, Goeree and Vulcan Shoals
	Montara reports: Final Report on Benthic Surveys at Ashmore, Cartier and Seringapatam Reefs (post-spill)	PTTEP (Link to report)	Ashmore, Cartier and Seringapatam Reefs
	Applied Research Program (ARP7): Subtidal Benthos: towards benthic baselines in the Browse Basin. Final report – Submerged Shoals	Shell/INPEX (Link to report)	Echuca and Heywood shoals
	Marine Biodiversity Survey of Mermaid Reef (Rowley Shoals), Scott and Seringapatam Reef	Western Australian Museum (Link to report)	Mermaid Reef (Rowley Shoals), Scott and Seringapatam Reef
	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment	INPEX (2010) (Link to report)	Browse Island, Echuca Shoal, Ichthys Field
	ARP7: Subtidal Benthos: towards benthic baselines in the Browse Basin – Quantitative information on the abundance, diversity and temporal variability of benthos and associated fish – Browse Island reef	AIMS (Shell/INPEX)	Browse Island
	Benthic primary productivity: production and herbivory of seagrasses, macroalgae and microalgae	WAMSI (Link to report)	Bardi Jawi Indigenous Protected Area (IPA), encompassing Cygnet Bay, One Arm Point, Jalan (Tallon Island) and Iwany (Sunday Island)
	Baselines of benthic communities, herbivory and reef metabolism at Browse Island	CSIRO/UWA/AIMS (Link to report)	Browse Island
	Egg size and fecundity of biannually spawning corals at Scott Reef	AIMS – Foster, T and Gilmour, J (Link to report)	Scott Reef
Marine reptiles	Long term monitoring of the marine turtles of Scott Reef	SKM/Woodside (Link to report)	Scott Reef
	Marine Turtles in the Kimberley: key biological indices required to understand and manage nesting turtles along the Kimberley coast	WAMSI (Link to report)	Near complete coverage of Kimberley Coast and Islands (>44,000 georeferenced images)
	Ecology of Marine Turtles of the Dampier Peninsula and the Lacepede Island Group, 2009–2010	RPS/Woodside (Link to report)	Dampier Peninsula and the Lacepede Islands

Receptor	Existing baseline monitoring	Source / Data Custodian	Spatial extent
	Ecological studies of the Bonaparte Archipelago and Browse Basin – Marine Turtles	INPEX (Waayers, D) (Link to report)	Maret Islands and other islands in the Bonaparte Archipelago
Seabirds and shorebirds	The status of seabirds and shorebirds at Ashmore Reef, Cartier Island and Browse Island. Monitoring Program for the Montara Well Release. Pre-Impact Assessment and First Post-Impact Field Survey	PTTEP (Clarke, R. et al) (Link to report)	Ashmore Reef (including Cartier Island) and Browse Island
	Evaluating the impacts of local and international pressures on migratory shorebirds in Roebuck Bay and Eighty Mile Beach	WAMSI (Rogers et al.) (Link to report)	Roebuck Bay and Eighty Mile Beach
	Adele Island Bird Survey Report	Western Australian Department of Biodiversity Conservation and Attractions (DBCA) (Boyle, et al.) (Link to report)	Adele Island
	Shell/INPEX ARP6 Milestone Report #7- Lacepede Islands: Report comparing the diet composition, foraging habitat and breeding between species and between years on Lacepede islands	Monash/UWA/AIMS	Lacepede Islands
	Ecological studies of the Bonaparte Archipelago and Browse Basin – Seabird survey	INPEX (Link to report)	Browse Island and Maret Islands
Marine mammals	Humpback Whale Survey Report. Browse Marine Mammal Fauna Survey	Woodside (RPS) (Link to Humpback Whale report 2010) (Link to Humpback Whale report 2011) (Link to dugong report 2009)	Browse Basin – James Price Point Migration Corridor, Pender Bay, Gourdon Bay, Scott Reef
	Humpback whale use of the Kimberley: understanding and monitoring spatial distribution (analysis of historical data, including other reports mentioned in this review. Also provides analysis of whale survey techniques and recommendations for future monitoring)	WAMSI	Kimberley region
	Browse Island habitat descriptions – Draft EIS Technical Appendices – Appendix 4 Ichthys Gas Field Development Project Studies of the Offshore Marine Environment (also described in Ecological studies of the Bonaparte Archipelago and Browse Basin – Cetacean survey – additional detail on a 2006 aerial survey in contained in this report)	INPEX (Link to report)	Browse Basin Region (Browse Island to Scott Reef)
	Integrating Indigenous knowledge and survey techniques to develop a baseline for dugong (Dugong dugon) management in the Kimberley	WAMSI (Link to report)	North Kimberley (Broome to NT border) South Kimberley (Broome to Port Hedland)
Commercial fisheries	Commercial Fisheries data collected by WA Department of Fisheries (WA DoF) and Australian Fishing Management Authority (AFMA)	WA Department of Fisheries / Australian Fishing Management Authority	Australia wide
	Montara Well Release: Olfactory analysis of Timor Sea fish fillets	Curtin University/PTTEP (Link to report)	Timor Sea
	Montara Well Release Monitoring Study S4A – Assessment of Effects on Timor Sea Fish	Curtin University/PTTEP (Link to report)	Vulcan Shoal, Heywood Shoal, Browse Island, Echuca Shoal, Scott Reef
	Montara Well Release: Assessment of Fish catch for the presence of Oil	PTTEP (Link to report)	Northern Demersal Scalefish Managed Fishery (NDSF)
	Monitoring the Northern Demersal Scalefish Managed Fishery: Establishing Baseline Biomarker Levels in Commercially Important Demersal Fishes	Curtin/AIMS	East Browse Basin
	Monitoring the Northern Demersal Scalefish Managed Fishery: accounting for spatial variability and detecting change in key fish populations	Curtin/CSIRO/AIMS	East Browse Basin

Receptor	Priority Protection Data	Source / Data Custodian	Map Sector	Spatial Extent / Location	WA DoT cell
Water and sediment quality	Ssaltmarsh, saltpan, salt flat	Seamap Australia	Wyndam-East Kimberley	North Kimberley (MP), Cambridge Gulf, Ord River, Drysdale River, Sir Graham Moore Island	1, 2, 5, 6, 7, 9, 16, 17
			Mitchell River	Islands west of Kalumburu	24, 25
	Exposed tidal flats, Saltpans or saline mudflats, Saltpans or saline mudflats to below sea level, Sheltered rocky shores	Seamap Australia	Wyndam-East Kimberley	Cape Domett, Berkley River	8, 10, 11, 12, 13
			Scott Reef / Browse Island	Browse Island, Scott Reef	302, 306
	Seagrasses	Seamap Australia	Wyndam-East Kimberley	Berkley River	12, 13
			Scott Reef / Browse Island	Scott Reef	306
		Australian Ocean Data Network - ACEAS	Wyndam-East Kimberley	Berkley River	12, 13
	Coral Reefs (Intertidal)	Curtin University - ReefKIM	Wyndam-East Kimberley	Berkley River, Sir Graham Moore Island	14, 15, 16, 17, 18
			Mitchell River	Islands west of Kalumburu, Bigge Island, Robroy Reefs, Holothuria Banks, Cassini Island	19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 282, 283, 284, 285
Shorelines and intertidal habitats	saltmarsh, saltpan, saltflat	Seamap Australia	Wyndam-East Kimberley	North Kimberley (MP), Cambridge Gulf, Ord River, Drysdale River, Sir Graham Moore Island	1, 2, 5, 6, 7, 9, 16, 17
			Mitchell River	Islands west of Kalumburu	24, 25
	Exposed tidal flats, Saltpans or saline mudflats, Saltpans or saline mudflats to below sea level, Sheltered rocky shores	Seamap Australia	Wyndam-East Kimberley	Cape Domett, Berkley River	8, 10, 11, 12, 13
			Scott Reef / Browse Island	Browse Island, Scott Reef	302, 306
	Segrasses	Seamap Australia	Wyndam-East Kimberley	Berkley River	12, 13
			Scott Reef / Browse Island	Scott Reef	306
		Australian Ocean Data Network - ACEAS	Wyndam-East Kimberley	Berkley River	12, 13
	Coral Reefs (Intertidal)	Curtin University - ReefKIM	Wyndam-East Kimberley	Berkley River, Sir Graham Moore Island	14, 15, 16, 17, 18
			Mitchell River	Islands west of Kalumburu, Bigge Island, Robroy Reefs, Holothuria Banks, Cassini Island	19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 282, 283, 284, 285
	Pelican Island Nature Reserve (IUCN IA) (Intertidal)	CAPAD protected area	Wyndam-East Kimberley	Cambridge Gulf	2, 5
	Ord River Nature Reserve (IUCN IA)	RAMSAR wetlands	Wyndam-East Kimberley	Cambridge Gulf, Ord River	3, 4
		CAPAD protected area	Wyndam-East Kimberley	Ord River	5
	Nationally Important Wetlands	Directory of Important Wetland - DCCEEW (Commonwealth Department of Climate Change, Energy, the Environment and Water)	Wyndam-East Kimberley	Ord River	5
			Mitchell River	Islands west of Kalumburu	25
	Lesueur Island Nature Reserve (IUCN IA)	CAPAD protected area	Wyndam-East Kimberley	Berkley River	13
	Low Rocks Nature Reserve (IUCN IA)	CAPAD protected area	Mitchell River	Islands west of Kalumburu	22
	Browse Island Nature Reserve (IUCN IA)	CAPAD protected area	Scott Reef / Browse Island	Browse Island	302
	Scott Reef Nature Reserve Unassigned (IUCN IA)	CAPAD protected area	Scott Reef / Browse Island	Scott Reef	307
	National Heritage List Spatial Database	DCCEEW	Wyndam-East Kimberley	North Kimberley (MP), Cambridge Gulf, Ord River, Drysdale River, Sir Graham Moore Island	1, 2, 5, 6, 7, 9, 16, 17
			Mitchell River	Islands west of Kalumburu, Bigge Island, Robroy Reefs, Holothuria Banks, Cassini Island	19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 282, 284, 285
			Scott Reef / Browse Island	Browse Island, Scott Reef	302, 305, 306
	KEFs based on marine bioregional plans	DCCEEW	Wyndam-East Kimberley	Cape Domett, Berkley River	8, 13
			Scott Reef / Browse Island	Browse Island, Scott Reef	302, 305, 306

Receptor	Priority Protection Data	Source / Data Custodian	Map Sector	Spatial Extent / Location	WA DoT cell
	Smartline Coastal Geomorphic Map of Australia	CSIRO	Wyndam-East Kimberley	Cape Domett, Berkley River	8, 10, 11
	BIAs of regionally significant marine species	DCCEEW	Wyndam-East Kimberley	Berkley River	11, 12
			Scott Reef / Browse Island	Browse Island, Scott Reef	305, 306
Benthic communities and fish assemblages	*Glyphis garricki* (Northern River Shark, New Guinea River Shark)	DPAW	Wyndam-East Kimberley	Cambridge Gulf, Ord River, Cape Domett, Drysdale River	2, 3, 4, 5, 6, 8, 9
		DCCEEW	Wyndam-East Kimberley	Cambridge Gulf, Ord River, Cape Domett, Drysdale River	2, 3, 4, 5, 6, 8, 9
	Pristis clavata (Dwarf Sawfish)	DCCEEW	Wyndam-East Kimberley	Berkley River, Sir Graham Moore Island	11, 12, 14, 15, 18
			Mitchell River	Islands west of Kalumburu, Bigge Island, Holothuria Banks, Cassini Island	19, 21, 22, 23, 26, 27, 28, 29, 30, 283, 285
	*Pristis pristis (*Freshwater Sawfish, Largetooth Sawfish)	DCCEEW	Wyndam-East Kimberley	Berkley River, Sir Graham Moore Island	11, 12, 14, 15, 18
			Mitchell River	Islands west of Kalumburu, Holothuria Banks, Cassini Island	19, 21, 22, 23, 26, 27, 28, 29, 283, 285
			Scott Reef / Browse Island	Browse Island	302
	Pristis zijsron (Green Sawfish)	DCCEEW	Wyndam-East Kimberley	Berkley River, Sir Graham Moore Island	11, 12, 14, 15, 18
			Mitchell River	Islands west of Kalumburu, Holothuria Banks, Cassini Island	19, 21, 22, 23, 26, 27, 28, 29, 283, 285
			Scott Reef / Browse Island	Browse Island	302
	Rhincodon typus (Whale Shark)	DCCEEW	Mitchell River	Cassini Island	285
			Scott Reef / Browse Island	Browse Island	302
	Cheilinus undulatus (Humphead Maori Wrasse)	DCCEEW	Scott Reef / Browse Island	Browse Island	306
Marine reptiles	*Caretta caretta* (Loggerhead Turtle)	DCCEEW	Wyndam-East Kimberley	Cape Domett, Sir Graham Moore Island	8, 18
			Mitchell River	Islands west of Kalumburu	19, 23, 26
	Dermochelys coriacea (Leatherback Turtle)	DCCEEW	Wyndam-East Kimberley	Cape Domett,Sir Graham Moore Island	8, 18
			Mitchell River	Islands west of Kalumburu	19, 23, 26
	Lepidochelys olivacea (Olive Ridley Turtle)	DCCEEW	Wyndam-East Kimberley	Cape Domett, Drysdale River ,Berkley River, Sir Graham Moore Island	8, 9, 11, 12, 14, 15, 18
			Mitchell River	Islands west of Kalumburu	19, 23, 26
	Natator depressus (Flatback Turtle)	DCCEEW	Wyndam-East Kimberley	Cape Domett, Drysdale River, Berkley River, Sir Graham Moore Island	8, 9, 11, 12, 14, 15, 18
			Mitchell River	Islands west of Kalumburu, Holothuria Banks, Cassini Island	19, 21, 22, 23, 26, 27, 28, 29, 283, 284, 285
	Chelonia mydas (Green Turtle)	DCCEEW	Wyndam-East Kimberley	Berkley River, Sir Graham Moore Island	14, 15, 18
			Mitchell River	Islands west of Kalumburu, Cassini Island	19, 21, 23, 26, 27, 28, 285
			Scott Reef / Browse Island	Browse Island, Scott Reef	302, 307
	Eretmochelys imbricata (Hawksbill Turtle)	DCCEEW	Scott Reef / Browse Island	Scott Reef	307
	Aipysurus apraefrontalis (Short-nosed Seasnake)	DCCEEW	Mitchell River	Islands west of Kalumburu, Holothuria Banks, Cassini Island	21, 22, 23, 26, 27, 28, 29, 283, 284, 285
			Scott Reef / Browse Island	Browse Island, Scott Reef	305, 306, 307
Seabirds and shorebirds	*Numenius madagascariensis (*Eastern Curlew, Far Eastern Curlew)	DCCEEW	Wyndam-East Kimberley	North Kimberley (MP), Cambridge Gulf, Ord River, Berkley River, Sir Graham Moore Island	1, 2, 3,4, 5, 6, 7, 10, 13, 17, 18
			Mitchell River	Islands west of Kalumburu, Robroy Reefs	19, 20, 22, 24, 25, 28, 29, 31

Receptor	Priority Protection Data	Source / Data Custodian	Map Sector	Spatial Extent / Location	WA DoT cell
	Calidris ferruginea (curlew sandpiper)	DCCEEW	Wyndam-East Kimberley	Ord River, Sir Graham Moore Island	4, 5, 6, 16
			Mitchell River	Islands west of Kalumburu, Holothuria Banks	25, 282
	Calidris tenuirostris (great knot)	DCCEEW	Wyndam-East Kimberley	Sir Graham Moore Island	16
	Charadrius leschenaultii (greater sand plover)	DCCEEW	Wyndam-East Kimberley	Sir Graham Moore Island	18
	Limosa lapponica (bar-tailed godwit)	DCCEEW	Wyndam-East Kimberley	Sir Graham Moore Island	18
	Charadrius mongolus (lesser sand plover)	DCCEEW	Scott Reef / Browse Island	Scott Reef	307
Marine mammals	*Megaptera novaeangliae* (Humpback Whale)	DCCEEW	Mitchell River	Islands west of Kalumburu, Cassini Island	27, 29, 285
			Scott Reef / Browse Island	Browse Island	302
	Balaenoptera borealis (Sei Whale)	DCCEEW	Mitchell River	Bigge Island	30
	Balaenoptera musculus (Blue Whale)	DCCEEW	Scott Reef / Browse Island	Browse Island, Scott Reef	305, 306, 307
	Balaenoptera musculus brevicauda (Pygmy Blue Whale)	DCCEEW	Scott Reef / Browse Island	Browse Island, Scott Reef	305, 306, 307
Commercial fisheries	Commonwealth fisheries: Northern Prawn Fishery	AFMA	Wyndam-East Kimberley	North Kimberley (MP), Cambridge Gulf, Ord River< Cape Domett, Drysdale River, Berkley River	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14
	Commonwealth fisheries: North West Slope Fishery, Western Tuna and Billfish	AFMA	Scott Reef / Browse Island	Browse Island, Scott Reef	305, 306, 307
	State fisheries: Invertebrates (IOE), Kimberley Gillnet and Barramundi Limited Entry Fishery (CMP), Land Hermit Crab Fishery (IOE), Mackerel Managed Fishery (CMP), Marine Aquarium Fish Managed Fishery (CMP), Mud Crab Fishery (IOE), Northern Demersal Scalefish Managed Fishery (CMP), South-West Coast Salmon Fishery (CMP), Specimen Shell Managed Fishery (CMP)	DPIRD Fisheries	Wyndam-East Kimberley	North Kimberley (MP), Cambridge Gulf, Ord River< Cape Domett, Drysdale River, Berkley River, Sir Graham Moore Island	1, 2, 3,4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18
			Mitchell River	Islands west of Kalumburu, Bigge Island, Robroy Reefs, Holothuria Banks, Cassini Island	27, 30, 31, 282, 283, 285
			Scott Reef / Browse Island	Browse Island, Scott Reef	302, 305
	Broome Prawn Managed Fishery (CMP)	DPIRD Fisheries	Scott Reef / Browse Island	Browse Island	302
	Pearling leases	DPIRD Fisheries	Wyndam-East Kimberley	Sir Graham Moore Island	17
		-	Mitchell River	Islands west of Kalumburu	19, 20, 21, 22, 23, 24, 25, 26, 28, 29
	Aquaculture sites	DPIRD Fisheries	Mitchell River	Islands west of Kalumburu	19

Appendix C-2 Protected Matters in the EMBA

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact)
Mammals (refer to Appendix 5 [Section 5.3.5] of the Beehive-1 Drilling EP for additional description of key receptors)				
DoE. 2015b. Conservation Management Plan for the Blue Whales - A Recovery Plan under the EPBC Act (2015-2025). TSSC. 2015a. *Balaenoptera borealis* (Sei Whale) Conservation Advice. TSSC. 2015b. Approved Conservation Advice for *Megaptera novaeangliae* (humpback whale). TSSC. 2015c. Approved Conservation Advice for *Balaenoptera physalus* — Fin Whale. EPBC Act Regulations 2000. Part 8 Interacting with cetaceans and whale watching. Division 8.1 Interacting with cetaceans. Commonwealth of Australia 2017. Australian National Guidelines for Whale and Dolphin Watching 2017. Commonwealth of Australia. DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DoEE. 2017. National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Fauna.	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Vessel strike • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill	• Ensure all vessel strike incidents are reported in the National Ship Strike Database. • Ensure the risk of vessel strikes on whales and dugongs is considered when assessing actions that increase vessel traffic in areas where whales occur and, if required, appropriate mitigation measures are implemented. • Protect habitat important to the survival of the species; assess and manage physical disturbance and development activities (such as ship-strike and pollution). • Environmental assessment processes must ensure that existing information about coastal habitat requirements, environmental suitability of coastal locations, historic high use and emerging areas are taken into consideration. • Contribute to the long-term prevention of the incidence of harmful marine debris. • If a whale, dolphin or dugong surfaces in the vicinity of a vessel travelling for a purpose other than whale and dolphin watching, take all care necessary to avoid collisions. • Increased reporting of vessel collision (a requirement of the EPBC Act). • Reduce risk of collision such as maintaining look out, consider reducing vessel speed and course alterations away from sightings.	OMP: Marine fauna assessment – Cetaceans SMP: Marine mega-fauna assessment – Whale sharks, dugongs and cetaceans	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island
Reptiles (refer to Appendix 5 [Section 5.3.6] of the Beehive-1 Drilling EP for additional description of key receptors)				
DoEE 2017a. Recovery Plan for Marine Turtles in Australia, Commonwealth of Australia 2017. TSSC. 2011. Commonwealth Conservation Advice on *Aipysurus apraefrontalis* (Short-nosed Seasnake). TSSC. 2011. Commonwealth Conservation Advice on *Aipysurus foliosquama* (Leaf-scaled Seasnake). DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DSEWPaC. 2012a. Marine bioregional plan for the North-west Marine Region. DSEWPaC. 2012b. Marine bioregional plan for the North Marine Region. DoEE. 2020. Light pollution guidelines – National light pollution guidelines for wildlife: Including marine turtles, seabirds and migratory shorebirds. DoEE. 2017b. National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Fauna.	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Vessel strike • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill • Light emissions	• Manage artificial light from onshore and offshore sources to ensure biologically important behaviours of nesting adults and dispersing hatchlings can continue. • Implementation of best practice light management guidelines for developments adjacent to marine turtle nesting beaches. • Identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution. • Support retrofitting of lighting at coastal communities and industrial developments, including imposing restrictions around nesting seasons. • Manage anthropogenic activities to ensure marine turtles are not displaced from identified habitat critical for survival. • Contribute to the reduction in the source of marine debris. • Ensure that spill risk strategies and response programs include management for turtles and their habitats, particularly in reference to slow to recover habitats, e.g. seagrass meadows or corals. • Implement best practices to minimise impacts to turtle health and habitats from chemical discharges.	OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Reptiles SMP: Marine mega-fauna assessment – Reptiles	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact)
		• Identify populations and areas of high conservation priority (sea snakes). • Ensure there is no anthropogenic disturbance / implement measures to reduce adverse impacts of habitat degradation and/or modification (sea snakes). • Increased reporting of vessel collision (a requirement of the EPBC Act). • Reduce risk of collision such as maintaining look out, consider reducing vessel speed and course alterations away from sightings.		
Marine Fish and Elasmobranchs (refer to Appendix 5 [Section 5.3.4] of the Beehive-1 Drilling EP for additional description of key receptors)				
Whale shark management. 2013. Wildlife management program no. 57. (DPAW, 2013a). TSSC. 2015d. Approved Conservation Advice for Rhincodon typus (whale shark). DSEWPaC. 2013a. Recovery Plan for the White Shark (Carcharodon carcharias). TSSC. 2014a. Approved Conservation Advice for Glyphis garricki (northern river shark). TSSC. 2009. Commonwealth Conservation Advice on Pristis clavata (Dwarf Sawfish). TSSC. 2008. Approved Conservation Advice for Pristis zijsron (Green Sawfish). DoE. 2015e. Sawfish and River Sharks - Multispecies Recovery Plan. DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DSEWPaC. 2012a. Marine bioregional plan for the North-west Marine Region. DSEWPaC. 2012b. Marine bioregional plan for the North Marine Region. TSSC. 2014b. Approved Conservation Advice for Glyphis glyphis (speartooth shark).	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Vessel strike • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill	• Identify populations and areas of high conservation priority (sawfishes). • Ensure there is no anthropogenic disturbance / implement measures to reduce adverse impacts of habitat degradation and/or modification (northern river shark). • Ensure all future developments will not significantly impact upon sawfish and river shark habitats critical to the survival of the species or impede upon the migration of individual sawfish or river sharks. Implement measures to reduce adverse impacts of habitat degradation and/or modification. • Review and assess the potential threat of introduced species, pathogens and pollutants. • Contribute to the long-term prevention of the incidence of harmful marine debris.	OMP: Marine fauna assessment – Fish SMP: Marine mega-fauna assessment – Marine fish and elasmobranch assemblages assessment SMP: Marine mega-fauna assessment – Whale sharks, dugongs and cetaceans	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island
Seabirds and Shorebirds (refer to Appendix 5 [Section 5.3.7] of the Beehive-1 Drilling EP for additional description of key receptors)				
DoE. 2015d. EPBC Act Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC listed migratory shorebird species. DoE. 2015f. Wildlife conservation plan for migratory shorebirds. DoE. 2015c. Draft referral guideline for 14 birds listed as migratory under the EPBC Act. DSEWPaC. 2012c. Species group report card - seabirds and migratory shorebirds. Supporting the marine bioregional plan for the North-west Marine Region. Prepared under the EPBC Act. DEWHA. 2009. Threat abatement plan to reduce the impacts of exotic rodents on biodiversity on Australian offshore islands of less than 100 000 hectares. Commonwealth of Australia. DoEE. 2018. Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans. DSEWPaC. 2012a. Marine bioregional plan for the North-west Marine Region. DSEWPaC. 2012b. Marine bioregional plan for the North Marine Region. TSSC. 2016a. Calidris tenuirostris (Great Knot) Approved Conservation Advice. TSSC. 2016b. Calidris canutus (Red Knot) Approved Conservation Advice. TSSC. 2016c. Charadrius leschenaultii (Greater Sand Plover) Approved Conservation Advice. TSSC. 2016d. Charadrius mongolus (Lesser Sand Plover) Approved Conservation	• Waste / marine debris • Noise and vibration • Introduced Marine Species • Introduced Terrestrial Pests (rodents) • Benthic habitat degradation / seabed disturbance • Emissions and discharges • Oil spill • Light emissions	• Reduce risk of rodents gaining access to key vessels at key ports • Contribute to the long-term prevention of the incidence of harmful marine debris • Identify threats to important (migratory shorebird) habitat and develop conservation measures for managing them. • Avoid degradation of migratory shorebird habitat that may occur through the introduction of exotic species, changes to hydrology or water quality (including toxic inflows), fragmentation of habitat or exposure to litter, pollutants and acid sulphate soils. Minimise human disturbance, a major threat to migratory shorebirds • Best practice waste management will be implemented.	OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Seabirds and shorebirds SMP: Seabirds and shorebirds	Cox-Finniss Daly Thamarrurr Victoria-Daly Wyndham-East Kimberley Mitchell River Ashmore Reef/Cartier Island Scott Reef/ Browse Island

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact)
Advice. TSSC. 2016e. Limosa lapponica menzbieri — Northern Siberian Bar-tailed Godwit. Approved Conservation Advice. TSSC. 2015e. Calidris ferruginea (Curlew Sandpiper) Approved Conservation Advice. TSSC. 2015f. Papasula abbotti — Abbott's Booby. Approved Conservation Advice. DoE. 2015a. Conservation advice Numenius madagascariensis (eastern curlew). TSSC. 2015g. Approved Conservation Advice for Anous tenuirostris melanops (Australian lesser noddy). TSSC. 2002. Commonwealth Listing Advice on Sterna albifrons sinensis (Little Tern (western Pacific)). DSEWPaC. 2013b. Approved Conservation Advice for Rostratula australis (Australian painted snipe). Canberra, ACT. DoEE. 2020. Light pollution guidelines – National light pollution guidelines for wildlife: Including marine turtles, seabirds and migratory shorebirds.				
Threatened Ecological Communities (refer to Appendix 5 [Section 5.4.5] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Approved Conservation Advice for the Monsoon vine thickets on the coastal sand dunes of Dampier Peninsula (DSEWPaC, 2013c)	• Clearing (shoreline clean-up and/or shoreline based monitoring activities)	• Protect and conserve remaining areas of the ecological community, monitor condition of Monsoon vine tickets	OMP: Shoreline clean-up assessment SMP: Intertidal and Coastal Habitat Assessment	
RAMSAR Wetlands (refer to Appendix 5 [Section 5.4.4] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Department of Environment and Conservation 2012, Ord River and Parry Lagoons nature reserves management plan 77 2012, Department of Environment and Conservation, Perth. (DEC, 2012)		• Appendix 2 Limits of acceptable change for the Ord River Floodplain Ramsar site	OMP: Water quality assessment OMP: Sediment quality assessment OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Seabirds and shorebirds SMP: Water quality impact assessment SMP: Sediment quality impact assessment SMP: Intertidal and Coastal Habitat Assessment SMP: Seabirds and shorebirds OMP: Marine fauna assessment – Dugongs SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs SMP: Benthic habitat assessment	Approx. 107 km SSW
BMT WBM (2011) Ecological Character Description for Cobourg Peninsula Ramsar Site. Prepared for the Australian Government, Canberra.		• Table 4-1 Limits of acceptable change (LAC)		Approx. 500 km NE
BMT WBM (2010) Ecological Character Description for Kakadu National Park Ramsar Site. Prepared for DSEWPaC.		• Table 4-3 Limits of acceptable change (LAC)		Approx. 500 km NE
Hale, J. and Butcher, R. (2013) Ashmore Reef Commonwealth Marine Reserve Ramsar Site Ecological Character Description. A report to the Department of the Environment, Canberra	• Relevant threat: oil and gas exploration and mining – boat strike, lighting, toxic effects of oil spills	• Limits of acceptable change to elements (component, process, service) of ecological character defined in Table 27 of Ecological Character Description		Ashmore Reef (601 km NW)
Australian Marine Parks (refer to Appendix 5 [Section 5.4.1] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
DNP Parks 2018b, North Marine Parks Network Management Plan 2018, Director of National Parks, Canberra.	• Climate change • Changes in hydrology • Extraction of living resources • Habitat modification • Human presence • Invasive species • Marine pollution	Park protection and management—timely and appropriate preventative and restorative actions to protect natural, cultural and heritage values from impacts	OMP: Water quality assessment OMP: Sediment quality assessment OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Seabirds and shorebirds SMP: Water quality impact assessment SMP: Sediment quality impact assessment SMP: Intertidal and Coastal Habitat Assessment SMP: Seabirds and shorebirds OMP: Marine fauna assessment – Dugongs	Oceanic Shoals (152 km N) Arafura (548 km NNE) Arnhem (585 km NE)
DNP 2018a, North-west Marine Parks Network Management Plan 2018, Director of National Parks, Canberra. North-west Marine Parks Network Management Plan 2018-28, Implementation Plan 1, Foundation Phase 2018-2022 (Parks Australia, 2018)				Argo-Rowley Terrace (890 km W) Ashmore Reef (601 km NW) Cartier Island (553 km W) Joseph Bonaparte Gulf (35 km E) Kimberley (235 km W)

Recovery plan / conservation advice (date issued)	Relevant threats	Relevant conservation actions	Relevant OMPs and SMPs	Relevant priority monitoring locations (quickest modelled time to contact)
			SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs SMP: Benthic habitat assessment SMP: Marine fish and elasmobranch assemblages assessment	Mermaid Reef (1052 km SSW) Montebello (1025 km SSW)
Western Australian Marine Parks and Northern Territory National Parks (refer to Appendix 5 [Section 5.4.9] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
North Kimberley Marine Parks joint management plan (WA)(DPAW, 2016a)	• oil spills • physical disturbance to reefs • disturbance to seabirds/shorebirds • anchoring from vessels • boat strike (turtles, cetaceans, dugongs, dolphins) • humpback calving, lighting (turtles)	• Relevant management actions: ensure the values of the park are fed into predictive models for oil spills, apply appropriate anchoring practices • Relevant management actions: Park protection and management—timely and appropriate preventative and restorative actions to protect natural, cultural and heritage values from impacts	OMP: Water quality assessment OMP: Sediment quality assessment OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Seabirds and shorebirds SMP: Water quality impact assessment SMP: Sediment quality impact assessment SMP: Intertidal and Coastal Habitat Assessment SMP: Seabirds and shorebirds OMP: Marine fauna assessment – Dugongs SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs SMP: Benthic habitat assessment SMP: Marine fish and elasmobranch assemblages assessment	(68 km S)
Lalang-garram/Horizontal Falls and North Lalang- garram marine parks joint management plan (WA) (DPAW, 2016b)				(423 km SW)
Lalang-garram / Camden Sounds Marine Park management plan (WA) (DPAW, 2013b)				(423 km SW)
Rowley Shoals Marine Park Management Plan (2007) 2007-2017, Management Plan No. 56. (DEC, 2007a)				(1,044 km SW)
Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves 2007–2017 Management Plan No 55 (WA) (DEC, 2007b)				(1,544 km SW)
Cobourg Marine Park Plan of Management. August 2011. Cobourg Peninsula Sanctuary and Marine Park Board and Parks and Wildlife Service of the Northern Territory, Department of Natural Resources, Environment, The Arts and Sport – includes Garig Gunak Barlu National Park (NT) (Sanctuary *et al.,* 2011)				(460 km NE)
Commonwealth Heritage Places and National Heritage Places (refer to Appendix 5 [Sections 5.4.3 and 5.4.6] of the Beehive-1 Drilling EP for additional description of key receptors for each location)				
Connell Wagner (1997). *Environmental Impact Study and Environmental Management Plan for Bradshaw Field Training Area*. Report prepared for Department of Defence.	• oil spills • physical disturbance to reefs • disturbance to seabirds/shorebirds • anchoring from vessels • boat strike (turtles, cetaceans, dugongs, dolphins) • humpback calving, lighting (turtles)	Relevant management actions: Park protection and management—timely and appropriate preventative and restorative actions to protect natural, cultural and heritage values from impacts	OMP: Water quality assessment OMP: Sediment quality assessment OMP: Shoreline clean-up assessment OMP: Marine fauna assessment – Seabirds and shorebirds SMP: Water quality impact assessment SMP: Sediment quality impact assessment SMP: Intertidal and Coastal Habitat Assessment SMP: Seabirds and shorebirds OMP: Marine fauna assessment – Dugongs SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs SMP: Benthic habitat assessment SMP: Marine fish and elasmobranch assemblages assessment SMP: Social Impact Assessment	Approx. 120 km SE
West Kimberley National Heritage Place				Approx. 70 km SW

<table>
<tr><th>Recovery plan / conservation advice (date issued)</th><th>Relevant threats</th><th>Relevant conservation actions</th><th>Relevant OMPs and SMPs</th><th>Relevant priority monitoring locations (quickest modelled time to contact)</th></tr>
<tr><td colspan="5">Nationally Important Wetlands (refer to Appendix 5 [Section 5.4.8] of the Beehive-1 Drilling EP for additional description of key receptors for each location)</td></tr>
<tr><td>Ord River Floodplain (WA)
Mitchell River System (WA)
Parry Floodplain (WA)
Prince Regent River System (WA)
Yampi Sound Training Area (WA)
Mermaid Reef (WA)</td><td rowspan="2">• oil spills
• physical disturbance to reefs
• disturbance to seabirds/shorebirds
• anchoring from vessels
• boat strike (turtles, cetaceans, dugongs, dolphins)
• humpback calving, lighting (turtles)</td><td rowspan="2">• Relevant management actions: Park protection and management—timely and appropriate preventative and restorative actions to protect natural, cultural and heritage values from impacts</td><td rowspan="2">OMP: Water quality assessment
OMP: Sediment quality assessment
OMP: Shoreline clean-up assessment
OMP: Marine fauna assessment – Seabirds and shorebirds
SMP: Water quality impact assessment
SMP: Sediment quality impact assessment
SMP: Intertidal and Coastal Habitat Assessment
SMP: Seabirds and shorebirds
OMP: Marine fauna assessment – Dugongs
SMP: Marine mega-fauna assessment – Whale sharks, cetaceans and dugongs
SMP: Benthic habitat assessment
SMP: Marine fish and elasmobranch assemblages assessment
SMP: Social Impact Assessment</td><td>(91 km S)
(323 km SW)
(168 km S)
(411 km SW)
(578 km SW)
(1,021 km SW)</td></tr>
<tr><td>Legune Wetlands (NT)
Moyle Floodplain and Hyland Bay System (NT)
Daly-Reynolds Floodplain Estuary System (NT)
Finniss Floodplain and Fog Bay Systems (NT)
Port Darwin (NT)
Adelaide River Floodplain System (NT)
Shoal Bay - Micket Creek (NT)
Mary Floodplain System (NT)
Kakadu National Park (NT)
Murgenella-Cooper Floodplain System (NT)
Cobourg Peninsula System (NT)</td><td>(131 km SE)
(123 km E)
(193 km NE)
(209 km NE)
(294 km NE)
(352 km NE)
(313 km NE)
(374 km NE)
(420 km NE)
(498 km NE)
(460 km NE)</td></tr>
</table>

Appendix C-3 Equipment Requirements

Key to equipment availability / supply	
(green)	Easily sourced
(orange)	May require some lead time
(red)	Hard to source short notice
(blue)	Sourced within RPS i.e., printing

Study name:	OMP: Hydrocarbon Properties and Weathering Behaviour			
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Oleophilic sampling device	3			
Field Laptop	3	RPS	JB Hi Fi	Officeworks
Hard drives for data backup	6	RPS	JB Hi Fi	Officeworks
GPS	3	RPS	MAFRL	Anaconda
Camera	3	RPS	JB Hi Fi	Harvey Norman
Sample containers	180	RPS	Australian Scientific	Techno Plas
Sorbent Pads	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
Plastic ziplock bags for sample containers	180	RPS	Officeworks	
Vinegar	3	RPS	Coles	Woolworths
Aluminium foil	3	RPS	Coles	Woolworths
Stationary various	9	RPS	Officeworks	Anaconda
Sampling PPE	9	RPS	RSEA safety	Safety World Wangara
Notebooks	9	RPS	Officeworks	
Data sheets	30	RPS		
CoC forms	9	RPS		
Tide charts	3	RPS		
Cleaning products for decontamination	3	RPS	Perth Petroleum Services Kewdale	
50 L eskies	6	RPS	Bunnings	BCF
Freezer ice blocks	18	RPS	Bunnings	Kmart

Study name:		OMP: Water Quality		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Fluorometer / water column profiler	3	RPS	MAFRL	RPS MetOcean
Deployment equipment (winches, Hiab's, A-frame)	3	Vessel Provider		
Surface and/or sub-surface water sampling equipment, such as wide-mouthed containers and water sampling pole/cable and stainless-steel Niskin Bottle, plus spares for redundancy	3	RPS	Ecotox service Australia	MAFRL
Water quality probe (e.g. YSI 6600 sonde)	3	RPS	YSI	
GPS	3	RPS	MAFRL	Anaconda
Stainless steel sampling buckets/containers	6	RPS	Supercheap Auto	Mitre 10
Pouring jugs	6	RPS	Bunnings	Mitre 10
Sample containers	180	RPS	Australian Scientific	Techno Plas
Sample labels	180	RPS	Officeworks	
Sample blanks	180	Supplied by Laboratory		
Bubble wrap	3	RPS	Bunnings	Officeworks
Tamper proof seals	180	RPS	Tamper evident	Security seals online
CoC	3	RPS		
Sorbent booms	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
Sorbent pads	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
Cleaning products and equipment to decontamination	3	RPS	Perth Petroleum Services Kewdale	
Notebooks	9	RPS	Officeworks	
Field laptop	3	RPS	JB Hi Fi	Officeworks
Hard drives	6	RPS	JB Hi Fi	Officeworks
Various stationary	9	RPS	Officeworks	

Study name:		OMP: Sediment Quality		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Sediment sampler (Stainless steel grab, box corer, spring loaded grab or ROV with corers)	3	RPS	RPS MetOcean	
Deployment equipment (winches, Hiab's, A-frame)	3	Vessel Provider		
Sorbent booms	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
Sorbent pads	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
GPS	3	RPS	MAFRL	Anaconda
USBL acoustic technology	3	RPS	Blueprint Subsea	Deep Trekker
Theodolite or Dumpy level	3	RPS	Mitre 10	Fathom Pacific
Tape measure	6	RPS	Bunnings	Total Tools
Quadrats		RPS	Bunnings	Haines Educational
Shovels	6	RPS	Bunnings	Mitre 10
Sample containers	180	RPS	Australian Scientific	Techno Plas
Sample labels	180	RPS	Officeworks	
Polyethylene / ziplock bags	300	RPS	Officeworks	
Glass mixing bowls	3	RPS	Spotlight	Kitchen Warehouse
Stainless steel spoons	3	RPS	LabFriend	
Cleaning products and equipment to decontamination	3	RPS	Perth Petroleum Services Kewdale	
Bubble wrap	3	RPS	Bunnings	Officeworks
Tamper proof seals	180	RPS	Tamper evident	Security seals online
Sampling PPE	9	RPS	RSEA Safety	Safety World Wangara
CoC	3	RPS		
Notebooks	9	RPS	Officeworks	
Camera	3	RPS	JB Hi Fi	Harvey Norman
Field laptop	3	RPS	JB Hi Fi	Officeworks
Hard drives	6	RPS	JB Hi Fi	Officeworks

Study name:		OMP: Marine Fauna		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Sampling PPE	9	RPS	RSEA safety	Safety World Wangara
GPS	3	RPS	MAFRL	Anaconda
Camera	3	RPS	JB Hi Fi	Harvey Norman
Clinometers	3	RPS	Fruugo Australia	Dynamics G-Ex
Observation sheets	30	RPS		
Audio recorder	3	RPS	Officeworks	Harvey Norman
Reptile species identification guide	3	RPS		
Cetaceans species identification guide	3	RPS		
Fish species identification guide	3	RPS		
Pinniped species identification guide	3	RPS		
Seabird and Shorebird species identification guide	3	RPS		
Binoculars	3	RPS	BCF	Anaconda
Nautical charts	3	RPS		
Large plastic bags	300	RPS	Officeworks	QIS Packaging
Haul nets	3	RPS	Diamond networks	Anaconda
Dip nets	3	RPS	BCF	Haverford
Stakes + small flags	90	RPS	Bunnings	Bronson Safety
Solvent rinsed glass containers with Teflon lined lids for tissue samples	180	RPS	Thomas Scientific	ThermoFisher
Aluminium foil	9	RPS	Woolworths	Coles
Isopropyl alcohol	3	RPS	Officeworks	Bunnings
Wooden tongue depressors	90	RPS	Chemist Warehouse	MedShop AU
Ziplock freezer bags	300	RPS	Woolworths	Coles
Forceps	6	RPS	Officeworks	Sentrymedical
Cotton gauze	3	RPS	Chemist Warehouse	Officeworks
Eskies	6	RPS	Bunnings	BCF
Freezer ice blocks	18	RPS	Bunnings	Kmart
Various stationary	9	RPS	Officeworks	
All weather identification tags	180	RPS	Elevate Survey Supplies	
Hand disinfectant	3	RPS	Officeworks	Bunnings
Measuring tape	6	RPS	Bunnings	Mitre 10
CoC forms	3	RPS		
JHA forms	3	RPS		
Field sheets	30	RPS		
HPLC grade hexane	3	RPS	ChemSupplyAustralia	Sigma Aldrich
Vaccum sealer	3	RPS	JB Hi Fi	Harvey Norman
Vaccum seal bags	300	RPS	JB Hi Fi	Harvey Norman

Study name:		OMP: Marine Fauna		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Dissection Kit + Filleting knives	6	RPS	MediTools	Medshop
Clean stainless-steel filleting surfaces	3	RPS	Sam Allen Wholesale	
Fish identification publication	3	RPS		

Study name:		SMP: Water Quality Impact Assessment		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Flurometer/water column profiler	3	RPS	MAFRL	RPS MetOcean
Deployment equipment	3	Vessel provider		
Surface and/or sub-surface water sampling equipment, such as wide-mouthed containers and water sampling pole/cable and stainless-steel Niskin Bottle, plus spares for redundancy	3	RPS	Ecotox service Australia	MAFRL
Water quality probe (e.g. YSI 6600 v2 multiparameter sonde) including cables, handsets, spare batteries, and instruction manual)	3	RPS	YSI	
Stainless steel bucket	6	RPS	Supercheap Auto	Mitre 10
Pouring jugs	6	RPS	Bunnings	Mitre 10
Sample containers	180	RPS	Australian Scientific	Techno Plas
Sample labels	180	RPS	Officeworks	
Sample blanks and transport blanks filed with ultrapure water	180	Supplied by Laboratory		
Bubble wrap	3	RPS	Bunnings	Officeworks
Tamper-proof security seals	180	RPS	Tamper evident	Security seals online
CoC documents	3	RPS		
Sorbent booms	150	RPS	Safter World Wangara	Perth Petroleum Services Kewdale
Sorbent pads	150	RPS	Safter World Wangara	Perth Petroleum Services Kewdale
GPS	3	RPS	MAFRL	Anaconda
Cleaning products for decontamination	3	RPS	Perth Petroleum Services Kewdale	
Field notebook	9	RPS	Officeworks	
Camera	3	RPS	JB Hi Fi	Harvey Norman
Camera set up for sampling equipment	3	RPS		
Field laptop	3	RPS	JB Hi Fi	Harvey Norman
Hard drives for data backup	6	RPS	JB Hi Fi	Officeworks
Various stationary	9	RPS	Officeworks	

Study name:	SMP: Sediment Quality Impact Assessment			
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Sediment sampler, such as stainless-steel grab, box corer, spring loaded grab or ROV with corers (or equivalent), plus spares for redundancy	3	RPS	RPS MetOcean	
Deployment equipment (winches, Hiab's, A-frame)	3	Vessel Provider		
Sorbent booms	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
Sorbent pads	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
GPS	3	RPS	MAFRL	Anaconda
USBL acoustic technology (desirable)	3	RPS	Blueprint Subsea	Deep trekker
Theodolite	3	RPS	Mitre 10	Fathom Pacific
Tide charts	3	RPS		
Tape measure	6	RPS	Bunnings	Mitre 10
Quadrats		RPS	Bunnings	Haines Educational
Shovels	6	RPS	Bunnings	Mitre 10
Sampling containers	180	RPS	Australian Scientific	Techno Plas
Sampling labels	180	RPS	Officeworks	
Sample blanks and transport blanks with lab-certified clean sediment	180	RPS	Supplied by laboratory	
polyethylene ziplock bags	300	RPS	Officeworks	
Glass mixing bowls	6	RPS	Spotlight	Kitchen Warehouse
Stainless steel spoons	6	RPS	Labfriend	
Cleaning products and equipment to decontamination	3	RPS	Perth Petroleum Services Kewdale	
Bubble wrap	3	RPS	Bunnings	Officeworks
Tamper-proof security seals	180	RPS	Tamper evident	Security seals Online
Sampling PPE	9	RPS	RSEA safety	Safety World Wangara
CoC documents	3	RPS		
Notebooks	9	RPS	Officeworks	
Camera	3	RPS	JB Hi Fi	Harvey Norman
Camera set up for sampling equipment	3	RPS		
Field laptop	3	RPS	JB Hi Fi	Harvey Norman
Hard drives	6	RPS	JB Hi Fi	Officeworks

Study name:		SMP: Benthic Habitat Assessment		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
ROV/AUV/drop camera/towed camera with accompanying accessories (e.g. lighting, laser scaling)	3	RPS	Aquenal	Fathom Pacific
USBL acoustic	3	RPS	Blueprint Subsea	Deep trekker
multiparameter probe/CTD	3	RPS	MAFRL	RPS MetOcean
Field Laptop	3	RPS	JB Hi Fi	Harvey Norman
Relevant software (CPCe, Video Editing, CATAMI)	3	RPS		
Quadrats		RPS	Bunnings	Haines Education
Sediment sampler (Van Veen grab, Box corer)	3	RPS	RPS MetOcean	
Formalin / Ethanol	3	RPS	Sigma Aldrich	ChemSupply Australia
Large 1L screw top plastic container	30	RPS	Spotlight	Mitre 10
Sieves	9	RPS	LabFriend	Sigma Aldrich
Glass mixing bowl	6	RPS	Spotlight	Kitchen Warehouse
Stainless steel spoon	6	RPS	LabFriend	
Crates with lids for storage + transport	15	RPS	Officeworks	Bunnings
Cutting tools	6	RPS	Officeworks	Bunnings
Aluminium foil	3	RPS	Woolworths	Coles
Sampling containers	180	RPS	Australian Scientific	Techno Plas
Isopropyl alcohol	3	RPS	Officeworks	Bunnings
Ziplock freezer bags	300	RPS	Woolworths	Coles
Eskies	6	RPS	Bunnings	BCF
Freezer ice blocks	18	RPS	Bunnings	Kmart
CoC documents	3	RPS		
Sampling PPE	9	RPS	RSEA safety	Safety World Wangara
Sorbent booms	150	RPS	Safety World Wangara	Perth Petroleum Services Kewdale
Sorbent pads	150	RPS	"	"
GPS	3	RPS	MAFRL	Anaconda
Cleaning products for decontamination	3	RPS	Perth Petroleum Services Kewdale	
Bubble wrap	3	RPS	Bunnings	Officeworks
Tamper-proof security seals	180	RPS	Tamper evident	Security seals Online
Notebooks	9	RPS	Officeworks	
Camera	3	RPS	JB Hi Fi	Harvey Norman
Camera set up for sampling equipment	3	RPS		
Hard drives	6	RPS	JB Hi Fi	Officeworks
Various stationary	9	RPS	Officeworks	

Study name:		SMP: Marine Megafauna		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Sampling PPE	9	RPS	RSEA safety	Safety World Wangara
GPS	3	RPS	MAFRL	Anaconda
Binoculars	3	RPS	BCF	Anaconda
Camera	3	RPS	JB Hi Fi	Harvey Norman
Observation sheets	30	RPS		
Megafauna species identification guide	3	RPS		
Nautical charts	3	RPS		
Solvent-rinsed glass containers with Teflon-lined lids	180	RPS	Thomas Scientific	ThermoFisher
Aluminium foil	3	RPS	Woolworths	Coles
Isopropyl alcohol	3	RPS	Officeworks	Bunnings
Disposable biopsy tool	30	RPS	EBOS Healthcare	ProSciTech
Disposable forceps	30	RPS	Officeworks	Sentry Medical
Surgical scissors	6	RPS	MedShop	EBOS Healthcare
Sampling bottle	180	RPS	Australian Scientific	Techno Plas
70-100% ethanol	3	RPS	FirstAid Shop	Sydney Solvents
Sharps disposal container	3	RPS	Officeworks	Seton Austalia
Wooden tongue depressors	30	RPS	Chemist Warehouse	MedShop Au
Ziplock freezer bags	300	RPS	Woolworths	Coles
Cotton gauze	3	RPS	Chemist Warehouse	Officeworks
Eskies	6	RPS	Bunnings	BCF
Freezer ice blocks	18	RPS	Bunnings	Kmart
Various Stationary	9	RPS	Officeworks	
All weather ID tags	180	RPS	Elevate Survey Supplies	
Hand disinfectant	3	RPS	Officeworks	Bunnings
Measuring tape	3	RPS	Bunnings	Mitre 10
CoC documents	3	RPS		
JSA forms	3	RPS		
Field sheets	30	RPS		
Clinometers	3	RPS	Fruugo Australian	Dynamic G-Ex
Audio recorder	3	RPS	Officeworks	Harvey Norman
100-watt spotlight	3	RPS	Anaconda	
Large plastic bags	300	RPS	Officeworks	
Haul nets	3	RPS	Diamond Networks	Anaconda
Dip nets	3	RPS	BCF	Haverford
Stakes + Flags	30	RPS	Bunnings	Bronson Safety
Cable ties	300	RPS	Bunnings	Officeworks
Stretcher	3	RPS	Seton Australia	MedShop Au
Manta boards	-	-		

Study name:		SMP: Marine Megafauna		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
Mask and snorkel	9	RPS	PDA Hillaries	Adreno
Go pros + helmet mounts	6	RPS	JB Hi Fi	Go Pro
JHA forms	3			
Ropes	9	RPS	Bunnings	

Study name:	SMP: Marine Fish Assemblages Assessment*			
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
SBRUVs: 8 SBRUVS frames including 1 spare, Video cameras, Base bars with housings securely attached, Bolts for attaching base bars (4 for each system), Diode arms for each system, Diodes, Shark clips for each system, Bait arms (include spares), Spare bait bags, Ropes (check correct length for planned depth), Buoys (deep water at least two sets for each system), Weights and wires to attach weights (Deep water SBRUVS only), Bin and lid for bait , Grapple, SBRUV tool kit including: ¾" spanners x 2, outside clip pliers for opening housings x 2, Pliers, Large shifting spanner, knife, Allen key for camera mounts, Phillips and flat head screwdrivers, SBRUV spares kit including: silicone grease, 'O' rings, Lanox, hose clamps, bolts and wing nuts, duct tape and cable ties	3	RPS		
ROVs: ROV propulsion system (Include: 8 vectored brushless DC motors, Auto heading, auto pitch, auto roll to 1 degree, Auto depth to 100 mm), ROV sensors (6-Axis heading, pitch, roll motion sensor with 1 degree resolution, Depth sensor with 100 mm resolution, Heading, depth, pitch, roll data – digital data output by RS232 , Downward facing Micron3 sonar altimeter, Forward facing ROV cameras, Forward facing high resolution colour zoom inspection camera, 4 strobe lights synched to camera, dimmable LED light units, DGPS system, 5mW Laser or equivalent image scaling system)	3	RPS	Diveworks	Shelf Subsea
Towed Video: High definition video camera and spare, Laser imaging scaling system,	3	RPS	Aquenal	Fathom Pacific

Study name:		SMP: Marine Fish Assemblages Assessment*		
Item	Min Qty	Supplier 1	Supplier 2	Supplier 3
200 m umbilical cable and spare, Tow frame, Camera power lead, Camera download box, USB-to-USB camera download cable, Serial-to-USB camera control cable, Monitor, Monitor power lead, Video coax cable, Garmin hand held GPS units, JRC DGPS receiver and data/power cables, VGA monitor cable, Batteries, Tool bag with tools including pliers, assorted spanners and screwdrivers, Whiteboard and markers, Whiteboard clock, Large and small cable ties, Electrical tape				
Field laptop	3	RPS	JB Hi Fi	Harvey Norman
Relevant software	3	RPS		
Cutting tools	6	RPS	Officeworks	Bunnings
Aluminium foil	3	RPS	Woolworths	Coles
Sample containers	180	RPS	Australian Scientific	Techno Plas
Isopropyl alcohol	3	RPS	Officeworks	Bunnings
Ziplock freezer bags	300	RPS	Woolworths	Coles
Eskies	6	RPS	Bunnings	BCF
Freezer ice blocks	18	RPS	Bunnings	Kmart
CoC documents	3	RPS		
Sampling PPE	9	RPS	RSEA safety	Safety World Wangara
GPS	3	RPS	MAFRL	Anaconda
Cleaning products for decontamination	3	RPS	Perth Petroleum Services Kewdale	
Bubble wrap	3	RPS	Bunnings	Officeworks
Tamper-proof security seals	180	RPS	Tamperevident	Secruityseals online
Notebooks	9	RPS	Officeworks	
Camera	3	RPS	JB Hi Fi	Harvey Norman
Camera set up for sampling equipment	3	RPS		
Hard drives	6	RPS	JB Hi Fi	Officeworks
Various stationary	9	RPS	Officeworks	

* *Marine fish assemblage SMP will also require the equipment from Water quality and Sediment quality SMP*

Appendix C-4 Blue Ocean Marine Capability

Oil Spill Response/Readiness Solutions

BLUE OCEAN MARINE SERVICES

Technology	Type	Sensors	Proximity	Application	Data Return	Range	Deployment	Lead Time
Autonomous Underwater Vehicles (AUV)	AUV 	• Water quality sensors • Hydrocarbon sensors • Rhodamine (dye) sensors • Side scan sonar • Multibeam echosounder • Still and video cameras	Near-Field	• Water column assessment • Seabed assessment	Full dataset post-mission	15-30 km per mission 1 mission @ 4-6 hrs	From vessel	< 2 weeks
	Long Range Gliders 	• Water quality sensors • Hydrocarbon sensors • Rhodamine (dye) sensors	Far-field	• Water column assessment • Seabed assessment • Directional currents	Data subsets in near real-time Full dataset post-mission	700-1400 km per mission 1 mission @ 30-60 days	From shore, vessel or platform	< 2 weeks
Autonomous Surface Vehicles (ASV)	Shallow water ASV 	• Water Quality • Hydrocarbon sensors • Rhodamine (dye) sensors • Side scan sonar • Single and multibeam echosounder • Still and video cameras • Current profilers	Inshore / Coastal	• Water column assessment • Seabed assessment • Directional currents	Data subsets in near real-time Full dataset post-mission	15-30 km per mission 1 mission @ 4-6 hrs	From shore or vessel	< 2 weeks
Unmanned Aerial Vehicles (UAV)	Multi-rotor UAV 	• Still and video cameras	Near-Field	• Sea surface assessment	Full dataset post-mission	5-10 km per mission 1 mission @ 30-60 mins	From shore, vessel or platform	< 2 weeks
Remotely Operated Vehicles (ROV	Compact ROV 	• Still and video camera • Water & sediment samplers • Water quality sensors • Hydrocarbon sensors	Near-field	• Water column assessment • Seabed assessment	Real-time data	N/A User limited	From shore, vessel or platform	< 2 weeks
Metocean & Environment al Monitoring Systems	Various  	• Wave buoys • Wave gauges • Current profilers • Water level sensors • Water quality sensors • Water column profilers • Water & sediment samplers • Weather stations • Sea surface drifters • Drogue and dye tracing • Single and multibeam echosounders	All areas	• Water column assessment • Seabed assessment • Directional waves • Directional currents • Tide & water levels • Meteorology • Hydrographic survey	Various	Various	From shore, vessel or platform	< 2 weeks

Appendix C-5 Environmental Performance

OMP 01 - Air Quality Modelling (Responder health and safety)		
Environmental Performance Outcome	Provide in field information on the airborne hydrocarbons, gases and chemicals and their predicted distribution to assist in determining safe distances from the spill source for response personnel via a desktop-based assessment.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: AIR QUALITY MODELLING (RESPONDER HEALTH AND SAFETY.	
SAP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OMP 01.01 OSM Service Provider ready to implement OMP 01.	OSM Service Provider (DIMT) has access to The Air Pollution Model (TAPM) software (or similar).	DIMT (AMOSC)
OMP 01.02 Air quality monitoring was activated in accordance with the initiation criteria.	Records show air quality monitoring was activated within 48 hours of OSM activation.	DIMT (AMOSC)
OMP 01.03 Data is analysed against the National Environment Protection (Ambient Air Quality) Measure.	Results of the desk-top assessment are reported against the thresholds outlined in the Standards for Pollutants within the National Environment Protection (Ambient Air Quality) Measure.	DIMT (AMOSC)
OMP 01.04 Results are communicated to response personnel.	Records show the modelling results were communicated to the response personnel with safe distances noted (if applicable).	DIMT
Termination Criteria	Completion of the gas, vapour and hydrocarbon discharge, containment and recovery, dispersant operations and shoreline clean-up operations. Continuing hazardous and noxious plume detection modelling has a low probability of contributing or influencing spill response decision-making.	
Reporting Requirements	• All data collected on air quality provided in spreadsheets to EOG DIMT / EMT to inform spill response operations. • Air quality modelling results provided to the EOG DIMT / EMT for integration into IAP development (if required). • Final report detailing all data collected on air quality throughout the monitoring program including relevant interpretation.	

OMP 02 – Hydrocarbon Properties and Weathering Behaviour		
Environmental Performance Outcome	Provide in field information on the hydrocarbon properties, behaviour, and weathering of the spilled hydrocarbons to assist in determining suitability of spill response tactics and strategies	
Initiation Criteria	The EOG DIMT / EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: HYDROCARBON PROPERTIES AND WEATHERING BEHAVIOUR	
SAP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 02.01 OSM Service Provider ready to implement OMP 02.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 02.02 Incident-specific Sampling Analysis Plan (SAP) in place.	SAP in place prior to conducting field work consistent with 'Design Considerations' (Section 4.1) of AEP OMP Document. SAP considers mobilisation and deployment requirements and incorporates SOPs consistent with industry good practice.	RPS
OM 02.03 Minimum monitoring parameters of samples analysed.	Samples analysed for parameters detailed in Table 4-2 of AEP OMP document.	RPS
OM 02.04 Samples labelled, transported, and stored appropriately.	SAP considers appropriate labelling, transport, and storage requirements. Samples labelled, transported and stored in accordance with SAP during field sampling activities.	RPS
OM 02.05 Minimum QA / QC requirements in place.	QA / QC consistent with Section 9 of AEP OMP document.	RPS
OM 02.06 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory.	RPS
OM 02.07 Training support crew.	During first deployment support vessel crew to be trained by Lead and Support scientists while in the field to perform support monitoring role.	RPS
Termination Criteria	The EOG DIMT / EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The EOG DIMT / EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or This OMP is no longer contributing to or influencing spill response decision-making; or Relevant scientific monitoring components initiation criteria have been triggered.	

Reporting Requirements	• All data collected on hydrocarbon properties provided in spreadsheets (including GPS location, timing, on water observations) to EOG DIMT / EMT to inform spill response operations • Regular field reports of results provided to the EOG DIMT / EMT for integration into IAP development • Analytical analysis of hydrocarbon properties following laboratory evaluation; • Final report detailing all data collected on hydrocarbon properties throughout the monitoring program including relevant interpretation • Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators. • Final report supplied to relevant Regulators within 1 month of review.

OMP 03 – Marine Fauna Assessment – Reptiles		
Environmental Performance Outcome	Rapid assessment of reptiles (including marine turtles, sea snakes, and saltwater crocodiles) to assist in decisions on appropriate management and response actions during an oil spill event to minimise the potential impact to reptiles.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and Modelling and/or analysis of data from Monitoring, Evaluation and Surveillance (MES) predicts, or has reported, an exposure of hydrocarbons to known sensitive fauna habitat.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: MARINE FAUNA ASSESSMENT- REPTILES	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 03.01 OSM Service Provider ready to implement OMP 03.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 03.02 Monitoring Design.	Monitor program consistent with 'Design Considerations' (Section 4.1) of AEP OMP document.	RPS
OM 03.03 Survey Techniques.	Monitoring program considers preferred survey techniques and records (Table 4-1 & Table 4-2) of the AEP OMP document.	RPS
OM 03.04 Fauna Handling Protocols.	Oiled, injured, and diseased wildlife only handled by trained personnel. Procedures and personnel for dealing with oiled wildlife agreed with Commonwealth / State / Territory Regulators and supported by EOG DIMT / EMT.	EOG DIMT
OM 03.05 SOPs.	SOPs for reptile surveys developed consistent with Table 6-1 to Table 6-5 of AEP OMP document.	RPS
OM 03.06 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory. Field data and sample analysis methodology consistent with Section 9.1 and Section 9.2 of AEP OMP document.	RPS
Termination Criteria	The IMT/EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The IMT/EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The Monitoring Coordinator (or delegate) considers that continuation of monitoring under this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation triggers have been assessed.	
Reporting Requirements	Regular field reports of results provided to the EOG DIMT/EMT including: • Presence of any observed fauna and the status of these animals (e.g. dead/alive, degree of oiling, alert or moribund, signs of injury etc.) • Presence of any fauna in the potential path of surface oil slick. • Fauna risk of exposure and perceived need for response activities. • Effectiveness of any response activities. • Instances of fauna disturbed/impacted by any onshore and/or offshore response activities. As they become available: • Results of samples analysed for evidence of hydrocarbon exposure. • Final pathology reports from carcasses necropsied.	

OMP 03 – Marine Fauna Assessment – Reptiles	
	• Recommendations regarding the requirements for triggering scientific monitoring and key species and sites to target during scientific monitoring. A final report will be prepared at the termination of this OMP and will include all the data collected and its interpretation. • Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators. • Final report supplied to relevant Regulators within 1 month of review.

OMP 04 – Marine Fauna Assessment – Cetaceans		
Environmental Performance Outcome	Assessment of cetaceans (whales and dolphins) to assist in decisions on appropriate management and response actions during an oil spill event to minimise the potential impact to cetaceans.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and Modelling and/or analysis of data from Monitoring, Evaluation and Surveillance (MES) predicts, or has reported, an exposure of hydrocarbons to known sensitive fauna habitat.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: MARINE FAUNA ASSESSMENT-CETACEANS	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 04.01 OSM Service Provider ready to implement OMP 04.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 04.02 Monitoring Design.	Monitor program consistent with 'Design Considerations' (Section 4.1) of AEP OMP document.	RPS
OM 04.03 Survey Techniques.	Monitoring program considers preferred survey techniques and records (Section 4.2) of the AEP OMP document.	RPS
OM 04.04 Fauna Handling Protocols.	Oiled, injured, and diseased wildlife only handled by trained personnel. Procedures and personnel for dealing with oiled wildlife agreed with Commonwealth / State / Territory Regulators and supported by EOG DIMT / EMT.	EOG DIMT
OM 04.05 SOPs.	SOPs for cetacean surveys developed consistent with Table 6-1 to Table 6-3 of AEP OMP document.	RPS
OM 04.06 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory. Field data and sample analysis methodology consistent with Section 9.1 and Section 9.2 of AEP OMP document.	RPS
Termination Criteria	The IMT/EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The IMT/EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The Monitoring Coordinator (or delegate) considers that continuation of monitoring under this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation triggers have been assessed.	
Reporting Requirements	Regular field reports of results provided to the EOG DIMT/EMT including: • Presence of any observed fauna and the status of these animals (e.g. dead/alive, degree of oiling, alert or moribund, signs of injury, etc.); • Presence of any fauna in the potential path of surface oil slick; • Fauna risk of exposure and perceived need for response activities; • Effectiveness of any response activities; and • Instances of fauna disturbed/impacted by any onshore and/or offshore response activities. As they become available: • Results of samples analysed for evidence of hydrocarbon exposure. • Final pathology reports from carcasses necropsied;	

OMP 04 – Marine Fauna Assessment – Cetaceans	
	• Recommendations regarding the requirements for triggering scientific monitoring and key species and sites to target during scientific monitoring. A final report will be prepared at the termination of this OMP and will include all the data collected and its interpretation; • Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators; and • Final report supplied to relevant Regulators within 1 month of review.

OMP 05 – Marine Fauna Assessment – Dugongs		
Environmental Performance Outcome	Assessment of dugongs to assist in decisions on appropriate management and response actions during an oil spill event to minimise the potential impact to dugongs.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and Modelling and/or analysis of data from Monitoring, Evaluation and Surveillance (MES) predicts, or has reported, an exposure of hydrocarbons to known sensitive fauna habitat.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: MARINE FAUNA ASSESSMENT-DUGONGS	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 05.01 OSM Service Provider ready to implement OMP 05.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
OM 05.02 Monitoring Design.	Monitor program consistent with 'Design Considerations' (Section 4.1) of AEP OMP document.	RPS
OM 05.03 Survey Techniques.	Monitoring program considers preferred survey techniques and records (Section 4.2) of the AEP OMP document.	RPS
OM 05.04 Fauna Handling Protocols.	Oiled, injured, and diseased wildlife only handled by trained personnel. Procedures and personnel for dealing with oiled wildlife agreed with Commonwealth / State / Territory Regulators and supported by EOG DIMT / EMT.	EOG DIMT
OM 05.05 SOPs.	SOPs for fish surveys developed consistent with Table 5-1 to Table 5-3 of AEP OMP document.	RPS
OM 05.06 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory. Field data and sample analysis methodology consistent with Section 8.1 and Section 8.2 of AEP OMP document.	RPS
Termination Criteria	The IMT/EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The IMT/EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The Monitoring Coordinator (or delegate) considers that continuation of monitoring under this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation triggers have been assessed.	
Reporting Requirements	Regular field reports of results provided to the EOG DIMT/EMT including: • Presence of any observed fauna and the status of these animals (e.g. dead/alive, degree of oiling, alert or moribund, signs of injury, etc.); • Presence of any fauna in the potential path of surface oil slick; • Fauna risk of exposure and perceived need for response activities; • Effectiveness of any response activities; and • Instances of fauna disturbed/impacted by any onshore and/or offshore response activities. As they become available: • Results of samples analysed for evidence of hydrocarbon exposure; • Final pathology reports from carcasses necropsied;	

OMP 05 – Marine Fauna Assessment – Dugongs	
	• Recommendations regarding the requirements for triggering scientific monitoring and key species and sites to target during scientific monitoring. A final report will be prepared at the termination of this OMP and will include all the data collected and its interpretation; • Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators; and • Final report supplied to relevant Regulators within 1 month of review.

OMP 06 – Marine Fauna Assessment – Fish		
Environmental Performance Outcome	Assessment of fish to assist in decisions on appropriate management and response actions during an oil spill event to minimise the potential impact to fish.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and Modelling and/or analysis of data from Monitoring, Evaluation and Surveillance (MES) predicts, or has reported, an exposure of hydrocarbons to known sensitive fauna habitat.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: MARINE FAUNA ASSESSMENT- FISH	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 06.01 OSM Service Provider ready to implement OMP 06.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 06.02 Monitoring Design.	Monitor program consistent with 'Design Considerations' (Section 4.1) of AEP OMP document.	RPS
OM 06.03 Survey Techniques.	Monitoring program considers preferred survey techniques and records (Section 4.2) of the AEP OMP document.	RPS
OM 06.04 Fauna Handling Protocols.	Oiled, injured, and diseased wildlife only handled by trained personnel. Procedures and personnel for dealing with oiled wildlife agreed with Commonwealth / State / Territory Regulators and supported by EOG DIMT / EMT.	EOG DIMT
OM 06.05 SOPs.	SOPs for fish surveys developed consistent with Table 5-1 to Table 5-3 of AEP OMP document.	RPS
OM 06.06 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory. Field data and sample analysis methodology consistent with Section 8.1 and Section 8.2 of AEP OMP document.	RPS
Termination Criteria	The IMT/EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The IMT/EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The Monitoring Coordinator (or delegate) considers that continuation of monitoring under this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation triggers have been assessed.	
Reporting Requirements	Regular field reports of results provided to the EOG DIMT/EMT including: • Presence of any observed fauna and the status of these animals (e.g. dead/alive, degree of oiling, alert or moribund, signs of injury, etc.); • Presence of any fauna in the potential path of surface oil slick; • Fauna risk of exposure and perceived need for response activities; • Effectiveness of any response activities; and • Instances of fauna disturbed/impacted by any onshore and/or offshore response activities. As they become available: • Results of samples analysed for evidence of hydrocarbon exposure; • Final pathology reports from carcasses necropsied;	

OMP 06 – Marine Fauna Assessment – Fish	
	• Recommendations regarding the requirements for triggering scientific monitoring and key species and sites to target during scientific monitoring. A final report will be prepared at the termination of this OMP and will include all the data collected and its interpretation; • Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators; and • Final report supplied to relevant Regulators within 1 month of review.

OMP 07 – Marine Fauna Assessment – Seabirds & Shorebirds		
Environmental Performance Outcome	Assessment of seabirds and shorebirds to assist in decisions on appropriate management and response actions during an oil spill event to minimise the potential impact to seabirds and shorebirds.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and Modelling and/or analysis of data from Monitoring, Evaluation and Surveillance (MES) predicts, or has reported, an exposure of hydrocarbons to known sensitive fauna habitat.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: MARINE FAUNA ASSESSMENT- SEABIRDS AND SHOREBIRDS	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 07.01 OSM Service Provider ready to implement OMP 08.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 07.02 Monitoring Design.	Monitor program consistent with ‘Design Considerations’ (Section 4.1) of AEP OMP document.	RPS
OM 07.03 Survey Techniques.	Monitoring program considers preferred survey techniques and records (Section 4.2) of the AEP OMP document.	RPS
OM 07.04 Fauna Handling Protocols.	Oiled, injured, and diseased wildlife only handled by trained personnel. Procedures and personnel for dealing with oiled wildlife agreed with Commonwealth / State / Territory Regulators and supported by EOG DIMT / EMT.	EOG DIMT
OM 07.05 SOPs.	SOPs for seabird and shorebird surveys developed consistent with Table 6-1 to Table 6-5 of AEP OMP document.	RPS
OM 07.06 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory. Field data and sample analysis methodology consistent with Section 9.1 and Section 9.2 of AEP OMP document.	RPS
Termination Criteria	The IMT/EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The IMT/EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The Monitoring Coordinator (or delegate) considers that continuation of monitoring under this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation triggers have been assessed.	
Reporting Requirements	Regular field reports of results provided to the EOG DIMT/EMT including: • Presence of any observed fauna and the status of these animals (e.g. dead/alive, degree of oiling, alert or moribund, signs of injury, etc.); • Presence of any fauna in the potential path of surface oil slick; • Fauna risk of exposure and perceived need for response activities; • Effectiveness of any response activities; and • Instances of fauna disturbed/impacted by any onshore and/or offshore response activities. As they become available: • Results of samples analysed for evidence of hydrocarbon exposure; • Final pathology reports from carcasses necropsied;	

OMP 07 – Marine Fauna Assessment – Seabirds & Shorebirds	
	• Recommendations regarding the requirements for triggering scientific monitoring and key species and sites to target during scientific monitoring. A final report will be prepared at the termination of this OMP and will include all the data collected and its interpretation; • Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators; and • Final report supplied to relevant Regulators within 1 month of review.

OMP 08 - Oil Spill Modelling Assessment		
Environmental Performance Outcome	Oil spill modelling is initiated to predict the oil slick direction, time to impact on possible sensitive receptors and assist in informing oil spill response activities	
Initiation Criteria	Notification of a spill incident from a LoWC or a Level 2 MDO spill.	
OMP Document	Appendix W of CSIRO Oil Spill Monitoring Handbook.	
SAP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OMP 08.01 Spill trajectory modelling initiated within 4 hours of forming DIMT.	Records show the DIMT submitted a trajectory modelling request form to AMOSC within 4 hours of forming the DIMT.	DIMT
OMP 08.02 Daily updates are issued to DIMT.	Records show RPS provided daily updates of trajectory model outputs to the DIMT.	RPS
OMP 08.03 Updates become more frequent if weather conditions are variable.	Records show RPS issued more frequent updates if weather became variable or changed suddenly.	RPS
OMP 08.04 Operational surveillance data is provided to RPS.	Records show operational surveillance data (aerial, vessel, tracker buoys) is to be provided to RPS to verify and adjust predictions and improve predictive accuracy.	DIMT
Termination Criteria	Oil source controlled. Surface water does not have an oiled appearance, specifically 'silver/grey' as per BAOAC.	
Reporting Requirements	• Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators. • Final report supplied to relevant Regulators within 1 month of review.	

OMP 09 – Pre-Emptive Desktop Assessment		
Environmental Performance Outcome	A desktop-based assessment of the presence, extent and current status of sensitive receptors at risk of being affected by a hydrocarbon spill, prior to contact to assist in determining suitability of spill response tactics and strategies.	
Initiation Criteria	The IMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and A probable hydrocarbon impact (or impact of dispersed hydrocarbon) on a resource, habitat or shoreline is anticipated on the basis of trajectory modelling or other assessment of the incident; or Damage to a natural resource or sensitive receptor is possible as a result of that impact.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: PRE-EMPTIVE DESKTOP ASSESSMENT OF SENSITIVE RECEPTORS AT RISK	
SAP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 09.01 OSM Service Provider ready to implement OMP 10.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 09.02 Monitoring Design.	Monitor program consistent with 'Design Considerations' (Section 4.1) of AEP OMP document.	RPS
OM 09.03 SOPs.	SOPs for desktop assessment developed consistent with Table 6-1 of AEP OMP document.	RPS
OM 09.04 Data Analysis and Laboratory Accreditation.	Data and sample analysis methodology consistent with Section 9 of AEP OMP document.	RPS
Termination Criteria	Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The assessment of sensitive receptors that were identified as being potentially impacted/contact by the hydrocarbon spill are completed.	
Reporting Requirements	• Map collating hydrocarbon spill trajectory modelling, surveillance data and behaviour and weathering overlaid on the sensitive receptors map. • Report detailing the presence and distribution of sensitive receptors within the trajectory of the spill, or that have been exposed to the spill and/or response activities. • Assessment the relative significance or conservation status of the identified sensitive receptors to assist in the determination of priority protection areas and inform spill response strategies.	

OMP 10 – Sediment Quality Assessment		
Environmental Performance Outcome	Rapid assessment of the presence, type, concentrations and character of hydrocarbons in marine sediments to assess the extent of spill contact and verify impact predictions for other monitoring plans.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and Modelling and/or analysis of data from monitoring, evaluation and surveillance (MES) predicts an exposure of hydrocarbons to marine and/or coastal sediment.	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: SEDIMENT QUALITY ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 10.01 OSM Service Provider ready to implement OMP 11.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 10.02 Monitoring Design and Sampling Techniques.	Monitor program consistent with 'Design Considerations' (Section 4.1) and 'Sampling Techniques' (Section 4.2) of AEP OMP document.	RPS
OM 10.03 Minimum monitoring parameters of samples analysed.	Samples analysed for parameters detailed in Table 4-2 of AEP OMP document.	RPS
OM 10.04 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
OMP 10.05 SOP.	SOP for sediment quality analysis developed consistent with Table 6-1 to Table 6-2 of AEP OMP document.	RPS
OM 10.06 Minimum QA / QC requirements in place.	QA / QC consistent with Section 9 of AEP OMP document.	RPS
OM 10.07 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory.	RPS
OM 10.08 Training support crew.	During first deployment support vessel crew to be trained by Lead and Support scientists while in the field to perform support monitoring role.	RPS
Termination Criteria	The EOG DIMT/EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The EOG DIMT/EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The Monitoring Coordinator (or delegate) considers that continuation of monitoring under this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation triggers have been assessed.	
Reporting Requirements	All relevant data collected will be provided in spreadsheets (including GPS location, depth of sampling, timing, on water observations and sample label	

OMP 10 – Sediment Quality Assessment	
	details) to EMT/IMT on a regular basis during spill response operations. • Regular field reports of results provided to the EOG DIMT/EMT for integration into IAP development. • Analytical results of sediment quality following laboratory evaluation. • Final report detailing all data collected on sediment quality throughout the monitoring program including relevant interpretation. • All electronic data will be backed up onto external hard drives or online cloud services each day. • Original hardcopies of datasheets will be transferred to a project folder and kept in a secure location (e.g., wheelhouse or vessel survey laboratory). • QA/QC'd data to be presented in spreadsheet format and then transferred to EOG. • Data received from the laboratories (including backups) to be downloaded and stored RPS's computer system.

OMP 11 - Shoreline Clean-up Assessment Technique		
Environmental Performance Outcome	Reduce the volume of oil on the shoreline, reduce the likelihood/consequence of impacts to shoreline sensitivities and promote increased speed to the natural recovery of the shoreline to its pre-oiled state.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred; and Analysis of data from hydrocarbon spill modelling, monitoring, evaluation and/or surveillance (MES) predicts an exposure of hydrocarbons to shoreline habitat; or Relevant response activities are being undertaken	
OMP Document	AEP: OPERATIONAL MONITORING PLAN: SHORELINE CLEAN-UP ASSESSMENT	
SAP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OMP 11.01 Shoreline clean-up was activated in accordance with the initiation criteria.	Records show shoreline clean-up was activated within ~ 7 days of OSM activation.	DIMT
OMP 11.02 Shoreline clean-up is prepared in accordance with the Beehive-1 Basis of Design and Response Strategy Requirements.	Records show shoreline clean-up was prepared in accordance with the EPS's outlined in Table 6.18 of Appendix B of the OPEP.	DIMT
OMP 11.03 Shoreline clean-up is responded to in accordance with the Beehive-1 Drilling EP.	Records show shoreline clean-up was responded to in accordance with the EPS's outlined in Table 9.15 of the Beehive-1 EP.	DIMT
Termination Criteria	This OMP will not result in a change to the scale or location of active response options; or Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or Continuation of monitoring of this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation criteria have been triggered.	
Reporting Requirements	• All data collected on hydrocarbon properties provided in spreadsheets (including GPS location, timing, shoreline observations) to EOG DIMT / EMT to inform spill response operations. • Regular field reports of results provided to the EOG DIMT / EMT for integration into IAP development. • Final report detailing all data collected on shoreline exposure throughout the monitoring program including relevant interpretation. • Final report reviewed by OSM Implementation Lead prior to distribution to relevant Commonwealth, State & Territory Regulators. • Final report supplied to relevant Regulators within 1 month of review.	

OMP 12 – Surface Chemical Dispersant Fate and Effectiveness		
Environmental Performance Outcome	To monitor the effectiveness of chemical dispersants by examining the distribution and fate (surface and subsurface) of surface chemical dispersants to verify impact and contact predictions for response planning (e.g. NEBA/SIMA) and other monitoring plans and to provide the IMT/EMT with sufficient information to determine if dispersant application should be continued, modified or ceased.	
Initiation Criteria	Application of dispersant has been selected as a response option.	
OMP Document	OPERATIONAL MONITORING PLAN: SURFACE CHEMICAL DISPERSANT FATE AND EFFECTIVENESS ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 12.01 Shaker tests.	Trained and competent personnel to implement dispersant efficacy shaker tests prior to the application of chemical dispersant.	DIMT
OM 12.02	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) to implement in-water fluorometry.	RPS
OM 12.03 Monitoring Design.	Monitor program consistent with 'Design Considerations' (Section 4.1) of AEP OMP document.	RPS
OM 12.04 Sampling Techniques.	Monitoring program considers preferred sampling techniques and records (Section 4.2) of the AEP OMP document.	RPS
OM 12.05 Data Analysis.	Field data analysis methodology consistent with Section 9 of AEP OMP document.	RPS
OM 12.06 Minimum QA / QC requirements.	QA / QC consistent with Section 9 of AEP OMP document.	RPS
OM 12.07 Training support crew.	During first deployment support vessel crew to be trained by Lead and Support scientists while in the field to perform support monitoring role.	RPS
Termination Criteria	Dispersant operations have ceased; and Measurements indicate that dispersed hydrocarbons are diluted to below levels of detection or below levels of concern; or Monitoring data indicates that dispersant operations are unlikely to cause harm; or Continuation of monitoring of this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation criteria have been triggered.	
Reporting Requirements	Dispersant Monitoring Forms, which will include the following information: • Visual observations; • Location of the dispersant application (use a GPS to record the latitude and longitude); • Degree of weathering and thickness of the oil before dispersant application. • Weather and sea state (dispersants require a degree of turbulence to promote mixing with the oil, although this can be created using the wake of a vessel); • Type of dispersant and method of dispersant application; • Rate of dispersant application, time of initiation of application, duration, consequent volume applied for each application; and • Anything that has been or could be impacted by the oil or dispersant application, such as marine mammals, fish coral reefs, etc.	

OMP 13 – Water Quality Assessment		
Environmental Performance Outcome	Provide a rapid assessment of the presence, type, concentrations and character of hydrocarbons in marine water to assess the extent of spill contact and verify impact predictions for other monitoring plans.	
Initiation Criteria	The EOG DIMT/EMT has determined that Level 2 or 3 hydrocarbon spill to marine or coastal waters has occurred.	
OMP Document	OPERATIONAL MONITORING PLAN: WATER QUALITY ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
OM 13.01 OSM Service Provider ready to implement OMP 15.	OSM Service Provider (RPS) monthly readiness report includes OMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
OM 13.02 Monitoring Design and Sampling Techniques.	Monitor program consistent with 'Design Considerations' (Section 4.1) and 'Sampling Techniques' (Section 4.2) of AEP OMP document.	RPS
OM 13.03 Minimum monitoring parameters of samples analysed.	Samples analysed for parameters detailed in Table 4-2 of AEP OMP document.	RPS
OM 13.04 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
OM 13.05 SOP.	SOP for water quality analysis developed consistent with Table 6-1 to Table 6-2 of AEP OMP document.	RPS
OM 13.06 Minimum QA / QC requirements in place.	QA / QC consistent with Section 9 of AEP OMP document.	RPS
OM 13.07 Data Analysis and Laboratory Accreditation.	Data/sample analysis process enables benchmarking of results against either ANZECC or OSPAR and samples analysed at NATA accredited laboratory.	RPS
OM 13.08 Training support crew.	During first deployment support vessel crew to be trained by Lead and Support scientists while in the field to perform support monitoring role.	RPS
Termination Criteria	The EOG DIMT/EMT IC (or delegate) considers that continuation of monitoring under this OMP will not result in a change to the scale or location of active response options; or The EOG DIMT/EMT IC (or delegate) has advised that agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response; or The spill is or is likely to be below visible criteria for surface oil (0.5g/m^2), and low thresholds for entrained (10 ppb) and dissolved (6 ppb) oil concentrations; or The Monitoring Coordinator (or delegate) considers that continuation of monitoring under this OMP is likely to increase overall environmental impact; or Relevant scientific monitoring components initiation triggers have been assessed.	
Reporting Requirements	• All relevant data collected to be provided in spreadsheets (including GPS location, depth of sampling, timing, on water observations, in-situ readings	

OMP 13 – Water Quality Assessment	
	and water sample label details) to EOG DIMT/EMT on a regular basis during spill response operations. • Regular field reports of results provided to the EOG DIMT/EMT for integration into IAP development. • Analytical results of samples following laboratory evaluation. • Final report detailing all data collected throughout the monitoring program including relevant interpretation. • All electronic data to be backed up onto external hard drives each day; and • Original hardcopies of datasheets will be transferred to a project folder and kept in a secure location (e.g., wheelhouse or vessel survey laboratory).

SMP 01 – Benthic Habitat Assessment		
Environmental Performance Outcome	Assess the impact (extent, severity, and persistence) and subsequent recovery of subtidal benthic habitats and associated biological communities in response to a hydrocarbon release and associated response activities.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts or confirms exposure of benthic habitats or communities to hydrocarbons.	
SMP Document	AEP: SMP: BENTHIC HABITAT ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 01.01 OSM Service Provider ready to implement SMP 01.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
SM 01.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 01.03 Monitoring Design & Sampling Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with 'Sampling Techniques & Parameters' (Section 5.1) of AEP OMP document.	RPS
SM 01.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.2 of the AEP SMP document.	RPS
SM 01.05 SOP.	SOP for benthic habitat assessment developed consistent with Table 7-1 to Table 7-3 of AEP SMP document.	RPS
SM 01.06 Minimum QA / QC requirements in place.	QA / QC consistent with Section 9 of the AEP SMP document.	RPS
SM 01.07 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 01.08 Training support crew.	During first deployment support vessel crew to be trained by Lead and Support scientists while in the field to perform support monitoring role.	RPS
SM 01.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the benthic habitat assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	There has been no impact to benthic habitats and associated biological communities (confirmation that benthic habitats were not exposed to hydrocarbons); or Measured parameters of benthic habitats and associated biological communities impacted by hydrocarbons spills have returned to within the expected natural dynamics of baseline state (taking into account natural variability) and/or control sites; and Agreement has been reached with the relevant stakeholders and Jurisdictional Authorities to cease monitoring this receptor.	
Reporting	QA/QC Protocols:	

SMP 01 – Benthic Habitat Assessment	
Requirements	• All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location (e.g. wheelhouse or vessel survey laboratory). • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Hard drives to be transported by the demobilising survey team; and • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Details of the impacts and subsequent recovery of benthic habitats and associated benthic organisms in response to a spill event and associated response activities, as well as comparisons of impact and reference sites. • Determination of whether the termination criteria have been reached, including recommendations on the requirements of future monitoring. • Where appropriate, data provided by this monitoring will be integrated with data from other relevant SMPs to fully understand the three-dimensional distribution of the spill. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. • Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 02 – Commercial and Recreational Fisheries Impact Assessment		
Environmental Performance Outcome	Monitor potential contamination and tainting of important finfish and shellfish species from commercial, aquaculture and recreational fisheries to evaluate the likelihood that a hydrocarbon spill impacting on the fishing and/or aquaculture industry.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts contact is possible to commercial, recreational, traditional species and or aquaculture species; or Advice has been provided to government to restrict, ban or close a fishery; or Declarations of intent by commercial fisheries or government agencies to seek compensation for alleged or possible damage.	
SMP Document	AEP: SMP: COMMERCIAL, RECREATIONAL AND AQUACULTURE FISHERIES IMPACT ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 02.01 OSM Service Provider ready to implement SMP 02.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM IP requirements.	RPS
SM 02.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 02.03 Monitoring Design & Sampling Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with 'Sampling Techniques & Parameters' (Section 6.1) of AEP OMP document.	RPS
SM 02.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 6.5 of the AEP SMP document.	RPS
SM 02.05 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
SM 02.06 SOP	SOP for fisheries impact assessment developed consistent with Table 7-1 of AEP SMP document.	RPS
SM 02.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 11 of the AEP SMP document.	RPS
SM 02.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 12 of the AEP SMP document.	RPS
SM 02.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the commercial and recreational fisheries impact assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	Agreement has been reached with the relevant Jurisdictional Authorities to cease monitoring of fisheries; and Contamination in the edible portion or in the stomach/intestinal contents	

SMP 02 – Commercial and Recreational Fisheries Impact Assessment	
	attributable to the spill is no longer detected; or No differences are detected in commercial, recreational or aquaculture fisheries from control and impact sites; or The physiological and biochemical parameters in the studied species have returned to baseline levels; or Evidence that catch rates, species composition, community abundance, distribution and age structure of commercial fisheries and their by-catches have returned to baseline levels.
Reporting Requirements	QA/QC Protocols: • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location (e.g. wheelhouse or vessel survey laboratory). • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Hard drives to be transported by the demobilising survey team. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • The impact of the spill event on commercial, recreational and aquaculture fisheries (including mortality, fish health and abundance, composition, distribution of commercial catches and of by-catches, age structure) and recovery of key process (i.e., breeding). • Details of the impacts and subsequent recovery of fisheries in response to a spill event and associated response activities as well as comparisons of impact and reference sites, along with a determination of whether the termination criteria have been reached, including recommendations on the requirements of future monitoring. • Where appropriate, data provided by this monitoring will be integrated with data from other relevant SMPs to fully understand the three-dimensional distribution of the spill. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 03 – Heritage Feature Assessment		
Environmental Performance Outcome	Assess the extent, severity, and persistence of impacts on heritage features—including shipwrecks, and sunken aircraft, and their associated artefacts—following a hydrocarbon spill and associated response activities.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts contact is possible to known areas of heritage features (shipwrecks, sunken aircraft, and associated artefacts protected under the UCH Act); or Allegations of damage to heritage features are received from other users (e.g., tourism operators, heritage groups) or government agencies.	
SMP Document	AEP: SMP: HERITAGE FEATURES ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 03.01 OSM Service Provider ready to implement SMP 03.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 03.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 03.03 Monitoring Design & Sampling Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Section 5 of the AEP SMP document. Monitoring program consistent with 'Sampling Techniques & Parameters' (Section 5.1) of AEP OMP document.	RPS
SM 03.04 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
SM 03.05 SOP	SOP developed consistent with Section 7 of the AEP SMP document.	RPS
SM 03.06 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 03.07 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 03.08 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the heritage feature assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	There has been no detectable impact to known heritage features; or Disturbance parameters (e.g. hydrocarbon visibility and concentration, condition/quality, area usage levels) have returned to within the expected natural dynamics of baseline state and/or control sites; and Agreement has been reached with the relevant Jurisdictional Authorities to cease monitoring of heritage features.	
Reporting	QA/QC Protocols:	

SMP 03 – Heritage Feature Assessment	
Requirements	• All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location (e.g. wheelhouse or vessel survey laboratory). • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Hard drives to be transported by the demobilising survey team. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • The impact of the spill event on commercial, recreational and aquaculture fisheries (including mortality, fish health and abundance, composition, distribution of commercial catches and of by-catches, age structure) and recovery of key process (i.e., breeding). • Details of the impacts and subsequent recovery of fisheries in response to a spill event and associated response activities as well as comparisons of impact and reference sites, along with a determination of whether the termination criteria have been reached, including recommendations on the requirements of future monitoring. • Where appropriate, data provided by this monitoring will be integrated with data from other relevant SMPs to fully understand the three-dimensional distribution of the spill. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or WA DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 04 – Intertidal and Coastal Habitat Assessment		
Environmental Performance Outcome	Assess the impact (extent, severity, and persistence) and subsequent recovery of intertidal and coastal habitats and associated biological communities in response to a hydrocarbon release and associated response activities.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts or confirms exposure of coastal or intertidal habitats or communities to hydrocarbons.	
SMP Document	AEP: SMP: INTERTIDAL AND COASTAL HABITAT ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 04.01 OSM Service Provider ready to implement SMP 04.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 04.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 04.03 Monitoring Design & Sampling Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with 'Sampling Techniques & Parameters' (Section 5.1) of AEP OMP document.	RPS
SM 04.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.2 of the AEP SMP document.	RPS
SM 04.05 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
SM 04.06 SOP.	SOP for intertidal and coastal habitat assessment developed consistent with Table 7-1 of the AEP SMP document.	RPS
SM 04.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 04.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 04.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the Intertidal and coastal habitat assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	Agreement has been reached with the relevant stakeholders and Jurisdictional Authorities to cease monitoring this receptor; and There has been no impact to coastal and intertidal habitats and associated biological communities (confirmation that habitats and species were not exposed to hydrocarbons); or Measured parameters of coastal and intertidal habitats and associated biological communities impacted by hydrocarbons spills have returned to within the expected natural dynamics of baseline state (taking into account natural	

SMP 04 – Intertidal and Coastal Habitat Assessment	
	variability) and/or control sites.
Reporting Requirements	QA/QC Protocols: • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location (e.g. wheelhouse or vessel survey laboratory). • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Hard drives to be transported by the demobilising survey team. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Spatially explicit information on the concentrations and nature of hydrocarbons for all water samples. • Digital maps generated of hydrocarbon concentrations and associated data. • Details of the impacts and subsequent recovery of shoreline and intertidal habitats and associated organisms in response to a spill event and associated response activities as well as comparisons of exposure sites and reference sites, along with a determination of whether the termination criteria have been reached, including recommendations on the requirements of future monitoring. • Where appropriate, data provided by this monitoring will be integrated with data from other relevant SMPs to fully understand the three-dimensional distribution of the spill. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 05 – Marine Fish and Elasmobranch Assemblages Assessment		
Environmental Performance Outcome	Assess the impacts to and subsequent recovery of fish and elasmobranch (sharks and rays) assemblages associated with specific benthic habitats (as identified in SMP 01: Benthic Habitat Assessment) in response to a hydrocarbon release and associated response activities.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts or confirms exposure to fish and/or elasmobranch areas or fish and/or elasmobranch habitat.	
SMP Document	AEP: SMP: MARINE FISH AND ELASMOBRANCH ASSEMBLAGES ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 05.01 OSM Service Provider ready to implement SMP 05.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 05.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 05.03 Monitoring Design & Sampling Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with 'Sampling Techniques & Parameters' (Section 5.1) of AEP OMP document.	RPS
SM 05.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.2 of the AEP SMP document.	RPS
SM 05.05 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
SM 05.06 SOP.	SOP for marine fish and elasmobranch assemblages' assessment developed consistent with Table 7-1 and Table 7-2 of the AEP SMP document.	RPS
SM 05.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 05.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 05.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the marine fish and elasmobranch assemblages assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	There has been no impact on fish and/or elasmobranchs and fish and/or elasmobranch population structure; or Measured parameters of fish and elasmobranchs, fish and elasmobranch habitat, and marine fisheries locations impacted by hydrocarbon spills have returned to within the expected natural dynamics of baseline state and/or control sites; and Agreement has been reached with the relevant stakeholders and Jurisdictional	

SMP 05 – Marine Fish and Elasmobranch Assemblages Assessment	
	Authorities to cease monitoring this receptor.
Reporting Requirements	QA/QC Protocols: • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location (e.g. wheelhouse or vessel survey laboratory). • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Hard drives to be transported by the demobilising survey team. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Spatially explicit information on the concentrations and nature of hydrocarbons for all water samples. • Digital maps generated of hydrocarbon concentrations and associated data. • Details of the impacts and subsequent recovery of fish/elasmobranch assemblages in response to a spill event and associated response activities as well as comparisons of exposure sites and reference sites, along with a determination of whether the termination criteria have been reached, including recommendations on the requirements of future monitoring. • Where appropriate, data provided by this monitoring will be integrated with data from other relevant SMPs to fully understand the three-dimensional distribution of the spill. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 06 – Marine Megafauna – Reptiles		
Environmental Performance Outcome	Identify and quantify the status and recovery of marine reptiles, including marine turtles, sea snakes and saltwater crocodiles, related to a hydrocarbon spill.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts contact is possible at important habitat locations for turtles (foraging and rookery), sea snakes and/or estuarine crocodiles; or Monitoring (OMP 03: Marine fauna assessment - reptiles) has identified contact or an impact to reptiles (dead, oiled, or injured reptiles) within area affected by hydrocarbons	
SMP Document	AEP: SMP: MARINE MEGAFAUNA - REPTILES	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 06.01 OSM Service Provider ready to implement SMP 07.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 06.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 06.03 Monitoring Design & Survey Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with 'Survey Techniques & Parameters' (Section 5.2) of AEP OMP document.	RPS
SM 06.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.3 of the AEP SMP document.	RPS
SM 06.05 Sample integrity, transport, and storage.	Monitoring program considers appropriate collection, transport, and storage of deceased marine turtles.	RPS
SM 06.06 SOP.	SOP for marine reptile assessment developed consistent with Table 7-1 to Table 7-10 of the AEP SMP document.	RPS
SM 06.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 06.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 06.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the marine megafauna team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	There has been no impact on reptiles or their key biological activities from the hydrocarbon spill; or The extent of damage of impacted reptiles has been quantified; and Measured parameters of turtle (and sea snakes and/or estuarine crocodiles, if determined appropriate) communities impacted by hydrocarbon spill have	

SMP 06 – Marine Megafauna – Reptiles	
	returned to within the expected natural dynamics of baseline state and/or control sites; and Agreement has been reached with the relevant stakeholders and Jurisdictional Authorities to cease monitoring this receptor.
Reporting Requirements	QA/QC Protocols: • Reports detailing impacts on reptiles as a result of a hydrocarbon spill. Reports to contain an up-to-date summary of data collected. Reports to document whether the termination criteria have been reached and make recommendations on the requirements of future/further monitoring. • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location. • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Quantification of the presence of marine reptiles (including life stage) within the area affected by hydrocarbons. • Quantification of the impacts of the hydrocarbon spill and response activities on reptiles, including abundance, mortality, sub-lethal effects, sickness and oiling. • Assessment of the impact of the hydrocarbon spill and response activities on nesting turtles, nests and hatchlings. • Determination of any changes in turtle nest beach usage by marine turtles following the hydrocarbon spill. • Recommendations for suitable and relevant remediation activities. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 07 – Marine Megafauna – Whale Shark, Dugong and Cetaceans		
Environmental Performance Outcome	Assess the impacts and subsequent recovery of marine megafauna (whale sharks, dugongs and cetaceans) in response to a hydrocarbon spill event and spill response activities.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts contact is possible at important habitat locations for whale sharks, dugongs and/or cetaceans (foraging, migratory routes, breeding locations); or Monitoring (OMP 04/05/06: Marine fauna assessment – cetaceans, dugongs, or fish) has identified contact or an impact to whale sharks, dugongs and/or cetaceans within the area affected by hydrocarbons.	
SMP Document	AEP: SMP: MARINE MEGAFAUNA- WHALE SHARKS, DUGONGS AND CETACEANS	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 07.01 OSM Service Provider ready to implement SMP 08.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 07.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 07.03 Monitoring Design & Survey Techniques.	Monitoring program considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with ‘Survey Techniques & Parameters’ (Section 5.2) of AEP OMP document.	RPS
SM 07.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.3 of the AEP SMP document.	RPS
SM 07.05 Sample integrity, transport, and storage.	Monitoring program considers appropriate collection, transport, and storage of deceased marine megafauna.	RPS
SM 07.06 SOP.	SOP for marine megafauna assessment developed consistent with Table 7-1 to Table 7-5 of the AEP SMP document.	RPS
SM 07.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 07.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 07.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the marine megafauna team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	There has been no demonstratable impact on whale sharks, dugongs and/or cetaceans or their key biological activities from the hydrocarbon spill; or The extent of damage of impacted whale sharks, dugongs and/or cetaceans and/or their BIAs has been quantified; and Measured parameters of whale sharks, dugongs and/or cetaceans and/or their BIAs impacted by hydrocarbon spill have returned to within the expected natural	

SMP 07 – Marine Megafauna – Whale Shark, Dugong and Cetaceans	
	dynamics of baseline state and/or control sites; and Agreement has been reached with the relevant stakeholders and Jurisdictional Authorities to cease monitoring this receptor.
Reporting Requirements	QA/QC Protocols: • Reports detailing impacts on marine megafauna (whale sharks, dugongs and/or cetaceans) as a result of a hydrocarbon spill. Reports to contain an up-to-date summary of data collected. Reports to document whether the termination criteria have been reached and make recommendations on the requirements of future/further monitoring. • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location. • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Quantification of the presence of whale sharks, dugongs and/or cetaceans within the area affected by hydrocarbons. • All necropsy findings (including cause of mortality, sublethal disease, physical oiling, hydrocarbon ingestion and/or inhalation), observed disease in live animals, evidence of physically oiling, and any injuries associated with the response activities. • Recommendations for suitable and relevant remediation activities. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG’s nominated representative.

SMP 08 – Seabirds & Shorebirds		
Environmental Performance Outcome	Document and quantify shorebird and seabird presence; and any impacts and potential recovery from hydrocarbon exposure.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts contact is possible to seabirds and/or shorebird populations or any of their habitats of importance for breeding, nesting or foraging; or Monitoring (OMP 08: Marine fauna assessment seabirds and shorebirds) has identified contact or an impact to seabirds and/ or shorebird populations as a result of the hydrocarbon spill; or There are reports or scientific evidence of oiled seabirds and/or shorebird populations.	
SMP Document	AEP: SMP: SEABIRDS AND SHOREBIRDS IMPACT ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 08.01 OSM Service Provider ready to implement SMP 09.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 08.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 08.03 Monitoring Design & Survey Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with 'Survey Techniques' (Section 5.2) of AEP OMP document.	RPS
SM 08.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.3 of the AEP SMP document.	RPS
SM 08.05 Sample integrity, transport, and storage.	Monitoring program considers appropriate collection, transport, and storage of deceased birds.	RPS
SM 08.06 SOP	SOP for seabirds and shorebirds assessment developed consistent with Table 7-1 to Table 7-6 of the AEP SMP document.	RPS
SM 08.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 08.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 08.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the seabirds & shorebirds team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	Agreement has been reached with the relevant stakeholders and Jurisdictional Authorities to cease monitoring this receptor; and	

SMP 08 – Seabirds & Shorebirds	
	There has been no impact on seabirds and/or shorebirds or their key biological activities; or The extent of damage and rate of recovery of key seabird and/or shorebird behaviour and breeding activities has been quantified; and Measured parameters have returned to baseline conditions (taking into account natural variability) in terms of breeding population (for seabirds) or counts (for shorebirds) and impacts on species and taxa are no longer detectable, with regard to control sites; or Oil pollution effects/impacts on critical species and taxa are no longer detectable.
Reporting Requirements	QA/QC Protocols: • Reports detailing impacts on seabirds and shorebirds as a result of a hydrocarbon spill. Reports will contain descriptive statistics of data collected. Reports will document whether the termination criteria have been reached and make recommendations on the requirements of future/further monitoring. • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location. • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Quantification of the impacts of the hydrocarbon spill and response activities on seabirds and shorebirds, including abundance, mortality, sub-lethal effects, sickness and oiling of seabird and shorebird populations. • Where an impact has occurred as a result of a spill event, quantification of the recovery of key seabird and shorebird behaviour and breeding activities. • Recommendations for suitable and relevant remediation activities. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 09 – Sediment Quality Impact Assessment		
Environmental Performance Outcome	Detect and monitor the presence, concentration, and persistence of hydrocarbons in marine sediments following the spill and associated response activities.	
Initiation Criteria	OMP 11: Sediment quality assessment has identified hydrocarbon concentrations exceed accepted guidelines and benchmarks; or Spill modelling has indicated that an impact on a sensitive resource that is closely linked to marine sediments is possible, and it is considered likely that ongoing (scientific) monitoring of a biological parameter will be required that supported by scientifically rigorous sediment quality monitoring.	
SMP Document	AEP: SMP: SEDIMENT QUALITY IMPACT ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 09.01 OSM Service Provider ready to implement SMP 10.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 09.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 09.03 Monitoring Design & Sampling Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with 'Sampling Techniques' (Section 5.1) of AEP OMP document.	RPS
SM 09.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.2 of the AEP SMP document.	RPS
SM 09.05 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
SM 09.06 SOP.	SOP for sediment quality impact assessment developed consistent with Table 7-1 and Table 7-2 of the AEP SMP document.	RPS
SM 09.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 09.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 09.08 Training support crew.	During first deployment support vessel crew to be trained by Lead and Support scientists while in the field to perform support monitoring role.	RPS
SM 09.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the sediment quality impact assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS

SMP 09 – Sediment Quality Impact Assessment	
Termination Criteria	The relevant Jurisdictional Authority/ Government Agency has been consulted and has agreed that sediment monitoring can be ceased; and All hydrocarbon concentrations in sediments are below guideline or benchmark levels, which can be defined as: toxicant default guideline values for sediment quality (Water Quality Australia (2019) Toxicant default guideline values for sediment quality); or the relevant regulatory site-specific trigger level (where these exist); or below baseline levels; or control site values (whichever is applicable).
Reporting Requirements	QA/QC Protocols: • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location. • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Hard drives to be transported by the demobilising survey team. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Spatially explicit information on the concentrations and nature of hydrocarbons for all sediment samples. • Digital maps generated of hydrocarbon concentrations and associated data, including comparison of impact and reference sites. • Where appropriate, data provided by this monitoring will be integrated with data from other relevant SMPs (e.g. Water quality) to fully understand the three dimensional distribution of the spill. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 10 – Social Impact Assessment		
Environmental Performance Outcome	Assess the extent, severity, and likely persistence of impacts on commercial, recreational and/or industrial users from a hydrocarbon release and associated response activities.	
Initiation Criteria	Spill trajectory modelling, surveillance or monitoring predicts or confirms hydrocarbon exposure to socio-economic features.	
SMP Document	AEP: SMP: SOCIAL IMPACT ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 10.01 OSM Service Provider ready to implement SMP 11.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 10.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 10.03 Monitoring Design.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Section 5 of the AEP SMP document.	RPS
SM 10.04 SOP.	SOP for social impact assessment developed giving consideration to Section 5 and Section 7 of the AEP SMP document.	RPS
SM 10.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 10.09 Scientific monitoring personnel have the appropriate experience and qualifications.	Records demonstrate that the social impact assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS
Termination Criteria	There has been no detectable impact to known socio-economic features; or Measured parameters of socio-economic features impacted by hydrocarbon spills have returned to within the expected natural dynamics of baseline state and/or control sites; or This SMP has been replaced by more detailed investigations; and Agreement has been reached with the relevant stakeholders and Jurisdictional Authorities to cease monitoring these receptors.	
Reporting Requirements	SMP report inclusive of: • Analysis of the impacts of the oil spill and response activities on commercial, recreational and/or industrial users, including direct and indirect impacts; and perceived and actual impacts. • Digital maps generated of hydrocarbon concentrations and associated data. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM	

SMP 10 – Social Impact Assessment	
	Implementation Lead prior to being submitted to EOG's nominated representative.

SMP 11 – Water Quality Impact Assessment		
Environmental Performance Outcome	Detect and monitor the presence, concentration and persistence of hydrocarbons in marine waters following the spill and associated response activities.	
Initiation Criteria	Spill modelling (see OMP 09: Hydrocarbon spill modelling) has indicated that contact on a sensitive resource is possible and it is considered likely that ongoing (scientific) monitoring of impacts will be required, supported by scientifically rigorous water quality monitoring; or OMP: Water quality assessment has identified hydrocarbon and/or dispersant concentrations exceed accepted guidelines or benchmarks; or Chemical dispersants have been applied as part of the spill response program.	
SMP Document	AEP: SMP: WATER QUALITY IMPACT ASSESSMENT	
SOP Reference	TBC	
Environmental Performance Standard	Measurement Criteria	Responsible
SM 11.01 OSM Service Provider ready to implement SMP 12.	OSM Service Provider (RPS) monthly readiness report includes SMP capability analysis (personnel and equipment) consistent with EOG OSM BIP requirements.	RPS
SM 11.02 Data Collation.	Monitoring program considers data requirements detailed within Table 4-1 of the AEP SMP document.	RPS
SM 11.03 Monitoring Design & Sampling Techniques.	Monitoring program consistent with relevant industry standards / guidelines and considers design approaches detailed within Table 5-1 of the AEP SMP document. Monitoring program consistent with ‘Sampling Techniques’ (Section 5.1) of AEP OMP document.	RPS
SM 11.04 Site Selection.	Monitoring program considers monitoring site selection consistent with Section 5.2 of the AEP SMP document.	RPS
SM 11.05 Samples labelled, transported, and stored appropriately.	Monitoring program considers appropriate labelling, transport, and storage requirements. Samples labelled, transported, and stored in accordance with laboratory recommendations during field sampling activities.	RPS
SM 11.06 SOP.	SOP for water quality impact assessment developed consistent with Table 7-1 and Table 7-2 of the AEP SMP document.	RPS
SM 11.07 Minimum QA / QC requirements in place.	QA / QC consistent with Section 10 of the AEP SMP document.	RPS
SM 11.08 Minimum data analysis requirements in place.	Data analysis undertaken in a manner consistent with Section 11 of the AEP SMP document.	RPS
SM 11.09 Training support crew.	During first deployment support vessel crew to be trained by Lead and Support scientists while in the field to perform support monitoring role.	RPS
SM 11.10 Scientific monitoring personnel have the appropriate experience and	Records demonstrate that the water quality impact assessment team have the applicable competencies outlined in Table 9.3 (Part A of OSM BIP).	RPS

SMP 11 – Water Quality Impact Assessment		
qualifications		
Termination Criteria	The relevant Jurisdictional Authority/ Government Agency has been consulted and has agreed that water quality monitoring can be ceased; and All hydrocarbon concentrations in sediments are below guideline or benchmark levels, which can be defined as: • Toxicant default guideline values for sediment quality (Water Quality Australia (2019) Toxicant default guideline values for sediment quality); or • The relevant regulatory site-specific trigger level (where these exist); or • Below baseline levels; or • Control site values (whichever is applicable).	
Reporting Requirements	QA/QC Protocols: • All records to be kept in a field log. This log to be copied to an electronic spreadsheet each day. • All electronic data to be backed up onto external hard drives each day. • Original hardcopies of datasheets to be transferred to a project folder and kept in a secure location. • GPS positional information and photographs to be downloaded and backed up onto external hard drives each day. • Hard drives to be transported by the demobilising survey team. • Copies of datasheets and analysis to be archived. SMP report inclusive of: • Spatially explicit information on the concentrations and nature of hydrocarbons for all water samples. • Digital maps generated of hydrocarbon concentrations and associated data, including comparison of impact and reference sites. • Where appropriate, data provided by this monitoring will be integrated with data from other relevant SMPs (e.g. Sediment quality) to fully understand the three-dimensional distribution of the spill. • Any data outputs made available to other relevant SMPs. Peer review process: • Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or DBCA (depending on jurisdiction), as appropriate. Comments from peer reviews to be addressed when finalising SMP reports. • Scientific monitoring data and reports to be reviewed by the OSM Implementation Lead prior to being submitted to EOG's nominated representative.	

Appendix C-6 AEP Framework

Table C-6.1 provides an evaluation against Appendix A of the AEP Framework ‘minimum standards’. ‘Minimum standards’ refer to those items that the OSM Framework sets as its minimum standard (e.g., personnel competencies, finalisation of monitoring designs). EOG is committed to upholding the AEP Framework minimum standards as outlined in Table C-6.1.

Table C-6.2 provides an evaluation against the AEP Framework ‘commitments.’ ‘Commitments’ refer to those items the Titleholder will need to individually address in their OSM Bridging Implementation Plans.

Table C-6.1 Alignment between EOG's OSM BIP and the AEP Framework minimum standards

Minimum standard	Section No. (if relevant)	Status / Responsible
Titleholders that apply this Framework will implement, as a minimum, the OMPs listed in Table 5-1 where initiation criteria for each of these studies are met.	5	Initiation criteria for each OMP applied
Titleholders that apply this Framework will implement, as a minimum, the SMPs listed in Table 6-1 where initiation criteria for each of these studies are met.	6	Initiation criteria for each SMP applied
The implementation of the spill response control measures will be subject to continual review during a response to determine if a strategy should commence, continue, continue with variations or cease.	5	EOG DIMT
Control measures will be identified to manage the impacts and risks of implementing a spill response (e.g. locations where surface dispersants can be deployed, restrictions on disturbance of sensitive shorelines by shoreline responders etc).	5	EOG DIMT / EOG OPEP
To ensure the application of robust designs and sampling approaches that have the highest likelihood of detecting an environmental impact while allowing suitable flexibility, these guiding principles will be adopted: • Align with existing baseline sampling design and methods wherever possible to maximise data comparability • Allow for appropriate spatial and temporal replication to account for natural dynamics in the system • Use exposure gradients where appropriate • Use indicator taxa where appropriate • Use benchmarks where appropriate.	6	RPS – detail design
The Monitoring Design information in each SMP will be considered by the Monitoring Provider in the review and finalisation of the monitoring design, including sampling techniques and standard operating procedures.	6	Applied in Sections 3 & 4 above
Finalisation of monitoring designs are considered to be a key decision in the OSM process and will need to be approved by personnel holding the competencies outlined in Table 11-1.	6	RPS - OSM competencies met
If benchmarks are relevant in the scientific studies, they will be selected taking into consideration guideline values that have already been established (e.g. Water Quality Australia (2019a, b), Simpson et al (2013), DEWHA (2019)) or if appropriate, follow the process as outlined in Water Quality Australia (2019a) or, if in Western Australia, the Environmental Protection Authority (EPA) *Technical Guidance: Protecting the Quality of Western Australia's Marine Environment* (EPA 2016) to develop a relevant benchmark value with appropriate statistical power. Benchmark values will also need to take into consideration levels of protection. Levels of protection are defined as the degree of protection afforded based on ecosystem condition (Water Quality Australia, 2019a, b). When finalising monitoring design, the levels of protection for that jurisdiction will need to be investigated. Water Quality Australia (2019a) lists the following levels of protection:	6	RPS – detail design

Minimum standard	Section No. (if relevant)	Status / Responsible
• High ecological/conservation value —99% species protection • Slightly to moderately disturbed system —95% species protection • Highly disturbed system —90 or 80% species protection Western Australia has a localised approach to levels of ecological protection, outlined in its EPA Technical Guidance: Protecting the Quality of Western Australia's Marine Environment (EPA 2016). In addition, Western Australia has also identified (through public consultation) and mapped levels of ecological protection for the Pilbara Region from the Exmouth Gulf to Cape Keraudren. EPA Technical Guidance: Protecting the Quality of Western Australia's Marine Environment (EPA 2016) will be consulted when investigating levels of protection.		
Post-spill, the OSMP Implementation Lead will be required to approve reactive baseline data requirements, determine if control sites are required and determine the number of samples and sampling sites as part of finalising the monitoring designs for each SMP.	7	RPS – detail design
Where possible and practicable, baseline data used will match the methods and parameters used in OMPs and SMPs. This will require Titleholders to examine baseline data sets they plan to use for OSM. This assessment will need to be addressed as part of their Bridging Implementation Plan. The Bridging Implementation Plan Template provides detailed guidance on this review process.	7	RPS – detail design
The OSMP Implementation Lead will be required to select the most suitable survey approaches and finalise monitoring designs for each SMP, according to the individual circumstances of the spill.	8	RPS – detail design
The OSM BIP will form part of the environmental management document framework for offshore petroleum activities and will need to be integrated with the activity's EP and OPEP.	10.1	EOG
In addition, Titleholders electing to use this Framework will need to consult with key stakeholders (i.e. Jurisdictional Authority for receptor, appointed State/Territory Environment and Science Coordinator) and monitoring service providers (including subject matter experts, where available) regarding monitoring priorities at the time of the spill (taking into account situational awareness information).	10.3	EOG DIMT
Whilst the methods may be varied, the individual monitoring plans aim/objectives, initiation and termination criteria and deliverables should not be varied outside the formal review process outlined in Section 12. In addition, the following are considered to be the minimum requirements in the individual monitoring plans (where listed). Modification of these must be justified by individual Titleholders if they are varied: • Data and information requirements (applicable to scientific monitoring only) • Monitoring parameters and metrics (as applicable) • Personnel requirements • QA/QC requirements (as applicable) • Data analysis and management (as applicable).	10.6	Applied in Sections 3 & 4 above

Minimum standard	Section No. (if relevant)	Status / Responsible
The OSM Monitoring Provider Implementation Lead and Technical Managers must be qualified (with appropriate skills and experience) to design and/or redesign the monitoring programs adaptively. Personnel competencies are outlined in Table 11-1.	10.6	RPS
When finalising monitoring designs post-spill, the latest threatened species recovery plans and/or conservation advice will be reviewed to take into account any controls or restrictions that need to be implemented to prevent impacts from monitoring activities.	10.6	RPS – detail design
The following reporting to Titleholders is required as a minimum and will need to be undertaken by the OSM Services Provider/s or any internal teams tasked with implementing OMPs/SMPs: • Any OMPs implemented during a response will have simple reporting requirements (e.g. activities undertaken, HES performance and survey progress). Reports will need be sent through to the IMT on a daily basis (or more frequently as requested by the IMT). OMP reporting will not be peer reviewed. No final reporting is required for OMPs. However, information from OMPs may feed into certain SMP draft and final reports as appropriate. • All sampling data and data interpretation provided in spatial data format (e.g. shape file) and/or spreadsheets as appropriate. • Technical survey reports detailing whether the termination criteria have been reached, including recommendations for future monitoring. Where possible, reports will compare monitoring results for hydrocarbons/chemicals against reference/baseline data or benchmark levels. Reporting should also include the spatial assessment of the distribution of hydrocarbons/chemicals over time. Where possible, reporting should also include an assessment of the performance of the response options against the environmental performance objectives in the relevant regulatory environmental permits or other relevant environmental management documentation. Draft technical survey reports for SMPs will be peer reviewed by an expert panel to be approved by the Commonwealth DCCEEW and/or the WA DBCA and/or NT DPEWS (depending on jurisdiction), as appropriate. Comments from peer reviews will be addressed when finalising SMP reports. Scientific monitoring data and reports shall be reviewed by the OSM Implementation Lead prior to being submitted to the Titleholder's nominated representative.	10.10	RPS – detail design

Minimum standard	Section No. (if relevant)	Status / Responsible
The requirements for QA/QC for monitoring plans include: • Use of CoC forms, procedures for sampling, data collection templates and a data management plan; • Quality control/review steps performed on the statistical analysis and interpretation (where applicable); • Adhering to handling, storage, holding times and transport requirements in accordance with the finalised monitoring design; • Collection and analyses of QA/QC samples in accordance with the finalised monitoring design; • Archiving of samples where applicable; • Maintenance and calibrations of systems and equipment; • Maintenance of metadata; and • Data backup, storage and archiving.	10.11	RPS – detail design
Table 11-1 provides minimum competencies for the key OSMP Management Team roles.	11.3	RPS
The OSM Joint Industry Framework shall initially be reviewed biennially, from the date of the Regulatory Advice Statement being issued and incorporate improvements from various continuous improvement sources. After 4 years (two revisions), the OSM Joint Industry Framework shall undergo a comprehensive review every 5 years.	12	AEP

Table C-6.2 Alignment between EOG's OSM BIP and the AEP Framework commitments

Commitment	Section No. (if relevant)	Status / Responsible
Titleholders will need to provide access/login details or a link to where I-GEMS can be accessed (i.e. Contacts Directory) in their Bridging Implementation Plan.	7	EOG
(In reference to baseline relevance: There are OSM components that are suited to pre-impact/reactive baseline monitoring, although this is not the case for all receptors, especially if a more detailed understanding of natural variability is required to assess the extent of oil spill impacts.) In this case, more detailed baseline planning will need occur and consideration should be given to the relevance of baseline data (including metrics and parameters) used in EPs and its relationship to the data required for the OSM	7	EOG s
If there is insufficient time to obtain reactive baseline data then Titleholders will need to consider whether additional baseline data are required to be collected.	7	EOG
The OSMP Bridging Implementation Plan will form part of the environmental management document framework for offshore petroleum activities and will need to be integrated with the activity's EP and OPEP. Titleholders will be required to provide the following information to demonstrate they meet the regulatory requirements associated with OSMP implementation. (Refer to Section 10.1 for detailed inclusions)	10.1	EOG
If a Titleholder chooses to adopt the Joint Industry OSM Framework, they will remain responsible for demonstrating its applicability and relationship to their activity.	10.1	EOG
Titleholders will need to undertake the following actions to support their Bridging Implementation Plan: • Assign OSMP roles and responsibilities (internal and external) • Establish external contracts to maintain OSMP capability and readiness • Determine internal and external personnel competencies and availability (to be monitored and reviewed on a regular basis) • Determine equipment providers and laboratories and establish processes/contracts as required • Liaise with internal logistics and supply chain departments to advise of OSMP requirements	Table 10-1	EOG EOG DIMT (Logistics) Monthly RPS Readiness Report
Titleholders will be required to identify in their Bridging Implementation Plan how they have used the results of their risk assessment process, in particular the modelling results, to help determine their likely initial monitoring priorities from their list of receptors.	10.3	EOG
Titleholders will be required to outline their initial monitoring priorities in their OSM BIP.	10.3	EOG
Titleholders will need to identify their relevant thresholds in the EP or Bridging Implementation Plan.	10.3	EOG
Titleholders will be required to outline who will be responsible for completing checklist tasks in their Bridging Implementation Plan.	10.3 and 10.5	EOG

Commitment	Section No. (if relevant)	Status / Responsible
Titleholders will need to define timeframes for implementation of each OMP in their Bridging Implementation Plan. Timeframes will need to be linked to the Titleholder's risk assessment process (Section 10.3).	10.5.1	EOG
SMP initiation and implementation timeframes will also need to be identified in the Titleholder's OSM BIP.	10.5.2	EOG
Titleholders will need to refer to the relevant Australian Marine Park Management Plan for specific requirements for marine parks and marine protected areas, which will need to be addressed in their Bridging Implementation Plan. (Guidance will be provided in Framework)	10.8	EOG
Specific access and permit requirements will need to be confirmed by the Titleholder in their Implementation Bridging Plan. Titleholders will also be required to outline who will be responsible for obtaining any necessary permits and access requirements for their selected monitoring activities. (Guidance provided in Framework)	10.8	EOG
Titleholders must have provision in their Bridging Implementation Plan and/or OPEP for notifications to be made to the Director of Parks Australia in the event of an oil pollution incident that occurs within, or may impact upon, an Australian Marine Park.	10.8	EOG
Titleholders will need outline their process for how OMP data will be recorded, communicated and used to inform response activities.	10.9.1	EOG DIMT IAPs
Titleholders need to outline the process for monitoring potential impacts from response activities in their OSM BIP.	10.9.2	EOG
Titleholders will need to outline in their Bridging Implementation Plan how they will use operational monitoring data to determine the effectiveness of the response control measures and to ensure that environmental performance standards for the implementation of control measures are met.	10.9.3	EOG
Titleholders will need to ensure that their OSM BIP has considered any possible linkages between spill response control measures, their resultant performance standards and how operational monitoring will provide information to confirm that the performance standards are being met.	10.9.3	EOG
Titleholders will need to state how results of OMPs and SMPs will be discussed with relevant stakeholders.	10.12	EOG
Information will need to be shared with regulatory agencies/authorities (as required) and inputs received from stakeholders will need to be evaluated. Where practicable, this input should be used to refine the ongoing spill response and/or ongoing operational and/or scientific monitoring.	10.12	EOG
The Bridging Implementation Plan will need to provide detail on the OSM Management Team structure and be relevant to the system of incident command used by the Titleholder (either ICS or AIIMS).	10.13.2	EOG
Titleholders must clearly articulate responsibility for implementation and decision-making of scientific monitoring components during the post-response phase in their Bridging Implementation Plan	10.13.2	EOG

Commitment	Section No. (if relevant)	Status / Responsible
To ensure Titleholders meet OPGGS (Environment) Regulations 2009 (Part 2, Division 2.3, Regulation 14 (8AA)), they will be required to detail the arrangements and capability in place within their own organisation and with external providers, for monitoring activation and implementation.	11.1	EOG Monthly RPS Readiness Report
Titleholders will be required to outline in their Implementation Bridging Plan the arrangements of how the equipment requirements for their selected OMPs and SMPs will be met.	11.2	EOG
Titleholders have a requirement to test the operational readiness of their response arrangements for monitoring, to meet OPGGS (Env) Reg. 14 (8A). This can include drills, audits and exercises to test arrangements such as resource requirements, implementation timeframes and logistics. This information must be presented in the Titleholder's EP Framework, either in the OPEP, EP or OSM BIP.	11.4	EOG Monthly RPS Readiness Report

Appendix C-7 Validation against NOPSEMA (2021) Guidance

Table C-7.1 provides an evaluation against NOPSEMA's Regulatory Advice Statement on AEP's Joint Industry Operational and Scientific Monitoring Framework (NOPSEMA, 2021).

Table C-7.1 Validation against NOPSEMA Guidance

Application of the template in the development of OSMPs is likely to meet NOPSEMA's interpretation of the requirements of the Environment Regulations, provided:	Status / Responsible
The EP uses the process described in Sections 2 and 13 of the template to identify the EMBA and the protection and monitoring priorities, including the application of oil concentration thresholds consistent with the exposure values for oil spill modelling presented in NOPSEMA's oil spill modelling bulletin, and fully justifies the outcome.	Sections 2 and 13
The EP adheres to the process described in Sections 3 and 4 of the template to undertake baseline data analysis and fully justifies the outcome.	Sections 3 and 4
The EP makes clear, unambiguous commitment that scientific monitoring reports 'will be' peer reviewed by an expert panel (Section 4, p10).	Appendix C-5
The EP includes clear, unambiguous activation, mobilisation, and implementation timeframes, which are relevant to the predicted time to contact of the pollution with sensitive receptors, baseline data available, sensitivities affected, practicability of implementation and/or other factors. Indicative mobilisation timeframes for OSM activities presented as worked examples in the template, for example, activation timeframes in Table 7-1 and Section 12 and implementation timeframes in Sections 13 and 15, should be revised to reflect each activity's oil pollution scenario(s) and specific response requirements.	Sections 7, 12, 13 and 15
Monitoring implementation timeframes consider any time requirements to finalise SMPs prior to implementation being required or take actions to reduce timeframes during the pre-spill (preparedness) phase.	Section 7
The EP includes OMPs that are sufficiently developed and/or finalised to ensure that they are ready to implement in the identified timeframes for operational monitoring to provide information to support initial and ongoing response decision-making.	Section 7
The EP identifies that operational monitoring detailed in the OMPs will be initiated, monitoring teams deployed, and information provided to the incident management team (IMT) in timeframes that match those identified and applied to the oil pollution emergency response planning in the development of the OPEP.	Sections 7 and 8
The EP identifies monitoring resources in the BIP that match the monitoring and response needs in terms of numbers of personnel, teams, equipment, sites etc. Tables 8-2, 8-3 and 10-1 in the template provide a suitable method of presenting the number of personnel and teams required to resource a monitoring program, however, the content of these tables will be assessed by NOPSEMA in the context of the oil pollution scenario(s), response needs analysis and capacity reasoning presented in the EP. Titleholders should not assume that the information presented in these example tables will be adequate for most responses.	Sections 8 and 10
The EP adheres to the exercise and testing process described in Section 9.3. Additionally, the BIP should identify the specific objectives of the testing of monitoring arrangements, ensure the frequency of the schedule of testing is consistent with the regulatory requirements and provide information on any aspects of the testing of monitoring that differ to the OPEP testing arrangements described elsewhere in the EP.	Sections 9.3
The EP confirms that the aims and objectives of the OMPs and SMPs are appropriate for a titleholder's monitoring requirements and address the potential impacts and risks and response activities.	Appendix C-5

Application of the template in the development of OSMPs is likely to meet NOPSEMA's interpretation of the requirements of the Environment Regulations, provided:	Status / Responsible
The EP uses the method provided in the template for titleholders to ensure special requirements for Matters Protected Under Part 3 of the EPBC Act are met through the proposed monitoring (Section 14). However, the method indicates that this would be done prior to finalisation of OMPs and SMPs, which may not be completed in a titleholder's EP. Titleholders should ensure that relevant requirements are at least identified in the EP. This process would also be repeated during finalisation of OMPs and SMPs in the event of an oil pollution emergency to ensure any changes to requirements since submission of the EP or the latest review are included.	Appendix C-5
The EP sets environmental performance outcomes, standards and measurement criteria that relate to the environmental impacts and risks and required level of performance of the proposed monitoring arrangements (preparedness and implementation) defined in the BIP.	Appendix C-5 Appendix B of the OPEP

Appendix D Cumulative Requirements and Demonstration of Capability

OPEP Appendix D: Cumulative Requirements and Demonstration of Capability

Beehive-1 Exploration Drilling

WA-488-P

17 May 2024

Rev 2

eog resources

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DOCUMENT CONTROL

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APPENDICES

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1 Introduction

1.1 Purpose and Scope

This document provides a detailed description of the cumulative requirements and the demonstrated capability to respond to the credible worst-case discharge (WCD) scenarios associated with the EOG Resources Australia Block WA-488 Pty Ltd (EOG) Beehive-1 exploration drilling activities. This demonstrates that EOG can meet its overall response needs with the identified response resources and arrangements.

It provides an overall assessment of cumulative incident management and responder capability against the response requirements of the DIMT (Appendix A of the OPEP) and the identified response strategies (Appendix B of the OPEP). It includes:

- The implementation times, and cumulative personnel and resource requirements for the DIMT and the response strategies, including allowances for redundancy, rostering, shift coverage, and rotation to maintain the response capability for the duration of the response (Section 2).
- A demonstration that EOG's identified response resources and arrangements will meet its overall personnel (Section 3.1), equipment and resource needs (Section 3.2).
- Section 4 describes the national and WA support arrangements. Note that these arrangements are considered as surge capacity and are not included in EOG's demonstration of capability. Descriptions include:
  - The NatPlan support arrangements, including the National Response Team (NRT), the Environment, Science and Technology Network (ES&T), and the Wildlife Response Network (Section 4.1).
  - The WA oil spill resources, including those of the WA DoT, the DBCA and other WA organisations (Section 4.2).
- Section 5 presents an overview of the contracting strategies in place.

The personnel requirements to fully implement the OPEP are identified in Appendix A of the OPEP (DIMT), Appendix B of the OPEP (Response Strategies) and Appendix C of the OPEP (OSM BIP). This document provides the cumulative personnel requirements for the DIMT, the Response Strategies, and the marine labour hire personnel required for the OSM[1], including allowances for rotations and redundancy. It then demonstrates EOG's capability to provide sufficient personnel, when required. Other personnel requirements and demonstration of capability for the OSM is provided in Appendix C of the OPEP.

Equipment and resource requirements to fully implement the OPEP are identified in Appendix B of the OPEP (Response Strategies) and Appendix C of the OPEP (OSM BIP). Note that there were no equipment/resource requirements identified for the operation of the DIMT (Appendix A). This document provides the cumulative equipment/resource requirements for the Response Strategies, plus the aircraft and vessel requirements for the OSM[1], and demonstrates EOG's capability to provide sufficient equipment and resources, when required. Other equipment/ resource requirements and demonstration of capability for the OSM is provided in Appendix C of the OPEP.

[1] Included in Appendix B of the OPEP.

Table 1.1 provides a key to the codes used for the 'nominated resources' identified for each swing in the 'Response Requirements' tables in the following sections.

Table 1.1 Nominated Resource Codes

Code	Nominated Resource
OSRO	Oil Spill Response Organisation (includes AMOSC and OSRL)
RPS	OSM Service Provider
AMOSC	AMOSC (where service is exclusive to AMOSC)
LH-Marine	Marine Labour Hire (unskilled personnel for marine operations)
LH-Shore	Shore-based Labour Hire (unskilled personnel)
EOG Contractor	EOG Contractors
Plant	Machinery/plant for shoreline operations and Operators
AMOSC-OWR	AMOSC OWR Capability Network – Skilled wildlife handlers
AMOSC-OWR*	AMOSC OWR Capability Network – includes: • Oiled Wildlife Coordinator • Reconnaissance Manager • Rescue and Transport Manager • Staging and Holding Manager • Rehabilitation Manager • Rehabilitation Facilities Management • Specialist Personnel (i.e. Veterinarians)
LPM	LPM Staff, LPM Consultants and Resilient Personnel
VoO	Vessels of Opportunity
Vehicle	4WD hire
Helicopter	Helicopter contractor

2 Cumulative Requirements

2.1 Personnel

Table 2.1 reproduces the cumulative personnel requirements for the DIMT, including 7.5% redundancy from Day 1 and resourcing for a second rotation (based on 2 weeks on/2 weeks off) from Day 10 (see Table 3.3, OPEP Appendix A).

Table 2.2 reproduces the cumulative personnel requirements for the Response Strategies, including 7.5% redundancy from Day 1 and resourcing for a second rotation (based on 2 weeks on/2 weeks off) from Day 10 and continuing to peak requirements on Day 51 (see Table 7.4, OPEP Appendix B). Note that OSROs includes resources from AMOSC Staff/Core Group (CG) and OSRL.

Table 2.3 shows the combined personnel requirements from each nominated source for the DIMT and the Response Strategies, including 7.5% redundancy from Day 1 and resourcing for a second rotation (based on 2 weeks on/2 weeks off) from Day 10 and continuing to peak requirements on Day 51.

2.2 Equipment/Resources

Table 2.4 reproduces the cumulative equipment and resource requirements for the Response Strategies, inclusive of aircraft and vessel requirements for the OSM (Appendix B of the OPEP, Table 7.6).

Table 2.1 DIMT Personnel Requirements by Organisation (incl. 7.5% redundancy from Day 1, and 2on/2off rotation from Day 10)

Source of personnel	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)
Agency personnel		3	7	7	7	7	7	7	14	14	14	14
LPM	7	19	22	22	22	22	22	22	44	44	44	44
AMOSC Staff/CG	2	11	18	23	25	25	25	26	48	48	48	48
EOG									5	5	5	5
EOG Consultants	2	4	7	7	7	7	8	8	16	16	16	16
EOG Contractor			2	2	2	2	2	2	4	4	4	4
Total personnel required	**11**	**37**	**56**	**61**	**63**	**63**	**64**	**65**	**131**	**131**	**131**	**131**

Table 2.2 Response Strategy Personnel Requirements by Organisation (incl. 7.5% redundancy from Day 1, and 2on/2off rotation from Day 10)

Source of personnel	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)
LPM	2	3	3	3	3	3	3	3	3	3	3	3
Shore-based Labour Hire				4	4	8	8	8	86	234	388	624
OSROs	3	5	10	13	16	21	21	25	53	79	105	129
Marine Labour Hire			7	13	16	22	22	35	74	102	128	160
Plant Operator									4	6	8	12
AMOSC-OWR*						2	2	2	13	21	30	51
AMOSC-OWR									22	66	108	216
Total personnel required	**5**	**8**	**22**	**35**	**41**	**60**	**60**	**77**	**265**	**527**	**794**	**1,219**

Table 2.3 Cumulative Personnel Requirements by Organisation (incl. 7.5% redundancy from Day 1, and 2on/2off rotation from Day 10) for DIMT and Response Strategies

Source of personnel	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)
Agency personnel		3	7	7	7	7	7	7	14	14	14	14
LPM	9	22	25	25	25	25	25	25	47	47	47	47
OSRO	5	16	28	36	41	46	46	51	101	127	153	177
EOG									5	5	5	5
EOG Consultants	2	4	7	7	7	7	8	8	16	16	16	16
EOG Contractor			4	4	4	6	6	6	12	20	28	28
Shore-based Labour Hire				4	4	8	8	8	86	234	388	624
Marine Labour Hire			7	13	16	22	22	35	74	102	128	160
Plant Operator									4	6	8	12
AMOSC-OWR*						2	2	2	13	21	30	51
AMOSC-OWR									22	66	108	216
Total personnel required	**16**	**45**	**78**	**96**	**104**	**123**	**124**	**142**	**396**	**658**	**925**	**1350**

Table 2.4 Equipment and Resource Requirements by Type

Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Aircraft Requirements															
Fixed wing aircraft			1	1	3	3	3	3	4	5	5	5	AMOSC	AMOSC	AMOSC supplementary contract
Helicopter				1	1	1	1	1	2	3	4	5	Helicopter	Helicopter	Helicopter contractor
Total aircraft required			**1**	**2**	**4**	**4**	**4**	**4**	**6**	**8**	**9**	**10**			
Vessel Requirements															
Dispersant vessel				2	2	4	4	4	4	4	4	4	VoO	VoO	Vessels of Opportunity
C&R vessel			4	4	4	4	4	8	8	8	8	8	VoO	VoO	Vessels of Opportunity
Nearshore vessel					2	3	3	3	6	13	19	19	VoO	VoO	Vessels of Opportunity
Offshore Vessel					1	1	1	1	4	6	6	6	VoO	VoO	Vessels of Opportunity
Small vessel					1	3	3	3	7	18	28	39	VoO	VoO	Vessels of Opportunity
Landing barge									2	4	6	10	VoO	VoO	Vessels of Opportunity
Primary Care Facility (PCF) vessel										1	1	2	VoO	VoO	Vessels of Opportunity
Accommodation vessel (250 pax)									1	2	2	2	VoO	VoO	Vessels of Opportunity
Transfer vessel				1	1	1	1	1	1	2	2	2	VoO	VoO	Vessels of Opportunity
Tanker								1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Very large barge								1	1	1	1	1	VoO	VoO	Vessels of Opportunity
Total vessels required			**4**	**7**	**11**	**16**	**16**	**22**	**35**	**60**	**78**	**94**			
Vehicle/Drone Requirements															
Vehicle 4WD						**2**	**2**	**2**	**5**	**15**	**25**	**36**	Vehicle	Vehicle	4WD hire
Drone						2	2	2	2	6	10	10	EOG Contractor	EOG Contractor	EOG Contractor
Dispersant Requirements - m^3															
Daily requirements		24	24	102	102	108	108	108	108	126	126	126			
Cumulative requirements		**24**	**48**	**150**	**252**	**360**	**468**	**576**	**792**	**2,538**	**4,932**	**5,940**			**11,862 m^3 over 98 days**
M&E Requirements															
Grab bag			1	1	1	1	1	1	2	2	2	**2**	AMOSC	AMOSC	AMOSC membership
ESTB (approx. every 5 days)	1				1				1	1	1	1	AMOSC	AMOSC	Approx. 20 over 98 days
AMOSC/OSRL contract (satellite imagery)													–	–	AMOSC/OSRL membership
Shake-jar test kit		1	1	1									AMOSC	AMOSC	AMOSC supplementary contract
Offshore requirements															
Application equipment (SDA)				2	2	4	4	4	4	4	4	4	AMOSC	AMOSC	AMOSC membership
Boom (C&R)			2	2	2	2	2	4	4	4	4	**4**	AMOSC	AMOSC	AMOSC membership
High-capacity skimming system (C&R)			2	2	2	2	2	4	4	4	4	**4**	AMOSC	AMOSC	AMOSC membership

Requirements	Timing												Nominated resource		Notes/Comments
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 10	Day 24	Day 43	Day 51 (peak)	1st swing	2nd swing	
Shoreline Operations															
50 m shore seal boom									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
50 m near shore boom									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Shoreline skimming system									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Waste capacity min 10 m3									2	6	10	15	OSRO	OSRO	AMOSC/OSRL membership
Shoreline response kits									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Manual oil collection equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Machinery/plant									1	2	3	5	Plant	Plant	Plant operator
Waste collection and containment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Zoning equipment									2	6	10	16	OSRO	OSRO	AMOSC/OSRL membership
Oiled Wildlife Response															
1st strike equipment cache									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
Wildlife response container									2	2	2	2	OSRO	OSRO	AMOSC/OSRL membership
OWR Rehabilitation centre										1	1	1	OSRO	OSRO	AMOSC/OSRL membership
Primary Care Facility (PCF)										1	1	2	VoO	VoO	Vessels of Opportunity

3 Demonstration of Capability

3.1 Personnel

The personnel resources described below are to meet the requirements identified in Table 2.3 inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10.

3.1.1 EOG

3.1.1.1. Staff

Table 2.3 identifies that 5 EOG personnel are required from Day 10, inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10.

EOG will have a minimum of 10 IMO I (or equivalent) trained staff available to fill these roles. One person will be based in Australia prior to the commencement of drilling; an additional two will be available on Day 5, and the remaining 7 will be mobilised from EOG's Houston offices within 10 days of a Tier 3 spill occurring.

3.1.1.2. Consultants

Table 2.3 identifies that 16 EOG consultants are required at peak (Day10), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10. These personnel are required for positions within the DIMT (and WA DoT IMT):

- PLANNING: Environment Unit (LEAD) (Aventus Consulting)
- OSM Implementation Lead (RPS)
- Historical & Cultural SME (Xenith Consulting (Xenith))
- CoP Display/GIS Expert (Aventus Consulting)
- Compensation Unit (Global Risk Solutions (GRS))
- WA DoT IMT Deputy PIO (Global Risk Solutions (GRS))
- WA DoT IMT Environmental Support Officer (MCC Environmental Consultants (MCC))

Sixteen personnel are available through EOG's consultancy agreements with:

- Aventus Consulting: 4 personnel available
- RPS (OSM): 3 personnel available
- MCC: 3 personnel available
- Xenith: 3 personnel available
- GRS: 3 personnel available

3.1.1.3. Contractors

Table 2.3 identifies that 28 EOG contractors are required at peak (Day 43), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10. This includes 22 personnel for drone operations, and six for waste management roles in the WA DoT IMT and Darwin.

EOG shall have a contract in place with a Waste Management Contractor with regional capacity to manage oil contaminated wastes, commencing six weeks prior to the commencement of the activity.

EOG shall maintain contractual arrangements with drone providers, commencing six weeks prior to the commencement of the activity, to enable the deployment of 10 drones and operators at peak.

3.1.2 Agency Personnel

Table 2.3 identifies that 14 Agency Personnel are required at peak (Day10), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10. These personnel are required for positions within the DIMT:

- Communications Unit (IT) Manager
- Incident Comms Centre Manager
- Food Unit Lead
- Medical Unit Lead (includes infection Control COVID)
- Procurement Unit
- Administration & Records

EOG shall have a contract in place with a medical and flight paramedic personnel provider, commencing six weeks prior to the commencement of the activity.

EOG shall have a contract in place with an agency hire provider, commencing six weeks prior to the commencement of the activity.

3.1.3 LPM

Table 2.3 identifies that 47 LPM personnel are required at peak (Day10), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10. Thirty-nine personnel are required for positions within the DIMT including:

- 7 personnel requiring IMO 3 (or equivalent) training.
- 13 personnel requiring IMO 2 (or equivalent) training.

Five personnel are required for the WA DoT IMT positions of Deputy Planning Officer and Deputy Logistics Officer; these people will have an intimate knowledge of this OPEP and EOG's planning processes. If EOG is required to take over these roles (when additional EOG personnel are deployed to Australia after a spill), a full update and handover between LPM and EOG will take place.

Three personnel are required for the Darwin FOB positions.

LPM will maintain the above requirements to ensure sufficient redundancy for all roles.

3.1.4 Oil Spill Response Organisations (OSROs)

For the purposes of demonstrating sufficient capability, the personnel available from the two OSROs described below have been pooled. Table 2.3 identifies that 5 OSRO personnel are required on Day 1, 31 on Day 2, 51 on Day 8, 101 on Day 10, and 177 on Day 51 (peak), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10.

3.1.4.1. Australian Marine Oil Spill Centre (AMOSC)

AMOSC is the lead OSRO in Australia. It maintains the Australian Industry Cooperative Spill Response Arrangements (AMOSPlan) which describes mutual aid arrangements of the industry coordinated by AMOSC. It outlines membership arrangements, activation procedures and interfaces with other plans.

EOG is an Associate Member of AMOSC and as such will have access to AMOSC's Level 2/3 resources as outlined in the AMOSPlan, including personnel, equipment and the FWADC. AMOSC has contracts with all its member companies to enable the release of Core Group personnel to be made available for any EOG requirements as soon as possible, as outlined in EOG's Master Service Contract with AMOSC.

Personnel available include 16 AMOSC Staff and ~100-120 Core Group members. AMOSC also advised that they have access to 18 additional personnel from AMOSC members (Participating and Associate) as well as consultants not currently counted in any other categories that would be available for response. These have been termed AMOSC / Industry Mutual Aid. The total available from AMOSC, including staff, CG and mutual aid is approximately 134-154 personnel.

AMOSC Core Group policy requires all Core-Group personnel to undertake initial training, followed by competency re-validation/training every 2 years. Typically, AMOSC manage the Core-Group re-validation/training by conducting 3 x 1 week Core- Group training/workshops per year. AMOSC coordinates the routine testing, monitoring and monthly reporting of Core-Group personnel availability.

Appendix D-1 (Core Group Availability) shows a total of 101 people for February 2024. Between 67 and 77 CG members are available on any given day (average = 72). AMOSC has advised that an additional 25 people would likely be available within a few days, with the remaining available within 2-4 weeks.

For this analysis, the following personnel availability assumptions are made:

- Day 1: 16 staff + 72 CG = 88 personnel available
- Day 5: 88 + 25 CG = 113 personnel available
- Day 24: 113 + 17 CG = 130 personnel available
- Day 43: 130 + 18 mutual aid = 148 personnel available

3.1.4.2. Oil Spill Response Limited (OSRL)

OSRL is a global OSRO. EOG is an Associate member with OSRL which guarantees access to the 24 hour, 7-days a week OSRL response service. In addition to equipment and personnel resources, OSRL has aircraft on standby to facilitate the movement of equipment from Singapore to Australia. AMOSC and OSRL are both professional response organisations and members of the Global Response Network (GRN) and would work together in support of a member's response.

The OSRL service level statements provides for:

- 24/7 call-out arrangements.

- Guaranteed initial response from OSRL of 5 technical support personnel (DIMT or field personnel) for 5 days.
- Guaranteed access to a team of 18 OSRL personnel, upon request from the DIMT.
- Depending on size/complexity, OSRL maintain 80 response team personnel globally, who are potentially able to be provided to support an ongoing Level 3 event, on a best-endeavours basis.
- A summary of EOG's Service Level Agreement with OSRL is provided as Appendix D-5.

Typical initial roles of the 18 person team include:

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

For this analysis, the following personnel availability assumptions are made:

- Day 5: 18 personnel available
- Day 24: 18 + additional 80 response personnel = 98 personnel available

3.1.4.3. Combined OSRO Capacity

For this analysis, the combined personnel availability from OSROs is estimated as:

- Day 1: 88 AMOSC personnel available
- Day 5: 113 AMOSC + 18 OSRL = 131 personnel available
- Day 24: 130 AMOSC + 98 OSRL = 228 personnel available
- Day 43: 148 AMOSC + 98 OSRL = 246 personnel available

Table 2.3 identifies that 5 OSRO personnel are required on Day 1, 31 on Day 2, 51 on Day 8, 101 on Day 10, and 177 on Day 51 (peak), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10.

3.1.5 Shore-based Labour Hire

Table 2.3 identifies that 86 shore-based labour hire personnel are required on Day 10, 234 on Day 24, 388 on Day 43, and 624 on Day 51 (peak), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10.

EOG shall maintain a contract with a labour-hire company, commencing six weeks prior to the commencement of the activity, to enable the engagement of shore-based labour hire personnel.

3.1.6 Marine Labour Hire

Table 2.3 identifies that 7 marine labour hire personnel are required on Day 3, 22 on Day 6, 74 on Day 10, 128 on Day 43, and 160 on Day 51 (peak), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10. Marine labour hire personnel would be required to have appropriate qualifications applicable to the activities (e.g. International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)).

EOG shall maintain a contract with a marine labour-hire company, commencing six weeks prior to the commencement of the activity, to enable the engagement of marine labour hire personnel.

3.1.7 Plant Operators

Table 2.3 identifies that 12 plant operators at peak (Day 51), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10. EOG believes these personnel would be readily available when the plant is required.

3.1.8 OWR

Table 2.3 identifies that 2 AMOSC-OWR* personnel are required by Day 6, ramping up to 51 at peak (Day 51), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10.

Table 2.3 identifies that 22 AMOSC-OWR personnel are required by Day 10, 66 by Day 24, 108 by Day 43, and 216 at peak (Day 51), inclusive of 7.5% redundancy and 2 weeks on/2 weeks off rotations from Day 10.

Personnel for OWR will primarily be sourced from AMOSC's OWR capability, with supplementary resources from OSRL.

3.1.8.1. AMOSC

AMOSC has been assisting members to develop their Oiled Wildlife Response (OWR) capability since 2012. This assistance has been based on strong cross-institutional relationships which AMOSC has developed with state/territorial and federal Government agencies, and national and international wildlife response organisations.

AMOSC has been involved in the coordination, development and delivery of OWR training for industry since 2012 in collaboration with Massey University (NZ) and the Department of Biodiversity, Conservation and Attractions in WA.

Since 2014 AMOSC has represented industry on the National Oiled Wildlife Working Group in addition to establishing the Industry Oiled wildlife Working Group to coordinate best practice within industry.

AMOSC's OWR capability is presented in Appendix D-4.

3.1.8.2. OSRL

Access to expert oiled wildlife advice is provided via OSRL's contracted provider, Sea Alarm Foundation (SAF). Two oiled wildlife response technical advisors are on call to support OSRL Members with one person in-field or at the Command Post and the second supporting remotely.

Furthermore, through OSRL's ongoing funding of the Global Oiled Wildlife Response System (GOWRS) Project, a wildlife assessment team of four wildlife experts can be mobilised in-field in addition to the Sea Alarm resources noted above. There is also access to additional oiled wildlife resources on a 'reasonable endeavours' only basis through the GOWRS partners. The GOWRS project comprises ten well-respected international wildlife rescue and rehabilitation organisations working to common Good Practice standards.

OSRL's OWR capability is presented in Appendix D-5.

3.1.9 Well Control Specialists

The Source Control Branch Director role will be filled by personnel from LPM Consultants and Resilient. EOG has a Master Services Agreement (MSA) and a global call-off agreement with Wild Well Control (WWC) who will supply staff for the Source Control Deputy Director and Source Control Emergency Advisor positions. WWC would take the lead role in the Relief Well operations.

EOG also has a MSA and call-off agreement with a specialist well control consultant.

3.1.10 Operational and Scientific Monitoring (OSM)

EOG has arrangements in place with a specialist OSM Service Provider (RPS) to provide operational and scientific monitoring (OSM) services. The OSM BIP (Appendix C of the OPEP) provides further details.

3.1.11 COVID Readiness

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

3.2 Equipment/Resources

3.2.1 AMOSC

3.2.1.1. FWADC

The current FWADC arrangement in place which covers the entire Australian coastline is jointly managed by AMSA & AMOSC. AMOSC's FWADC contract provides for 'wheels up' of four aircraft around Australia within 4 hours of activation. EOG will maintain a supplementary contract with AMOSC to ensure the provision of two additional aircraft.

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

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

AMOSC will also manage the OSRL C-130 under the FWADC contract.

3.2.1.2. OWR Capability

AMOSC has been assisting members to develop their Oiled Wildlife Response (OWR) capability since 2012. This assistance has been based on strong cross-institutional relationships which AMOSC has developed with state/territorial and federal Government agencies, and national and international wildlife response organisations.

AMOSC has been involved in the coordination, development and delivery of OWR training for industry since 2012 in collaboration with Massey University (NZ) and the Department of Biodiversity, Conservation and Attractions in WA.

Since 2014 AMOSC has represented industry on the National Oiled Wildlife Working Group in addition to establishing the Industry Oiled wildlife Working Group to coordinate best practice within industry.

AMOSC's OWR capability is presented in Appendix D-4.

3.2.1.3. Equipment

AMOSC maintains and stores oil spill equipment at Broome, Exmouth, Fremantle and Geelong. Systems stocked by AMOSC include the VIKO and AFEDO spray systems. Upon notification of a spill, this equipment will be transferred to Darwin (or other ports where vessels are located).

A list of AMOSC's equipment is provided in Appendix D-2.

3.2.1.4. Mutual Aid Equipment

Should the response require mutual aid from equipment owned and personnel employed by another company, the request for assistance is made directly company to company via each company's nominated Mutual Aid Contact. EOG will also be required to contact AMOSC to activate the Standing Agreement and the Service Contract (for the borrowing company).

A list of AMOSC's mutual aid equipment is provided in Appendix D-3.

3.2.2 OSRL

EOG is an Associate member with OSRL which guarantees access to Tier 3 technical advice, resources and expertise 365 days a year on a 24-hours a day.

If there is an incident, EOG is entitled to 50% of the SLA dispersant stockpile located in Southampton, Singapore, Fort Lauderdale and Bahrain. OSRL may be able to obtain further dispersant through the Global Response Network (GRN) and other organisations, if required.

As per the SLA, EOG can mobilise up to 50% of the global stockpile by type available at the time of request. Equipment will be mobilised from the most appropriate location to provide the most timely and effective response.

SLA response equipment is housed in secure facilities in Singapore, UK, Bahrain and USA, customs cleared where required, and ready for deployment. EOG is responsible for ensuring the clearance of equipment into the country and the payment of all associated duties, importations costs etc. A complete list of equipment can be downloaded from OSRL's website at https://www.oilspillresponse.com/services/member-response-services/equipment-list/.

Logistics support through OSRL includes:

- Access to global cargo network via contracted broker for aircraft of opportunity, vessels, and road transport.
- Access to aircraft of opportunity for passenger charter services through a contracted broker

Appendix D-5 provides a summary of the SLA and an overview of OSRL's OWR capability.

3.2.3 APPEA Mutual Aid

EOG is a signatory to the APPEA Memorandum of Understanding: Mutual Aid to enable access to industry resources including equipment, dispersant stockpiles, and trained personnel.

3.2.4 Aircraft

Table 2.4 identifies that 5 fixed-wing aircraft and 5 helicopters would be required at peak (Day 51).

AMOSC will be engaged by EOG, under a supplementary contract to their membership, to ensure that fixed-wing aircraft are available as required.

Prior to mobilisation, EOG will have a dedicated contract in place with suitable contractors to provide helicopters for crew change, 24/7 Medevac, and Search and Rescue coverage. These helicopters can be used for aerial surveillance in event of an oil spill. EOG will also have a Call off/MoU arrangement for fixed-wing aerial services provider 6 weeks prior to start of activity.

EOG shall maintain a contract with a helicopter provider, commencing six weeks prior to the commencement of the activity, to ensure that helicopters are available as required.

EOG shall actively monitor current aircraft availability to support monitoring and evaluation, commencing six weeks prior to the commencement of the activity.

3.2.5 Vessels

Table 2.4 identifies that 35 vessels are required by Day 10, 60 by Day 24, 78 by Day 43 and 94 vessels at peak (Day 51).

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

EOG shall actively monitor current vessel availability to identify emergency vessels and those that are closest to the incident location, commencing six weeks prior to the commencement of the activity.

3.2.6 Vehicles/Drones

Table 2.4 identifies that 36 x 4WD vehicles would be required at peak (Day 51). EOG believes these vehicles would be readily available from existing hire companies when required.

EOG shall maintain contractual arrangements with drone providers, commencing six weeks prior to the commencement of the activity, to enable the deployment of 10 drones and operators at peak.

3.2.7 Dispersants

Table 2.4 identifies that peak dispersant application is reached on Day 24 with 126 m^3/day applied. Table 3.1 lists the dispersant stockpiles which EOG has access to through contractual arrangements with AMOSC and OSRL.

EOG has contracts in place with both AMOSC and OSRL to facilitate access to:

- regional and global dispersant stockpiles.

- FWAD capability (including Hercules C130) capability including provision of ground crew and air attack supervisors.

EOG is a signatory to the APPEA Memorandum of Understanding: Mutual Aid to enable access to industry resources, including vessel dispersant spray systems, dispersant stockpiles, and trained personnel.

The dispersants available (6,508 m^3) are estimated to be exhausted on Day 55. The total required over 98 days of spill response is 11,862 m^3.

In the event of a Level 3 hydrocarbon spill, the DIMT will liaise with its OSROs regarding production of 'Just in Time Dispersant' for deployment throughout the oil spill response. This will take into consideration the start-up, continuous production, and termination of production of relevant dispersant based on the requirements and status of the incident response.

At a recent workshop, *Overcoming Barriers: Challenges to the Dispersant Delivery Chain, Members' Information Day 2022*, OSRL provided the information in Figure 3.1 regarding current dispersant-re-supply arrangements. They also provided the information in Figure 3.2 showing a global database of third-party held dispersant stockpiles of over 16,000 m^3. Information on OSRL's dispersant availability is provided here.

Table 3.1 Dispersant stockpiles by location & owner, as of September 2023

Source	Volume (m^3)	Type	Notes
AMSA (7 Feb 2024) (link)	115	Slickgone NS	Stockpiles in Adelaide, Brisbane, Darwin, Devonport, Fremantle, Geelong, Horn Island, Karratha, Melbourne, Sydney and Townsville
	123	Slickgone EW	
AMOSC (2 Feb 24) (Appendix D-2)	158	Slickgone NS	Stockpiles in Altona North, Broome, Exmouth and Welshpool
	89	Corexit 9500	
	14	Ardrox 6120	
	250 *	Slickgone NS	Fremantle
OSRL (SLA) (7 Feb 2024) (link)	205	Corexit 9500	Stockpiles in UK (Southampton), Singapore, Bahrain and USA (Fort Lauderdale)
	84	Corexit 9527	
	70	Finasol OSR52	
	68	Slickgone EW	
	224	Slickgone NS	
GDS (OSRL) (7 Feb 2024) (link)	850	Slickgone NS	Stockpiles in UK (Southampton), Singapore, South Africa (Cape Town), Brazil, France and USA (Fort Lauderdale)
	1,000	Corexit 9500A	
	3,150	Finasol OSR52	
Total	**6,508**		

* Half of the Subsea First Response Toolkit (SFRT) dispersants stockpile is available to be released for surface response

Supplier	Re-supply Rate
Dasic International	• 60m^3 / 567 bbls Slickgone NS with 24 hrs • 108m^3/ 680bbls per day with a 12-week lead time.
Total Energie Fluide	• 60m^3 /378 bbls OSR52 per day, with a 12-week lead time
Champion X	• Previously- 100m^3 / 630 bbls Corexit EC9500A per day, 2-week lead time (2019) • *Currently unavailable*

Figure 3.1 Dispersant Re-supply

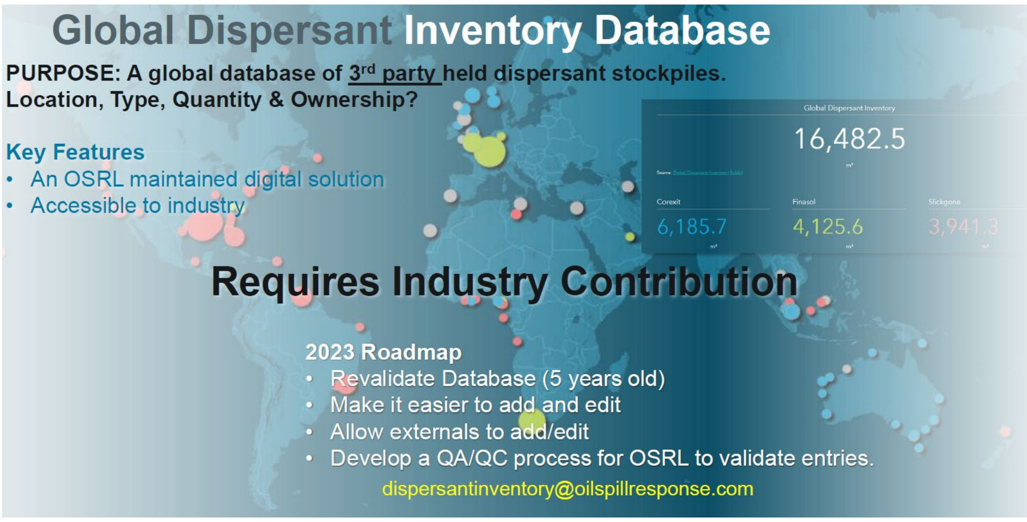

Figure 3.2 OSRL's Global Dispersant Inventory Database

There are eight vessel-mountable dispersant spray systems available from AMOSC (2 each in Exmouth, Broome, Fremantle and Geelong). The two systems in Broom could be transported to Darwin within 24 hours. It is approximately 15.5 hours steaming to the Beehive-1 location. Therefore, two vessel-based dispersant systems could be operational within 4 days following the spill, with another 2 operational by Day 6.

3.2.8 M&E Equipment/Resources

Table 2.4 identifies that two aerial observation grab bags are required at peak. These are available from AMOSC (Appendix D-2) as part of EOG's membership. Table 2.4 also identifies that that three 'shake jar test' kits and approximately 20 ESTBs are required. EOG shall have additional agreements with AMOSC for the provision of 'shake jar test' kits and ESTBs.

3.2.9 Containment and Recovery Equipment/Resources

Table 2.4 identifies that 4 booms and 4 high-capacity skimming systems will be required by Day 8. This equipment is readily available from AMOSC (Appendix D-2) and AMOSC mutual aid (Appendix D-3).

3.2.10 Shoreline Operations Equipment/Resources

Table 2.4 identifies that the following equipment is required for shoreline operations at peak (Day 51):

- 15 x 50 m shore seal boom.
- 15 x 50 m near shore boom.
- 15 x Shoreline skimming system.
- 15 x Waste capacity min 10 m^3.
- 16 x Shoreline response kits.
- 16 x Manual oil collection equipment.
- 16 x Waste collection and containment.
- 16 x Zoning equipment.

This equipment is readily available from AMOSC (Appendix D-2), AMOSC mutual aid (Appendix D-3) and OSRL (Appendix D-5).

Table 2.4 also identifies that 5 units of machinery/plant (e.g. earthmoving equipment) are required for shoreline operations at peak (Day 51). EOG believes these would be readily available when required.

3.2.11 OWR Equipment/Resources

Table 2.4 identifies that the following equipment is required for OWR at peak (Day 51):

- 2 x 1st strike equipment cache.
- 2 x Wildlife response container.
- 1 x OWR Rehabilitation centre.
- 2 x Primary Care Facility (PCF).

This equipment is available from AMOSC's OWR capability (Appendix D-4) and OSRL (Appendix D-5).

3.2.12 Forward Operations

A response to a WCD event will require large quantities of equipment and personnel to be deployed and accommodated in multiple locations. Coordination of these aspects of the response will be the responsibility of the Logistics Section in the DIMT. EOG has existing arrangements for the storage and transport of equipment which will be initially used in a response. These arrangements include agreements with logistics providers for air, marine and land.

EOG will set up a Marine Operations Base in Darwin and a Forward Operations Base at a location agreed with the WA DoT and/or NT DEPWS. Although Darwin is approximately 300 km from the Beeehive-1 location, it is the closest centre with sufficient resources to support a spill response (e.g., accommodation, storage, laydown/biosecurity areas, forklifts, office space warehouses, lifting equipment, cleaning and servicing facilities). EOG will have dedicated contracts in place prior to mobilisation.

A logistics plan will be developed by the DIMT with a look ahead to replace or supplement vessels during the response operations to maintain the operational capability.

Road transportation of personnel will be by hire cars (for team leaders, SCAT teams, small teams) and by charter buses for large movements of teams such as shoreline responders. EOG will have dedicated contracts in place prior to mobilisation with multiple service providers that can call on additional resources regionally as well as other regional providers. Regional providers can supplement the existing arrangements within 2-3 days. Freight logistics by road will utilise existing local contracts and other local operators supplemented by larger regional providers.

Accommodation will be provided through a combination of liveaboard charter vessels, other vessels with sufficient accommodation and land-side accommodation, where feasible.

4 National and WA Arrangements

4.1 National Plan Support Arrangements

The resources described in this section are considered as surge capacity and are not included in EOG's demonstration of capability.

All jurisdictions (the Commonwealth and the States and Northern Territory) can both contribute to and make use of these arrangements, agreements, contracts and capabilities that together provide Australia with the ability to mobilise personnel, expertise and equipment to respond quickly to maritime environmental emergencies. These arrangements are active at all times. AMSA has the responsibility to process all requests and to provide all jurisdictions with suitable support.

State and Territory Control Agencies and AMOSC (on behalf of the offshore industry) can request access to these arrangements through a formal notification of request to AMSA (as per NP–GUI–003: Accessing National Plan support arrangements).

4.1.1 National Response Team (NRT)

The National Response Team (NRT) is comprised of personnel able to support pollution response operations around the country. The NRT is managed in cooperation with all jurisdictions; which nominate members to meet the needs of both incident management and operations. The NRT is managed in accordance with the National Response Team Policy (AMSA 2023), approved by the National Plan Strategic Coordination Committee (NPSCC) with activation of the NRT managed by AMSA.

The purpose of the National Response Team (NRT) is to provide a national incident management and field operations surge capacity that supports control agencies to respond to major maritime environmental emergency incidents. The NRT can perform the following functions during response operations:

- Incident Controller Advisor – appointed to advise or mentor senior officers within the incident management team (IMT or conducting field operations).
- IMT Section Officer - lead a section (planning, operations, logistics) within an IMT.
- IMT Unit Coordinator - lead a unit within the IMT (e.g. situation unit, shoreline unit).
- Field Team Leader - lead a team conducting field operations (Marine and Shoreline)
- Wildlife Advisor - advisor to IMT on wildlife management

The NRT will be formed by personnel drawn from the Australian State and Northern Territory governments. Table 4.1 identifies the minimum number and functions of individuals to be provided by each State and the NT.

The deployment of the NRT will be conducted consistent with *NP-GUI-005 Deployment of the National Response Team*. NRT Members will be required to be made available for deployment within 24 hours of activation and are to be at the worksite (IMT or field) within 48 hours of activation. The standard deployment period for domestic deployments will be for 10 days including travel time. Extraordinary extensions to this deployment period will be considered on a case-by-case basis subject to appropriate fatigue management processes.

Table 4.1 NRT Composition (AMSA 2023)

Role	Minimum positions per State/NT	Total	Assurance Target (available at any time)**
Incident Control Advisor	N/A*	5	3
Planning Officer	1	7	4
Intelligence Officer	1	7	4
Operations Officer	1	7	4
Logistics Officer	1	7	4
Field Team Leader (Marine)	3	21	12
Field Team Leader (Shoreline)	3	21	12
Wildlife Response Advisor	1	7	4
	Total	**82**	**47**

* Incident Control Advisors will be appointed on a capability basis, rather than distributed across the States/NT.
** States/NT may nominate more than the minimum number of nominated jurisdictional personnel.

The Control Agency makes a request to AMSA for National Response Team assistance to AMSA Search and Rescue on 1800 641 792 followed up by email to RCCaus@amsa.gov.au. The Control Agency making a verbal request should follow up with an email request within three hours of the initial request. A request may also be made directly to an AMSA Liaison Officer that may be part of the IMT. If this person is on site in the IMT then all requests should be directed through this person. The Control Agency making a request should provide the following information:

- Roles or skills required (for example, Planning Officer, Aerial Observer).
- Number of personnel required to fill each role.
- Preferred start date.
- Brief overview of the work to be undertaken.
- Contact name, mobile number, time and address where personnel are to initially report.
- Name, position (within the response management structure) and contact details of the person making the request.

4.1.2 Environment, Science and Technology Network (ES&T)

ES&T expert response functions, roles, and positions often require diverse and significant technical capability, and may need to be sustained throughout an extended response. Few response agencies have all the required expertise. The ES&T network has been established to provide a national support group of highly skilled and professional scientists and technicians. Network members come from government agencies across all jurisdictions, from the ports, maritime and petroleum sectors, from academia and research organisations, and from the education, commercial and consulting sectors.

4.1.3 Wildlife Response Network

No National Plan Control Agency has direct responsibility for wildlife response - all rely on external support. However, every State and the Northern Territory has an injured wildlife response system or network. A national Wildlife Response Network is the aim of the Oiled Wildlife Working Group.

This group would oversee nationally consistent training, planning, building and delivery of wildlife response capabilities.

The key role in each jurisdiction is the Wildlife Division Coordinator, accountable to the IMT Operations Officer for delivery of secondary and tertiary wildlife response functions. Planning and prioritization activities also require awareness of wildlife value, impact and response operations. Many other specialist roles and functions support the overall wildlife response, many of whom are likely to be trained community volunteers.

4.2 WA Resources

The resources described in this section are considered as surge capacity and are not included in EOG's demonstration of capability.

The State Hazard Plan – Maritime Environmental Emergency (SHP-MEE) identifies the Chief Executive Officer of the WA DoT as the Hazard Management Agency (HMA) for marine oil pollution and marine transport emergencies under the *Emergency Management Act 2005.*

WA DoT has advised during consultation that EOG's demonstration of capability should not include personnel from the sources described below. They have also advised that in the event of a LoWC event, they expect up to 50 personnel in total would be deployed from WA DoT (Section 4.2.1) and other organisations (Section 4.2.2). EOG would be responsible for providing support to these personnel (e.g. accommodation, aircraft, vessels).

4.2.1 WA DoT

The WA DoT maintains a database of WA personnel who have been trained by WA DoT and/or AMSA as incident management and/or oil spill responders. Participants who have completed the relevant training courses may be called upon to assist in MEE. These include the:

- Maritime Incident Management Team (MIMT)
  The MIMT is comprised of personnel from WA DoT and other State Government organisations who are trained to perform roles within an IMT. Activation of individuals in the MIMT during MEE is through the State Marine Pollution Controller (SMPC).
- State Response Team (SRT)
  The SRT comprises personnel from WA DoT, State Government organisations and selected external organisations trained to perform field response operations. Activation of individuals in the SRT during MEE is through the SMPC.
- Environmental Liaison Group (ELG)
  The Environmental Liaison Group is comprised of nominated individuals from key State Government Agencies who provide support to the Environmental Scientific Coordinator (ESC). Membership of the ELG includes the Department of Biodiversity, Conservation and Attractions (DBCA), the Department of Primary Industries and Regional Development (DPIRD) and the Department of Water and Environmental Regulation (DWER). Additional representatives from the ChemCentre, Department of Mines, Industry Regulation and Safety (DMIRS), Water Corporation and the Department of Health (DoH) may also be requested to participate as appropriate.

4.2.2 Other WA Organisations

WA DoT Maritime has the primary role of coordinating the response to Maritime Environmental Emergencies (MEE) (for marine oil pollution and marine transport emergency). Various officers, agencies and entities undertake activities in relation to emergency management in WA. Table 4.2 outlines the response roles and responsibilities of agencies under the SHP-MEE. Full details of these roles and responsibilities can be found in Appendix E of the State Emergency Management Plan (link).

Table 4.2 WA Organisations – Roles and Responsibilities

Organisation	Response Responsibilities
Department of Transport (DoT)	• CEO is HMA / Jurisdictional Authority / Controlling Agency as per State Hazard Plan – MEE
Department of Biodiversity Conservation and Attractions (DBCA)	• Oiled wildlife response • Environmental Scientific Coordinator role • Environmental Liaison Group membership • Environmental advice • Marine park management advice/support • Regional expert advice • Local resource support
ChemCentre	• Environmental Liaison Group membership • Environmental advice • 24/7 On-call analytical services • Provision of supplementary sampling equipment • Regional expert advice • Local resource support • Provision of analytical services for Post Incident investigations • Able to assist with remediation and Post Oil Spill Monitoring advice
Department of Communities	• Support organisation of the emergency management activity of Providing welfare services
Department of Fire and Emergency Services (DFES)	• HMA for Hazardous Materials Emergencies (HAZMAT) • HMA for land based spills • HMA for fire • Logistical support • Evacuation support/coordination
Department of Health (DoH)	• Environmental Liaison Group membership • Coordinate the health response • Medical support • Public health and safety support
Department of Indigenous Affairs (DIA)	• Cultural, heritage, indigenous advice • Conduit for communication between communities and emergency management
Department of Mines, Industry Regulation and Safety (DMIRS)	• Environmental Liaison Group membership • Assess and approve OSCPs for offshore petroleum activities in State waters • Environmental advice

Organisation	Response Responsibilities
Department of Primary Industries and Regional Development (DPIRD)	• Environmental Liaison Group membership • Sustainability and Biosecurity advice
Department of Water and Environmental Regulation (DWER)	• Environmental Liaison Group membership • Environmental advice • Waste management approvals • Air quality sampling • Chemical response advice/support
Local Government	• Local knowledge • Local logistical support • Community engagement support • Assist shoreline clean up • Undertake recovery activities
Port Authorities	• Controlling Agency for MEE Incidents in Port Authority Waters • Resource support
Port Operators, Port Facilities Operators, Boat Harbour Operators	• Formulate, exercise and review own OSCP/OPEP • May be assigned to assist MEE response in relevant OSCPs/OPEPs
Water Corporation	• Environmental Liaison Group membership • Water resource management advice
Western Australia Police Force (WA Police Force)	• HMA for Search and Rescue Emergencies (SAR), Hostile Acts, Terrorist Acts and Radiation Escape from a Nuclear- • Powered Warship • Assist with evacuation on request • Maintain public order where required • In the event of mass casualties, provide Disaster Victim Identification • Provide liaison officers and/or representation to any ISG/OASG and/or SECG as appropriate • Provide emergency coordinators as appropriate to assist in the provision of a coordinated response

5 External Services Contracting Strategy

A large spill may require deployment of substantive spill response resources for an extended period. These resources will be obtained from third party contractors, industry support groups and government support agencies (collectively referred to as 'external services'). Table 5.1 lists the key external services organisations, summary roles and service provision arrangements. An up-to-date contact list will be maintained by EOG/LPM on their networks and in hardcopy in the emergency control centre (ECC). In the event of a Level 2 or Level 3 spill and activation of relevant external resources, the DIMT will request and receive up to date equipment inventories from each contractor.

Table 5.1 External services contracting strategy

Scope of work	Supplier/contractor	Contract	Contract timing	General contract specifications and notes
MODU-related				
Relief well MODU.	As available.	D / E	Contracted when required via APPEA Mutual Aid MoU or direct.	NOPSEMA-accepted MODU Safety Case. Technical specification to meet requirements of relief well.
Vessel support for relief well MODU	Existing primary support vessels plus additional vessels via Clarksons and/or APPEA MoU.	A / E	Contracted as required.	Vessels to support relief well operations.
Relief well drilling personnel and technical services	Wild Well Control (WWC).	C	In place 6 weeks prior to start of activity	Global call off agreement
Casing and wellhead for relief well	Supply agreement for casing, casing accessories and wellhead for relief well	A	In place 2 months prior to drilling	Supply agreement with documented inventory of available casing and wellhead equipment.
Vessels				
Initial vessel-based hydrocarbon surveillance	Existing primary support vessels plus additional vessels via brokerage.	A / E	In-place prior to start of Activity	Initial (immediate) hydrocarbon surveillance
Oil spill response vessels – <u>small</u>	Vessels of opportunity.	E	Contracted when required direct from local suppliers.	Vessels to support following spill response efforts: • Operational and scientific monitoring. • OWR. • Shoreline protection and deflection. • SCAT assessment. • Shoreline clean-up. • Shoreline waste management.
Oil spill response vessels – <u>large</u>	Vessel contractors via brokerage.	A / E	Vessels in place with primary vessel supplier plus sourcing via Mutual Aid MoU or vessel brokers / direct.	Vessels to support following spill response efforts: • Surface dispersant application • Containment and recovery • Shoreline Operations • Waste management • OWR • Forward Operations
Aircraft				
Helicopter services for spill monitoring	Helicopter provider(s)	A	In-place at mobilisation.	Dedicated helicopter will be available if not otherwise required, for safety reasons.
Fixed-wing aircraft services for spill monitoring	Aircraft from qualified contractors	E	Available via AMOSC supplementary contract.	Provision of fixed wing aircraft for aerial observation will meet deployment timeline and number of aircraft.
Fixed-wing aircraft for dispersant application	AMOSC service agreement	B	In place 6 weeks prior to start of activity	Adequate aircraft can be sourced to meet the requirements
	OSRL membership	C	In place 6 weeks prior to start of activity	
Oiled Wildlife Response				
OWR personnel OWR kits OWR container OWR centres	AMOSC service agreement	B	In place 6 weeks prior to start of activity	Trained in the implementation of OWR plan including long-term care, relocation and remediation of marine fauna.
	OSRL membership	C	In place 6 weeks prior to start of activity	
	AMSA (via National Plan)	E	N/A	
Vehicles				
Mainland transport contractor	Logistics and transport contractor	A	In-place prior to mobilisation	Vehicles and drivers (with controlled waste licences), hotshot services, transport of personnel mobilised during response.

Scope of work	Supplier/contractor	Contract	Contract timing	General contract specifications and notes
Land vehicles for shoreline response	Various car rental firms	E	Hired as required	
Other resources				
1 satellite tracking buoy on MODU during activity and 1 on each support vessel (3 in total). Further tracking buoys as necessary.	AMOSC Fastwave Advisian	A	In-place at mobilisation	
DIMT support services	LPM (including Resilient)	A	In place	Support services from specialist third party providers to support DIMT resourcing
	AMOSC service agreement	B	In place 6 weeks prior to start of activity	
	OSRL membership	C	In place 6 weeks prior to start of activity	
	WWC global framework agreement	C	In place	
	Global Risk Solutions (GRS)	C	In place 6 weeks prior to start of activity	
	Legal consultancy	A	In place	
	Media consultancy	A	In place 6 weeks prior to start of activity	
	Environmental consultancy	B	In place	
	Agency hire	E	In place 6 weeks prior to start of activity	
Communication equipment (satellite phones) (50 estimated)	Various communications companies	E	Hired as required	Required for remote teams to contact central vessel/ vehicles, etc.
Satellite imagery	AMOSC service agreement	B	In place 6 weeks prior to start of activity	May be accessed direct or via AMOSC and/or OSRL.
	OSRL membership	C	In place 6 weeks prior to start of activity	
OSTM	RPS via AMOSC	B	In place 6 weeks prior to start of activity	Provision of OSTM and 3D modelling during spill.
Oil spill observers	AMOSC service agreement	B	In place 6 weeks prior to start of activity	Trained observers and sampling of spilled oil and water column.
Operational and scientific monitoring personnel and equipment	Environmental consultancy	B	Access to trained personnel and equipment necessary for scientific monitoring via a dedicated scientific monitoring standby contract in-place 6 weeks prior to start of activity.	Demonstrated capability and capacity to implement Scientific Monitoring Plan including: • Nominated personnel with expertise in relevant disciplines that meet the minimum qualifications and experience requirements for key OSM BIP roles. • Confirmed local (i.e., WA) resourcing (personnel and equipment) capacity sufficient to meet immediate OSM BIP implementation requirements. • Experience coordinating and implementing scientific monitoring studies.
Dispersants	AMOSC service agreement	B	In place 6 weeks prior to start of activity	Dispersant stockpiles from AMOSC within Australia (>250 m^3) and OSRL global stockpiles (~5,000 m^3), supplemented by AMSA stockpiles from around Australia (>350m^3) meet the dispersant volume and availability requirements
	OSRL GDS membership	C	In place 6 weeks prior to start of activity	
	AMSA (via National Plan)	E	N/A	
Trained personnel and equipment for dispersant operations	AMOSC service agreement	B	In place 6 weeks prior to start of activity	AMOSC Core Group of trained responders in the DIMT and field. OSRL for surge resources.
	OSRL membership	C	In place 6 weeks prior to start of activity	
Marine oil spill response equipment Associated personnel and technical services	OSRL membership	C	In place 6 weeks prior to start of activity	Includes equipment for offshore containment and recovery, and shoreline protection and deflection.
	AMOSC service agreement	B	In place 6 weeks prior to start of activity	
	AMSA (via NatPlan)	E	N/A	
	Equipment suppliers	E	Sourced as required	
Shoreline oil spill response equipment	OSRL membership	C	In place 6 weeks prior to start of activity	Trained shoreline clean-up personnel, able to brief and lead shoreline clean-up teams provided. Experienced clean-up personnel to train clean-up labourers as required. Appropriate PPE to be provided as required.
	AMOSC service agreement	B	In place 6 weeks prior to start of activity	
	WA DoT (via WA State Hazard Plan)	E	N/A	

Scope of work	Supplier/contractor	Contract	Contract timing	General contract specifications and notes
Associated personnel and technical services	AMSA (via NatPlan)	E	N/A	
	Equipment suppliers	E	Sourced as required	
Waste management equipment and services	Licensed waste management contractor	A	In-place prior to mobilisation.	Set up secure temporary waste storage/laydown areas in proximity to clean-up operations, manage collection, transport and delivery of wastes to licensed facilities, and maintain all relevant waste documentation. Waste will include hazardous and non-hazardous solid and liquid wastes.
Shoreline staging area equipment and personnel	AMOSC service agreement	B	In place 6 weeks prior to start of activity	Secure temporary areas for labour in proximity to shoreline clean-up operations (e.g., generators, accommodation, sewage/grey water facilities, catering)
	Equipment suppliers	E	Sourced as required	
General labour hire	Labour hire contractors	B	In-place 6 weeks prior to start of activity	Primarily for shoreline clean-up, but also for other spill response activities (e.g., protection and deflection deployment working under the guidance of team leaders) or other specialist workforce (e.g., forklift drivers, security).
Marine labour hire	Marine labour hire contractors	B	In-place 6 weeks prior to start of activity	Primarily for offshore spill response activities and protection and deflection deployment working under the guidance of team leaders
Marine operations base	Darwin	A	In-place prior to mobilisation	Likely established at primary supply port (Darwin). Storage, laydown and biosecurity areas, forklifts, office space warehouses, lifting equipment, cleaning and servicing facilities.
Forward operations base	Darwin	A	In-place prior to mobilisation	If required, likely established at locations to be agreed with WA DoT and/or NT IMT depending on occurrence of substantive shoreline loadings. Storage, laydown and biosecurity areas, forklifts, office space warehouses, lifting equipment, cleaning and servicing facilities.
Shoreline clean-up equipment	AMOSC service agreement	B	In-place 6 weeks prior to start of activity	For each team: Shoreline response kits incl (Type and quantalities to be adjusted according to shoreline type & oiling): • Manual oil collection equipment. • Mechanical oil collection/removal machinery & plant. • Waste collection and containment equipment. • Equipment and personnel decontamination equipment. • Site zoning equipment for sealing of the site. • 2 x Vehicles to transport personnel and trailered equipment. 1 x vessel for teams working at inaccessible locations.
	OSRL membership	C	In place 6 weeks prior to start of activity	
Shoreline Clean-up and Assessment Teams	AMOSC service agreement	B	In-place 6 weeks prior to start of activity	Trained in beach profiling and shoreline assessment.
	OSRL membership	C	In place 6 weeks prior to start of activity	

Contract Type	Notes
A: EOG dedicated contract B: EOG call-off agreement C: EOG Global call-off agreement D: Assignment from other titleholders/operators E: No contract arrangement needed	1. Contract scopes of work will match EP and OPEP commitments. 2. MODUs conducting relief well drilling require a NOPSEMA-accepted Vessel Safety Case (VSC) and activity specific safety case revision. Presence of such MODUs in Australian waters is dependent on activities of other Titleholders at any given time. MODUs are likely to be active in the Southeast Asia region and can be mobilised to Australia, in which case close liaison with NOPSEMA (Safety Division) will be required. EOG maintains a register of MODUs active in the region so can be ready to contact operators at short notice.

APPENDICES

Appendix D-1 AMOSC Core Group Availability

Core Group Availability Feb 2024

AMOSC Australian Marine Oil Spill Centre

Company	Total CG members	1-Feb			2-Feb			3-Feb			4-Feb			5-Feb			6-Feb			7-Feb		
		Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual
AMOSC	16	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6
Ampol	13	12		1	12		1	12		1	12		1	12		1	12		1	12		1
BP	2																					
Chevron	6																					
ExxonMobil	14	6	2		6	2		6	2		6	2		6	2		6	1		6	1	
Inpex	4	1	2		1	2		1	2		1	2		1	2		1	2		1	2	
Santos	14	7	2		7	2		7	2		7	2		7	2		7	2		6	2	
Shell	16		1	13		1	13		1	13		1	11		1	11		1	11		1	11
Viva	6	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1	3	1	1	3	1	1
Woodside	10	2	3		2	3		2	3		2	3		2	3		2	3		2	3	
Weekly Total	**101**	**33**	**20**	**21**	**33**	**20**	**21**	**33**	**20**	**21**	**33**	**20**	**19**	**33**	**20**	**19**	**33**	**18**	**19**	**32**	**18**	**19**

2

Company	Total CG members	8-Feb			9-Feb			10-Feb			11-Feb			12-Feb			13-Feb			14-Feb		
		Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual
AMOSC	16	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6
Ampol	13	12		1	12		1	12		1	12		1	12		1	12		1	12		1
BP	2																					
Chevron	6							1			1			1			1			1		
ExxonMobil	14	6	2		6	2		6	2		6	2		6	2		6	2		6	2	
Inpex	4	1	1		1	1		1	2		1	2		1	2		1	2		1	2	
Santos	14	6	1		6	1		6	2		6	1		6	2		6	2		6	2	
Shell	16		1	11			11	1	1	11	1	1	11	1	1	11	1	1	12	1	1	12
Viva	6	3	1	1	3	1	1	3	1	1	3	1	1	3	0	1	3		1	3		1
Woodside	10	2	3		2	3		2	3		2	3		2	3		2	3		2	4	
Weekly Total	**101**	**32**	**17**	**19**	**32**	**16**	**19**	**34**	**19**	**19**	**34**	**18**	**19**	**34**	**18**	**19**	**34**	**18**	**20**	**34**	**19**	**20**

Company	Total CG members	15-Feb			16-Feb			17-Feb			18-Feb			19-Feb			20-Feb			21-Feb		
		Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual
AMOSC	16	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6
Ampol	13	12		1	12		1	12		1	12		1	12		1	12		1	12		1
BP	2																					
Chevron	6	1			1			1			1			1			1			1		
ExxonMobil	14	5	2		5	2		5	2		5	2		5	2		5	2		5	1	
Inpex	4		2			3			3			3			3			3			3	
Santos	14	6	2		6	2		6	2		6	1		6	2		6	2		6	2	
Shell	16	1	1	12	1	1	12	1	1	12	1	1	12	1	1	12	1	1	13	1	1	13
Viva	6	3		1	3	1	1	3		1	3	1	1	3	1	1	3	1	1	3	1	1
Woodside	10	2	4		2	4		2	4		2	4		2	4		2	4		2	4	
Weekly Total	**101**	**32**	**19**	**20**	**32**	**21**	**20**	**32**	**20**	**20**	**32**	**20**	**20**	**32**	**21**	**20**	**32**	**21**	**21**	**32**	**20**	**21**

Company	Total CG members	22-Feb			23-Feb			24-Feb			25-Feb			26-Feb			27-Feb			28-Feb		
		Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual	Ops	Man	Dual
AMOSC	16	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6	2	8	6
Ampol	13	12		1	12		1	12		1	12		1	12		1	12		1	12		1
BP	2																					
Chevron	6	1			1			1			1			1			1			1		
ExxonMobil	14	5	1		5	1		5	1		5			6			6	1		6	1	
Inpex	4		3			2			2			2			2			2			2	
Santos	14	7	2		7	2		7	2		7	2		7	2		7	2		7	2	
Shell	16	1	1	13	1	1	13	1	1	13	1	1	13	1	1	13	1	1	13	1	1	13
Viva	6	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1
Woodside	10	2	4		2	4		2	4		2	4		2	4		2	4		2	4	
Weekly Total	**101**	**34**	**21**	**21**	**34**	**20**	**21**	**34**	**20**	**21**	**34**	**19**	**21**	**35**	**19**	**21**	**35**	**20**	**21**	**35**	**20**	**21**

Company	Total CG members	29-Feb		
		Ops	Man	Dual
AMOSC	16	2	8	6
Ampol	13	12		1
BP	2			
Chevron	6	1		
ExxonMobil	14	6	2	
Inpex	4		2	
Santos	14	7	2	
Shell	16	1	1	13
Viva	6	4	2	1
Woodside	10	2	4	
Weekly Total	**101**	**35**	**21**	**21**

Trained operators	**Ops**
Trained IMT Support	**Man**
Trained in both areas	**Dual**

Australian Marine Oil Spill Centre 01/02/2024

Appendix D-2 AMOSC Equipment

Product Totals by Location Report

Friday, 2 February 2024
8:31:02 AM

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
Altona North						
8	8		G-604	Dispersant-Slickgone NS	Dispersant	Bay 0
67	67		G-605	Dispersant-Slickgone NS	Dispersant	Bay 0
62	62		G-606	Dispersant-Corexit 9500	Dispersant	Bay 0, Outside Warehouse
Broome						
2	2		G-033	Dispersant Spray-Afedo System 200-TS	Dispersant Spray Equipment	Supply Base 3
1	1		G-041	Power Pack-Lamor Hydraulic LPP 14	Power Packs, Pumps & Accessories	Supply Base 3
1	1		G-052	Skimmer-Minimax 12-Brush	Skimmer	Supply Base 3
2	2	400	G-092	Boom-Lamor HDB 1300 (200m)on Reel	Boom	Supply Base 3
4	4	100	G-110	Boom-Beach Guardian Shoreseal (20m)	Boom	Supply Base 3
8	8	200	G-111	Boom-Zoom Boom (25m)	Boom	Supply Base 3
1	1		G-130	Boom Accessories-Beach Guardian Deployment Kit	Boom Accessories	Supply Base 3
4	4		G-133	Boom Accessories-Zoom Boom Anchor Kit	Boom Accessories	Supply Base 3
1	1		G-141	Waste (Land)-Vikotank (13000Ltr)	Waste Storage	Supply Base 3
12	12		G-150	Sorbent-Boom	Sorbents	Supply Base 3
3	3		G-151	Sorbent-Squares	Sorbents	Supply Base 3
3	3		G-184	Shipping Container	General	Supply Base 3
1	1		G-330	Wildlife-Oiled fauna kit	Decontamination	Supply Base 3
1	1		G-331	Decontamination-Kit (PPE)	Decontamination	Supply Base 3
1	1		G-500	Response tool box	General	Supply Base 3
14	14		G-607	Dispersant-Ardrox 6120	Dispersant	DG Shed
Exmouth						
1	1		G-030	Dispersant Spray-Viko Spray	Dispersant Spray Equipment	Harold Holt
1	1		G-033	Dispersant Spray-Afedo Ecospray 80W	Dispersant Spray Equipment	Harold Holt
1	1		G-040	Power Pack-Desmi Ro-Boom	Power Packs, Pumps & Accessories	Harold Holt
1	1		G-051	Skimmer-Komara 12K-Disc	Skimmer	Harold Holt
1	1		G-052	Skimmer-Minimax 12-Brush	Skimmer	Harold Holt
1	1		G-054	Skimmer-Passive-Weir	Skimmer	Harold Holt
1	1		G-070	Skimmer-Ro-Vac-Vacuum	Skimmer	Harold Holt

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
1	1		G-079	Skimmer-Desmi GT 185-Brush/Weir	Skimmer	Harold Holt
2	2		G-090	Hydraulic Powered reel Winder- Roboom	Boom Accessories	Harold Holt
2	2	400	G-091	Boom-Desmi Ro-Boom 1500 (200m)	Boom	Harold Holt
20	20	500	G-110	Boom-Beach Guardian Shoreseal (20m)	Boom	Harold Holt
20	20	500	G-111	Boom-Zoom Boom (25m)	Boom	Harold Holt
3	3		G-130	Boom Accessories-Beach Guardian Deployment Kit	Boom Accessories	Harold Holt
1	1		G-132	Boom Accessories-Shoreline Boom Anchoring kit	Boom Accessories	Harold Holt
10	10		G-133	Boom Accessories-Zoom Boom Anchor Kit	Boom Accessories	Harold Holt
2	2		G-140	Waste (Land)-Fastank Temporary Storage (9000Ltr)	Waste Storage	Harold Holt
1	1		G-160	Skimmer-Desmi Ro Mop 240-Oil Mop	Skimmer	Harold Holt
1	1		G-181	Trailer-General Support	Trailer	Harold Holt
2	2		G-184	Shipping Container	General	Harold Holt
10	10		G-186	Shoreline Accessories-Wheelbarrow	General	Harold Holt
1	1		G-260	Genarator-Hatz 15kva (12kw)	Trailer	Harold Holt
1	1		G-330	Wildlife-Oiled fauna kit	Decontamination	Harold Holt
1	1		G-335	Decontamination-Kit (PPE)	Decontamination	Harold Holt
1	1		G-336	Decontamination-Kit Locker	Decontamination	Harold Holt
1	1		G-337	Shoreline Accessories-Hand Tool Accessories Cage	General	Harold Holt
30	30		G-604	Dispersant-Slickgone NS	Dispersant	Harold Holt
45	45		G-605	Dispersant-Slickgone NS	Dispersant	Harold Holt
1	1		G-610	Dispersant-Agitator	General	Harold Holt
1	1		G-888	Miscellaneous Items	General	Harold Holt
Fremantle						
1	1		G-029	Dispersant Spray-Boom Vane (Containerised)	Dispersant Spray Equipment	Outside Warehouse
1	1		G-030	Dispersant Spray-Viko Spray	Dispersant Spray Equipment	
1	1		G-032	Dispersant Spray-Transfer Pump	Dispersant Spray Equipment	ABM Container
5	5		G-033	Dispersant Spray-Afedo System 100-TS	Dispersant Spray Equipment	Outside Warehouse
1	1		G-034	Dispersant Spray-Global Boat Spray	Dispersant Spray Equipment	Outside Warehouse
1	1		G-035	Pump-Lamor GTA 30 Oil Transfer	Power Packs, Pumps & Accessories	2D
4	4		G-037	Pump-Honda GX-160 Water (2")	Power Packs, Pumps & Accessories	Outside Warehouse
5	5		G-039	Boom Accessories-Air Blower-2 Stroke	General	Outside Warehouse
1	1		G-040	Power Pack-Desmi Ro-Boom	Power Packs, Pumps & Accessories	4B

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
3	3		G-042	Power Pack-Lamor Hydraulic LPP 36	Power Packs, Pumps & Accessories	12, 13, 14
1	1		G-043	Power Pack-Lamor Hydraulic LPP 7	Power Packs, Pumps & Accessories	
1	1		G-044	Boom Accessories-Lamor Control Stand for LPP36	Power Packs, Pumps & Accessories	2A
3	3		G-045	Boom Accessories-Lamor Air Blower-Hydraulic	General	12, 13, 14
1	1		G-051	Skimmer-Komara 12K-Disc	Skimmer	3B, 3E
2	2		G-052	Skimmer-Minimax 12-Brush	Skimmer	2C, 2F, 2B, 2E
1	1		G-053	Skimmer-Komara 20K-Disc	Skimmer	3C, 3F
1	1		G-054	Skimmer-Passive-Weir	Skimmer	4C, 4F
2	2		G-060	Skimmer-Lamor Rock Cleaner-Brush	General	1C, 1F, 1B, 1E
3	3		G-081	Skimmer-Lamor LWS500-Brush/Weir	Skimmer	12, 13, 14
6	6		G-090	Hydraulic Powered reel Winder- Roboom	Boom Accessories	14, 13, 12
6	6	1200	G-091	Boom-Desmi Ro-Boom 1500 (200m)	Boom	14, 13, 12
1	1	36	G-093	Boom-Lamor HDB 1500 (100m)	Boom	Bay A
19	19	475	G-110	Boom-Beach Guardian Shoreseal (20m)	Boom	Outside Warehouse
34	34	850	G-111	Boom-Zoom Boom (25m)	Boom	4 A/D, Outside Warehouse, Bay L
18	18	540	G-112	Boom-Lamor SFB-18 GP Solid Floatation (30m)	Boom	Outside Warehouse
2	2		G-130	Boom Accessories-Beach Guardian Deployment Kit	Boom Accessories	4E
3	3		G-131	Boom Accessories-Ro-Boom Anchoring System	Boom Accessories	12, 13, 14
28	28		G-133	Boom Accessories-Zoom Boom Anchor Kit	Boom Accessories	Outside Warehouse
1	1		G-139	Waste (Land)-Fastank Temporary Storage (3000Ltr)	Waste Storage	Outside Warehouse
1	1		G-140	Waste (Land)-Fastank Temporary Storage (9000Ltr)	Waste Storage	Outside Warehouse
2	2		G-142	Waste (On-Water)-Lancer Storage Barge (25000Ltr)	Waste Storage	Outside Warehouse
3	3		G-143	Waste (On-Water)-Deck Bladder Storage (25000Ltr)	Waste Storage	Outside Warehouse
4	4		G-144	Waste (Land)-Lamor TemporaryStorage (11400Ltr)	Waste Storage	Outside Warehouse
1	1		G-161	Skimmer-Desmi Ro Mop 260-Oil Mop	Skimmer	Warehouse 2
2	2		G-172	Forklift - Crown 2.5 Tonne	Vehicle	Warehouse, Fremantle Warehouse
1	1		G-180	Trailer-Mobile Workshop	Trailer	Warehouse 3
2	2		G-181	Trailer-Tandem (Galvanised)	Trailer	Outside Warehouse
5	5		G-183	Aluminium Container	General	Outside Warehouse
8	7		G-184	Shipping Container	General	Outside Warehouse
4	4		G-188	Monitoring/Surveillance-Voyager Drift Buoy	Communications	Bay 1A
1	1		G-199	Wildlife-Bird Scarer	Wildlife Support	1D

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
1	1		G-200	Vessel-Zodiac Pro 500 (4.7Mtr)	Vessel	Warehouse
1	1		G-251	PPE- Inflatable PFD Set of 24	General	12 C/F
3	3		G-259	Generator	General	Warehouse, Wildlife Container, ABM Container
1	1		G-262	Decontamination-Vehicle Washdown Trailer	Trailer	Warehouse 2
1	1		G-325	Wildlife-Fauna Hazing & Exclusion Kit	Wildlife Support	
3	3		G-326	Wildlife-Fauna Hazing & Exclusion Kit	Wildlife Support	Warehouse
1	1		G-332	Wildlife-Washdown Container	Wildlife Support	Outside Warehouse
1	1		G-333	Shoreline-Support Kit	General	3A
1	1		G-334	Shoreline-Flushing Kit (3")	Power Packs, Pumps & Accessories	3D
1	1		G-336	Decontamination-Kit Locker	Decontamination	7 C/F
1	1		G-339	PPE-PPE Response Container (SCFU 1114735)	General	Outside Warehouse
1	1		G-350	Airbase Management Container	Misc	
1	1		G-610	Dispersant-Agitator	General	Warehouse
1	1		G-700	Monitoring/Surveillance-Phantom 4 Drone	General	Head Office
1	1		G-750	Monitoring/Surveillance-Aerial Surveillance Kit	General	Head Office
1	1		G-755	Backpack-Response Backpacks	General	
2	2		G-808	Monitoring/Surveillance-4-1 Personnal Gas Monitor	General	Warehouse
1	1		G-809	Monitoring/Surveillance-Air Quality Monitoring Kit	Misc	Head Office
4	4		G-850	Ancilliaries box 1	General	Outside Warehouse
4	4		G-851	Ancilliaries Box 2	General	Outside Warehouse
2	2		G-889	Oil sampling kit	General	Outside Warehouse
3	3		G-890	Sorbent-Boom	Sorbents	Outside Warehouse
3	3		G-891	Sorbent-Squares	Sorbents	Outside Warehouse
1	1		G-950	AMOSC Vehicles	Vehicle	Warehouse
1	1		G-960	Vehicle-ATV- CF Moto u550 (1GQM058)	Vehicle	Warehouse

Nth Geelong

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
1	1		G-029	Dispersant Spray-Boom Vane (Containerised)	Dispersant Spray Equipment	Outside Warehouse
2	2		G-030	Dispersant Spray-Viko Spray	Dispersant Spray Equipment	Bay D
1	1		G-032	Dispersant Spray-Transfer Pump	Dispersant Spray Equipment	ABM Container
4	4		G-033	Dispersant Spray-Afedo System 100-TS	Dispersant Spray Equipment	Outside Warehouse, Bay D
1	1		G-035	Pump-Lamor GTA 30 Oil Transfer	Power Packs, Pumps & Accessories	Bay P
1	1		G-040	Power Pack-Desmi Ro-Boom	Power Packs, Pumps & Accessories	Bay A

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
3	3		G-042	Power Pack-Lamor Hydraulic LPP 36	Power Packs, Pumps & Accessories	Bay A, Container G-184-20 (STS)
1	1		G-044	Boom Accessories-Lamor Control Stand for LPP36	Power Packs, Pumps & Accessories	Bay K
3	3		G-045	Boom Accessories-Lamor Air Blower-Hydraulic	General	Bay A
1	1		G-046	Boom Accessories - Magnetic Boom Anchoring Kit	Boom Accessories	Bay M
2	2		G-050	Skimmer-Komara 30K-Disc	Skimmer	Bay J
2	2		G-051	Skimmer-Komara 12K-Disc	Skimmer	Bay J
1	1		G-052	Skimmer-Minimax 12-Brush- STS	Skimmer	Bay G
1	1		G-054	Skimmer-Passive-Weir	Skimmer	Bay K
2	2		G-060	Skimmer-Lamor Rock Cleaner-Brush	General	Bay O
3	3		G-070	Skimmer-Ro-Vac-Vacuum	Skimmer	Bay P
1	1		G-079	Skimmer-Desmi GT 185-Brush/Weir	Skimmer	Bay C
1	1		G-080	Skimmer-Desmi 250-Weir	Skimmer	Outside Warehouse
3	3		G-081	Skimmer- Lamor LWS500-Brush/Weir	Skimmer	Bay A, Container G-184-02 (STS)
1	1		G-083	Skimmer-Canadyne Multi Head-Brush/Disc/Drum	Skimmer	Bay K
1	1		G-084	Skimmer-Versatech Multi Head-Brush/Disc/Drum	Skimmer	Bay C
12	12		G-090	Hydraulic Powered reel Winder- Roboom	Boom Accessories	Bay A
10	10	2000	G-091	Boom-Desmi Ro-Boom 1500 (200m)	Boom	Bay A
2	2	72	G-093	Boom-Lamor HDB 1500 (100m) on reel	Boom	Bay A
5	5		G-094	Boom Accessories - Ro-Boom Ancillaries Cage	Boom Accessories	Bay A
1	1		G-095	Boom Accessories - Lamor HDB 1500 Ancillaries Cage	Boom Accessories	Bay A
131	131	3275	G-110	Boom-Beach Guardian Shoreseal (20m)	Boom	Bay L, Training Trailer
126	126	3150	G-111	Boom-Zoom Boom (25m)	Boom	Bay L, Training Trailer, Outside Warehouse
40	40	1200	G-112	Boom-Lamor SFB-18 GP Solid Floatation (30m)	Boom	Outside Warehouse, Bay L, Training Trailer
1	1		G-113	Boom System- NOFI Current Buster 2	Boom	Container G-184-20 (STS)
1	1		G-114	Boom System-Desmi Speed Sweep	Boom	Bay E
3	3		G-120	Pump-General Purpose Diaphragm (3")	Power Packs, Pumps & Accessories	Bay P
1	1		G-121	Pump-Desmi DOP 250 Transfer	Power Packs, Pumps & Accessories	Bay P
8	8		G-130	Boom Accessories-Beach Guardian Deployment Kit	Boom Accessories	Training Trailer, Bay M
3	3		G-131	Boom Accessories-Ro-Boom Anchoring System	Boom Accessories	Bay A
4	4		G-132	Boom Accessories-Shoreline Boom Anchoring kit	Boom Accessories	Bay M
29	29		G-133	Boom Accessories-Zoom Boom Anchor Kit	Boom Accessories	Training Trailer, Bay K
1	1		G-139	Waste (Land)-Fastank Temporary Storage (3000Ltr)	Waste Storage	Bay M

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
3	3		G-140	Waste (Land)-Fastank Temporary Storage (9000Ltr)	Waste Storage	Training Trailer, Bay M
1	1		G-141	Waste (Land)-Vikotank (13000Ltr)	Waste Storage	Bay M
2	2		G-142	Waste (On-Water)-Lancer Storage Barge (25000Ltr)	Waste Storage	Bay F, Container G-184-20 (STS)
3	3		G-143	Waste (On-Water)-Deck Bladder Storage (25000Ltr)	Waste Storage	Bay G
65	65		G-150	Sorbent-Boom	Sorbents	Bay N
40	40		G-151	Sorbent-Squares	Sorbents	Bay N
96	96		G-152	Sorbent-Viscous Oil Snares	Sorbents	Bay N
11	11		G-153	Sorbent-Roll	Sorbents	Bay N
1	1		G-160	Skimmer-Desmi Ro Mop 240-Oil Mop	Skimmer	Trailer Bay
1	1		G-161	Skimmer-Desmi Ro Mop 260-Oil Mop	Skimmer	Trailer Bay
1	1		G-162	Vessel-Egmopol Barge w/t Brush Skimmer-AMOSC 1	Skimmer	Warehouse
2	2		G-172	Forklift-Hyster 2 Tonne	Vehicle	Warehouse
1	1		G-180	Decontamination-Decon Support Trailer	Trailer	Trailer Bay
3	3		G-181	Trailer-General Support	Trailer	Trailer Bay
1	1		G-182	Trailer-Egmopol	Trailer	Warehouse
1	1		G-183	Aluminium Container	General	
13	13		G-184	Shipping Container	Misc	Outside Warehouse, Dispersant Area
18	18		G-185	Waste (Land/Onwater)-IBC	Waste Storage	North Wall
2	2		G-187	IBC Lifting Frame	Misc	STS Cage
4	4		G-188	Monitoring/Surveillance-Voyager Drift Buoy	Communications	
1	1		G-201	Vessel-Aluminium Catamaran (9Mtr)AMOSC 3	Vessel	Warehouse
1	1		G-251	PPE- Inflatable PFD Set of 32	General	Warehouse
4	4		G-259	Generator	General	Bay, Wildlife Container, ABM Container
1	1		G-260	Cleaning-Generator/Karcher Pressure Washer Unit	Trailer	Trailer Bay
1	1		G-261	Shoreline-Flushing Kit (4")	General	Bay O
1	1		G-262	Decontamination-Vehicle Washdown Trailer	Trailer	Trailer Bay
2	2		G-263	Cleaning-Diesel Pressure Washer	Power Packs, Pumps & Accessories	Bay O
1	1		G-325	Wildlife-Fauna Hazing & Exclusion Kit	Wildlife Support	
2	2		G-330	Wildlife-Oiled fauna kit	Decontamination	Bay H
1	1		G-332	Wildlife-Washdown Container	Wildlife Support	Outside Warehouse
1	1		G-334	Shoreline-Flushing Kit (3")	Power Packs, Pumps & Accessories	Bay O
1	1		G-335	Decontamination-PPE Kit (First Strike Support)	Decontamination	Bay I

Quantity	Available	Length	Product#	Product Name	Product Category	Bay Location
1	1		G-336	Decontamination-Kit Locker	Decontamination	Bay I
1	1		G-338	Shoreline-Impact Lance Kit	Power Packs, Pumps & Accessories	Bay O
1	1		G-339	PPE-PPE Response Container (TCIU 1962281)	General	Outside Warehouse
1	1		G-350	Airbase Management Container	Misc	Outside Warehouse
1	1		G-500	Response tool box	General	Warehouse Store
1	1		G-610	Dispersant-Agitator	General	Dispersant
2	2		G-700	Monitoring/Surveillance-DJI Spark	General	Head Office
1	1		G-750	Monitoring/Surveillance-Aerial Surveillance Kit	General	Head Office
2	2		G-755	Backpack-Response Backpacks	General	Head Office
1	1		G-760	Dispersant-Effectiveness Field Test Kit	Dispersant	Head Office
1	1		G-770	Monitoring/Surveillance-Shoreline Surveillance Kit	Misc	Head Office
6	3		G-808	Monitoring/Surveillance-4-1 Personnal Gas Monitor	General	Warehouse
1	1		G-889	Oil sampling kit	General	Outside warehouse
2	2		G-890	Sorbent-Boom	Sorbents	Outside warehouse
2	2		G-891	Sorbent-Squares	Sorbents	Outside warehouse
3	3		G-950	AMOSC Vehicles	Vehicle	Warehouse
1	1		G-960	Vehicle-ATV- CF Moto u550	Vehicle	Warehouse
Welshpool						
8	8		G-605	Dispersant-Slickgone NS	Dispersant	Outside Warehouse, Dispersant Area
27	27		G-606	Dispersant-Corexit 9500	Dispersant	Outside Warehouse, Dispersant Area

Appendix D-3 AMOSC Mutual Aid Equipment

Industry Mutual Aid Equipment Register Updated - December 2023

Company	Equipment	Type	Units	State	Location
Ampol as of December 2023					
Ampol	Absorbent, Boom	Rubberiser Boom	200 m	Queensland	Lytton Refinery
Ampol	Boom, Nearshore	GP 800 Fence Boom	180 m	Queensland	Lytton Refinery
Ampol	Shoreline Cleanup equipment	Oil Spill shed	1 unit	Queensland	Lytton Refinery
Ampol	Vessel	4.75 mtr Aluminium Runner about "Jabiru"	1 unit	Queensland	Lytton Refinery
Ampol	Vessel	5.7 litre multicruiser "Mimi"	1 unit	Queensland	Lytton Refinery
Ampol	Vessel	135hp Honda "Ocean Cruiser"	1 unit	Queensland	Lytton Refinery
Ampol	Skimmer, Multi Head	Versatech Multi Skimmer, Brush, drum, disc with all hydraulic hoses, oil transfer hose and diesel Hydraulic power pack deliver FIS	1 Unit	Queensland	Lytton Refinery
Ampol	Boom, Nearshore	Zoom Boom	150m	Queensland	Lytton Refinery
Ampol	Vessel	Seamac (Punt)	1 units	Queensland	Lytton Refinery
Ampol	Boom, OnShore	Beach guardian	7 units	Queensland	Lytton Refinery
Ampol	Boom, OnShore	Anchor Kits	15 units	Queensland	Lytton Refinery
CHEVRON as of December 2023					
Chevron	Boom, OnShore	AirBlower	1	Western Australia	BWI
Chevron	Temporary Storage	Canflex Open Top, Floating Collar Tank	1	Western Australia	BWI
Chevron	Boom, Nearshore	Current Buster 2 (plus air blower)	1	Western Australia	BWI
Chevron	Boom, Nearshore	Current buster 6 with boom vane (plus 2 x air blowers)	1	Western Australia	BWI
Chevron	Power Pack	Desmi Skimmer Power Pack/ Skimmer Hose Reel	3	Western Australia	BWI
Chevron	Shoreline Cleanup equipment	Diesel Powered Water pump for low pressure flushing system	2	Western Australia	BWI
Chevron	Temporary Storage	Fastank 2000	4	Western Australia	BWI
Chevron	Tracking Buoys	iSphere tracking buoy	1	Western Australia	BWI
Chevron	Skimmer, Weir	Mini-Max Weir Skimmer Set	2	Western Australia	BWI
Chevron	Boom, Nearshore	NOFI Solid Floatation Boom Bags 350 EP	2	Western Australia	BWI
Chevron	Boom, Nearshore	NOFI towable boom bag	2	Western Australia	BWI
Chevron	Boom, Nearshore	Self-Inflating Zoom Boom	7	Western Australia	BWI
Chevron	Boom, Nearshore	Self-Inflating Zoom Boom	10	Western Australia	BWI
Chevron	Power Pack	Spate pump	2	Western Australia	BWI
Chevron	Skimmer, Brush	Terminator Skimmer	3	Western Australia	BWI
Chevron	Boom, Nearshore	Tidal Boom 500 (Shore sealing boom)	6	Western Australia	BWI
Chevron	Temporary Storage	Towable bladder canflex	2	Western Australia	BWI
Chevron	Dispersant, Spray Systems	AFEDO nozzles spray system	1	Western Australia	Ashbuton North
Chevron	Dispersant	Slickgone EW dispersant	5m3	Western Australia	Ashbuton North
Chevron	Power Pack	Spate pump	2	Western Australia	Ashbuton North
Chevron	Tracking Buoys	iSphere tracking buoy	1	Western Australia	Ashbuton North
Chevron	Temporary Storage	Towable bladder (Canflex Series 1 'Sea Slug')	1	Western Australia	Ashbuton North
Chevron	Temporary Storage	Fastank 2000	1	Western Australia	Ashbuton North
Chevron	Boom, Nearshore	Self-Inflating Zooom Boom	6 (38 in store)	Western Australia	Ashbuton North
Chevron	Boom, Nearshore	Current Buster 2 in 10ft container	1	Western Australia	Ashbuton North
Chevron	Skimmer, Brush	Terminator in 10ft container	1	Western Australia	Ashbuton North
Chevron	Skimmer, Vacumm	Manta Ray skimmer	2	Western Australia	Ashbuton North
Chevron	Boom, Nearshore	NOFI Boom Bag 350EP	1	Western Australia	Ashbuton North
Chevron	Skimmer, Brush	Terminator	1	Western Australia	Karratha
Chevron	Boom, Offshore	Norlense NO-1000-R	300 1	Western Australia	BWI
Chevron	Boom, Offshore	Norlense NO-1000-R	300 1	Western Australia	BWI
Chevron	Dispersant, Spray Systems	AFEDO nozzles spray system	1	Western Australia	Karratha
Chevron	Dispersant	Slickgone EW dispersant	5m3	Western Australia	Karratha
Chevron	Boom, Nearshore	Current Buster 4 with boom vane	1	Western Australia	Karratha
ESSO as of December 2023					
Esso	Temporary Storage	Aluminium Skips (3m x 2m x 600mm High)	12 unit	Victoria	LIP
Esso	Vessel	Sperm Whale for nearshore response. (F.Y.I. to transport this vessel a tilt tray or Semi would be required & is potentially oversized load due to width of vessel and cradle)	1	Victoria	BBMT
Esso	Dispersant, Spray Systems	AFEDO dispersant spray systems	2	Victoria	BBMT
Esso	Dispersant	Corexit 9500	30 m3	Victoria	BBMT
Esso	Boom, Nearshore	Expandi 3000 Harbour Boom	300m	Victoria	BBMT
Esso	Boom, Nearshore	Sea Sentinel (Can be used Offshore, ASTM connectors)	2000m	Victoria	LIP
Esso	Trailer	Beach/shoreline cleanup trailers	x4	Victoria	LIP x 2, BBMT x 1, Sale x 1
Esso	Trailer	Decontamination Trailer	x1	Victoria	LIP
Esso	Dispersant, Spray Systems	Vikospray Dispersant System, Boat Spray Booms (pressure wands) & pump	X1	Victoria	LIP
Esso	Boom, Nearshore	Shoreboom	750m	Victoria	LIP
Inpex as of December 2023					
INPEX	Boom, Nearshore	400m zoom-boom in deployment trailer, plus ancillaries, (towing bridles, ship hull magnets, 6 x anchor kits etc)	1	Northern Territory	Bhagwan Darwin Marine Logistics Base – East Arm (Darwin Harbour)
INPEX	Skimmer, Weir	Desmi Termite Weir Skimmer (with brush skimmer adaptor)	1	Northern Territory	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Skimmer, Weir	(Skimmer) Action Hydraulics Power Pack and ancillaries (hydraulic hoses etc)	1	Northern Territory	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Temporary Storage	25m3 towable oil storage bladder	2	Northern Territory	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Oil Transfer Equipment	Desmi DOP 200 Offloading Pump	1	Northern Territory	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Oil Transfer Equipment	20m oil transfer hoses on reel	1	Northern Territory	ASCO Marine Supply Base – East Arm (Darwin Harbour)
INPEX	Dispersant	IsoTank 8000Lt Dasic Slick Gone NS Dispersant (MSDS attached)	2	Western Australia	Ichthys Venturer FPSO – Ichthys Field
INPEX	Dispersant, Spray Systems	AFEDO Spray System	1	Western Australia	Ichthys Venturer FPSO – Ichthys Field

INPEX	Tracking Buoys	RPS MetOcean Drifter (ARGOS satellite system)	10	Northern Territory Western Australia	Darwin (INPEX Offshore Logistics Base) Broome (INPEX Drilling Logistics Base) Ichthys Field (CPF, FPSO and various vessels)
Jadestone as of December 2023					
Jadestone	Boom, Offshore	Offshore Boom Lamor 1200 - 200m	2	Northern Territory	Darwin
Jadestone	Skimmer, Brush	Brush Skimmer Minimax 12 W/S	2	Northern Territory	Darwin
Jadestone	Temporary Storage	11 Te. Collapsible Storage Tank	4	Northern Territory	Darwin
Jadestone	Temporary Storage	50 Te. Deck Tank	2	Northern Territory	Darwin
Jadestone	Dispersant	Dasic Slickgone NS Dispersant (1000lt IBC)	6m3	Northern Territory	Darwin
Jadestone	Dispersant, Spray Systems	AFEDO 100D Dispersant Spray System	1	Northern Territory	Darwin
Jadestone	Tracking Buoys	iSphere Tracking Buoy	3	Northern Territory	Darwin
Jadestone	Dispersant, Spray Systems	Dispersant Spray System (Kohler Arms spray system)	2	Northern Territory	Darwin
Jadestone	Skimmer, Wier	Lamor LWS500 Wier Skimmer	1	Northern Territory	Darwin
Jadestone	Absorbent, Boom	3M T270 4x 3m booms/bag	22	Northern Territory	Darwin
Jadestone	Absorbent, Pad	HP 156 - 50pk	9	Northern Territory	Darwin
Jadestone	Dispersant	Dasic Slickgone NS Dispersant (1000lt IBC)	5m3	Northern Territory	Darwin
Jadestone	Pumps, Transfer	Spate 75c Dispersant Transfer Pump	1	Northern Territory	Darwin
Jadestone	Tenporary Storage	Empty IBC's	0	Northern Territory	Darwin
SANTOS WA & SA as of December 2023					
Santos WA	Absorbent, Boom	Boom, 3metre x 180mm	120 metres	Western Australia	Exmouth
Santos WA	Absorbent, Boom	Boom, 3metre x 180mm	144 metres	Western Australia	Varanus Island
Santos WA	Absorbent, Roll	Roll,40mx1.1m	280 metres	Western Australia	Varanus Island
Santos WA	Boom, Nearshore	Zoom Boom	200 metre	Western Australia	Varanus Island
Santos WA	Boom, Nearshore	Zoom Boom	125 metre	Western Australia	Exmouth
Santos WA	Boom, Nearshore	Harbo T-Fence Boom	25 metre	Western Australia	Varanus Island
Santos WA	Boom, Offshore	Expandi self-inflating boom – 2 x 200 m vertical bundles	400 metre	Western Australia	Exmouth
Santos WA	Boom, Offshore	Power pack for Expandi Self-inflating Boom	1 unit	Western Australia	Exmouth
Santos WA	Boom, Offshore	Roto Cassette Retrieval Reel for Expandi Self-inflating Boom	2 unit	Western Australia	Exmouth
Santos WA	Boom, Offshore	Expandi self-inflating boom – 1 x 200 m vertical bundles	200 metre	Western Australia	Varanus Island
Santos WA	Boom, Offshore	Roto Cassette Retrieval Reel for Expandi Self-inflating Boom	1 Unit	Western Australia	Varanus Island
Santos WA	Boom, Offshore	Current Buster 4	1 Unit	Western Australia	Varanus Island
Santos WA	Boom, OnShore	Beach Guardian Boom	100 metre	Western Australia	Varanus Island
Santos WA	Boom, OnShore	Beach Guardian, Deployment Kit	1 unit	Western Australia	Varanus Island
Santos WA	Boom, OnShore	Beach Guardian Boom	50 metre	Western Australia	Exmouth
Santos WA	Dispersant, Spray Systems	Double AFEDO Head Spray System	2 unit	Western Australia	Exmouth
Santos WA	Dispersant, Spray Systems	Double Arm Spray System	1 unit	Western Australia	Exmouth
Santos WA	Dispersant, Spray Systems	Single Arm Spray System	1 unit	Western Australia	Exmouth
Santos WA	Dispersant, Spray Systems	4 x Lance Head Spray System	1 unit	Western Australia	Exmouth
Santos WA	Dispersant, Spray Systems	Double Arm Spray System	1 unit	Western Australia	Exmouth
Santos WA	Shoreline Clean-up	Shoreline Clean-up Kit (W/barrows,Shovels,Brooms,Squeegy, sorbents)	1 unit	Western Australia	Varanus Island
Santos WA	Skimmer, Oleophilic/Brush	Skimmer, Disc and brush, Desmi DBD 16, incl. hoses and powerpack	1 unit	Western Australia	Exmouth
Santos WA	Skimmer, Oleophilic/Brush	Skimmer, Disc and brush, Desmi DBD 16, incl. hoses and powerpack	1 unit	Western Australia	Varanus Island
Santos WA	Tracking Buoys	Fastwave	6 unit	Western Australia	Dampier
Santos WA	Tracking Buoys	Fastwave	2 unit	Western Australia	Exmouth
Santos WA	Tracking Buoys	Fastwave	2 unit	Western Australia	Ningaloo Vision
Santos WA	Tracking Buoys	Fastwave	2 unit	Western Australia	FSO - Bayu Undan
Santos WA	Tracking Buoys	Fastwave	4 unit	Northern Territory	Darwin
Santos WA	Tracking Buoys	Fastwave	2 unit	Northern Territory	MS-1 Rig (Barossa)
Santos WA	Tracking Buoys	Fastwave	4 unit	Western Australia	Varanus Island
Santos WA	Rapid Assessment	Rapid Assessment Team Kit	2 unit	Western Australia	Varanus Island
Santos WA	Rapid Assessment	Rapid Assessment Team Kit	1 unit	Western Australia	Exmouth
Santos WA	Rapid Assessment	Rapid Assessment Team Kit	2 unit	Northern Territory	Darwin
Santos WA	Vessel	28'Aluminium Response Vessel "Monte Belle"	1 unit	Western Australia	Varanus Island
Santos SA	Vessel	6 Mtr Stabi Craft with 135 HP Outboard	1 unit	South Australia	Port Bonython
Santos SA	Vessel	4.08 Mtr Alocraft Sprint, Aluminium Open Boat 20hp Outboard	1 unit	South Australia	Port Bonython
Santos SA	Boom, Nearshore	Solid Floatation Boom	165m	South Australia	Port Bonython
Santos SA	Tracking Buoys	Fastwave	2 unit	South Australia	Port Bonython
Santos SA	Rapid Assessment	Rapid Assessment Team Kit	2 unit	South Australia	Port Bonython
Santos SA	Shoreline Clean-up	Shoreline Clean-up Kit (Trailarised for rapid site control)	1 unit	South Australia	Port Bonython
Viva Energy as of December 2023					
Viva	Boom, OnShore	Beach Guardian, 25 metre	150m	Victoria	Geelong
Viva	Boom, Nearshore	Zoom Boom, 25 metre	200m	Victoria	Geelong
Viva	Boom, Nearshore	Fence Boom, 500mm, 20 metre	Nil	Victoria	Geelong
Viva	Boom, Nearshore	Fence Boom, 600mm, 20 metre	160m	Victoria	Geelong
Viva	Temporary Storage	10,000 Fastank	2 units	Victoria	Geelong
Viva	Skimmer, Oleophilic	Disc, 12k Komara	1 unit	Victoria	Geelong
Viva	Skimmer, Vacumm	Manta Ray Head	1 unit	Victoria	Geelong
Viva	Boom, OnShore	Beach Guardian, Deployment Kit	1 unit	Victoria	Geelong

WOODSIDE as of December 2023					
Woodside	Boom, Onshore	Fence Boom	150m	Western Australia	King Bay Supply Facility
Woodside	Boom, Onshore	Lamor Shore Seal	200m	Western Australia	King Bay Supply Facility
Woodside	Boom, Onshore	Shore Guardian, 20 metre	160m	Western Australia	King Bay Supply Facility
Woodside	Boom, (Curtin on reel)	Curtain Boom, 30 metre lengths	300m	Western Australia	King Bay Supply Facility
Woodside	Boom, Nearshore	Zoom Boom, 25 metre	175m	Western Australia	King Bay Supply Facility
Woodside	Boom, Nearshore	Zoom Boom, 50 metre	200m	Western Australia	King Bay Supply Facility
Woodside	Boom, Nearshore	Lamor inflatable Boom	250m	Western Australia	King Bay Supply Facility
Woodside	Boom, Offshore	Offshore Boom on reel 200m per reel	400m	Western Australia	King Bay Supply Facility
Woodside	Skimmer, Vacuum	Delta Ray Head	2 units	Western Australia	King Bay Supply Facility
Woodside	Skimmer, Weir	Dragon Fly Weir Skimmer	1 unit	Western Australia	King Bay Supply Facility
Woodside	Skimmer, Weir	Global 30m3/hr Weir Skimmer	1 unit	Western Australia	King Bay Supply Facility
Woodside	Skimmer	Lamor 12 - Multi Skimmer	1 unit	Western Australia	King Bay Supply Facility
Woodside	Boom, Nearshore	Anchoring Systems	21 units	Western Australia	King Bay Supply Facility
Woodside	Shoreline Clean-up	Spades, Rakes, Some PPE etc.	multiple units	Western Australia	King Bay Supply Facility
Woodside	Shoreline Clean-up	Decontamination Kit	2 unit	Western Australia	King Bay Supply Facility
Woodside	Temporary Storage	Lamor storage tanks (like fast tanks) 7000L	2 units	Western Australia	King Bay Supply Facility
Woodside	Dispersant	Slickgone NS	1m3 on each vessel (2x OSV's)	Western Australia	King Bay Supply Facility / Exmouth, Supply Vessels
Woodside	Dispersant	Slickgone NS	5m3	Western Australia	King Bay Supply Facility
Woodside	Dispersant, Spray Systems	AFEDO Set	1 unit	Western Australia	Exmouth
Woodside	Dispersant, Spray Systems	AFEDO Set	1 unit	Western Australia	King Bay Supply Facility
Woodside	Gas monitors	Auto Rea	x6	Western Australia	Karratha Gas Plant
Woodside	Dispersant, Spray Systems	Auspray Dispersant system ASDS	1	Western Australia	Pyrenees FPSO
Woodside	Dispersant, Spray Systems	Auspray Dispersant system ASDS	1	Western Australia	King Bay Supply Facility
Woodside	Dispersant	Corexit 9527	1.2 m3	Western Australia	Pyrenees FPSO

Appendix D-4 AMOSC OWR Capacity Statement

AMOSC
Australian Marine
Oil Spill Centre Pty Ltd

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8 February 2024

Oiled Wildlife Response Capacity Statement

The Australian Marine Oil Spill Centre (AMOSC) is based in Geelong, Victoria, with a second office in Fremantle, Western Australia. AMOSC is an Oil & Gas industry-based organisation specialising in the provision of oil spill preparedness (including strategic advice, training, exercising and equipment maintenance) and 24/7 response readiness. An important component of AMOSC's capability is to provide technical advice, equipment, personnel and strategies when encountering wildlife during an oil spill incident in the marine environment.

AMOSC has been assisting members to develop their Oiled Wildlife Response (OWR) capability since 2012. This assistance has been based on strong cross-institutional relationships which AMOSC has developed with state/territorial and federal Government agencies, and national and international wildlife response organisations.

AMOSC has been involved in the coordination, development and delivery of OWR training for industry since 2012 in collaboration with Massey University (NZ) and the Department of Biodiversity, Conservation and Attractions in WA.

Since 2014 AMOSC has represented industry on the National Oiled Wildlife Working Group in addition to establishing the Industry Oiled wildlife Working Group to coordinate best practice within industry.

The current OWR capacity is detailed in the Tables below.

Oiled Wildlife Response Plan Status:

State	Plan	Status

WA	WA Oiled Wildlife Response	• WA Oiled Wildlife Response Plan (2022)
		• WA OWR Manual (2022)
		• Regional Plans
		    • Pilbara Region Plan - 2014 – approved
		    • Kimberley Region Plan – 2019 approved as a working document
		    • Swan Region Plan - 2019 – approved as a working document
		    • South Coast - BP OWR Plan – approved as a working document
		https://www.dbca.wa.gov.au/wildlife-and-ecosystems/marine/marine-wildlife-response-oiled-wildlife-response

NT	Northern Territory OWR Plan NT OWR Strategic Plan	• 2019 – Joint Shell, Inpex and CoP Industry developed Response Plan • In development

SA	South Australia OWR Plan	• Endorsed by Department of Planning Transport and Infrastructure (DPTI) 2019
		• Regional Plans (2017):
		    − Adelaide and Mount Lofty Ranges
		    − Alinytjara Wilurara and Eyre Peninsula
		    − Kangaroo Island
		    − Northern and Yorke
		    − SA Murray-Darling Basin
		    − South East Region
		https://www.environment.sa.gov.au/topics/plants-and-animals/animal-welfare/oiled-wildlife-response-plan

QLD	QLD OWR Plan	• Wildlife Response Plan for Maritime Environmental Emergencies 2021

AMOSC
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Vic	Wildlife All Emergencies Oiled Wildlife Response Plan	• Victorian Emergency Animal Welfare Plan - October 2019 • Draft in development
Tas	Oiled Wildlife Response Plan	• Tasmanian Oiled Wildlife Response Plan 2006 (in review)
NSW	Oiled Wildlife Response Plan	• Various SOP's 2012 (in Review)

Equipment:

Item	**Location – Responsible Party**

OWR Containers
*Requested through the National Plan
	• AMOSC
	  ○ Fremantle
	  ○ Geelong
	• *AMSA
	  ○ WA - Karratha - light industrial area
	  ○ NT - Darwin
	  ○ Tas – Devonport
	  ○ QLD - Townsville
	• *DoT – WA – Fremantle - AMOSC Warehouse
	• *DoT – NSW – Sydney

Other equipment	• 2 x fauna hazing and exclusion kits (Geelong and Fremantle) • 4 x OWR kits (Fremantle, Geelong, Broome, Exmouth) • *2 x DBCA OWR trailers (Kensington and Karratha)

Personnel:

	AMOSC trained personnel	**availability**
AMOSC Industry Personnel Wildlife Care Groups	2 pax trained OWR personnel 62 trained industry personnel – minimum introductory level • 35 introductory trained personnel • 24 completed Management course • 16 completed Responder course	1 (12hr) ~10 (24hr) TBC
(24HR)	**State and National Response Teams**	
State and National Response Teams	Precise numbers to be determined but indicate between 50-100 available through the National Plan.	~10 (24hr) TBC
	Contractual	
Dwyertech	2 pax personnel in NZ responding within 24hrs (call of contract)	2 (24hr)
	Supporting Organisations Nationally	
	Victoria	
Phillip Island Nature Park - VIC	~ 50 PINP staff – collection/facility ops/rehabilitation ~ 45 volunteers – collection/facility ops/rehabilitation ~ 20 staff – animal feeding 6 x PINP staff - wildlife emergency response Inc. cetacean stranding/entanglement etc. 17 x PINP staff - wildlife team leaders 5 x PINP staff - IMT training	~ 10 (24hr)
	Western Australia	
Blue Planet Marine - WA	10 – 20 personnel - Best endeavours to respond	~4 (24hr)
WA Seabird Rescue - WA	No permanent staff ~30 volunteers	
WA Native Animal Rescue **Wangara** avifauna and mammals	5 staff ~80 volunteers	~10 (24hr)

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Broome Marine turtles		
WA Wildlife	10 staff ~80 volunteers	~10 (24hr)
Darling Range Wildlife	5 staff ~50 volunteers	~5 (24hrs)
Mandurah Wildlife	5 staff ~30 volunteers	~5 (24hrs)
	South Australia	
Zoo's South Australia	20 staff ~30-40 volunteers	~10 (24hr) TBC
SA Veterinary Emergency Management - SAVEM	5 staff	
RSPCA - SA	Staff Volunteers unknown	
Australian Marine Wildlife Research and Rescue Organisation AMWRO	5 staff ~30 volunteers	
	International support - specialist advice, support – planning, preparedness and response	
AMSA		
OSRL **GOWRS** **Sea alarm**	**Support for members** **4 personnel from the GOWRS network for advice in country** **2 personnel for support**	
University of California - Davis	Best endeavours to respond Personnel TBC	~1 (72hr)
International Bird Rescue – West US	Best Endeavours to respond - 4 OW Response personnel	~ 4 (72hr)
Tri State – East US/Canada	Best Endeavours to respond - 4 OW Response personnel	~ 4 (72hr)
SANCOB – South Africa	Best Endeavours to respond - 4 OW Response personnel	~ 4 (72hr)
Massey University	Best Endeavours to respond - 4-6 OW Response personnel	~4 (48 hr)

Training Courses

Course	2015	2016	2017	2018	2019	2020	2021	2022	2023
Animal handling									
Animal Rehabilitation									
Intro to OWR	DBCA	DBCA	DBCA	DBCA	AMOSC	AMOSC	AMOSC	AMOSC	AMOSC
OWR Management	Mass Uni	DBCA	DBCA	DBCA			AMOSC	AMOSC	AMOSC
OWR Field Responders		DBCA	DBCA	DBCA					
Facilities Masterclass		AMOSC			AMOSC				

Exercises Attended:

Year	Exercise

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2023	SpillCon – Brisbane - 11-15 Sept DoT – WA State Exercise Roebuck Challenge – Broome WA - 16-20 Oct AMSA – National Ex – Hobart Tasmania – November 13 – 17 Nov
2022	AMOSC - Zephyr – Dampier - 22-26 August AMSA – October – National Ex Vic, Geelong
2021	Champion Challenge – Geraldton – WA State Exercise NSW -
2019	Dampier Challenge – Dampier – WA State Exercise SpillCon – Perth – Container masterclass ex
2018	Amity Challenge – Albany – WA State Exercise
2017	Ningaloo Challenge – Exmouth – WA State Exercise
2016	Beadon – Onslow – WA State Exercise Bunker Oil – Phillip Island – Vic State Exercise SpillCon – Perth – Container masterclass ex
2015	Westwind – Exmouth – National/Industry Exercise
2014	Penguino – Phillip Island - PINP

Appendix D-5 OSRL Capability

EOG is an Associate member with OSRL which guarantees access to Tier 3 technical advice, resources and expertise 365 days a year on a 24-hours a day.

The table below summarises the OSRL's SLA available to EOG. Further details can be found in the service-level-agreement_v18.pdf (oilspillresponse.com) on OSRL's website.

Table: OSRL Service Level Agreement summary

<table>
<tr><th>Service</th><th>OSRL Service Information</th></tr>
<tr><td>Response notification, mobilisation, service and advice</td><td>Members can call OSRL's Duty Manager on any of the response hotline numbers listed below to notify of incidents:
<table>
<tr><th></th><th>Telephone Number</th></tr>
<tr><td>EMEA (Europe Africa Middle East)</td><td>+44-2380-331551</td></tr>
<tr><td>APAC (Asia Pacific)</td><td>+65-6266-1566</td></tr>
<tr><td>AMER (Americas)</td><td>+1-954-983-9880</td></tr>
</table>
The call will be initially routed to a Duty Manager in an appropriate working-hours time zone who will either take the call directly or will call back within 10 minutes. Once contact has been made, further details will be collected to agree a response strategy.</td></tr>
<tr><td>Spill response equipment</td><td>SLA response equipment is housed in secure facilities in Singapore, UK, Bahrain and USA, customs cleared where required, and ready for deployment.

EOG is responsible for ensuring the clearance of equipment into the country and the payment of all associated duties, importations costs etc.

A complete list of equipment can be downloaded from OSRL's website at http s://www.oilspillresponse.com/services/member-response-services/equipment-list/.

As per the SLA, EOG can mobilise up to 50% of the global stockpile by type available at the time of request. Equipment will be mobilised from the most appropriate location to provide the most timely and effective response.</td></tr>
<tr><td>SLA dispersant stockpile</td><td>If there is an incident, EOG is entitled to 50% of the SLA dispersant stockpile located in Southampton, Singapore, Fort Lauderdale and Bahrain. OSRL may be able to obtain further dispersant through the Global Response Network (GRN) and other organisations, if required.</td></tr>
<tr><td>Global aerial dispersant</td><td>
<table>
<tr><th>Aircraft Type</th><th>Location</th><th>Dispersant Capacity</th><th>Mobilisation time</th><th>Range</th></tr>
<tr><td>C-130A Hercules</td><td>Singapore</td><td>13,000 litres</td><td>6 hours</td><td>2000 nm in 8 hours</td></tr>
<tr><td>Boeing 727</td><td>UK, Doncaster</td><td>15,000 litres</td><td>4 hours</td><td>970 nm in 6 hours</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>World-wide transportation of equipment</td><td>Logistics support through OSRL includes:
Access to global cargo network via contracted broker for aircraft of opportunity, vessels, and road transport.
Access to aircraft of opportunity for passenger charter services through a contracted broker</td></tr>
<tr><td rowspan="3">Oil spill trajectory and tracking</td><td>3D and 2D modelling available on request providing trajectory and backtrack modelling.</td></tr>
<tr><td>Access to global satellite imagery through an agreement with OSRL’s dedicated satellite provider MDA.</td></tr>
<tr><td>Access to unmanned aerial vehicles (UAV’s) through strategic partnerships.</td></tr>
<tr><td>Oiled Wildlife Advice</td><td>Access to expert oiled wildlife advice via OSRL’s contracted provider Sea Alarm Foundation (SAF). Two oiled wildlife response technical advisors are on call to support OSRL Members with one person in-field or at the Command Post and the second supporting remotely.

Furthermore, through OSRL’s ongoing funding of the Global Oiled Wildlife Response System (GOWRS) Project, a wildlife assessment team of four wildlife experts can be mobilised in-field in addition to the Sea Alarm resources noted above. There is also access to additional oiled wildlife resources on a ‘reasonable endeavours’ only basis through the GOWRS partners. The GOWRS project comprises ten well-respected international wildlife rescue and rehabilitation organisations working to common Good Practice standards.</td></tr>
<tr><td rowspan="2">Response Personnel</td><td>Technical Advisors (TAs) can be deployed to support EOG during an actual or potential oil spill incident. The first 5 response personnel (Technical Advisors) are free of charge for the first five days. If these personnel are retained after the free (5 day) period, a signed Mobilisation form will be required, and these personnel will form part of the 18 person SLA entitlement and the normal OSRL daily charges will apply.</td></tr>
<tr><td>As per the SLA, EOG has guaranteed access to a team of 18 oil spill response personnel. This team of 18 is chosen with the most appropriate competence and experience as determined by EOG requirements. Personnel are on standby and available 24 hours a day, 365 days a year.

The skill set of the team will be determined by the specifics of the incident and requirements.

Typical initial roles of the team include:
Technical advice and incident management coaching within the command centre
Development of an Incident Management Plan
Tier 1 / 2 equipment readiness and training of contractors
In-country logistics planning and support for inbound equipment
Impact assessment and advice on response strategy selection
SCAT and aerial surveillance / quantification surveys
Tactical response planning</td></tr>
</table>

	In a prolonged incident, if EOG determines that more support from OSRL is required, this may be approved on a case-by-case basis. OSRL maintains a minimum pool of 80 dedicated response staff but can also draw from suitably experienced and qualified personnel in other roles throughout the business. If additional staff are provided, it is on the condition that they may be recalled by OSRL in needed for a further incident response.

Oil Spill Response Duty Team Equipment Availability Report

The attached audit equipment report is to be used for guidance purposes only

Year Book/Cost Sheet Desc	DM Report Ref	Quantity on January 2023 Cost Sheet	Difference from DM Report	Response Ready (TOTAL OF ALL BASES)	Out of Service	Spill Use	Other	% Available	Total Quantity	AVAILABLE TO USE	Available Last Month	Difference	Response Ready	Out of Service	Spill Use	Other	% Available	Total Quantity	AVAILABLE TO USE	Response Ready	Out of Service	Spill Use	Other	% Available	Total Quantity	AVAILABLE TO USE	Response Ready	Out of Service	Spill Use	Other	% Available	Total Quantity	AVAILABLE TO USE	Response Ready	Out of Service	Spill Use	Other	% Available	Total Quantity	AVAILABLE TO USE
DISPERSANT APPLICATION																																								
Neat Sweep dispersant boom system	Section 01-010 Neatsweep	3	0	2	1	0	0	67%	3	2	2	◀0	1	0	0	0	100%	1	1	1	1	0	0	50%	2	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Boat Spray sets for use as vessel mounted Type 3 dispersant application system	Section 01-020 Boat Spray	30	2	21	0	5	2	75%	28	21	23	▼-2	7	0	3	2	58%	12	7	8	0	0	0	100%	8	8	2	0	2	0	50%	4	2	4	0	0	0	100%	4	4
Boat Spray 200 sets	Section 01-025 Boat Spray 200	0	-2	2	0	0	0	100%	2	2	2	◀0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Fluorometer for dispersant application analysis (Spill Response Specialist required)	Section 01-030 Fluorometer	7	0	2	3	1	1	29%	7	2	2	◀0	0	2	1	1	0%	4	0	1	1	0	0	50%	2	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Dispersant effectiveness test Kit	Section 01-054 Effectiveness kit	11	0	5	1	2	3	45%	11	5	5	◀0	4	0	0	0	100%	4	4	0	0	0	3	0%	3	0	0	0	2	0	0%	2	0	1	1	0	0	50%	2	1
Oil Sampling Kit	Section 01-056 Oil Sampling Kit	4	1	2	1	0	0	67%	3	2	2	◀0	1	1	0	0	50%	2	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
Aircraft Systems				**TOTALS**									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**						
Underslung helicopter mounted spray system (150-240 gallons) (helicopter not included)*	Section 02-030 Helicopter Spray	6	0	6	0	0	0	100%	6	6	6	◀0	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0
Inshore Boom				**TOTALS**									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**						
Air/Skirt boom 10 metres air/skirt for coastal areas	Section 03-010 Airskirt Boom 10m*	240	5	217	1	14	3	92%	235	217	213	▲4	92	0	2	3	95%	97	92	64	0	0	0	100%	64	64	22	0	12	0	65%	34	22	39	1	0	0	98%	40	39
Air/Skirt boom 20 metres air/skirt for coastal areas	Section 03-020 Airskirt Boom 20m*	690	5	629	5	34	17	92%	685	629	586	▲43	245	1	19	16	87%	281	245	198	3	0	1	98%	202	198	80	0	15	0	84%	95	80	106	1	0	0	99%	107	106
Air/Skirt boom 200 metres on reel with power pack for coastal area	Section 03-030 Airskirt Boom 200m*	4	0	4	0	0	0	100%	4	4	3	▲1	0	0	0	0	0%	0	0	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Beach Sealing boom 10 metres	Section 03-040 Beach Sealing Boom 10m*	161	-2	127	24	10	2	78%	163	127	112	▲15	22	0	2	2	85%	26	22	45	7	0	0	87%	52	45	29	17	8	0	54%	54	29	31	0	0	0	100%	31	31
Beach Sealing boom 15 metres	Section 03-050 Beach Sealing Boom 15m*	65	0	39	0	0	26	60%	65	39	39	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	39	0	0	26	60%	65	39
Beach Sealing boom 20 metres	Section 03-060 Beach Sealing Boom 20m*	125	11	85	6	14	9	75%	114	85	77	▲8	37	2	6	9	69%	54	37	32	1	0	0	97%	33	32	1	3	8	0	8%	12	1	15	0	0	0	100%	15	15

Troil Boom GP 750 (20 metres) (price per 20 metres)	Section 03-070 Troil Boom 20m	4	0	4	0	0	0	100%	4	4	4	◄0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0
Troil Boom GP 1100 (25 metres) (price per 25 metres)	Section 03-080 Troil Boom 25m	22	0	22	0	0	0	100%	22	22	22	◄0	0	0	0	0	0%	0	0	22	0	0	0	100%	22	22	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Supermax - Rigid boom in 25 metres sections	Section 03-090 Supermax Rigid Boom 25m	26	0	26	0	0	0	100%	26	26	25	▲1	0	0	0	0	0%	0	0	26	0	0	0	100%	26	26	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Sea Curtain - Foam filled in 50 metres sections	Section 03-100 Sea Curtain 50m	12	0	6	0	6	0	50%	12	6	12	▼-6	0	0	0	0	0%	0	0	6	0	6	0	50%	12	6	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
River Boom 10" solid floatation in 10 metre sections	Section 03-110 River Boom 10inch x 10m	15	0	15	0	0	0	100%	15	15	15	◄0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	15	0	0	0	100%	15	15
River Boom 12" solid floatation in 15 metre sections	Section 03-120 River Boom 12inch x 15m	98	0	96	0	0	2	98%	98	96	97	▼-1	7	0	0	2	78%	9	7	9	0	0	0	100%	9	9	0	0	0	0	0%	0	0	80	0	0	0	100%	80	80
Nearshore boom 18" Solid floatation in 30 metres sections	Section 03-130 Nearshore Boom 18inch x 30m	60	1	59	0	0	0	100%	59	59	59	◄0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	59	0	0	0	100%	59	59
Nearshore boom 20" Solid floatation in 15 metres sections	Section 03-140 Nearshore Boom 20inch x 15m	140	0	140	0	0	0	100%	140	140	140	◄0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	140	0	0	0	100%	140	140
Nearshore boom 24" Solid floatation in 30 metres sections	Section 03-150 Nearshore Boom 24inch x 30m*	59	33	26	0	0	0	100%	26	26	26	◄0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2	24	0	0	0	100%	24	24
BOOM ANCILLARIES				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Inshore Boom Going Away Box	Section 04-010 Air & water pump support box	80	0	67	3	5	5	84%	80	67	64	▲3	23	2	3	3	74%	31	23	19	1	0	0	95%	20	19	12	0	2	0	86%	14	12	13	0	0	2	87%	15	13
Boom Vane Small - boom deployment unit	Section 04-020 Boom Vane - Small	8	0	6	0	1	1	75%	8	6	7	▼-1	1	0	1	1	33%	3	1	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Boom Vane Medium - boom deployment unit	Section 04-030 Boom Vane - Medium	3	0	1	0	1	1	33%	3	1	1	◄0	0	0	0	1	0%	1	0	0	0	0	0	0%	0	0	0	0	1	0	0%	1	0	1	0	0	0	100%	1	1
Boom Vane Large - boom deployment unit	Section 04-050 Boom Vane (1.5m)	10	1	8	0	0	1	89%	9	8	8	◄0	3	0	0	1	75%	4	3	2	0	0	0	100%	2	2	2	0	0	0	100%	2	2	1	0	0	0	100%	1	1
Boom Vane (Combination)	Section 04-040 Boom Vane - Combination	1	0	1	0	0	0	100%	1	1	1	◄0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
INSHORE RECOVERY SKIMMERS				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Diesel driven rope mop system OM 140 Capacity 3-5 tph	Section 05-020 Rope Mop OM140	19	2	15	1	0	1	88%	17	15	15	◄0	3	1	0	1	60%	5	3	5	0	0	0	100%	5	5	5	0	0	0	100%	5	5	2	0	0	0	100%	2	2
Cowen Weir Skimmer	Section 05-040 Cowen Weir	2	0	2	0	0	0	100%	2	2	2	◄0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
Komara 20k disc skimmer inc power pack	Section 05-050 Komara 20K	3	0	2	0	0	1	67%	3	2	2	◄0	0	0	0	1	0%	1	0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0
Komara 12k disc skimmer inc power pack	Section 05-060 Komara 12K	1	0	1	0	0	0	100%	1	1	1	◄0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0

Komara 7k disc skimmer inc power pack	Section 05-070 Komara 7K	18	0	14	1	2	1	78%	18	14	14	◀0	9	1	0	1	82%	11	9	2	0	0	0	100%	2	2	3	0	2	0	60%	5	3	0	0	0	0	0%	0	0
Elastec combi drum skimmer inc power pack	Section 05-080 Elastec Combi Drum	6	0	4	1	1	0	67%	6	4	4	◀0	0	1	1	0	0%	2	0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2
Elastec Magnum 100 skimmer c/w power pack	Section 05-090 Elastec Magnus 100	4	1	3	0	0	0	100%	3	3	3	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	3	0	0	0	100%	3	3
Vikoma Minivac vacuum system	Section 05-100 Vikoma Minivac	16	0	14	2	0	0	88%	16	14	13	▲1	3	2	0	0	60%	5	3	3	0	0	0	100%	3	3	4	0	0	0	100%	4	4	4	0	0	0	100%	4	4
Roclean Minivac vacuum system	Section 05-110 Roclean Minivac	9	0	9	0	0	0	100%	9	9	9	◀0	5	0	0	0	100%	5	5	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Powervac vacuum system	Section 05-115 Powervac	4	0	4	0	0	0	100%	4	4	4	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0
Delta Skimmer - w/o pump	Section 05-120 Delta/Manta Ray Skimmer	23	2	21	0	0	0	100%	21	21	21	◀0	3	0	0	0	100%	3	3	5	0	0	0	100%	5	5	0	0	0	0	0%	0	0	13	0	0	0	100%	13	13
Slickdisc MK-13 interchangeable skimmer brush / disc / weir c/w power pack	Section 05-130 Slickdisc MK-13	3	0	3	0	0	0	100%	3	3	3	◀0	0	0	0	0	0%	0	0	3	0	0	0	100%	3	3	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Aquaguard RBS-20 Drum/Brush Skimmer c/w power pack	Section 05-150 Aquaguard RBS-20	1	0	0	1	0	0	0%	1	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	1	0	0	0%	1	0
Aquaguard RBS-5 Drum/Brush Skimmer c/w power pack	Section 05-160 Aquaguard RBS-5	7	0	7	0	0	0	100%	7	7	7	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	7	0	0	0	100%	7	7
Desmi DBD5 Disc/drum skimmer c/w power pack	Section 05-170 Desmi DBD5	3	0	3	0	0	0	100%	3	3	3	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	3	0	0	0	100%	3	3
Desmi DBD13 Disc/Brush skimmer c/w power pack	Section 05-172 Desmi DBD13	7	1	5	0	1	0	83%	6	5	5	◀0	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0	1	0	1	0	50%	2	1	0	0	0	0	0%	0	0
Desmi DBD16 Disc/Brush skimmer c/w power pack	Section 05-174 Desmi DBD16	4	2	2	0	0	0	100%	2	2	2	◀0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Lamor Multimax Skimmer LAM50/3C	Section 05-175 Lamor Multimax Skimmer LAM50/3C	2	0	1	1	0	0	50%	2	1	1	◀0	1	1	0	0	50%	2	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Elastec TracVac system	Section 05-180 Elastec TracVac	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Vikoma Duplex skimmer c/w power pack	Section 05-190 Vikoma Duplex	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Lamor LWS 70 skimmer with brush attachment c/w power pack	Section 05-200 Lamor LWS 70	3	0	3	0	0	0	100%	3	3	3	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	3	0	0	0	100%	3	3
Minimax Weir Skimmer	Section 05-210 Minimax Weir	5	0	5	0	0	0	100%	5	5	5	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	5	0	0	0	100%	5	5
Skim Pak skimmer head	Section 05-230 Skim Pak	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2
Fastflo 25 Skimmer c/w inflatable boom	Section TBA	1	1	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0

INSHORE STORAGE EQUIPMENT				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Ro-tank storage - capacity 10 m³ / 2600 Us Gallons	Section 06-010 Ro-tank 10 m sq	6	0	4	0	0	2	67%	6	4	4	◀0	0	0	0	0	0%	0	0	4	0	0	2	67%	6	4	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Fastanks - capacity 10m³ / 2400 US Gallons	Section 06-030 Fastank 9 m sq	121	2	93	5	9	12	78%	119	93	101	▼-8	45	4	5	8	73%	62	45	21	0	0	2	91%	23	21	6	0	4	0	60%	10	6	21	1	0	2	88%	24	21
Fastank - capacity 5m³ / 1320 US Gallons	Section 06-040 Fastank 5 m sq	4	0	3	1	0	0	75%	4	3	2	▲1	3	1	0	0	75%	4	3	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Canflex floating collar tank- capacity 2000 US gallons	Section 06-060 Canflex 2000 US Gall	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2
Canflex floating collar tank- capacity 1000 US gallons	Section 06-070 Canflex 1000 US Gall	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2
Pit liner, 105000 US Gal, 398 T	Section 06-080 Pit Liner 105000 US Gall	3	0	3	0	0	0	100%	3	3	3	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	3	0	0	0	100%	3	3
OILED WILDLIFE RESPONSE PACKAGE				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Search and Rescue BHR	Section 07-010 Search & Rescue Pallet	2	2	0	0	0	0	0%	0	0	1	▼-1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Cleaning and rehabilitation	Section 07-030 Cleaning & Rehab Pallet Bottom	4	4	0	0	0	0	0%	0	0	1	▼-1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Wildlife Cleaning and Rehab Part 1	Section 07-050 Wildlife Cleaning & rehab Pt 1	1	-4	4	1	0	0	80%	5	4	2	▲2	1	1	0	0	50%	2	1	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1
Wildlife Cleaning and Rehab Part 2	Section 07-060 Wildlife Cleaning & rehab Pt 2	1	-3	3	1	0	0	75%	4	3	4	▼-1	1	1	0	0	50%	2	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Wildlife Cleaning and Rehab Medical	Section 07-070 Wildlife Cleaning and Rehab Medical	1	-2	2	1	0	0	67%	3	2	2	◀0	0	1	0	0	0%	1	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Wildlife Search and Rescue	Section 07-080 Wildlife Search and Rescue	1	-3	4	0	0	0	100%	4	4	3	▲1	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1
Wildlife Search and Rescue Medical	Section 07-090 Wildlife Search & Rescue Medical	1	-2	3	0	0	0	100%	3	3	3	◀0	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
VEHICLES													United Kingdom							Singapore							Bahrain							Fort ale						
6 wheel all terrain vehicle Ranger	Section 08-010 ATV Ranger	2	0	2	0	0	0	100%	2	2	2	◀0	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
6 wheel all terrain vehicle Sportsman	Section 08-012 ATV Sportsman	2	2	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
4 wheel drive all terrain vehicle JCB	Section 08-014 ATV JCB	2	0	2	0	0	0	100%	2	2	2	◀0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
John Deere Gator Utility vehicle c/w/ cargo trailer	Section 08-020 John Deere Utility	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2
Bob Cat	Section 08-030 Bob cat	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
VW Transporter (£0.45/mile)	Section 08-032 VW Transporter	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0

VW Crafter Van (£0.45/mile)	Section 08-034 VW Crafter Van	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Toyota Hi-Lux Double Cab Pickup	Section 08-066 Toyota Pickup	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
4x4 Vehicle	Section 08-050 4x4 Vehicle	3	0	3	0	0	0	100%	3	3	3	◀0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
F-150 pickup	Section 08-058 F150 pickup	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
F-250 pickup	Section 08-060 F250 diesel	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Isuzu Dmax pickup	Section 08-064 Isuzu pickup	1	1	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Trailer - Arctic/Semi (£0.50/mile)	Section 08-100 Trailer - Artic/Semi	10	1	8	0	0	1	89%	9	8	8	◀0	7	0	0	1	88%	8	7	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Tracked Barrow	Section 08-035 Tracked Barrow	5	1	4	0	0	0	100%	4	4	4	◀0	1	0	0	0	100%	1	1	2	0	0	0	100%	2	2	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
VESSELS - no crew & approximate sizes							**TOTALS**									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**			
2.4 metres - 2.9 metres inflatable + outboard	Section 09-010 2.4m - 2.9m Inflatable Boat	2	1	0	0	1	0	0%	1	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	1	0	0%	1	0	0	0	0	0	0%	0	0
3.1m - 4.2m inflatable + outboard	Section 09-020 3.1m - 4.2m Inflatable Boat	1	0	0	0	1	0	0%	1	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	1	0	0%	1	0	0	0	0	0	0%	0	0
Rigiflex Workboat + outboard - Tango's	Section 09-030 Rigiflex Workboat	4	0	2	2	0	0	50%	4	2	1	▲1	0	2	0	0	0%	2	0	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
4.7 metres inflatable Zodiac + Outboard Motor	Section 09-024 Zodiac	1	0	0	1	0	0	0%	1	0	0	◀0	0	1	0	0	0%	1	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
6.2 metres semi rigid + outboard	Section 09-050 6.2 metres semi rigid Sparrowhawk	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
7.3 metres rigid + outboard motor	Section 09-060 Rigid 24ft Hanko	1	1	0	0	0	0	0%	0	0	1	▼-1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
7.5 metres semi rigid + outboard	Section 09-070 7.5 metres semi rigid Tornado	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
8.1 metres Aluminium Landing Craft	Section 09-085 Arion Landing Craft	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Egmopol belt skimming barge system inc propulsion for sheltered waters	Section 09-110 Egmopol	1	1	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
VESSELS				**h crew and approximate sizes (These vessels are for regional use only) (excluding fuel)**																																				
20 metres EARL oil spill response vessels (in use only)	Section 10-010 EARL	1	1	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
OFFSHORE BOOM																																								
Roboom 200 metres Bay Boom, on reel without power pack	Section 11-010 Roboom 200m Bay Boom	36	2	22	3	4	5	65%	34	22	22	◀0	10	2	0	1	77%	13	10	8	1	0	2	73%	11	8	0	0	4	2	0%	6	0	4	0	0	0	100%	4	4
Hi Sprint rapid boom with reel (300 metres long without power pack)	Section 11-020 Hi Sprint	2	0	2	0	0	0	100%	2	2	2	◀0	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0

ACTIVE BOOM SYSTEMS				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Ro-skim system, tandem, 120tph skimmer, without power pack (can be used in conjunction with additional 200m boom on reel)	Section 12-010 Ro-Skim	3	0	1	1	0	1	33%	3	1	1	◀0	0	1	0	1	0%	2	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
2 pump weir boom capacity (120 tph) - for use in conjunction with Roboom units excluding power systems	Section 12-020 Weir Boom	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Norlense Oil Trawl	Section 12-025 Norlense Oil Trawl	4	0	4	0	0	0	100%	4	4	4	◀0	2	0	0	0	100%	2	2	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Nofi Current Buster 2	Section 12-030 Nofi Current Buster	7	0	5	1	1	0	71%	7	5	5	◀0	1	1	0	0	50%	2	1	2	0	0	0	100%	2	2	0	0	1	0	0%	1	0	2	0	0	0	100%	2	2
Current Buster 6 c/w reel & power pack	Section 12-040 Current Buster 6	8	0	7	0	0	1	88%	8	7	5	▲2	3	0	0	1	75%	4	3	2	0	0	0	100%	2	2	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1
Elastec Hydro Fire Boom 150 metres, c/w power pack & water pump	Section 13-010 Elastec Hydro Fire Boom 150m	4	0	4	0	0	0	100%	4	4	4	◀0	3	0	0	0	100%	3	3	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Elastec American Fireboom in 15-metre sections	Section 13-020 Elastec American Fireboom 15m	30	0	30	0	0	0	100%	30	30	30	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	30	0	0	0	100%	30	30
OFFSHORE RECOVERY SKIMMERS				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Komara 40k skimmer without power pack	Section 14-010 Komara 40k	6	0	6	0	0	0	100%	6	6	6	◀0	2	0	0	0	100%	2	2	2	0	0	0	100%	2	2	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0
Desmi DS 250 skimmer without power pack	Section 14-020 Desmi DS 250	2	2	0	0	0	0	0%	0	0	2	▼-2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Ro-Disc attachment for DS250	Section 14-030 Ro-Disc attachment	1	1	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
GT 185 weir skimmer without power pack	Section 14-040 GT185	3	0	3	0	0	0	100%	3	3	3	◀0	3	0	0	0	100%	3	3	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Termite weir skimmer without power pack	Section 14-050 Termite Weir Skimmer	19	0	14	0	5	0	74%	19	14	12	▲2	6	0	1	0	86%	7	6	6	0	0	0	100%	6	6	0	0	4	0	0%	4	0	2	0	0	0	100%	2	2
Termite Combi system brush / disc / weir without power pack	Section 14-060 Termite Combi System	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Terminator weir skimmer (with thrusters) without power pack	Section 14-070 Terminator Weir Skimmer	2	0	2	0	0	0	100%	2	2	2	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
Terminator combi system brush / disc / weir skimmer without power pack	Section 14-080 Terminator combi system	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Helix Skimmer Head (Attachment)	Section 14-090 Helix Skimmer Head Attachment	10	3	6	0	1	0	86%	7	6	5	▲1	1	0	0	0	100%	1	1	3	0	0	0	100%	3	3	0	0	1	0	0%	1	0	2	0	0	0	100%	2	2
Desmi Seamop c/w transfer pump	Section 14-130 Seamop	2	2	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
HEAVY OIL RECOVERY				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Giant Octopus skimmer c/w powerpack and crane	Section 15-010 Giant Octopus	2	0	2	0	0	0	100%	2	2	2	◀0	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0

Komara Star incl power pack	Section 15-020 Komara Star	6	0	5	0	0	1	83%	6	5	6	▼-1	1	0	0	1	50%	2	1	2	0	0	0	100%	2	2	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0
WP 130 drum skimmer without power pack	Section 15-030 WP 130 drum skimmer	2	1	0	0	0	1	0%	1	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	1	0%	1	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Rotodrum without power pack	Section 15-040 Rotodrum	2	0	2	0	0	0	100%	2	2	2	◀0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Sea Devil skimmer without power pack	Section 15-050 Sea Devil	8	1	7	0	0	0	100%	7	7	6	▲1	5	0	0	0	100%	5	5	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
Scantrawl System c/w boom	Section 15-080 Scan Trawl	1	-2	3	0	0	0	100%	3	3	3	◀0	1	0	0	0	100%	1	1	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Scantrawl Net charged at replacement cost once deployed	Section 15-100 Scan Trawl Bag	2	0	2	0	0	0	100%	2	2	2	◀0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Trawl Net System c/w boom	Section TBA	2	2	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Trawl Net charged at replacement cost once deployed	Section TBA	10	10	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
OFFSHORE STORAGE EQUIPMENT				**TOTALS**									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**						
Storage Barge - 50m³	Section 16-020 Storage barge 50m sq	14	0	14	0	0	0	100%	14	14	12	▲2	8	0	0	0	100%	8	8	4	0	0	0	100%	4	4	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0
Storage Barge - 25m³	Section 16-010 Storage Barge 25m sq	21	0	20	0	0	1	95%	21	20	18	▲2	6	0	0	1	86%	7	6	8	0	0	0	100%	8	8	2	0	0	0	100%	2	2	4	0	0	0	100%	4	4
Waste Containment Tank 10m³ / 2600 US Gallons	Section 16-050 Waste cont tank 10m sq	9	9	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Floating Storage Tank - 50m sq	Section TBA	1	1	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Floating Storage Tank - 25m sq	Section TBA	2	2	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
COMMUNICATIONS EQUIPMENT				**TOTALS**									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**						
Mobile base station	Section 17-070 Mobile base station	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
VHF Sky Masts	Section 17-100 VHF Sky Masts	3	2	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Iridium satellite phone	Section 17-110 Iridium satellite phone	7	1	6	0	0	0	100%	6	6	5	▲1	3	0	0	0	100%	3	3	2	0	0	0	100%	2	2	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
Inmarsat satellite phone	Section 17-120 Inmarsat satellite phone	2	2	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Imersat satellite phone for marine use	Section 17-130 Imersat satellite - marine	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1
BGAN Hughes Network Systems (HNS) 9202	Section 17-140 BGAN Hughes	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
BGAN Explorer 510	Section 17-151 BGAN Explorer 510	5	1	4	0	0	0	100%	4	4	4	◀0	1	0	0	0	100%	1	1	2	0	0	0	100%	2	2	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
BGAN Explorer 710	Section 17-155 BGAN Explorer 710	4	0	4	0	0	0	100%	4	4	4	◀0	1	0	0	0	100%	1	1	3	0	0	0	100%	3	3	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
OceanEye 100 (Aerostat)	Section 17-190 OceanEye 100	0	0	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
OceanEye 200 (Aerostat)	Section 17-200 OceanEye 200	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0

ANCILLARIES - Transfer Pumps				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Spate diaphragm pump 30 m3	Section 18-010 Spate diaphragm pump	46	5	35	3	0	3	85%	41	35	37	▼-2	5	3	0	3	45%	11	5	18	0	0	0	100%	18	18	5	0	0	0	100%	5	5	7	0	0	0	100%	7	7
Desmi DOP 160 pump without power pack	Section 18-020 Desmi DOP 160	18	0	14	0	3	1	78%	18	14	13	▲1	7	0	1	1	78%	9	7	4	0	0	0	100%	4	4	0	0	2	0	0%	2	0	3	0	0	0	100%	3	3
Desmi DOP 250 pump without power pack	Section 18-030 Desmi DOP 250	10	1	7	2	0	0	78%	9	7	8	▼-1	3	2	0	0	60%	5	3	4	0	0	0	100%	4	4	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Water injection flange for DOP pump	Section 18-040 Water injection flange	28	13	15	0	0	0	100%	15	15	15	◀0	8	0	0	0	100%	8	8	2	0	0	0	100%	2	2	4	0	0	0	100%	4	4	1	0	0	0	100%	1	1
Peristaltic pump	Section 18-050 Peristaltic Pump	9	0	9	0	0	0	100%	9	9	9	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	9	0	0	0	100%	9	9
Sala Roll Pump c/w power pack	Section 18-060 Sala Roll Pump	9	0	7	2	0	0	78%	9	7	7	◀0	3	0	0	0	100%	3	3	2	0	0	0	100%	2	2	0	2	0	0	0%	2	0	2	0	0	0	100%	2	2
Fire / washdown pump 2.5"	Section 18-070 Fire / washdown pump 2.5 inches	5	0	5	0	0	0	100%	5	5	5	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	5	0	0	0	100%	5	5
Shoreline Deluge / flushing System	Section 18-100 Shoreline Deluge/flushing	3	0	3	0	0	0	100%	3	3	3	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	3	0	0	0	100%	3	3
Hydraulic air fan for offshore booms	Section 18-110 Hydraulic Air Fan for offshore	39	0	32	1	4	2	82%	39	32	33	▼-1	9	1	1	2	69%	13	9	19	0	0	0	100%	19	19	0	0	3	0	0%	3	0	4	0	0	0	100%	4	4

ANCILLARIES - Power Packs & Generators				TOTALS									United Kingdom							Singapore							Bahrain							Fort ale						
Generator - 1Kw- 3Kw	Section 19-010 Generators Up to 3Kw	38	15	21	0	0	2	91%	23	21	22	▼-1	5	0	0	2	71%	7	5	6	0	0	0	100%	6	6	8	0	0	0	100%	8	8	2	0	0	0	100%	2	2
Coleman Generator 3.5Kw	Section 19-020 Coleman Generators 3.5Kw	9	0	9	0	0	0	100%	9	9	9	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	9	0	0	0	100%	9	9
Diesel Generator	Section 19-025 Diesel Generator	11	0	10	0	0	1	91%	11	10	10	◀0	0	0	0	1	0%	1	0	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	8	0	0	0	100%	8	8
GP10 power pack (7.4kw)	Section 19-030 GP10 power packs	1	0	0	1	0	0	0%	1	0	1	▼-1	0	1	0	0	0%	1	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
GP24 power pack (17.4kW	Section 19-035 GP24 power pack	2	0	2	0	0	0	100%	2	2	2	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2
GP30 power packs (21.9kw)	Section 19-040 GP30 power packs	5	0	2	0	2	1	40%	5	2	3	▼-1	2	0	0	1	67%	3	2	0	0	0	0	0%	0	0	0	0	2	0	0%	2	0	0	0	0	0	0%	0	0
Lamor 25 power pack (23kw)	Section 19-050 Lamor 25 power packs	10	0	9	1	0	0	90%	10	9	9	◀0	3	1	0	0	75%	4	3	6	0	0	0	100%	6	6	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Desmi power pack (25kw)	Section 19-060 Desmi Power Pack (25kw)	6	0	5	1	0	0	83%	6	5	5	◀0	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	3	1	0	0	75%	4	3

Desmi power pack (50 kw)	Section 19-090 Desmi power pack (50kw)	6	0	5	1	0	0	83%	6	5	5	◀0	0	0	0	0	0%	0	0	5	1	0	0	83%	6	5	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Multi purpose power pack (50kw) c/w air fan / lighting	Section 19-100 Multi purpose P/Pack (50kw) Winter	3	1	2	0	0	0	100%	2	2	0	▲2	0	0	0	0	0%	0	0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Tiger power pack (84kw)	Section 19-110 Tiger power pack	9	0	5	0	3	1	56%	9	5	6	▼-1	5	0	0	1	83%	6	5	0	0	0	0	0%	0	0	0	0	3	0	0%	3	0	0	0	0	0	0%	0	0
Vikoma power pack (80kw)	Section 19-120 Vikoma power packs	4	0	4	0	0	0	100%	4	4	4	◀0	2	0	0	0	100%	2	2	1	0	0	0	100%	1	1	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
Grizzly power pack (98 kw)	Section 19-130 Grizzly power pack	10	0	4	5	1	0	40%	10	4	4	◀0	2	2	0	0	50%	4	2	2	3	0	0	40%	5	2	0	0	1	0	0%	1	0	0	0	0	0	0%	0	0
ANCILLARIES - Site Safety & Clean-Up				**TOTALS**									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**						
Hydraulic Hose reels	Section 20-010 Hydraulic Hose Reels	35	-2	24	0	6	7	65%	37	24	25	▼-1	12	0	1	4	71%	17	12	5	0	0	3	63%	8	5	1	0	5	0	17%	6	1	6	0	0	0	100%	6	6
Hydraulic pressure washers (without power pack)	Section 20-020 Hydraulic pressure washers	13	0	11	0	2	0	85%	13	11	12	▼-1	5	0	0	0	100%	5	5	3	0	0	0	100%	3	3	3	0	2	0	60%	5	3	0	0	0	0	0%	0	0
Mobile diesel drive high pressure and temperature washer for sea water use (trailer mounted)	Section 20-030 Mobil pressure washer (trailer)	8	0	4	4	0	0	50%	8	4	5	▼-1	3	1	0	0	75%	4	3	1	3	0	0	25%	4	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
High pressure and temperature washer for freshwater use only	Section 20-050 Diesel pressure washer - freshwater	5	5	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Honda snow thrower tracked	Section 20-062 Snow Thrower	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Cat Scanner	Section 20-070 Cat Scanner	4	0	3	0	0	1	75%	4	3	4	▼-1	3	0	0	1	75%	4	3	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Signal Generator for Cat Scan	Section 20-075 Signal Generator	2	0	1	0	0	1	50%	2	1	2	▼-1	1	0	0	1	50%	2	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Powered floodlights	Section 20-080 Powered floodlights	1	0	1	0	0	0	100%	1	1	1	◀0	0	0	0	0	0%	0	0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Peli Lights	Section 20-090 Peli Lights	12	0	9	2	0	1	75%	12	9	9	◀0	2	0	0	1	67%	3	2	1	2	0	0	33%	3	1	3	0	0	0	100%	3	3	3	0	0	0	100%	3	3
Plug in Halogen light stands	Section 20-100 Plug in Halogen light stands	12	0	12	0	0	0	100%	12	12	12	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	12	0	0	0	100%	12	12
Prism light c/w generator	Section 20-110 Prism light	10	0	9	0	0	1	90%	10	9	9	◀0	1	0	0	1	50%	2	1	2	0	0	0	100%	2	2	2	0	0	0	100%	2	2	4	0	0	0	100%	4	4
Orimulsion Reflotation Device without power pack	Section 20-120 Orimulsion	1	0	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Multi RAE lite	Section 20-140 Multi Rae lite	21	-1	14	1	7	0	64%	22	14	11	▲3	5	0	3	0	63%	8	5	6	1	0	0	86%	7	6	0	0	4	0	0%	4	0	3	0	0	0	100%	3	3

Multi RAE Benzene	Section 20-142 Multi Rae Benzene	9	0	3	2	3	1	33%	9	3	3	◀0	1	0	2	1	25%	4	1	0	2	0	0	0%	2	0	0	0	1	0	0%	1	0	2	0	0	0	100%	2	2
Air Monitor Microdust Pro	Section 20-190 Air Monitor Microdust Pro or CEL-712	11	0	10	0	1	0	91%	11	10	10	◀0	10	0	1	0	91%	11	10	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Norlense Swift Tent	Section 20-200 Norlense Swift Tent	1	0	0	0	0	1	0%	1	0	0	◀0	0	0	0	1	0%	1	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Portable inflatable shelter	Section 20-210 Portable inflatable shelter	10	0	9	0	0	1	90%	10	9	9	◀0	5	0	0	1	83%	6	5	3	0	0	0	100%	3	3	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0
Field Command Post (Inflatable)	Section 20-220 Field Command Post (Inflatable)	4	0	4	0	0	0	100%	4	4	4	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	4	0	0	0	100%	4	4
OIL TRACKING				**TOTALS**									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**						
Oil Spill Tracking Buoy - I-Sphere	Section 21-010 Tracking Buoy iSphere	2	0	0	2	0	0	0%	2	0	0	◀0	0	2	0	0	0%	2	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
OSRL Duty Managers Report To be added to cost sheet																																								
Not currently on Cost Sheet	Section 22-120 Foilex		-1	0	0	0	1	0%	1	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	1	0%	1	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
These are Honda Water Pumps that are not on the cost sheet	Section 22-080 Water Pump	0	-7	6	0	0	1	86%	7	6	6	◀0	0	0	0	0	0%	0	0	2	0	0	1	67%	3	2	0	0	0	0	0%	0	0	4	0	0	0	100%	4	4
These are 4kw petrol generators in cold weather load	Section 22-130 Generator Petrol 4kw	1	-1	2	0	0	0	100%	2	2	2	◀0	2	0	0	0	100%	2	2	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
RoBoom 1500	Section 22-140 RoBoom	0	0	0	0	0	0	0%	0	0	0	◀0	0	0	0	0		0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Belt Attachment	Section 22-150 Belt Terminator	0	-1	0	1	0	0	0%	1	0	0	◀0	0	1	0	0		1	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
WATER QUALITY METER	Section 22-160 Water	0	0	0	0	0	0	0%	0	0		◀0	0	0	0	0		0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
OSRL Duty Managers Report - SLA Dispersant																																								
				TOTALS									**United Kingdom**							**Singapore**							**Bahrain**							**Fort ale**						
Corexit 9500 - IBC	Section 25-011 SLA Corexit 9500 - IBC	n/a	n/a	205	0	0	1	100%	206	205	194	▲11	57	0	0	0	100%	57	57	33	0	0	1	97%	34	33	0	0	0	0	0%	0	0	115	0	0	0	100%	115	115
Corexit 9500 - 300 gallon	Section 25-012 SLA Corexit 9500 - 330 gallon	n/a	n/a	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Corexit 9527 - IBC	Section 25-020 SLA Corexit 9527 - IBC	n/a	n/a	84	0	0	0	100%	84	84	84	◀0	0	0	0	0	0%	0	0	84	0	0	0	100%	84	84	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
FINASOL OSR52 - IBC	Section 25-030 SLA Finasol OSR52 - IBC	n/a	n/a	70	0	0	6	92%	76	70	70	◀0	25	0	0	6	81%	31	25	36	0	0	0	100%	36	36	9	0	0	0	100%	9	9	0	0	0	0	0%	0	0
Slickgone EW - IBC	Section 25-040 SLA Slickgone EW - IBC	n/a	n/a	68	0	0	0	100%	68	68	68	◀0	68	0	0	0	100%	68	68	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Slickgone LTSW - Barrel	Section 25-050 SLA Slickgone LTSW - Barrel	n/a	n/a	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0

Slickgone LTSW - IBC	Section 25-051 SLA LTSW - IBC	n/a	n/a	0	0	0	0	0%	0	0	0	◀0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Slickgone NS - ISO Tank 17000L	Section 25-060 SLA Slickgone NS - ISO tank 17000L	n/a	n/a	1	0	0	0	100%	1	1	1	◀0	1	0	0	0	100%	1	1	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0	0	0	0	0	0%	0	0
Slickgone NS - IBC	Section 25-061 SLA	n/a	n/a	207	0	130	0	61%	337	207	196	▲11	118	0	104	0	53%	222	118	89	0	0	0	100%	89	89	0	0	26	0	0%	26	0	0	0	0	0	0%	0	0

Appendix E Environmental Sensitivities

Table E.1 Criteria used to determine receptor sensitivity

Environmental Value	Low Sensitivity	Medium Sensitivity	High Sensitivity	Very High Sensitivity
Protected Fauna	Normal range for threatened migratory or marine species. Species present occasionally or as vagrants – no intersection with Biologically Important Areas (BIAs). Populations known to recover rapidly from disturbance. Benthic flora/fauna	Likely foraging, migration area for threatened species (reptiles, mammals) Known breeding/pupping, congregation, aggregation area/habitat for threatened species (fish) Known breeding/aggregation/foraging areas for listed migratory or marine species Species may be present at the time of activity Some susceptibility to oiling Population has medium-term recovery times Some intersection with BIAs Important site for endemic species	Known breeding/aggregation, inter-nesting area for threatened species (reptiles, mammals) Known breeding, nesting, aggregation areas for threatened species (birds) including important bird areas (IBA) Known to be present at the time of activity Known to be susceptible to oiling. Significant intersection of BIAs. Population has long recovery times	Critical Habitat to a species as defined in Protected Species Recovery Plans or on the EPBC Register of Critical Habitat
Protected Areas/Habitats	ESI1-6: Exposed rocky shores, man-made structures, rocky cliffs, wave-cut platforms in bedrock; exposed scarps and steep slopes in clay, sand and gravel beaches, exposed rip-rap structures (rapid recovery from oiling (~1 year or less) Identified sites of importance but no protected status (e.g., sites of conservation significance)	ESI 7-9: Exposed tidal flats, sheltered scarps and rocky shores; Sheltered Tidal Flats Seagrass Sub-tidal reefs Fish Habitat Protection Area Marine National Park (MNP)(Com) (Multiple Use (Blue Zone)) MNP (General Use) (State)	ESI10: Salt and brackish water marshes & mangroves Corals Inter-tidal Reef Nationally Important Wetlands MNP (Com) (Habitat Protection (Yellow Zone)) MNP (Special purpose) (State)	RAMSAR Wetlands MNP (Com) (Sanctuary - Green Zone) MNP/Sanctuary Area (State)
Economic/Commercial	Very low economic significance for the region (<$150k per km of coast) Tourism region key population centre (> 5% of state income from tourism) Port throughput < 10 M tonnes/annum Salt works seawater intakes, aquaculture seawater intakes and LNG seawater intake facilities State or Commonwealth-managed Commercial Fishery:<$100M	Low economic significance for the region ($150k-$500k per km of coast) Port throughput 11-100 M tonnes/annum Cooling water intakes for power stations Tourism region key population centre (> 10% of state income from tourism) Pearling Leases State or Commonwealth-managed Commercial Fishery: $101M-$500M	Some economic significance for the region $500k - $1.5M per km of coast) Port throughput 101-400 M tonnes/annum State or Commonwealth-managed Commercial Fishery: $500M-$1B	High economic significance for the region > $1.5M per km of coast) Reverse osmosis potable water intakes Port throughput >401M tonnes /annum State or Commonwealth-managed Commercial Fishery: >$1B
Cultural Heritage	Local indigenous Significance (Joint Management of Parks by Traditional Owners) Protected Shipwrecks and Maritime Archaeology	Commonwealth Heritage Places: Indigenous, Historic and Natural Heritage Places Commonwealth Maritime Cultural Heritage State Protected Heritage Places	National Heritage Places: Indigenous, Historic and Natural Heritage Places	World Heritage Areas
Social, amenity and recreation	Low to moderate local recreational use, community or amenity values	Regionally significant seasonal recreational use, community or amenity values	Regionally significant year-round recreational use, community or amenity values	Nationally significant seasonal and year-round recreational use, community or amenity values

Table E.2 Sensitivity of Environmental Receptors (CH – Cultural Heritage; T – Turtle; C – Crocodile; D – Dolphin; G – Dugong)

Location	Jurisdiction	Environmental Receptor	Marine Open Water	Cetaceans/Mammals	Reptiles	Seabirds	Shorebirds/Wetland Birds	Protected Sharks/Fish	Other Shark/Fish Species	Fish/Sharks	Crocodile Breeding Area	Corals/ Halimeda/ Sponges	Protected Area	Key Ecological Feature (KEF)	Critical Habitat for Turtles	BIA/Important Bird Area	Wetlands (incl. RAMSAR)	Banks/Shoals/Pinnacles	Estuaries Present	Mangroves	Saltmarsh	Seagrass & Macroalgae	Exposed Inter-tidal Flats	Sheltered Inter-tidal Flats	Sand Beach	Inter-tidal Coral Reef	Sub-tidal Reef	Exposed Rocky Shore/Cliffs	Aboriginal Cultural Heritage	Heritage Places	European Heritage/Shipwrecks	Pearling/Aquaculture	Commercial Fisheries	Oil & Gas	Tourism	Coastal Facilities	Recreational Fishing/Boating
OFFSHORE/ OFFSHORE ISLANDS	COM	AMP: Arnhem AMP (Depth 15-70 m)	✓	Y	Y	1							Y					Y											Y	✓			Y		Y		
		AMP: Joseph Bonaparte Gulf AMP (Depth 15-75 m)	✓	Y	Y			✓				Y	Y	Y	Y			Y								Y	Y		Y				✓		Y		
		AMP: Oceanic Shoals AMP (Depth 15-500 m)	✓	Y	✓T				✓			YS	Y	Y	2			Y									✓		Y				Y				
		AMP: Arafura AMP (Depth 15-500 m)	Y	Y	✓T	Y		3				✓S	Y	Y	4														Y				Y		Y		
		AMP: Kimberley AMP (Depth 15-800 m)	Y	5		6		Y	Y				Y	Y	7														Y		Y		Y		Y		
		AMP: Argo-Rowley Terrace AMP (Depth 220-6000m)	Y	8		9						✓	Y	Y													✓				Y		Y				
		AMP: Ashmore Reef AMP (Depth 15-500m)	✓	Y	✓T	10	Y		Y			Y	Y	Y	Y		Y					Y			Y	Y	Y		Y	Y					Y		
		AMP: Cartier Island AMP (Depth 15-500m)	✓	Y	✓T	Y	✓		Y			Y	Y	Y	Y										Y	Y	Y		Y		Y						
		AMP: Mermaid Reef AMP (Depth 15-500m)	Y	Y		Y			✓			✓	Y	Y		YB										Y	Y				Y				Y		
		AMP: Montebello AMP (Depth 15-150m)	Y	Y	✓	Y		11				Y	Y	Y	Y	YB										Y	✓				Y		Y		Y		
		KEF: Carbonate bank and terrace system of the Sahul Shelf	Y		YT				Y			Y		Y				Y																			
		KEF: Pinnacles of the Bonaparte Basin	Y						Y			Y		Y				Y																			
		KEF: Carbonate bank and terrace system of Van Diemen Rise	Y		YT				Y			Y		Y				Y																			
		KEF: Ancient Coastline at 125m Depth Contour	Y											Y				Y																			
		KEF: Continental Slope Demersal Fish Communities	Y						Y					Y																							
		KEF: Canyons linking the Argo Abyssal Plain with Scott Plateau	Y						Y					Y																							
		KEF: Shelf Break and Slope of the Arafura Shelf	Y		YT			Y	Y			Y		Y				Y																			
		KEF: Tributary Canyons of the Arafura Depression	Y		YT				Y			Y		Y																							
		KEF: Glomar Shoals (Min WD 33m)	✓						✓			Y		✓				Y															✓				
	WA	Scott Reef Nature Reserve (WA)	✓	12	✓T	✓		13	✓			✓	✓	✓	Y										✓	✓	✓										
		Seringapatam Reef (WA)	✓	✓	Y	✓		✓	✓			✓	✓	✓												✓	✓										
		Lacepede Islands (WA) (Class A Nature Reserve)	✓		✓		14	✓				✓	✓		15	✓									✓	✓	✓										
		Rowley Shoals (incl. Clerke & Imperieuse Reef & Bedwell, Cunningham Islands) MP (WA) (Class A marine Reserve)	✓	Y	16		17		Y			✓	Y												Y	Y	Y								Y		
		Browse Island Nature Reserve (WA Nature Reserve)	✓	✓	✓		18					Y	✓		19																Y						
		Adele Island (WA)	Y	20	Y		21	✓				Y			22	Y									Y	Y	Y										
	NT	Vernon Islands Conservation Reserve (NT)	Y	YD	Y			✓	✓			Y	Y		23					Y		Y	✓		Y	Y	Y	Y	Y						Y		Y
		West Arnhem (Cobourg Peninsula including Gurig Gunak Barlu National Park & Cobourg Marine Park) to Wildman River including South and West Alligator Rivers)[24]		DG2 5	✓ TC	✓	✓	✓	✓			✓	✓		26		Y		✓	✓		✓	✓		✓	✓	✓	✓	✓			27	✓		✓		✓
		South Alligator (Van Diemen Gulf – Wildman to Adelaide River)			✓T		✓	28							Y	29			✓	✓			✓		✓												
		Bathurst & Melville Island[30]		✓	✓T	31	32	✓							33	34				✓	✓	✓	✓		✓			✓	✓								
		Litchfield (Adelaide River to Includes Tree Point Conservation Area & Shoal Bay Coastal Reserve)					✓	35	✓				✓			36			✓	✓			✓		✓				✓						✓		
		Litchfield (Shoal Bay Coastal Reserve to Greenwood Island and includes Darwin [37] & Casuarina Coastal Reserve. Channel Island Reef, Charles Darwin National Park, Channel Island Coastal Reserve)[38]		✓D	✓T		✓	✓					✓		39		40		✓	✓	✓	41		✓	✓	✓		✓	✓	✓					42	43	✓
		Cox-Finniss (Greenwood Bay (Darwin Harbour) to Fog Bay /Finniss River Floodplain includes Dundee Beach)		✓	✓T		44	✓			45		✓		✓	✓	✓		✓	✓	✓		46		✓			✓	✓				47		✓	✓	
		Cox-Finness (Lorna Shoal)	✓		✓T			✓	✓				48					✓																			
		Cox-Finniss (Peron Island North & South)		✓	✓T		49	✓							✓	✓				✓	✓		✓		✓			✓	✓								
		Cox-Finniss (Fog Bay/Finniss River to north of Daly River Mouth)						✓												✓			✓														
		Daly (Daly River Mouth to Cape Ford)		✓	✓ TC		50	51			✓				✓	✓	✓		✓	✓	✓			✓	✓			✓	✓								
		Daly - Thamarrurr (Cape Ford to Moyle River Estuary/ Floodplain)			✓C		52	53			✓		✓			✓	✓		✓	✓	✓	54	✓		✓			✓	✓				✓				
		Thamarrurr (Emu Reef)	✓					✓	✓			✓	55														✓										
		Thamarrurr (Moyle River Estuary to Fitzmaurice Estuary including Dorcherty Island and Port Keats/Wadeye)		56 G	57T			✓											✓	✓			✓		✓			✓	✓							✓	

Location	Jurisdiction	Environmental Receptor	Marine Open Water	Cetaceans/Mammals	Reptiles	Seabirds	Shorebirds/Wetland Birds	Protected Sharks/Fish	Other Shark/Fish Species	Fish/Sharks	Crocodile Breeding Area	Corals/ Halimeda/ Sponges	Protected Area	Key Ecological Feature (KEF)	Critical Habitat for Turtles	BIA/Important Bird Area	Wetlands (incl. RAMSAR)	Banks/Shoals/Pinnacles	Estuaries Present	Mangroves	Saltmarsh	Seagrass & Macroalgae	Exposed Inter-tidal Flats	Sheltered Inter-tidal Flats	Sand Beach	Inter-tidal Coral Reef	Sub-tidal Reef	Exposed Rocky Shore/Cliffs	Aboriginal Cultural Heritage	Heritage Places	European Heritage/Shipwrecks	Pearling/Aquaculture	Commercial Fisheries	Oil & Gas	Tourism	Coastal Facilities	Recreational Fishing/Boating
		Victoria-Daly (Victoria River Estuary including Quoin and Clump Islands, Forsyth Creek & Whale Flat)						58											✓	✓			✓						✓				✓				
		Victoria-Daly (Keep Estuary and Turtle Point)			✓T		✓	✓								59			✓	✓			✓														
		Wyndham - East Kimberley (Cape Domett to NT-WA Border A&B) (DoT Cells 1 & 2)			✓T		60	61					✓		62					✓	✓				✓			✓					✓				
		+ Nth Kimberley MP (Cape Domett Special Purpose Zone)	✓	63 D	✓T			✓	✓				✓		✓																						
		East Cape Domett – WA-NT Border C (Cambridge Gulf mouth including Lacrosse Island) *(DoT Cell 3)*		✓D	YT		✓	64	✓				✓		65		✓		✓	✓	✓		✓		✓			✓	66	✓			✓			✓	
		Bare Hill – East Cape Domett A,B,C,D (Ord River Floodplain (incl. Wyndham) *(DoT Cell 4,5,6,7)*					✓	✓	✓								67		✓	✓	✓							✓	68	✓	69					✓	
		Bare Hill - East Cape Dommett E (Cape Dussejour- Thurburn Bluff) *(DoT Cell 8)*		✓D	✓T		70	✓					✓		✓										✓			✓	✓	✓			✓				
		+ Nth Kimberley MP (King Shoals Sanctuary Zone)	✓	71	72			✓	✓			✓	✓	✓	✓			✓									✓		✓	✓							
		Aunty Islet – Thurburn Bluff (Thurburn Bluff - Buckle Head) **(***DoT Cell 9***)**			✓T		✓	✓				73	✓		74					✓	✓				✓	✓		✓	✓	✓			✓				
		Cape Bernier – Elsie Island N (Buckle Head – Elsie Island) (*DoT Cell 10*) *+ Includes Nth Kimberley MP (Berkeley River Special Purpose Zone and Reveley Island & Elsie Island))*		✓D G	✓T		75	✓	✓				✓						✓			76	✓		✓			✓	✓	✓					✓	✓	
		Cape Rulhieres-Cape Bernier; Unnamed Head – Cape Rulhieres A (Elsie Island - Cape Rulhieres**)** (*DoT Cell 11, 12*)		✓	✓T		77	✓				✓	✓	✓				✓	✓			✓	✓		✓	✓		✓	✓	✓							
		Cape Rulhieres – Unnamed Head B (Cape Rulhieres to Unnamed Head) (DoT Cell 13) *+ Includes Nth Kimberley MP (King George River Special Purpose Zone & Lesueur Island)*		✓D G	✓T		78	✓				✓	✓	✓				✓	✓	✓		✓				✓	✓	✓	✓	✓					✓		
		Unnamed Head – Cape Rulhieres C; Cape Talbot-Cape Londonderry (Unnamed Head – Cape Talbot) (*DoT Cell 14, 15*) *+ Includes Nth Kimberley MP (Cape Londonderry Sanctuary Zone including Stewart Islands)*		✓D G	✓T		✓	✓	✓			✓	✓	79				✓	✓	80	✓	✓	✓			81		✓	✓	✓			✓				
		Cape Talbot-Cape Londonderry B (Cape Talbot to Forest River) (*DoT Cell 16)* *+ Includes Nth Kimberley MP (Drysdale River Sanctuary Zone)*		✓D G	✓TC		✓	82	✓				✓		83		✓		✓	✓	✓		✓		✓				84	✓							
		Low Island Point – Anjo A (Forest River - Anjo Peninsula (*DoT Cell 17)* *+ Includes Kalumbaru* *+ Nth Kimberley MP (Drysdale River and Napier Boome Bay Special Purpose Zone – includes West Governor Island)*		✓D G	✓TC		85	86	✓				✓		87		✓		✓	✓	✓		✓		✓			✓	✓	✓	✓				✓	✓	✓
		+ Nth Kimberley MP (Sir Graham Moore Islands Special Purpose Zone – Includes Sir Graham Moore Island)	✓	✓	✓T			✓				✓	✓		88										✓	✓		✓	✓	✓					✓		
		Low Island Point-Anjo B; Cape Bougainville – Low Island Point A,B (Anjo Peninsula to Vansittart Bay (Jar Island)) (*DoT Cells 18, 19, 20*) *+ Includes Nth Kimberley MP (Vansittart Bay Special Purpose Zone)*		✓D G	✓T		89	✓					✓		90					✓	✓	✓	✓		✓	✓		✓	✓	✓	91	✓			✓		✓
		Cape Bougainville – Low Island C (Vansittart Bay (Jar Island) to Cape Bougainville**)** (*DoT Cells 21*)		✓D	✓T		✓	✓				✓	✓		92					✓						✓		✓	✓	✓							
		Cape Bougainville – Low Island Point D; Crystal Head – Cape Bougainville (Cape Bougainville to Osborne Island) (*DoT Cells 22,23*)		✓	✓T		✓	✓					✓		93					✓					✓			✓	✓	✓			✓				
		+Nth Kimberley Marine Park (Long Reef & East Holothuria Reef Sanctuary Zone -includes Troughton and Sand Island)	✓	✓	✓T		94					✓	✓		✓										✓	✓	✓	✓	✓	✓							
		+ Nth Kimberley MP (Cassini Island)	✓	✓D	✓T		✓						✓		95										✓			✓	✓	✓			✓				
		Davidson Point – Crystal Head A (*Osborne Islands to Crystal Head***)** (*DoT Cell 24)* *+ Includes Nth Kimberley MP (Port Warrender Special Purpose Zone)*		✓D	✓TC		✓	✓	✓			✓	✓		96				✓	✓	✓		✓		✓	✓		✓	97	✓	✓				✓	✓	
		Davidson Point - Crystal Head B (Crystal head to Bigge Point) (*DoT Cell 25*) *+ Includes Nth Kimberley MP (Mitchell River Special Purpose Zone)*		✓	✓		✓	✓					✓CH				98			✓	✓		✓					✓	99	✓			✓		✓		

Location	Jurisdiction	Environmental Receptor	Marine Open Water	Cetaceans/Mammals	Reptiles	Seabirds	Shorebirds/Wetland Birds	Protected Sharks/Fish	Other Shark/Fish Species	Fish/Sharks	Crocodile Breeding Area	Corals/ Halimeda/ Sponges	Protected Area	Key Ecological Feature (KEF)	Critical Habitat for Turtles	BIA/Important Bird Area	Wetlands (incl. RAMSAR)	Banks/Shoals/Pinnacles	Estuaries Present	Mangroves	Saltmarsh	Seagrass & Macroalgae	Exposed Inter-tidal Flats	Sheltered Inter-tidal Flats	Sand Beach	Inter-tidal Coral Reef	Sub-tidal Reef	Exposed Rocky Shore/Cliffs	Aboriginal Cultural Heritage	Heritage Places	European Heritage/Shipwrecks	Pearling/Aquaculture	Commercial Fisheries	Oil & Gas	Tourism	Coastal Facilities	Recreational Fishing/Boating
		Davidson Point – Crystal Head C,D; Swift Bay to Davidson Point A,B (Cape Bigge to Swift Bay (Montague Sound)) (*DoT Cells 26,27,28,29*) *+Includes Nth Kimberley MP (Institut Island Special Purpose Zone - Institut Islands, Lafontaine , Descartes and Corneille Islands)*	✓	✓	✓T		100	✓				✓	✓		101			✓					✓		✓	102		✓	✓	✓	103				✓		
		Augereau Island-Coobe Hill Point A,B (Swift Bay to Cape Pond) (*DoT Cells 30, 31*)		✓	✓		✓						✓		104													✓	✓	✓			✓				
		+ Nth Kimberley MP (Bigge Island Sanctuary Zone including Bigge Island)	✓	✓D	✓		✓					✓	✓		✓					✓			✓		✓	✓	✓	✓	✓	✓							
		+ Nth Kimberley Marine Park (Maret & Montilivet Islands)	✓	✓	✓							✓	✓		✓					✓					✓		✓	✓	✓	✓			✓				
		+ Nth Kimberley MP (Coronation Islands Sanctuary Zone including Coronation Islands and Lamarck Island)	✓	105	✓							✓	✓		106							✓		✓	✓	✓		✓	✓	✓							

Notes to Table E.2	
1	Bridled Tern (Marine, Migratory) BIA within this MP. The MP provides foraging habitat for seabirds given its proximity to Nationally Important Wetlands (Blyth-Cadell Floodplain and Boucaut Bay)
2	Eastern area of the MP falls within a defined critical habitat for Flatback turtles
3	Sawfish and whale sharks present in the MP
4	Southern tip of MP supports a critical habitat for Green Turtles (Oct and April) and Hawksbill Turtle (all year) (Conservation Plan for Marine Turtles
5	Humpback breeding and aggregation area
6	Breeding (Adele Island – see separate entry) and foraging area for CE – eastern curlews and curlew sandpipers
7	Area adjacent to State Waters is a critical habitat for the green turtle
8	Foraging Area for the Blue Whale (BIA)
9	Resting and foraging area for Little Tern and White-tailed tropic bird (BIAs)
10	Ashmore & Cartier Island are an important staging area for seabirds and migratory shorebirds
11	Whale Shark foraging area
12	Humpback Whale Aggregations at Scott & Seringapatam Reefs
13	Whale Shark aggregations
14	Islands are nominated an IBA. Breeding area for CE species such as the great knot, greater sand plovers and lesser crested terns
15	Critical habitat for the Flatback Turtle between October and March
16	Bedwell Island contains nesting areas for Green Turtles but not regionally significant (Rowley Shoals MP Management Plan, 2007)
17	Provides habitat for CE eastern curlew, curlew sandpiper, bar-tailed godwit and great knot (WA DoT, 2018)
18	Provides habitat for CE eastern curlew, curlew sandpiper, bar-tailed godwit and great knot (WA DoT, 2018)
19	Browse Island is a critical habitat for the Green turtle between November and March
20	Humpback breeding occurs in Kimberley AMP which surrounds Adele Island
21	Adele Island is classified as an IBA by Birdlife International. Important breeding area for CE eastern curlew and curlew sandpiper
22	Adele Island is a critical habitat for the Green Turtle between Nov-Mar
23	Within Critical Habitat for the Flatback Turtle
24	Ref: Cobourg Marine Park management Plan https://depws.nt.gov.au/__data/assets/pdf_file/0006/249045/Cobourg-Marine-Park.pdf
25	Australian Snubfin, Indo-pacific and Indo-pacific/Spotted Bottlenose Dolphins breed and calve in the Gurig Gunak Barlu MP (NCVA, 2022)
26	For Green Turtle (Oct-Apr), Flatback Turtle (All Year), Olive Ridley Turtle (All year), Leatherback (Dec-Jan). Recovery Plan for Marine Turtles in Australia 2017-2027 (DoEE, 2017)
27	Pearling Present within Gurig NP. Ref: https://nt.gov.au/__data/assets/pdf_file/0017/200069/garig-gunak-barlu-national-park.pdf

Notes to Table E.2	
28	Nominated pupping area for the largetooth sawfish and northern river shark
29	Adelaide, Mary & Alligator River Floodplains are all IBAs
30	Biodiversity Conservation on the Tiwi islands NT (NT Gov, 2003) https://depws.nt.gov.au/__data/assets/pdf_file/0006/254913/2003WoinarskiJ.BrennanK.CowieI.KerriganR.HempleC.pdf
31	https://tiwilandcouncil.com/documents/Uploads/TiwiIslands_Sites%20of%20Conservation%20Significancelr.pdf
32	Aggregation area for Great Knot (CE) present on SE of Melville Island (Tiwi Island – Site of Conservation Significance
33	Critical Habitat for Olive Ridley Turtle (All year). Ref: Recovery Plan for Marine Turtles 2017
34	Tiwi Islands are an Important Bird Area (IBA)
35	Nominated pupping area for the largetooth sawfish and northern river shark
36	Shoal Bay is an IBA
37	https://www.darwinport.com.au/safety-environment/environment
38	Charles Darwin National Park Management Plan https://depws.nt.gov.au/__data/assets/pdf_file/0005/249044/charlesdarwinpom.pdf
39	Critical Habitat for the Flatback Turtle (all year) (from Darwin to Daly River)
40	https://nt.gov.au/parks/find-a-park/charles-darwin-national-park
41	East Arm Darwin Harbour Ref: Darwin Port Environment Management Plan, 2020
42	https://www.tra.gov.au/data-and-research/reports/state-tourism-satellite-account-2020-21/northern-territory-summary & https://www.tra.gov.au/data-and-research/reports/regional-tourism-satellite-account/regional-tourism-satellite-account
43	https://www.darwinport.com.au/trade/total-trade
44	Major breeding area for Magpie Goose (Marine species) as per Finniss Floodplain and Fog Bay System Wetlands Report. Also supports internationally significant numbers of migratory shorebirds (including Great Knot). NT site of conservation significance
45	Major Breeding area for Crocodile as per Finniss Floodplain and Fog Bay System Wetlands Report
46	https://www.environment.gov.au/cgi-bin/wetlands/report.pl (Finniss Floodplain and Fog Bay System)
47	https://www.environment.gov.au/cgi-bin/wetlands/report.pl (Finniss Floodplain and Fog Bay System) – Banana Prawn Harvesting
48	Lorna shoals to the NW of Dundee Beach is a Reef Fish Protection Area – Adjacent reefs include Fish Reef, Kelleway Reef, Middle Reef, Bass Reef, Loee Patches and Roach Reef (adjacent reefs not included in protection area)
49	Part of the Anson Bay, Daly and Reynolds River Plains IBA
50	Part of the Daly River Plains IBA
51	Pupping area for the largetooth sawfish and northern river shark
52	Part of the Hyland Bay & Moyle River Floodplain IBA
53	Pupping area for largetooth sawfishin wet season
54	Blacktip Project – Draft EIS – Seagrasses (Chapter 7)
55	Reef Fisk Protection Area adjacent to Wadeye and Dorcherty Island – includes Emu Reef, Howland Shoals and Bank Shoal)
56	Dugongs present on Dorcherty Island
57	Blacktip Draft EIS – Turtle Nesting between Cape Hay and Point Pearce
58	Blacktip EIS – Juvenile Prawns are in the mangrove nursery habitats of Victoria River to the Ord River and Cambridge Gulf in the west. Likely timing of migration is Feb-Apr and Oct-Dec. Pupping Estuary for the largetooth sawfish in Victoria River and Keep River Deltas. Keep estuary is also pupping area for dwarf sawfish
59	Legune IBA is located on Turtle Point Peninsula
60	DoT Cell 1-7 is known to contain the Curlew Sandpiper (CE), Eastern Curley (CE), Australian Painted Snipe (EN), Greater Sand Plover (VU) and Bar-tailed Godwit (VU) (WA Marine Oil Pollution Risk Assessment – Protection Priorities, Advisian 2018)
61	DoT Cell 2 contains habitat for sawfish (Nth Kimberley PM Management Plan p21)
62	DoT Cell 2 Cape Domett is a Critical Turtle Habitat with a 60km radius. Occupied all year with a peak in Jul-Sep. (Nth Kimberley MP Management Plan p22)
63	DoT Cell 2 overlaps the foraging (high prey density) and breeding/calving BIA for the Australian Snubfin Dolphin (Migratory) (Nth Kimberley MP Management Plan p21)
64	Cambridge gulf is nominated as a pupping area for the largetooth sawfish
65	Lacrosse Island is a Critical Turtle Habitat with a 60km radius. Occupied all year with a peak in Jul-Sep
66	Western side of gulf only
67	DoT Cell 4 Only. Cells 4 & 5 contain the Parry Floodplain (Nationally Important Wetland). Highest sensitivity selected
68	DoT Cell 5& 6 Only Ref: The West Kimberley national Heritage List https://upload.wikimedia.org/wikipedia/commons/c/cd/The_West_Kimberley%2C_National_Heritage_List_boundaries%2C_1_September_2011.pdf
69	DoT Cell 5 Only

Notes to Table E.2	
70	Due to the presence of the Eastern Curlew, Curlew Sandpiper, bar-tailed godwit, great knot, red knot, lesser sand plover, Hutton's Shearwater and Australasian Bittern (WA Marine Oil Pollution Risk Assessment – Protection Priorities, Advisian 2018)
71	Australian Snubfin Dolphin foraging (high density) and breeding calving is in DoT Cell 8
72	Located in the Critical Habitat Zone for Flatback Turtles
73	Ref: Shoreline Ecological Assessment – Aerial and Ground Surveys 7-19 November 2009
74	Located within the critical habitat for flatback turtles
75	Due to the presence of the Eastern Curlew, Curlew Sandpiper, bar-tailed godwit, great knot, red knot, lesser sand plover, Hutton's Shearwater, Australian painted snipe, greater sand plover (WA Marine Oil Pollution Risk Assessment – Protection Priorities, Advisian 2018)
76	Ref: Nth Kimberley Marine Park management Plan p47
77	Due to the presence of the Eastern Curlew, Curlew Sandpiper, bar-tailed godwit, great knot, red knot, lesser sand plover, Hutton's Shearwater and Australasian Bittern (WA Marine Oil Pollution Risk Assessment – Protection Priorities, Advisian 2018)
78	Due to the presence of the Eastern Curlew, Curlew Sandpiper, bar-tailed godwit, great knot, red knot, lesser sand plover, Hutton's Shearwater, Australian painted snipe, greater sand plover (WA Marine Oil Pollution Risk Assessment – Protection Priorities, Advisian 2018)
79	DoT Cell 14 Only
80	Mangroves and Saltmarsh for DoT Cell 15 Only
81	Fringing Coral for DoT Cell 14 Only
82	Likely pupping area for largetooth sawfish
83	Within the 60km critical habitat zone around West Governor Island for flatback turtles between May and July
84	Very High Significance to Aboriginal Community of Kalumburu
85	Due to the presence of the eastern curlew, curlew sandpiper, bar-tailed godwit and great knot (WA Marine Oil Pollution Risk Assessment – Protection Priorities – Advisian 2018)
86	Likely pupping area for the largetooth sawfish
87	West Governor Island is a critical habitat for the flatback turtle between May and July
88	Sir Graham Moore Island is a critical habitat for the flatback turtle between May and July
89	Due to the presence of Eastern Curlew, Curlew Sandpiper, bar-tailed godwit, great knot, red knot, lesser sand plover, Hutton's Shearwater, Australian painted snipe, greater sand plover (WA Marine Oil Pollution Risk Assessment – Protection Priorities, Advisian 2018)
90	Cassini Island (including 20km buffer) is a critical habitat for the green turtle between November and March and flatback turtle between May and July
91	DoT Cell 19 & 20 Only
92	West Governor and Sir Graham Moore islands are critical habitat (including 60km buffer) for the flatback turtle between May and July
93	West Governor and Sir Graham Moore islands are critical habitat (including 60km buffer) for the flatback turtle between May and Jul
94	Due to the presence of the eastern curlew, curlew sandpiper, north-eastern Siberian bar-tailed godwit, great knot, red knot, lesser sand plover, Hutton's shearwater, Australian painted snipe, greater sand plover, bar-tailed godwit (WA Marine Oil Pollution Risk Assessment – Protection priorities – Advisian, 2018)
95	Cassini Island is a critical habitat for the flatback turtle to a 60km radius between May & June
96	Cassini Island is a critical habitat for the flatback turtle to a 60km radius between May & June
97	Indigenous culturally sensitive area (access restrictions may apply) on coast and around Steep Head Island
98	Mitchell River System Nationally Important Wetland
99	Mitchell River is a zone of cultural heritage within the Wunambal Gambera sea country.
100	DoT Cell 27 Contains Sterna Island which is an Important Bird Site in the Kimberley
101	Maret Island is a critical habitat (with 60km buffer) for the flatback turtle during May and July
102	DoT Cell 28 Only has fringing coral reefs
103	DoT Cell 27 Only
104	Maret Island is a critical habitat for the flatback turtle during May and July
105	Presence of Humpback whales, calves feeding and resting following calving (Nth Kimberley Marine Park Management Plan)
106	Coronation Islands (including Lamarck Island) is a critical habitat for the flatback turtle between May and July