Stag Field Oil Pollution Emergency Plan

GF-70-PLN-I-00001

Rev 9

Facility:	**GF - Stag Field**
Review Interval:	**12Months**
Safety Critical:	**Yes**

Approval:				
Rev:	**Date:**	**Owner:**	**Reviewer:**	**Approver:**
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REVISION HISTORY

Revision	Date	Author / Editor	Amendment
0	4/11/16	M. Walker	Document creation
1	21/12/16	M. Walker	Revision 1 for submission to NOPSEMA.
2	22/05/17	M. Walker	Arrangements for oil spill response moved to Jadestone Energy Australia Oil Spill Response Arrangements document [JS-70-PLN-I-00037]. Stag Field Operations-specific Oil Pollution Emergency Plan (OPEP) detail remains in this document.
3	28/07/17	M. Walker / M. Patt	Revision 3 for submission to NOPSEMA.
4	18/10/17	M. Walker / M. Patt	Updates to chemical dispersion strategy and address NOPSEMA OMR comments.
5	13/06/18	H. Astill	Updates to contractual changes (TSA completion, RPS APASA); alignment with updates to OSRA
5a	05/07/18	H. Astill	Updates after review of legislative framework elements. No MoC required.
5.01	18/06/19	M. Patt	Updates after annual review. No MoC required.
5.02	26/03/20	S. Kenwery	Annual review – Table 7-1. Tracker buoy logins. S9.4 & Table 15-1. No MoC required.
6	31/08/20	L. Sands / M. Patt	Revision for submission to NOPSEMA for tanker operations
7	19/01/21	L. Sands / M. Patt	Revision for submission to NOPSEMA to address comments
8	16/03/21	L. Sands / M. Patt	Revision for submission to NOPSEMA to address DoT comments
9	28/11/22 05/05/23	L. Sands / C. Holyoake/ A. Gillion / J van Rensburg	MOC 1020 incorporating NOPSEMA Inspection Recommendation 2405-C1-R1 MOC-1020 including required changes for the NOPSEMA five year revision update Resubmitted (05/05/2023) to address incomplete for assessment letter, no change in revision

Holders of Controlled Copies:	
Perth Office	Vessel Master
Stag OIM	Australian Maritime Safety Authority
AMOSC	WA Department of Transport

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FIRST STRIKE RESPONSE PLAN

Following an oil spill, personnel on the Stag Facility are required to follow first-strike procedures, which are outlined in the Stag Incident Response Plan (GF-00-PR-F-00041).

The information below is designed to guide the Incident Management Team (IMT) during the first 24–48 hours of a spill, or until all actions in Table A-1 and Table A-2 (facility spills[1]) and Table A-2 and Table A-3 (vessel spills[1]) are complete, and the initial Incident Action Plan (IAP) is finalised and ready for implementation.

The Stag Incident Response Plan includes checklists for key roles in the Incident Response Team (IRT), focusing on initial response actions for the period immediately following the incident. Only key actions from the Stag Incident Response Plan are repeated in Table A-1, so that IMT members are aware of the actions that may have already been undertaken by the IRT.

The level of activation of the IRT, IMT and Group Crisis Team will be related to the classification level of the oil spill (Table 2-1).

Table A-1: Incident Response Team Initial Actions (key actions taken from the Stag Incident Response Plan (GF-00-PR-F-00041)

Responsibility	Action
Observer/s and Immediate Supervisor	Raise the alarm via Manual Alarm Call Point, telephone, radio, or in person providing details of the incident to the Central Control Room
	Monitor the safety of all personnel by clearing the immediate vicinity of the spill, if possible
Central Control Room	Take full details of incident and assess incident information
	Raise General Site Alarm, if not already activated
	Notify On-Scene Commander of incident
On-Scene Commander (Offshore Installation Manager [OIM])	Muster in Central Control Room
	Take immediate actions in accordance with the Stag Incident Response Plan (GF-00-PR-F-00041). This will include assessing the situation and determining if the IRT needs to be mobilised in consultation with the Incident Coordinator
	Make initial assessment of spill level (Table 2-1)
	Notify IMT Leader (Perth) of the incident and maintain open lines of communication to determine if IMT support is required.
	Consult with IMT Leader to agree on initial incident level (Table 2-1)
	Take immediate actions to control the source of the spill. If source control is not possible, ensure personnel safety by clearing the immediate vicinity of the spill
	Prepare the POLREP[2] and provide as much information[3] to the IMT Leader as soon as practicable, including: • Location and coordinates

[1] Refer to Section 2.2 for a definition of Facility v's Vessel spills

[2] This information will also be required when completing Jadestone incident reports and reports to external agencies.

[3] Some details may be limited in the initial POLREP. Aim to get the initial report submitted as soon as possible and follow up with more detail as it becomes available.

Responsibility	Action
	• Date and time the release occurred or was first reported • How it was detected • Names of any witnesses • Cause of the spill • Source of spill (e.g. fuel tank) • Approximate volume of spill (better to overestimate) • If the spill is controlled or continuous • Weather, tide and current details • Trajectory of the spill (what direction is the slick spreading) • If any fauna has been observed nearby (e.g. whales, dolphins, seabirds)
	Deploy tracking buoy to leading edge of the spill
	Provide updated POLREPs to the IMT Leader, as required
	Use personal Incident Log to record events
	Take photos and send to the Operations Section Chief, if possible

Table A-2: Vessel Master and Incident Response Team Initial Actions (Spills from Support Vessels Only)

Responsibility	Action
Vessel Master	Take immediate actions to control the source of the spill (Refer to vessel-specific Shipboard Oil Pollution Emergency Plan [SOPEP])
	Monitor the safety of all personnel
	If source control is not viable, ensure vessel safety by clearing the immediate vicinity of the spill, if possible.
	Contact Jadestone's Offshore Installation Manager (or delegate) and inform them of the incident
	Conduct risk assessment and assess safe approach routes
	Deploy tracking buoy if one is available on the vessel
	Contact the Australian Marine Safety Authority (AMSA), as soon as practicable, to inform them of the incident, providing as much information as possible via Pollution Report (POLREP), including: • Location and coordinates • Date and time the release occurred or was first reported • How it was detected • Names of any witnesses • Cause of the spill • Source of spill (e.g. fuel tank) • Approximate volume of spill (better to overestimate) • If the spill is controlled or continuous • Weather, tide and current details • Trajectory of the spill (what direction is the slick spreading)

Responsibility	Action
	• If any fauna has been observed nearby (e.g. whales, dolphins, seabirds)
	Take photos and send to the OIM (or delegate) and AMSA, if possible
	Continue to provide updated situation reports to the OIM (or delegate) and AMSA, as required
OIM (On-Scene Commander) or delegate	Confirm incident report and capture key details relating to the incident. Obtain POLREP
	Classify the level of the spill (Table 2-1)
	Notify IMT Leader (Perth) of the incident and maintain open lines of communication to determine if IMT support is required.
	Consult with IMT Leader to agree on initial incident level (Table 2-1)
	Deploy tracking buoy to leading edge of the spill if vessel was unable to do so

Table A-3: Incident Management Team Initial Actions (0–48 hours)

Responsibility	Action	Completed
IMT Leader	Confirm incident report and capture key details relating to the incident (obtain POLREP)	☐
	Ensure all external notifications are completed in the specified timeframes (Refer to Table 9-1) **Note: Some notifications must be made within 2 hours of incident being identified**	☐
	Notify and activate IMT, if required. This shall occur via direct telephone call from IMT Leader to individual positions. The IMT Leader will specify the location and the time at which the team is to convene. The IMT Leader will decide whether a full or partial mobilisation is required depending on the initial assessment of the level of the incident (Table 2-1) and the level of support required by the On-Scene Commander (OSC) during the initial period of the incident.	☐
	Confirm level of the incident in consultation with OSC (Table 2-1)	☐
	Set up IMT room	☐
	If the initiation criteria for Monitor and Evaluate listed in Section 11.1 are met, commence implementation of the Monitor and Evaluate Strategy as per the actions listed in Table 11-1	☐
	Ensure Planning Section Chief conducts all required external notifications and reporting (Refer to Table 9-1 for reporting requirements) within specified timeframes (Note: some notifications are required within 2 hours of spill being identified)	☐
	Notify Country Manager, then subsequently notify the Chief Executive Officer (CEO) (if unable to reach Country Manager after two attempts (leave voicemail to call back IMT Lead urgently), continue to call Chief Executive Officer, continue to reach Country Manager), as link into Group Crisis Team as appropriate	☐

Responsibility	Action	Completed
Planning Lead	Notify and activate oil spill response support organisations as listed in Table 8-1	☐
	Gather available situational awareness data from monitor and evaluate tactics to help inform IMT and preparation of initial IAP	☐
	Prepare initial IAP (Section 7)	☐
Environment Unit Leader	Liaise with Planning Lead to obtain available situational awareness data from initial monitor and evaluate tactics to help inform the initial Operational Spill Impact Mitigation Assessment (SIMA)	☐
	Commence preparation of initial Operational SIMA (Refer to Section 10)	☐
	Conduct activations as per Table 8-1 and Section 12 of the Jadestone Stag Facility Operational and Scientific Monitoring Bridging Implementation Plan (GF-70-PLN-F-00003)	☐
Operations Section Chief	Initiate Source Control Strategy in consultation with OSC (Section 12)	☐
	Commence process to establish Forward Operations Base, if required	☐
The following actions depend upon the outcomes of the Operational SIMA. If the response strategies listed below are selected, then refer to the implementation guidance tables referenced below for more detail.		
IMT Leader (or delegate)	If the initiation criteria for Containment and Recovery listed in Section 14.1 are met, commence implementation of the Containment and Recovery Strategy as per the actions listed in Table 14-2	☐
	If the initiation criteria for Surface Chemical Dispersant listed in Section 15.1 are met, commence implementation of the Surface Chemical Dispersant Strategy as per the actions listed in Table 15-1	☐
	If the initiation criteria for Shoreline Protection and Deflection listed in Section 16.1 are met, commence implementation of the Shoreline Protection and Deflection Strategy as per the actions listed in Table 16-1	☐
	If the initiation criteria for Shoreline Clean-up listed in Section 16.1 are met, commence implementation of the Shoreline Clean-up Strategy as per the actions listed in Table 17-1	☐
	Initiate Oiled Wildlife Response Strategy according to the actions listed in Table 18-1	☐

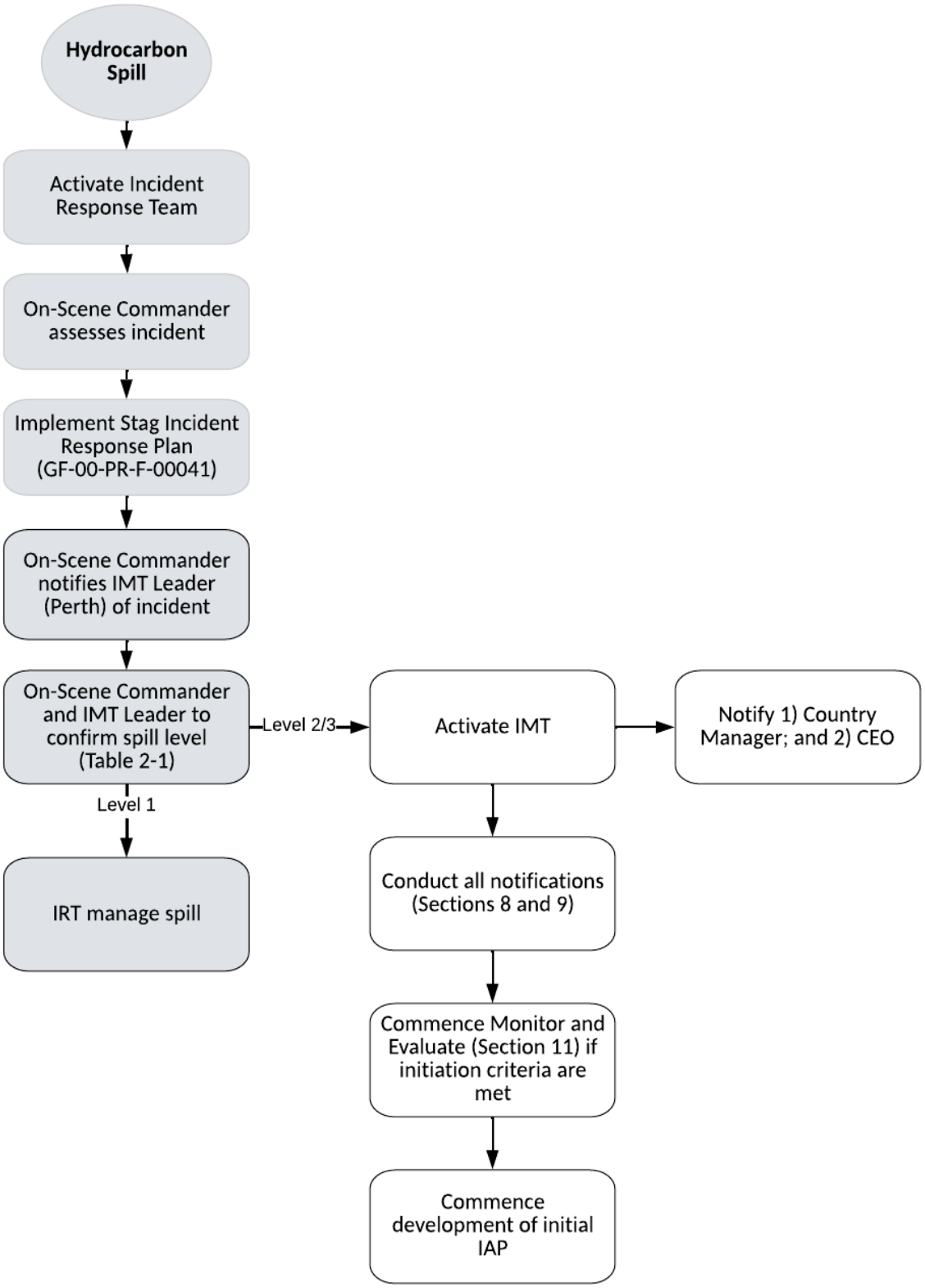

Figure A-1: First Strike Response Guidance

QUICK REFERENCE INFORMATION

In the event of an incident where human safety is at significant risk, tasks included in this OPEP may not be implemented, and the International Convention for the Safety of Life at Sea (SOLAS) 1974 may take precedence.

Parameter	Information		Further Information
Facility Name	Stag Field Production and Export Facility (Stag Facility)		Section 1.2 and 3 of EP
Location (Lat/Long and Easting Northing)	Refer to Table 1-1		
Title/s (Block/s)	Permit area WA-15-L		N/A
Water Depth	49 m		Section 1.4 of EP
Hydrocarbon Type/s and International Tanker Owners Pollution Federation (ITOPF) Classification	Marine Diesel Oil (MDO): Group 2 Stag Crude Oil: Group 3		Section 4.2.2
Worst Case Spill Scenario Reference Number	**Scenario**	**Worst case spill volume**	Section 4.2.1
Level 1			
N/A	Surface release of Stag Crude from marine breakaway coupling activation during offtake activity at floating hose	0.07 m^3	
N/A	Release of MDO from bunker transfer	5 m^3	
N/A	Surface release of MDO from handling and storage of hydrocarbons, equipment failure, refuelling of machinery from day tank	500 L	
Level 2			
1	Subsea release of Stag Crude from the underbuoy hose at the Catenary Anchor Leg Mooring (CALM) buoy (30 min release)	86.5 m^3	
2	Pinhole leak of Stag Crude – subsea pipeline or flowline from damage or corrosion (12 hour release)	85 m^3	
3	Surface release of Stag Crude from a loss of integrity from the conductor due to Mobile Offshore Drilling Unit (MODU) collision	68 m^3	
4	Surface release of Stag Crude from damage to the floating hose between the CALM buoy and third-party tanker (30 mins)	17.2 m^3	

Parameter	Information		Further Information
5	Surface release of MDO from support vessel due to a vessel collision/loss of integrity	80–250 m^3	
6	Subsea release of Stag Crude due to loss of pipeline integrity (12 hour release)	120 m^3	
Weathering Potential	Stag Crude is a moderately persistent hydrocarbon with a density slightly lower than seawater. Weathering under low (5 knots) and constant wind indicates that approximately 14% of the oil volume would evaporate within 12 hours. The remaining oil would weather at increasingly slower rate as the mixture becomes proportionally enriched by compounds with longer carbons chains, hence higher boiling points. Once all volatile compounds have evaporated, only the residual compounds will remain and weathering rates would slow significantly. After one day approximately 40–80% is predicted to remain on the sea surface (% dependent upon wind variability). This reduces to approximately 32–68% of the crude remaining on the surface after seven days. MDO is a mixture of volatile and persistent hydrocarbons with low viscosity. It will spread quickly and thin out to low thickness levels, thereby increasing the rate of evaporation. Up to 60% will generally evaporate over the first two days. Approximately 5% is considered to be persistent, which is unlikely to evaporate but will decay over time. MDO has a strong tendency to entrain into the upper water column (0–10 m) (and consequently reduce evaporative loss) in the presence of moderate winds (>10 knots) and breaking waves. MDO re-surfaces when the conditions calm. It does not form mousse.		Appendix A
Priority Protection Areas	Montebello Islands		Section 4.4

PART A – PREPAREDNESS INFORMATION

1. INTRODUCTION

1.1 Purpose

The purpose of this Oil Pollution Emergency Plan (OPEP) is to detail Jadestone Energy's oil pollution preparedness and response arrangements for all of the Stag Field and Facility activities. This OPEP is a supporting document to the Stag Field Operations Environment Plan (EP) (GF-70-PLN-I-00002) (the Stag Field Operations EP) and the Stag 50H and 51H Drilling Environment Plan (Stag Drilling EP) (GF-70-PLN-I-00008).

The objectives of this OPEP in relation to the unplanned release of hydrocarbons arising from activities associated with the Stag Field and Facility are:

- To provide guidance to the IMT in relation to spill response implementation
- To safely limit the adverse environmental effects to the marine environment from an oil spill to a level that is As Low As Reasonably Practicable (ALARP)
- Define the oil spill response arrangements and capability that is in place for the credible spill scenarios
- Provide alignment with arrangements in the Western Australia (WA) State Emergency Management Plan (SEMC, 2022), specifically the WA State Hazard Plan for Maritime Environmental Emergencies (SHP-MEE), and the National Plan (AMSA, 2020)
- To meet the requirements of the OPGGS (E) Regulations.

1.2 Area of operation

The Stag Field is located approximately 32 km northwest of the Dampier Archipelago and 82 km northeast from Varanus Island, in approximately 49 m water depth. Latitude and longitude of the Stag Central Processing Facility (CPF) and the CALM buoy are provided in Table 1-1. A schematic of the Stag Field is provided in Figure 1-1.

Section 5 of both the Stag Field Operations EP and the Stag Drilling EP include a comprehensive description of the existing environment in the Operational Area and the potential spill trajectory area (as predicted by spill fate modelling). A list of the nearest regional features is provided in Table 1-2.

Table 1-1: Stag CPF and the CALM Buoy coordinates

Facility	Latitude	Longitude
Stag CPF	20° 17.413' South	116° 16.517' East
CALM Buoy	20° 16.315' South	116° 16.571' East

Table 1-2: Distances from Stag facility to key regional features

Regional Feature	Distance from Stag CPF
Dampier Archipelago	32 km (17.3 Nm)
Closest Montebello Island	75 km (40.5 Nm)
Varanus Island	82 km (44.3 Nm)
Barrow Island	96 km (51.8 Nm)

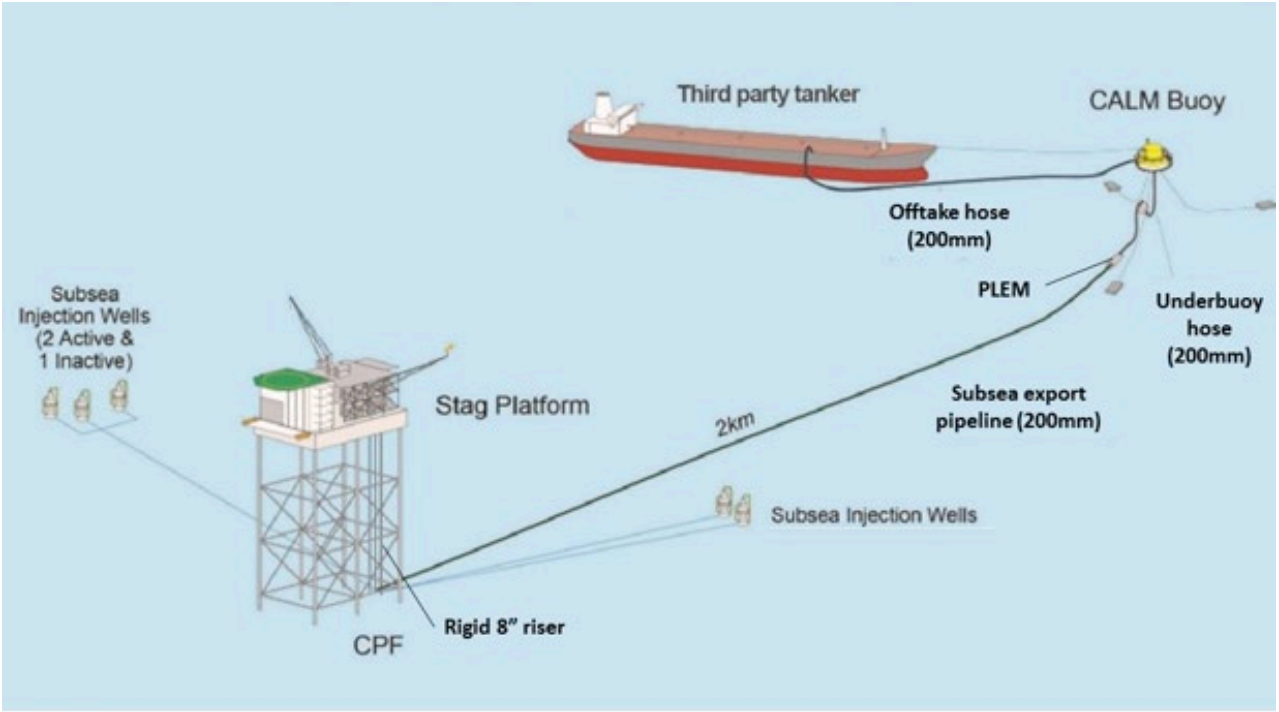

Figure 1-1: Schematic of the Stag Field facilities

1.3 Interface with Other Documents

This OPEP acts as a key document in Jadestone's environmental management framework, as well as being the primary instruction for responding to a spill from Stag Facility. Table 1-3 describes key documents that form Jadestone's environmental management document framework and emergency management documents that also provide guidance and instruction relevant to the spill response.

Table 1-3: Key Jadestone Documents

Reference No.	Description
Emergency and Facility Management Documents	
Incident Management Team Response Plan (JS-70-PLN-F-00008)	Details procedures for responding to an emergency incident, including a hydrocarbon spill event. This plan contains details of the incident management structure, procedures for the activation of the IMT and the roles and responsibilities of the IMT.
Stag Incident Response Plan (GF-00-PR-F-00041)	Provides information to guide a coordinated and timely offshore and onshore response to all anticipated emergency situations. This document describes the incident command organisational structure, roles and responsibilities of the IRT, initial actions, communication arrangements and reporting requirements.
Incident Management Contact List	Contains all internal contact and communications information to enable effective communication amongst response personnel. It also contains details of external Support Agencies, Service Providers and Government Agencies to be contacted as per the reporting requirements in Table 9-1. It is regularly updated and accessed via the Jadestone IMT Portal.
Offtake Vessel Vetting Procedure (JS-90-PR-G-00211)	Formalises the offtake tanker vetting procedure and includes standard acceptance criteria for proposed offtake tankers which facilitates the vetting and terminal acceptance process.

Reference No.	Description
Stag Marine Tanker Operations Manual (GF-00-MN-H-00037)	Provided to Offtake Tanker Agents/Owners/Operators to enable them to transmit to Offtake Tanker Masters, to prepare for a safe arrival at anchorage, embarkation of Pilot and Surveyor, and transit to the Stag Marine Facility CALM Buoy for Crude Offtake.
Stag Marine Facility Operating Manual (GF-90-MN-G-00038)	Defines the procedures which must be applied concerning vessel movements and operations within the Marine Facility Restricted Area to ensure safety of personnel, protection of the environment and protection of equipment.
Emergency Pipeline Repair Plan (GF-09-PLN-L-000039)	Provides a framework regarding the response to pipeline damage which necessitates an immediate shutdown or cutback in the rate of production to the associated facilities.
Stag Performance Standards Report (GA-70-REP-F-00007)	Includes the Operations Performance Standards for all Safety Critical Elements for the Stag CPF.
Environmental Management Documents	
Stag Drilling EP (GF-70-PLN-I-00008) and Stag Field Operations EP (GF-70-PLN-I-00002)	The EP describes the drilling activity and the location, the environment, the risks to the environment as a result of the activity and the associated management controls. Of particular relevance to this plan, it identifies sensitive receptors, potential impacts from hydrocarbon spills and the environment that may be affected (EMBA).
Stag Field Operational and Scientific Monitoring Bridging Implementation Plan (OSM-BIP [GF-70-PLN-F-00003])	Describes a program of monitoring oil pollution that will be adopted in the event of a hydrocarbon spill incident (Level 2–3) to marine waters. It is aligned to the Joint Industry Operational and Scientific Monitoring Framework (APPEA, 2021) and describes how this Framework applies to the Stag Operations activities and spill risks in Australian waters.

In addition, this OPEP is consistent with the requirements of external documents and frameworks for spill response, including:

- National Plan for Maritime Environmental Emergencies (National Plan) and National Marine Oil Spill Contingency Plan – sets out national arrangements, policies and principles for the management of maritime environmental emergencies. The plan provides for a comprehensive response to maritime environmental emergencies regardless of how costs might be attributed or ultimately recovered.
- Australian Government Coordination Arrangements for Maritime Environmental Emergencies – provides a framework for the coordination of Australian Government departments and agencies in response to maritime environmental emergencies.
- AMOSPlan – Australian Industry Cooperative Spill Response Arrangements – details the cooperative arrangements for response to oil spills by Australian oil and associated industries.
- WA State Hazard Plan for Maritime Environmental Emergencies (SHP-MEE) – details the management arrangements for preparation and response to a marine pollution incident occurring in State waters.
- WA DoT Incident Management Plan – Marine Oil Pollution – provides operational and strategic guidance for the coordination and control of Marine Oil Pollution incidents within WA, where DoT is the HMA and Jurisdictional Authority. This guidance applies whether or not DoT is also the Controlling Agency.
- WA DoT's Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements.

- WA Oiled Wildlife Response Plan – establishes the framework for responding to potential or actual wildlife impacts in WA waters, within the framework of an overall maritime environmental emergency; outlines risk reduction strategies, preparedness for, response to and initiation of recovery arrangements for wildlife impacts during a marine oil pollution incident.
- WA Oiled Wildlife Response Manual – a companion document to the WA Oiled Wildlife Response Plan for Maritime Environmental Emergencies, designed to standardise operating procedures, protocols and processes for wildlife response.
- Joint Industry Operational and Scientific Monitoring Framework - provides a standardised approach to oil pollution monitoring, including industry guidance, templates, worked examples and standardised Operational and Scientific Monitoring Plans which titleholders can apply to identify and detail monitoring arrangements and capabilities in their EP and OPEP submissions.
- Oil Spill Response Limited (OSRL) Associate Agreement – defines the activation and mobilisation methods of OSRL spill response personnel and equipment allocated under contract.

1.4 Document Review

This document shall be reviewed, updated and submitted to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) every five years from date of acceptance.

The document may be reviewed and revised more frequently, if required, in accordance with the Jadestone Management of Change Procedure (JS-90-PR-G-00017). This could include changes required in response to one or more of the following:

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

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

The custodian of the OPEP is the Occupational Health, Safety and Emergency Response Lead.

2. SPILL MANAGEMENT ARRANGEMENTS

2.1 Spill Response Levels

Jadestone uses a tiered response framework which classifies incidents based on the significance of the consequences, the risks involved and potential for escalation. The significance of the incident determines the level of response that is activated.

Incident response personnel are trained to respond according to the characteristics of the response level. Table 2-1 provides an overview of the characteristics and escalation criteria for each level and how each level aligns to the incident levels in the National Plan for Environmental Emergencies (AMSA, 2020).

Following an oil spill incident to the marine environment, the OIM or Vessel Master shall make the initial assessment of the spill, which shall then be confirmed in consultation with the IMT Leader. If the Incident Management Team is activated, the IMT Leader is responsible for ongoing re-assessment of spill level.

In the event of a spill occurring where an effective response is considered beyond the capabilities within a level, the response will be escalated immediately to the next level. The decision to escalate a response to a higher level (as defined in Table 2-1) will be made by the responsible Control Agency (Section 2.2). If the response level is undetermined, then a worst-case scenario should be assumed when activating resources, as it is always possible to scale down the response effort.

The level of the oil spill incident shall be recorded in the IMT Incident Log following activation.

Table 2-1 shall be used by the OIM and IMT Leader when determining the level of the oil spill incident.

Table 2-1: Oil Spill Response Level Classification for Spills to the Marine Environment

Characteristic	**Incident management response level**		
	Level 1	**Level 2**	**Level 3**
Teams involved	Incident Response Team		
	Inform IMT	Incident Management Team	
	-	Inform Group Crisis Team	Group Crisis Team
General description and escalation criteria	An incident which will not have an adverse effect on the public or the environment which can be controlled using resources normally available at the facility or vessel concerned without the need to mobilise the Jadestone IMT or other external assistance.	An incident that cannot be controlled using facility resources alone and requires external support and resources to combat the situation Or An incident that can be controlled by the facility but which may have an adverse effect on the public or the environment.	An incident which has a wide-ranging impact on Jadestone and may require the mobilisation of external State/Territory, National or International resources to bring the situation under control.
AMSA National Plan levels and escalation criteria	**Level 1** Generally able to be resolved by Responsible Party through the application of local or initial response resources (first strike response)	**Level 2** Typically, more complex in size, duration, resource management and risk than Level 1 incidents. May require deployment of resources beyond the first strike response	**Level 3** Characterised by a high degree of complexity, require strategic leadership and response coordination. May require national and international response resources

Characteristic	Incident management response level		
	Level 1	**Level 2**	**Level 3**
Resources at risk			
Human	Potential for serious injuries	Potential for loss of life	Potential for multiple loss of life
Environment	Isolated impacts or with natural recovery expected within weeks.	Significant impacts and recovery may take months. Monitoring and remediation may be required.	Significant area and recovery may take months or years. Monitoring and remediation will be required.
Wildlife	Individuals of a small number of fauna species affected	Groups of fauna species or multiple numbers of individuals affected	Large numbers of fauna (individuals and species) affected
Economy	Business level disruption	Business failure	Disruption to a sector
Social	Reduced services	Ongoing reduced services	Reduced quality of life
Infrastructure	Short term failure Non-safety/operational critical failure	Medium term failure Potentially safety/operational critical failure	Severe impairment Safety/operational critical system failure
Public affairs	Local and regional media coverage	National media coverage	International media coverage

2.2 Control Agencies and Jurisdictional Authorities

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

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

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

Table 2-2: Jurisdictional Authorities and Control Agencies for hydrocarbon spills

Jurisdiction	Spill Source	Jurisdictional Authority	Control Agency	
			Level 1	Level 2/3
Commonwealth waters (three to 200 nautical miles from territory/state sea baseline)	Vessel[4]	AMSA	AMSA	
	Petroleum activity[5]	NOPSEMA	Titleholder	
WA state waters (State waters to three nautical miles and some areas around offshore atolls and islands)	Vessel	WA DoT	WA DoT	
	Petroleum activity	WA DoT	Titleholder	WA DoT
International waters	All activities	Relevant foreign authority	Jadestone will liaise with the Australian Government Department of Foreign Affairs and Trade (DFAT) in the event that an oil spill may enter international waters. Jadestone will work with DFAT and the respective governments to support response operations, as requested.	

2.3 Petroleum Activity Spill in Commonwealth Waters

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

Under the OPGGS (E) Regulations and Section 572C of the OPGGS Act 2006, the petroleum titleholder (i.e. Jadestone) is responsible for responding to an oil spill incident as the Control Agency in Commonwealth waters (Refer to Table 2-2), in accordance with this OPEP.

NOPSEMA, as the Jurisdictional Authority, is responsible for verifying that an adequate spill response plan is prepared, and in the event of an incident, that a satisfactory response is implemented. Where NOPSEMA considers it necessary to intervene during an oil pollution incident to protect the safety of people or the environment, NOPSEMA may direct a petroleum titleholder to take or cease to take certain actions in response to the oil pollution incident.

[4] Vessels are defined by Australian Government Coordination Arrangements for Maritime Environmental Emergencies (AMSA, 2017a) as a seismic vessel, supply or support vessel. N.B. this definition does not apply to WA State waters.

[5] Includes a 'facility', such as a fixed platform, FPSO/FSO, MODU, subsea infrastructure, or a construction, decommissioning and pipelaying vessel. As defined by Schedule 3, Part 1, Clause 4 of the OPGGS Act 2006. Refer to the NOPSEMA Guideline - Facility definition includes an associated offshore place (NOPSEMA, 2020) for additional clarification of definition of a facility.

2.4 Cross-jurisdictional spills

2.4.1 Cross-jurisdictional petroleum activity spills

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

Where a Level 2/3 spill originating in Commonwealth waters moves into State waters, multiple Control Agencies will exist: WA DoT and the petroleum titleholder (Jadestone), each with its own IMT and Lead IMT responsibilities. The arrangements between WA DoT and Jadestone for sharing resources and coordinating a response across both Commonwealth and State waters are further detailed in Section 2.5.2.

2.4.2 Cross-jurisdictional vessel spills

If a Level 2/3 vessel spill crosses jurisdictions between Commonwealth and State waters, multiple Jurisdictional Authorities will exist: AMSA for Commonwealth waters; and DoT for WA State waters. Coordination of Control Agency responsibilities will be determined by WA DoT and AMSA based on incident specifics, with Jadestone providing first strike response and all necessary resources (including personnel and equipment) as a supporting agency.

AMSA may request that WA DoT manage a vessel incident in Australian Commonwealth waters (WA DoT, 2023).

2.5 Integration with government organisations

2.5.1 AMSA

AMSA manages the National Plan for Maritime Environmental Emergencies (National Plan), Australia's key maritime emergency contingency and response plan (AMSA, 2020). AMSA fulfils its obligations under the National Plan for non-ship source pollution incidents on the formal request from the respective Offshore Petroleum Incident Controller/s (AMSA, 2021).

AMSA is to be notified immediately of all ship-source incidents through the AMSA Rescue Coordination Centre (RCC) Australia, as outlined in Table 9-1. In addition, in the interests of facilitating the most efficient and effective response to any oil pollution event (regardless of source), Jadestone Energy agrees to notify AMSA as per the notifications in Table 9-1.

The AMSA National Plan Incident Management System Policy (NP-POL-003) (AMSA, 2022a) describes the incident management system which is applied by AMSA, State Control Agencies and the offshore industry Australia wide for all marine oil spill response incidents and implemented through the National Plan for Maritime Environmental Emergencies. The Jadestone Incident Management System is based on AIIMS which is consistent with the AMSA system.

Copies of National Plan supporting documentation can be found here: https://www.amsa.gov.au/marine-environment/national-plan-maritime-environmental-emergencies#collapseArea374

2.5.2 WA DoT

The State Emergency Management Plan enables the WA Government to prevent, prepare for, respond to and recover from hazards as listed in the *Emergency Management Act 2005 (WA)* and prescribed in the Emergency Management Regulations 2006 (the EM Regulations).

The State Emergency Management Committee (SEMC) is the body with overall responsibility for emergency planning. SEMC is responsible for the development and review of several emergency plans for the Department of Transport, including the State Hazard Plan: Maritime Environmental Emergencies.

The State Hazard Plan – Maritime Environmental Emergencies covers:

- Prevention and mitigation responsibilities and strategies.
- Responsibilities for preparedness and planning arrangements.
- Responsibilities and arrangements for responding to maritime emergencies.
- Information on recovery arrangements.

The State Hazard Plan – Maritime Environmental Emergencies can be found at: https://www.wa.gov.au/system/files/2023-11/state_hazard_plan_maritime_environmental_emergencies.pdf

If a Level 2/3 spill arises within, or has potential to enter WA State waters, the WA DoT is the Hazard Management Authority (HMA) will nominate(WA DoT or proxy). The Assistant Executive Director (or proxy) has been nominated by the HMA to perform the role of the State Maritime Pollution Coordinator (SMPC) to certain DoT positions (as described in Section 1.3 of the State Hazard Plan -MEE (DoT, 2023)) and DoT will take on the role as a Controlling Agency. The SMPC provides strategic management of the incident response on behalf of the HMA.

If a spill occurs within, or has the potential to impact State waters, Jadestone Energy will notify the DoT Maritime Environmental Emergency Response (MEER) unit as soon as reasonably practicable (within 2 hours of becoming aware of the incident occurring). On notification, the SMPC will activate their Maritime Environmental Emergency Coordination Centre (MEECC) and the DoT IMT. Jadestone will work in partnership with DoT during such instances, as outlined within the DoT's *Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements* (WA DoT, 2020).

For Level 2 /3 spills that cross from Commonwealth waters to State waters, there will be two Controlling Agencies. Jadestone will retain Control Agency responsibility for Commonwealth waters, whilst DoT will assume Control Agency responsibility for the portion of the response in State waters. For a cross-jurisdictional response, there will be a Lead IMT (DoT or Jadestone) for each spill response activity. Appendix 2 within *Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements* (July 2020) provides guidance on the allocation of a Lead IMT to response activities for a cross jurisdictional spill. Figure 2-1 shows the cross jurisdictional arrangements and Control Agency structure for a Facility spill entering State waters.

To facilitate effective coordination between the two Controlling Agencies and their respective IMTs during a cross-jurisdictional response, a Joint Strategic Coordination Committee (JSCC) will be established. The JSCC will be jointly chaired by the SMPC and Jadestone's nominated senior representative 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 are outlined in *Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements* (July 2020).

For a cross-jurisdictional response, Jadestone will be responsible for ensuring adequate resources are provided to DoT as Control Agency, initially 11 personnel to fill roles in the DoT IMT (Table B-6) or Forward Operating Bases (FOB) and operational personnel to assist with those response strategies where DoT is the Lead IMT. Concurrently DoT will also provide two of their personnel to the Jadestone IMT as described in Table B-7. Jadestone's CMT Liaison Officer and the Deputy Incident Controller are to attend the DoT Fremantle Incident Control Centre (ICC) as soon as possible after the formal request has been made by the SMPC. It is an expectation that the remaining initial cohort will attend the DoT Fremantle ICC no later than 8am on the day following the request being formally made to Jadestone by the SMPC. Jadestone personnel designated to serve in DoT's FOB will arrive no later than 24 hours after receipt of formal request from the SMPC.

Jadestone will conduct initial response actions in State waters as necessary in accordance with this OPEP, and continue to manage those operations until formal handover of incident control is completed.

Appendix 1 in DoT's *Offshore Petroleum Industry Guidance Note* (WA DoT, 2020) provides a checklist for formal handover. Beyond formal handover, the Jadestone will continue to provide all necessary resources, including personnel and equipment, to assist the DoT in performing duties as the Control Agency. The required roles and responsibilities of these positions are outlined in Appendix B.

As a minimum, the Deputy Planning Officer and Deputy Logistics Officer supporting the WA DoT IMT will be filled by Jadestone IMT personnel familiar with relevant Jadestone systems and processes and trained as per role specific training and competency requirements outlined in Appendix C.

Two DoT personnel will be provided from DoT's command structure into Jadestone's Group Crisis Team/ IMT as Group Crisis Team / Media Liaison Officers. The roles and responsibilities of these positions are outlined in Appendix B.

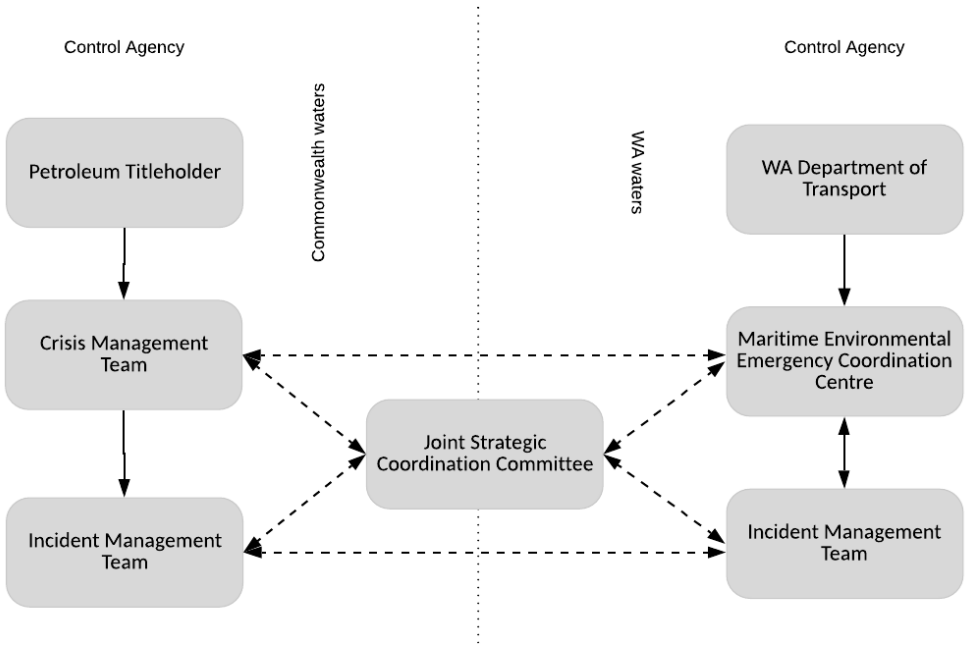

Figure 2-1: Cross-jurisdictional control agency arrangements (WA waters)

2.5.3 WA Department of Biodiversity, Conservation and Attractions

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

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

Any deterrence, displacement or rescue activity involving wildlife in WA (living or dead) constitutes "disturbance" or "taking" of wildlife under the *Biodiversity Conservation Act 2016* and will require authorisation through DBCA unless undertaken by licensed personnel. The DBCA OWA will expedite the process of granting interim licences or other authorities to undertake approved activities. No action specifically targeted at wildlife should occur without this authority. Deceased animals disposal will be managed in accordance with the DBCA's WAOWRP which describes the process for disposal of dead

animals/carcasses. Initially, the granting of authority to take deceased wildlife is likely to be via a direction from a DBCA wildlife officer while the appropriate licences or licence holder/s that the animals can be held by are identified and organised.

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

This may include advice on priorities for environmental protection, appropriateness of proposed response strategies and the planning and coordination of operational and scientific monitoring for impact and recovery assessment. The ESC can also advise on where AMSA National Plan Dispersant Effectiveness Test Kits can be located, which could be utilised in addition to Jadestone dispersant testing resources (refer to Section 15.6).

2.6 Interface with external organisations

2.6.1 Australian Marine Oil Spill Centre

The AMOSPlan is a voluntary mutual aid plan which is administered and funded by the oil industry through AMOSC. The principle of the AMOSPlan is that, to assist in a local response to an incident, individual company resources are available under co-operative arrangements through the AMOSC hiring agreements. Jadestone is a participating company of AMOSC and as such has access to AMOSC's Level 2 and 3 oil spill recovery and response equipment, dispersant and technical (human) capabilities, as outlined in the AMOSPlan. AMOSC manages a core group of personnel for oil spill response that can be made available for Jadestone requirements, as outlined in Jadestone's Master Service Contract with AMOSC.

2.6.2 Oil Spill Response Limited

Jadestone Energy is an Associate Member of OSRL, providing access to spill response services from its offices in Perth, Singapore, UK and at other various international locations. In the event of a Level 2/3 response, Jadestone could access OSRL's international personnel, equipment and dispersants to supplement resources available within Australia. Jadestone may also call on OSRL for technical services to support its IMT.

Response equipment and personnel are allocated on a 50% of inventory basis under OSRL's Service Level Agreement (SLA). Jadestone also has access to additional dispersant stockpiles held by OSRL through a Global Dispersant Stockpile Supplementary Agreement.

Under the OSRL Associate membership Service Level Agreement (SLA), Jadestone has access to response personnel (18 personnel per incident) and 50% of the global response equipment stockpile. In addition to this, Jadestone is also a member of OSRL's Global Dispersant Stockpile (GDS) and Operational and Scientific Monitoring (OSM) Supplementary Services.

The GDS Supplementary Agreement provides Jadestone with access to 5,000 m^3 of dispersant stockpile in addition to the dispersant stockpile available under the Associate membership SLA. The OSM Supplementary Services provides Jadestone with access to operational and scientific monitoring services. Additional information on OSM services and capability is provided in the Stag Field OSM-BIP (GF-70-PLN-F-00003).

3. INCIDENT MANAGEMENT

The Jadestone incident response structure is based on the Australasian Inter-Service Incident Management System (AIIMS), which consists of a standard management hierarchy and procedures for managing incidents of any size. The use of AIIMS principles drives consistent response operations through a set of common terminology, procedures and processes to:

- Organise personnel and skills necessary for a safe, secure and compliant response
- Allow personnel from a wide variety of agencies to meld rapidly into a common management structure
- Provide a unified, centrally authorised emergency organisation.

Jadestone utilises a tiered incident response structure to deal with and manage incidents according to the spill response levels (Refer to Table 2-1). The structure is activated progressively, from business as usual, facility-based IRT, shore-based IMT, then if required to the Corporate Group Crisis Team.

The Jadestone incident response organisational structure is defined in the Jadestone Incident Management Team Response Plan (IMTRP) (JS-70-PLN-F-00008), and in Figure 3-1 for reference. Jadestone IMT and IRT roles are scalable; roles can be activated and mobilised according to the nature and scale of the incident response.

Effective incident management requires the ability to establish command and control, gain and maintain situational awareness and then develop, implement and monitor response activities either in support of a Jadestone facility/site or directly.

The Jadestone incident management system defines and standardises the organisational processes and structures to enable transition from reactive to proactive and ensure integration of the organisation and all other stakeholders while promoting successful incident management and coordination.

The IMT Leader will decide whether a full or partial mobilisation is required depending on the nature of the incident and the level of support required by the OSC during the initial period of the incident. The standard Jadestone IMT structure is shown in Figure 3-2.

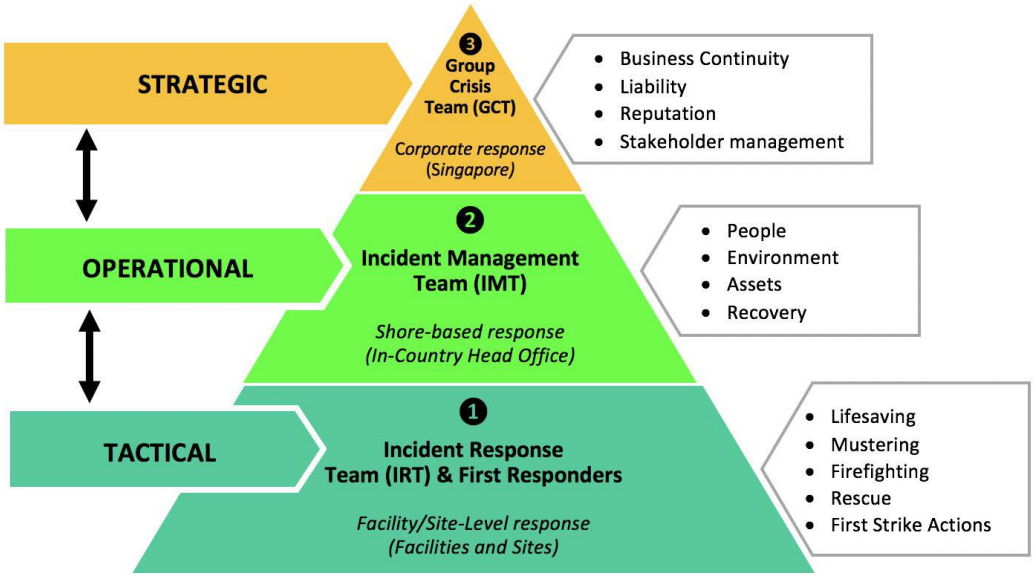

Figure 3-1: Jadestone incident response structure

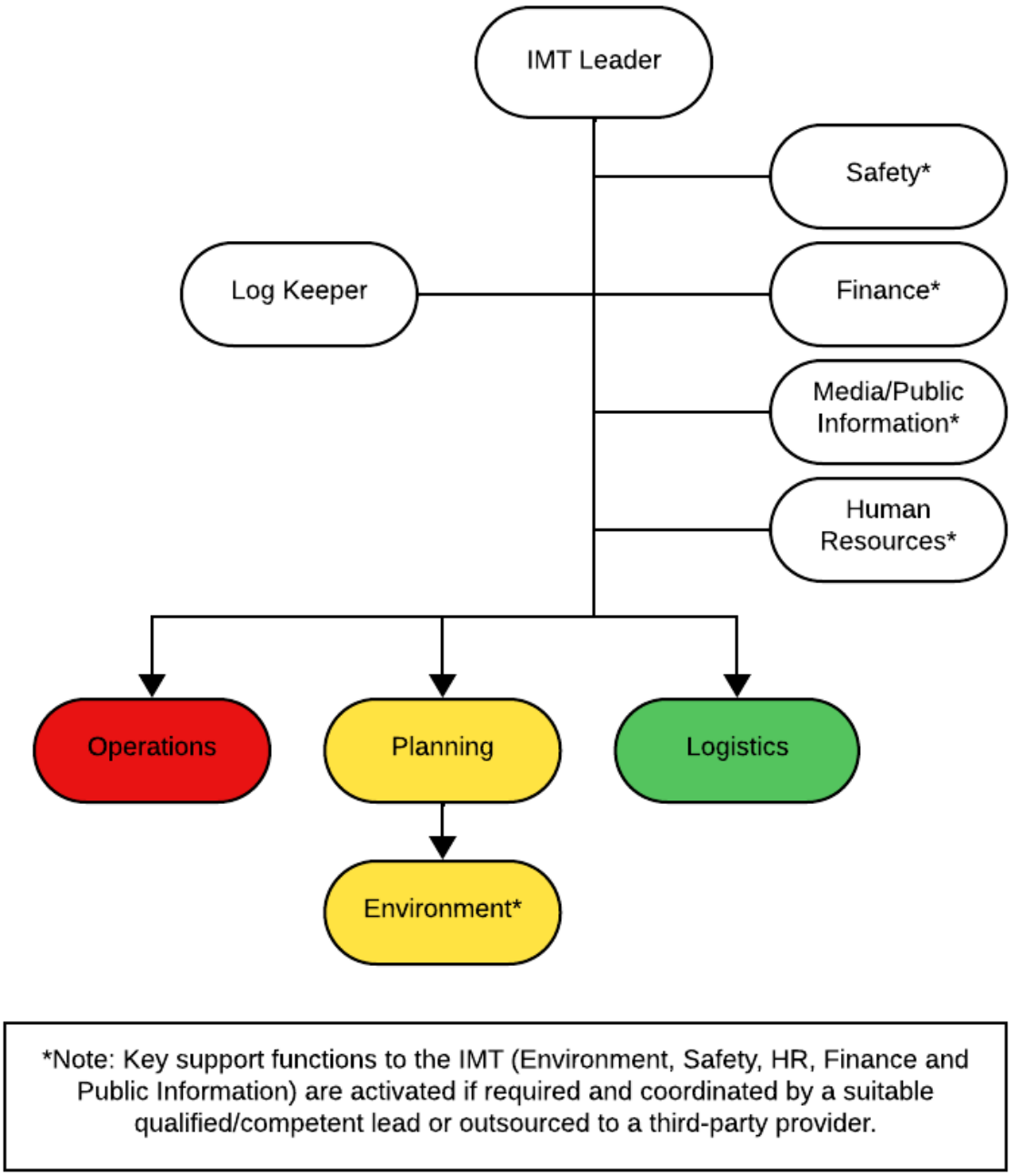

Figure 3-2: Jadestone Incident Management Team Structure

3.1 Incident Response Team– Tactical Level

The IRT and First Responders function at the tactical level and are responsible for the provision of immediate response to incidents in order to preserve safety of life, minimise damage (where possible) to the environment and protect property or assets. The IRT are responsible for the implementation of the Facility's Incident Response Plan.

Each facility/site/office will have a tactical level capability responsible for dealing with any emergency or hazard that may be foreseen as a function of its operations and to provide basic first aid and account for personnel. In addition, communicating of information will be a key requirement from the tactical level upwards to ensure that all levels within the are able to build and maintain situational awareness and provide guidance and/or support as necessary.

3.2 Incident Management Team – Operational Level

For an operational level response, a IMT will generally be required for the following:

- To provide additional support to an IRT (facility or site) during an incident; and/or
- To develop and implement response actions/plans when an incident escalates to a level that the IRT can no longer effectively manage or coordinate response activities (example: Level 2/3 oil spill incident).

The IMT is led by the IMT Leader, who will lead the IMT to address the organisations key priorities. The IMT is responsible for coordinating operational advice and functional support to the IRT and early liaison/notification of the Group Crisis Team and external authorities, if required.

The IMT will develop and implement operational plans to mitigate or respond to the incident and provide technical and logistic support as required.

The key roles and responsibilities of key IMT positions are provided in Appendix B.

3.3 Group Crisis Team – Strategic Level

Strategic level responses support the management of significant events that threaten the organisation and its stakeholders. At Jadestone these types of incidents will be managed by the Group Crisis Team; whose primary objectives will be to:

- Develop strategies and plans to manage reputation, operability, licence to operate, liabilities and/or potential financial loss
- Provide technical, operational and communications advice to the in-country IMT and ensure it is adequately resourced
- Identify, monitor, prioritise and manage domestic and global issues, gaining a deep understanding of perceptions and expectations of response and behaviour
- Liaise and interface with high level government agencies including host country government authorities and elected/appointed political leaders
- Review and approve external and internal engagement strategies/plans and statements at global and country levels.

3.4 IMT Training and Competency

Internal drills/exercises to demonstrate competency are undertaken as per the Incident Management Exercise and Testing Program (JS-70-PR-F-00001). Jadestone's IMT will undertake training in their respective roles and responsibilities as provided by an Australian Registered Training Organisation or internationally accredited training provider.

Competencies for IMT members will be maintained and managed by the Occupational Health, Safety and Emergency Response Lead. Training requirements and core competencies for Jadestone key IMT response personnel are outlined in Appendix C.

3.5 IMT Exercise and Testing Program

Jadestone utilises the categories of drills and exercises in Table 3-1 to maintain the organisation's ability to react to and manage major incidents, maintain competency, and familiarise the Jadestone IMT with the relevant documentation.

Table 3-1: Jadestone Emergency Management Test Categories

Test Type	Description
Workshop	A formal discussion-based activity led by a facilitator or presenter, used to build or achieve a product. Products produced from a workshop can include new or revised plans and procedures, mutual aid or cooperation agreements and improvement plans.
Drill	A coordinated, supervised activity employed to validate a specific function or capability within an organisation. Drills will be used to provide training on new equipment, validate procedures, or practice and maintain current skills.
Exercise	Designed to validate and evaluate capabilities, multiple functions and/or sub-functions, or interdependent groups of functions. Exercises are focused on exercising plans, policies, procedures, and staff members involved in management, direction, command and control functions. An exercise scenario with event updates drives activity, typically at the management level. Functional exercises are conducted in a realistic, real-time environment.

Jadestone schedules exercises on a three-year exercise cycle. Over the course of a 3-year period it is intended that all major incident events including key Major Accident Event (MAE) and oil spills will be exercised using a stand-alone IMT drill or as part of an annual functional exercise.

Each year, a quarterly MAE scenario, annual oil spill response workshop and annual oil spill exercises will test the IMT and will alternate between Jadestone's offshore facilities. Where response arrangements are the same for a number of activity specific OPEPs, one exercise may be used to test these response arrangements for these OPEPs at the same time. A quarterly MAE scenario can be substituted for, or combined with, the Annual Oil Spill exercise. Exercises program shall align with facility exercise programs wherever practical.

The Incident Management Exercise & Testing Program (JS-70-PR-F-00001) provides information on drill and exercises (types and documentation), including aims of the test, and key testing objectives for the test categories listed in Table 3-1.

As part of the exercise process, Jadestone prepares a number of documents to ensure drills and exercises are well planned, conducted and evaluated. To support this, the following documents are used:

- Exercise Scope Document – provides background context to the exercise, outlines the exercise need, aim, objectives, details of the scenario, participating groups and agencies, exercise deliverables and management structure. This document can be used to engage a third-party contractor to assist in conducting the exercise.
- Exercise plan and instructions – provide instructions and 'play' (including any injects) for conducting the exercise.
- Post exercise report – includes an after-action review of the exercise, evaluating how the exercise performed against meeting its aim and objectives.

Jadestone routinely undertakes post-exercise debriefings following Level 2-3 OPEP exercises and drills to identify opportunities for improvement and communicate lessons learned. An independent assessor (either internal or external) will examine the effectiveness of the response arrangements during the annual oil spill exercise. The assessor will make written findings and recommendations from the test for consideration to

assist in identifying deficiencies with response arrangements and continually improve Jadestone's overall response readiness. All actions that are derived from drills and exercises including debriefs are documented in Jadestone's Computerised Maintenance Management System (CMMS). CMMS is used to allocate actions to individual positions within Jadestone to ensure any post-exercise actions are completed by a nominated due date.

The following exercises and drills will be conducted to specifically test response preparedness outlined within the scope of this OPEP:

- Test of arrangements when they are introduced or significantly amended; and
- Test of arrangements if a new location or activity is added to the EP after response arrangements have been tested, and before the next test is conducted.

3.6 Emergency Coordination and Response Locations

In support of response operations, an Incident Control Centre (ICC) will be established within the Jadestone Offices in Perth. The ICC has adequate facilities for the IMT to function and coordinate response operations. The main conference room shall be the ICC with meeting rooms used as breakout rooms, as required.

Jadestone utilises an electronic platform to provide all IMT personnel with universal access to key emergency management documents that may be required in the event of a spill (e.g. IMTRP, OPEPs, IAPs). This system is also directly linked to Jadestone's Electronic Document Management System.

Jadestone will also consider the activation of regional operational centre or a Forward Operations Base (FOB) to assist with oil spill response. The location of a regional operational centre or FOB will depend upon the nature, direction and extent of any spill. The preferred regional operational centre or FOB for Stag would be Dampier.

In accordance with the Jadestone IMT structure, the FOB will be subordinate to the IMT Operations function, and will be responsible for the coordination of personnel, resources, material, equipment and localised activities as directed by the IMT.

3.7 Initial Briefing

The IMT Leader is to conduct an initial briefing to bring key IMT members together to share initial assessment information and to outline the process for initial response activities.

The initial briefing is designed to provide all personnel with information about the incident, reason for IMT activation and initial intentions. The objectives of the initial briefing will be to confirm:

- Known details of the incident
- Initial spill level (Table 2-1)
- Actions taken at the tactical level prior to IMT activation
- Overarching intention with respect to IMT actions
- Provision of initial actions to be taken by the IMT.

If required, the initial briefing may be conducted by teleconference ahead of the IMT arriving at the ICC.

3.8 Environmental Performance

Table 3-2 lists the environmental performance standards and measurement criteria for this section.

Table 3-2: Environmental Performance Standards and Measurement Criteria – Incident Management

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS01	Training requirements and core competencies for Jadestone's key IMT response personnel are maintained as per the requirements in Appendix C and the Incident Management Team Response Plan (JS-70-PLN-F-00008)	Response personnel competency and training records
EPS02	Jadestone will complete an annual evaluation of oil spill response organisation arrangements and key contractors to confirm it has access to adequate third party service provider capability to address its worst-case resourcing requirements for Jadestone activities	Audit schedule Audit reports
EPS03	Jadestone will conduct a monthly assurance check to confirm it has access to the key personnel and resources listed in Appendix E	Audit reports
EPS04	Personnel are aware of roles and responsibilities in the event of a response, in accordance with Stag Incident Response Plan (GF-00-PR-F-00041)	Exercise and training records
EPS05	Internal drills/exercises to demonstrate competency are undertaken as per the Incident Management Exercise and Testing Program (JS-70-PR-F-00001)	Exercise and training records

4. SELECTION OF RESPONSE STRATEGIES

4.1 Strategic Spill Impact Mitigation Assessment

Titleholders typically use a Spill Impact Mitigation Assessment (SIMA) (also referred to as a Net Environmental Benefit Analysis [NEBA]) as their decision support tool to consider available information which helps them select the most suitable response strategies or combination of strategies that would minimise impacts to ecological, cultural, economic and social values (hereafter referred to as receptors). Different response strategies provide varying levels of effectiveness and protection under different environmental conditions, depending on the individual spill (Coelho *et al*. 2014).

Conducting a SIMA is an important step in the oil spill planning and preparedness process and is often called a Strategic SIMA. An overview of this assessment process is provided in Figure 4-1. To complete a Strategic SIMA, all available information on a potential spill is considered (e.g. oil type, volume, duration of release), together with spill trajectory modelling to consider potential impacts to sensitive receptors.

A list of possible response strategies is considered from a 'response toolbox', as detailed in 4.5.1.

A detailed assessment of the benefits and drawbacks of each response strategy is completed to help determine the combination of strategies that would be most suited to each maximum credible spill scenario. This includes 'primary response strategies' and 'secondary response strategies', with the former typically being more reliable and effective in reducing impacts from an individual spill.

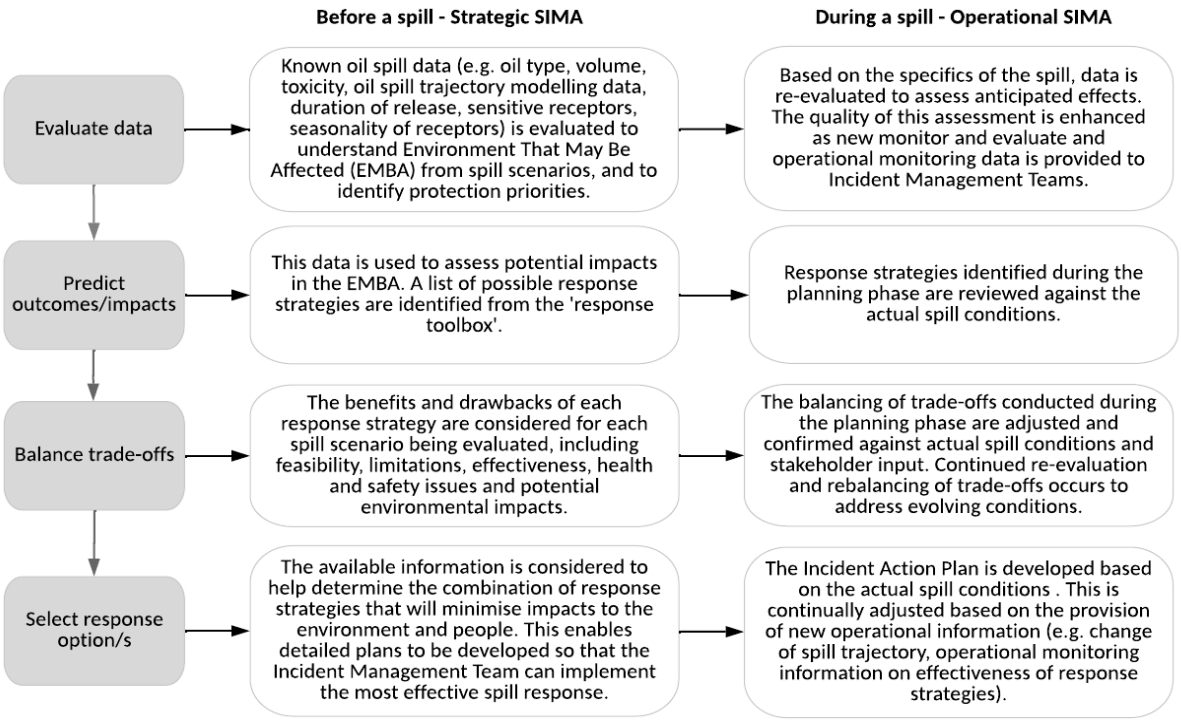

Figure 4-1: SIMA application during planning and responses phases (adapted from IPIECA-IOPG, 2017)

4.2 Evaluate Data

4.2.1 Spill Scenarios

During Stag activities, the following hydrocarbons may be unintentionally released to the marine environment: oily water, marine diesel, hydraulic oils and lubricating fluids, or crude oil.

This OPEP outlines strategies, actions and supporting arrangements applicable for all credible oil spill events associated with Stag activities. Of the credible spill scenarios identified in the Stag Drilling EP (Section 7.5) and Stag Operations EP (Section 7.4), scenarios 5 (250 m^3 MDO) and 6 (120 m^3 Stag Crude Oil) (Table 4-1) have been selected to represent worst-case spills from a response perspective and have been used to inform the resourcing requirements for this OPEP. Modelling results for scenario 1 (86.5 m^3 Stag Crude Oil) predicted contact with the same receptors as scenario 6, however the modelling results from scenario 1 showed slightly less shoreline accumulation and minimum timeframes to contact with receptors, which is why that scenario was not selected as the worst-case.

Additional unplanned credible spills are presented in Table 4-1. These include unplanned credible spills that may occur during Stag activities but do not represent the worst case and have not been used to inform response capability.

Table 4-1: Identified Credible Spill Scenarios for Hydrocarbon Releases to the Marine Environment from Stag Activities

Scenario level; spillage type and National Plan defined level	Scenario No.	Hydrocarbon type	Source / cause	Total potential volume
Level 1 Spills				
An incident which will not have an adverse effect on the public or the environment which can be controlled using resources normally available at the facility or vessel concerned without the need to mobilise the Jadestone Incident Management Team or other external assistance.	N/A	Stag Crude	Marine breakaway coupling activation during offtake activity at floating hose (30 mins)	0.07 m^3
	N/A	MDO	Release from bunker transfer	5 m^3
	N/A	MDO	Surface release from handling and storage of hydrocarbons, equipment failure, refuelling of machinery from day tank	500 L
Level 2 Spills				
An incident that cannot be controlled using facility resources alone and requires external support and resources to combat the situation or An incident that can be controlled by the facility, but which may have an adverse effect on the public or the environment.	1	Stag Crude	Subsea release from the underbuoy hose at the CALM buoy (30 min release)	86.5 m^3
	2	Stag Crude	Pinhole leak in subsea pipeline or flowline from damage or corrosion (12 hour release)	15 m^3
	3	Stag Crude	Surface release from a loss of integrity from	68 m^3

Scenario level; spillage type and National Plan defined level	Scenario No.	Hydrocarbon type	Source / cause	Total potential volume
			the conductor due to MODU collision	
	4	Stag Crude	Surface release from damage to the floating hose between the CALM buoy and third-party tanker (30 mins)	17.2 m^3
	5	MDO	Vessel collision/ Loss of integrity: surface release from maintenance support vessel	80–250 m^3
	6	Stag Crude	Subsea release due to loss of pipeline integrity (12 hour release)	120 m^3

4.2.2 Hydrocarbon properties

4.2.2.1 Stag Crude

Stag oil is a medium crude composed of hydrocarbons which will begin to evaporate at different rates on exposure to the atmosphere. Change in the mass balance calculated for Stag crude weathering under low (5 knots) and constant wind indicates that approximately 14% of the oil volume would evaporate within 12 hours. The remaining oil would weather at increasingly slower rate as the mixture becomes proportionally enriched by compounds with longer carbons chains, hence higher boiling points. Once all volatile compounds have evaporated, only the residual compounds will remain, and weathering rates would slow significantly. After one day approximately 40% to 80% is predicted to remain on the sea surface (% dependent upon wind variability). This reduces to approximately 32% to 68% of the crude remaining on the surface after seven days.

Further detail on Stag Crude oil is provided in Appendix A.

4.2.2.2 Marine Diesel Oil

ITOPF (2023) categorises MDO as a light group II hydrocarbon. In the marine environment, a 10% residual of the total quantity of MDO spilt will remain after the volatilisation and solubilisation processes associated with weathering, although this amount will slowly decay over time. Change in the mass balance calculated for MDO weathering under the constant wind case indicates that approximately 34.4% of the oil volume would evaporate within 24 hours. Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate due to the MDO being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Further detail on MDO is provided in Appendix A.

4.3 Oil Spill Modelling Results

The worst-case credible spill scenarios shown in Table 4-1 were used as the basis for modelling, which was performed using a three-dimensional spill trajectory and weathering model, Spill Impact Mapping and Analysis Program (SIMAP). The SIMAP model calculates the transport, spreading, entrainment, evaporation and decay of surface hydrocarbon slicks as well as the entrained and dissolved oil components in the water column, either from surface slicks or from oil discharged subsea.

A total of 200 spill trajectories were simulated across two seasons (i.e. 100 trajectories for Summer [September to February] and 100 trajectories for Winter [March to August]) using a number of unique environmental conditions sampled from historical metocean data.

The stochastic modelling outputs do not represent the potential behaviour of a single spill (which would have a much smaller area of influence) but provides an indication of the probability of any given area of the sea surface being contacted by hydrocarbons above impact thresholds. For the purpose of spill response preparedness, outputs relating to floating oil and oil accumulated on the shoreline are most relevant (i.e. oil that can be diverted, contained, collected or dispersed through the use of spill response strategies) for the allocation and mobilisation of spill response resources.

Table 4-2 and Table 4-4 presents the stochastic modelling results for floating concentrations and shoreline accumulation volumes respectively for scenario 5 (vessel collision [MDO] spill) and Table 4-3 and Table 4-5 present the same results for scenario 6 (subsea release due to loss of pipeline integrity [Stag Crude]). These represent the worst-case credible spills for the two hydrocarbon types presented in Table 4-1.

Modelling results for dissolved and entrained oil for the worst-case scenarios have not been included given there are limited response strategies that will reduce subsurface impacts. However, Jadestone assesses the modelling results for entrained oil from the worst-case scenarios for the purposes of identifying scientific monitoring priority areas as outlined in Stag Operational and Scientific Monitoring - Bridging Implementation Plan (OSMP-BIP) (GF-70-PLN-F-00003).

4.3.1.1 The Influence of Chemical Dispersant Use on Projected Spill Trajectory Area

APASA was commissioned by Quadrant Energy to prepare a report, the Net Environmental Benefit Analysis for the Use of Dispersants (APASA, 2012), to assess whether the application of chemical dispersants reduced the probability of contact to shorelines. Key findings of this report at the time included a reduction in the predicted probabilities for shoreline accumulation exceeding the 100 g/m^2 threshold, and greater prediction times to sensitive locations following the application of chemical dispersant, particularly effective during the summer months.

Jadestone commissioned APASA to reanalyse the 2012 study (APASA, 2017) to further assess the effects of hydrocarbon dispersant application for the WCS spill scenario and the proposed dispersant treatment plan. Mass balance distribution results show that the application of the proposed dispersant treatment is predicted to reduce the proportion of released oil that would remain floating on the surface. Therefore, the proportion of oil predicted to be entrained in the water column slightly increases with dispersant application, while the proportion of oil that evaporates is slightly reduced.

Table 4-2: Spill modelling results (scenario 5) – floating oil from vessel collision (MDO) (RPS, 2023)

Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (hours)	Probability (%) of ≥10 g/m² floating	Min. arrival time ≥10 g/m² floating (hours)	Probability (%) of ≥50 g/m² floating	Min. arrival time ≥50 g/m² floating (hours)
Montebello AMP (W)	1	50	NC	NC	NC	NC
State Waters boundary	-	24	-	-	-	-

W = Winter (March to August); NC= No contact predicted; - = Data not in modelling report

Table 4-3: Spill modelling results (scenario 6) – floating oil from subsea release due to loss of pipeline integrity (Stag Crude) (RPS, 2020)

Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (hours)	Probability (%) of ≥10 g/m² floating	Min. arrival time ≥10 g/m² floating (hours)	Probability (%) of ≥50 g/m² floating	Min. arrival time ≥50 g/m² floating (hours)
Dampier Archipelago (S)	2	135	<1	NC	<1	NC
Karratha-Port Hedland (S)	2	279	<1	NC	<1	NC
Port Hedland- Eighty Mile Beach (S)	2	347	<1	NC	<1	NC
Montebello Islands (W)	4	43	<1	NC	<1	NC
Rankin Bank (W)	4	182	<1	NC	<1	NC

Receptor	Probability (%) of ≥1 g/m² floating	Min. arrival time ≥1 g/m² floating (hours)	Probability (%) of ≥10 g/m² floating	Min. arrival time ≥10 g/m² floating (hours)	Probability (%) of ≥50 g/m² floating	Min. arrival time ≥50 g/m² floating (hours)
State Waters boundary	-	24	-	-	-	-

S = Summer (September to February); W = Winter (March to August); NC= No contact predicted; - = Data not in modelling report

Table 4-4: Spill modelling results (scenario 5) – shoreline accumulation from vessel collision (MDO) (RPS, 2023)

Receptor	Probability (%) of shoreline accumulation ≥10 g/m²	Min. arrival time (days) shoreline accumulation ≥10 g/m²	Probability (%) of shoreline accumulation ≥100 g/m²	Min. arrival time (days) shoreline accumulation ≥100 g/m²	Peak volume on shoreline (m³)	Max. length shoreline accumulation (km) ≥100 g/m²
Montebello Islands (W)	9	3	1	6	6	2

W = Winter (March to August); NC= No contact predicted

Table 4-5: Spill modelling results (scenario 6) – shoreline accumulation from subsea release due to loss of pipeline integrity (Stag Crude) (RPS, 2020)

Receptor	Probability (%) of shoreline accumulation ≥10 g/m²	Min. arrival time (days) shoreline accumulation ≥10 g/m²	Probability (%) of shoreline accumulation ≥100 g/m²	Min. arrival time (day) shoreline accumulation ≥100 g/m²	Peak volume on shoreline (m³)	Max. length shoreline accumulation (km) ≥100 g/m²
Dampier Archipelago (S)	4	5.7	2	7.4	38	39
Eighty Mile Beach – Broome (S)	7	18.5	2	22.5	26	29
Karratha-Port Hedland (S)	5	10.5	1	12.3	23	29

Receptor	Probability (%) of shoreline accumulation ≥10 g/m^2	Min. arrival time (days) shoreline accumulation ≥10 g/m^2	Probability (%) of shoreline accumulation ≥100 g/m^2	Min. arrival time (day) shoreline accumulation ≥100 g/m^2	Peak volume on shoreline (m^3)	Max. length shoreline accumulation (km) ≥100 g/m^2
Pilbara Middle Islands and Shoreline (S)	2	23.4	1	25.2	<1	1
Port Hedland- Eighty Mile Beach (S)	8	9.9	4	12	24	30
Montebello Islands (W)	13	1.1	8	1.1	68	25
Barrow Island (S)	3	21.6	<1	NC	NC	NC
Lowendal Islands (W)	4	1.8	2	2.9	8	10

S = Summer (September to February)

W = Winter (March to August)

4.4 Protection Priority Areas

For any oil spill that enters or occurs within WA State waters, the WA DoT is the Control Agency and the ultimate decision-maker regarding identification and selection of protection priorities.

Prioritising receptors helps identify where available resources should be directed for an effective response and to minimise impacts on key environmental and/or socioeconomic receptors. This enables the Control Agency to make informed decisions, and ultimately develop and execute an effective response operation.

Spill modelling results were used to predict the EMBA for Stag activities. The Risk EMBA is the area in which Jadestone's activities may result in environmental impacts – defined as the area potentially impacted by hydrocarbons from a spill event above impact concentration thresholds.

Results from hydrocarbon spill modelling were compared against the location of key sensitive receptors with high conservation valued habitat or species, and/or important socio-economic/heritage value within the Risk EMBA for Stag activities (refer to Section 3.1 of the Stag Drilling EP and Section 3 of the Stag Field Operations EP). This analysis is used to identify Protection Priority Areas (PPAs) within the Risk EMBA.

Jadestone defines PPAs as:

- emergent receptors (i.e. coastal areas and islands) that are predicted to be contacted at moderate thresholds at greater than 5% probability; and
- receptors predicted to be contacted within the shortest timeframe; or
- receptors predicted to be contacted at the highest volumes; or
- Are vulnerable to impact from hydrocarbons – e.g. mangroves are more vulnerable than intertidal rock pavement; known turtle nesting beaches are vulnerable during nesting periods; or
- Any other area of interest within the Risk EMBA including areas that have a high social value or are a concern raised through stakeholder consultation (refer Section 4 of the Stag EPs).

Table 4-6 outlines the list of PPAs associated with Stag activities and a ranking, which is consistent with the rankings in Provision of WA Marine Oil Pollution Risk Assessment – Protection Priorities: Assessment for Zone 2: Pilbara (Advisian, 2017). An initial response priority is provided for the PPAs, using a combination of the receptors rankings, the modelled maximum total volumes ashore and minimum time to shoreline contact.

The PPAs listed in Table 4-6 are based on stochastic spill modelling results, which include hundreds of individual spill simulations. In addition, this list of PPAs does not discount the importance of other sensitivities.

The PPAs are presented to help guide the IMT when making decisions on where to prioritise their available resources and have been used as a basis for demonstrating that Jadestone has the capability to respond to the nature and scale of a worst-case credible spill from Stag activities.

Implementation of operational and scientific monitoring may focus on other receptors as described in the Stag OSMP-BIP (GF-70-PLN-F-00003).

Table 4-6: Initial Priority Protection Areas – Stag Facility Scenario 5 (MDO vessel collision) and Scenario 6 (Stag Crude pipeline spill)

Priority Protection Area	Key Sensitivities	DoT Ranking (Floating oil)	DoT Ranking (Dissolved oil)	Key locations	Relevant key seasonal periods	Peak volume on shoreline (m^3)	Min. arrival time (days) shoreline accumulation ≥100 g/m^2	Initial Response Priority
Montebello Islands (DoT Cells 318 and 319)	Turtles Loggerhead (Endangered) and green (Vulnerable) (significant rookeries); hawksbill (Vulnerable), flatback (Vulnerable) turtles	4	3	Northwest and Eastern Trimouille Islands (hawksbill) Western Reef and Southern Bay at Northwest Island (green)	Turtle nesting and breeding Nov to Mar with peak in late Dec/early Jan	Scenario 5 (vessel collision [MDO]) = 6 Scenario 6 (pipeline spill [Stag Crude]) = 68	Scenario 5 (vessel collision [MDO]) = 6 Scenario 6 (pipeline spill [Stag Crude]) = 1.1	Medium
	Mangroves (globally unique as they are offshore mangrove communities)	3	3	Widespread and present in lagoons. Important stands in Stephenson Channel	N/A			Medium
	Birds Migratory and threatened seabirds – at least 14 species Significant nesting, foraging and resting areas	3	2	Widespread	Nesting: Sep to Feb			Medium
	Coral reefs and other subsea benthic primary producers	3	4	Widespread	Coral spawning: Mar & Oct			Low
	Marine mammals Pygmy blue whale (Vulnerable) and	3	2	N/A	Pygmy blue whale migration: Apr to Aug			Low

Priority Protection Area	Key Sensitivities	DoT Ranking (Floating oil)	DoT Ranking (Dissolved oil)	Key locations	Relevant key seasonal periods	Peak volume on shoreline (m^3)	Min. arrival time (days) shoreline accumulation ≥100 g/m^2	Initial Response Priority
	humpback whale migration area Dugong				Humpback whale peak migration between June –Aug			
	<u>Socio-economic</u> Pearling (inactive/pearling zones) Very significant for recreational fishing and charter boat tourism (Marine Management Area) Social amenities and other tourism Nominated place (national heritage) European history and maritime heritage Identified Aboriginal Heritage Place (Haynes Cave, Noala Cave)	3	2	Widespread	Year-round			Low

4.5 Predict Outcomes

4.5.1 Response Toolbox

Possible response strategies for a surface oil spill include:

- Monitor and evaluate
- Source control
- Containment and recovery
- (Mechanical) physical dispersion
- Chemical dispersion – surface application
- Shoreline protection
- Shoreline clean-up
- In-situ burning
- Oiled wildlife response

Support functions:

- Waste management
- Scientific monitoring

4.5.2 Response Planning Thresholds

In addition to the impact assessment thresholds described in the Stag Drilling EP (Section 7.5.3.2) and Stag Field Operations EP Section (7.4.2.1), response thresholds have been developed for response planning to determine the conditions that response strategies would be effective. These thresholds are provided as a guide for response planning based on case studies that have demonstrated some response strategies (e.g. chemical dispersant application) require certain oil spill thicknesses and conditions to be effective.

The thresholds assist with understanding worst-case spill scenario response strategy capability requirements when used in conjunction with oil spill trajectory modelling results. Modelling informs the predicted spatial extent of the spill at certain response thresholds, which in turn can inform response strategy capability.

Response planning thresholds are provided in Table 4-7.

Table 4-7: Response Planning Hydrocarbon Thresholds

Hydrocarbon (g/m^2)	Description	Justification
≥1	Estimated minimum threshold for commencing some monitoring components (e.g. water quality monitoring) and monitoring and evaluation tactics (e.g. aerial surveillance)	This thickness approximates the range of socio-economic effects and helps to establish the spatial extent for scientific monitoring (NOPSEMA, 2019).
≥10	Estimated minimum threshold for commencing all triggered monitoring components	This approximates the lower limit for harmful exposures to birds and marine mammals (NOPSEMA, 2019) so assists with planning for related scientific monitoring components.
≥50	Estimated minimum floating hydrocarbon threshold for on water response strategies	Surface chemical dispersants are most effective on hydrocarbons that are at a thickness of 50–

Hydrocarbon (g/m^2)	Description	Justification
		100 g/m^2 on the sea surface. EMSA (2010) recommends thin layers of spilled hydrocarbons should not be treated with dispersant. This includes Bonn Agreement Oil Appearance Codes (BAOAC) 1–3 (EMSA, 2010). However, this may not always be practical in the field, as the actual thickness of a slick can vary greatly over even short distances (IPIECA-IOPG, 2015a). Hence, this threshold is applied for planning purposes but should be judged according to real-time conditions in the event of a spill. McKinney and Caplis (2017) tested the effectiveness of various oil skimmers at different oil thicknesses. Their results showed that the oil recovery rate of skimmers dropped significantly when oil thickness was less than 50 g/m^2.
≥100	Estimated floating hydrocarbon threshold for on water response strategies. Estimated minimum shoreline accumulation threshold for shoreline clean-up (if required) and subsequent waste management.	This threshold is often used as the minimum thickness for effective shoreline clean-up (Owens and Sergy, 2000; French-McCay, 2009).

4.6 Balance Trade-offs and Select Applicable Response Strategies

Selecting which response strategies to use often involves making trade-offs (e.g. risk, feasibility, flexibility, effectiveness), based on which environmental receptors should receive priority for protection. Table 4-8 indicates the applicability of each possible response strategy (Section 4.5.1) for each of the worst-case spill scenarios listed in Table 4-1.

In addition to this analysis, Appendix D provides an initial assessment of the potential impacts that each of the suitable response strategies has on the environmental values of the identified Protection Priority Areas, noting that response strategies are not used in isolation. This information will be considered in the initial Operational SIMA (Section 10).

Note: The information contained in Table 4-8 has been developed by Jadestone for preparedness purposes. Jadestone may not be the Control Agency or Lead IMT for implementing a spill response. For example, for Level 2/3 spills within or entering WA State waters, DoT will ultimately determine the strategies and controls implemented for most WA State water activities with Jadestone providing resources and planning assistance.

Table 4-8: Evaluation of Applicable Response Strategies – Strategic SIMA

OSR strategy	Scenario No.			Operational Considerations
	1, 2, 6 (Subsea release Stag Crude)	3,4 (Surface release Stag Crude)	5 (Surface release MDO)	
Source Control	Primary response strategy	Primary response strategy	N/A	**Scenarios 1,2,3,4,6:** Emergency Shutdown Devices will be activated to isolate and control the source of the spill. The Stag Incident Response Plan (GF-00_PR-F-00041) will be activated. Implementation of Emergency Pipeline Repair Plan (GF-09-PLN-L-00039) (Pipeline leak scenario). **Scenario 5 – Vessel collision:** In the event of a vessel spill, the Vessel Master would revert to the SOPEP, which is a MARPOL requirement for applicable vessels. The SOPEP may include guidance for securing cargo via transfer to another storage area on-board the vessel, transfer to another vessel, or through pumping in water to affected tank to create a water cushion (tank water bottom). Trimming the vessel may also be used to avoid further damage to intact tanks.
Monitor and evaluate	Primary response strategy	Primary response strategy	Primary response strategy	Surveillance actions are used to monitor and evaluate the dispersion of the released hydrocarbon, and to identify and report on any potential impacts to flora and fauna that may occur while the spill disperses. This strategy has several tactics (e.g. tracking buoys, aerial surveillance, satellite surveillance) and is scalable according to the nature and scale of a spill. There are clear benefits in maintaining situational awareness throughout the duration of a spill event and little or no environmental impact associated with its implementation. Operational monitoring results can also be used to assist in escalating or de-escalating response strategies as required.
Chemical Dispersion (Surface)	Secondary response strategy	Secondary response strategy	Not recommended	**Stag Crude:** Modelling results (RPS, 2020) indicate the largest extent of actionable oil (floating oil ≥10 g/m^2) for any scenario (scenario 1) was 35 km from the spill source. Surface chemical dispersants are most effective on hydrocarbons that are at a thickness of 50–100 g/m^2 on the sea surface. Thin layers of spilled hydrocarbons should not be treated with dispersant (EMSA, 2010) as spraying thin sheens can result in an overdose of dispersant.

OSR strategy	Scenario No.			Operational Considerations
	1, 2, 6 (Subsea release Stag Crude)	3,4 (Surface release Stag Crude)	5 (Surface release MDO)	
				Therefore, the actionable oil area likely to reach the desired thickness of 50–100 g/m^2 for effective surface dispersant application will be localised to the spill location. Operational monitoring would be required to help determine if the desired thickness close to the spill location may be achieved. This information would be required to help inform the Operational SIMA which would determine if surface chemical dispersant application would result in a net environmental benefit (Section 10). SQT results for Stag crude, referenced to the analysis of the crude in its present state from reservoir (Stag crude is significantly degraded from reservoir), indicate that chemical dispersants would be best applied (Window of Opportunity) within the first 72 hours (three days) of a spill before the crude becomes too weathered for effective application. The SQT method applied to the Stag crude has shown an average 40% effectiveness of the three types of chemical dispersant available through AMSA and AMOSC on the NWS with the maximum effectiveness of 60%. **MDO:** is not considered a persistent hydrocarbon and has high natural dispersion rates in the marine environment. Chemical dispersant application is not recommended as a beneficial option for MDO as it has a low probability of increasing the dispersal rate of the spill while introducing more chemicals to the marine environment.
Mechanical dispersion	Not recommended	Not recommended	Not recommended	In general, this strategy is considered an opportunistic strategy; used on targeted, small, breakaway areas, especially patches close to shorelines. Given that oil is expected to emulsify by the time it approaches shorelines, and chemical dispersant application would be preferred as a means of dispersing bulk oil; this strategy has limited effectiveness and is not considered to be a strategy requiring further planning and associated control measures.
In-situ burning	Not recommended	Not recommended	Not recommended	Operational and oil constraints expected during a spill from the Stag activities suggest in-situ burning is not applicable. For in-situ burning to be undertaken, oil has to be thicker than 1–2 mm but marine diesel tends to have high evaporation rate and spreads into very thin films rapidly. Stag crude is a highly weathered oil, with little light fractions and prone to emulsification. In addition, in-situ burning requires containment. Due to operational constraints and the expected hydrocarbon not being suitable for in-situ burning, this response strategy is deemed inapplicable for Stag activities.

OSR strategy	Scenario No.			Operational Considerations
	1, 2, 6 (Subsea release Stag Crude)	**3,4 (Surface release Stag Crude)**	**5 (Surface release MDO)**	
Containment and Recovery	Secondary response strategy	Secondary response strategy	Not recommended	**Stag Crude:** Spill modelling results from the worst-case (120 m^3) Stag Crude spill indicate that floating oil concentrations exceeding 50 g/m^2 are limited to 1 km from the spill site in both seasons (winter and summer). Therefore, containment and recovery has only been included as a secondary response strategy in case there are areas observed at suitable thickness, and as deemed beneficial by the operational SIMA. The drawbacks of this strategy include production of significant volumes of waste due to the collection of water with floating oil, however this can be mitigated to some extent if decanting is permitted. If metocean conditions are favourable, this strategy may result in the removal of floating hydrocarbons from the environment, although recovery rates from historical spills to the marine environment have been limited, ranging from 4-10% of the oil spilt being recovered. **MDO:** Given the fast spreading nature of MDO, and the expected moderate to high sea states of the area causing the slick to break up and disperse, this response is not considered to be effective in reducing the net environmental impacts of an MDO spill. The ability to contain and recover spreading MDO on the ocean water surface is extremely limited due the very low viscosity of the fuel and the inability to corral the hydrocarbon to a sufficient thickness for skimmers to be effective at removal.
Nearshore and Shoreline Protection and Deflection	Secondary response strategy	Secondary response strategy	Not recommended	**Stag Crude**: Deployment will be considered under an Operational SIMA if post-spill monitor and evaluate data predicts contact with sensitive shorelines. Operational SIMA shall consider if resources can be deployed effectively, safely and will not result in more harm than if the product was left to degrade naturally. Given tidal influences, lack of access, lack of anchoring points and subsequent distance for effective placement, this strategy would be unsuitable in many locations. This is not considered to be a primary response strategy. If selected, preparations for this strategy should be made as soon as predictions indicate a possible shoreline impact. DOT Incident Controller (as Control Agency) approval is required before commencing protect and deflect activities in State waters.

OSR strategy	Scenario No.			Operational Considerations
	1, 2, 6 (Subsea release Stag Crude)	**3,4 (Surface release Stag Crude)**	**5 (Surface release MDO)**	
				MDO: Modelling indicates no shoreline accumulation above moderate shoreline accumulation thresholds (≥100 g/m^2).
Shoreline Clean-up	Secondary response strategy	Secondary response strategy	Not recommended	**Stag Crude**: Intrusive response that requires careful site-specific planning in order to reduce secondary impacts of physical disturbance and secondary contamination to intertidal and shoreline habitats. Flushing may be considered if the oil enters high priority/slow recovery habitats such as mangroves. Natural dispersion will occur as the hydrocarbon is remobilised from rock shelves and hard substrates, while residual oil will biodegrade. Due to these disturbances, this response has potential to cause more harm than light oiling, so must be carefully considered under a shoreline assessment and SIMA. If selected, preparations for this strategy should be made as soon as predictions indicate a possible shoreline impact. DoT IC (as Control Agency) approval is required before commencing clean-up activities in State waters. **MDO**: Modelling indicates no shoreline accumulation above moderate shoreline accumulation thresholds (≥100 g/m^2).
Oiled Wildlife Response	Primary response strategy	Primary response strategy	Primary response strategy	**Stag Crude and MDO**: Applicable for marine animals that come close to the spill when on the water and shorelines. Targeted wildlife surveillance/reconnaissance with planning taking into consideration the time of year and key biological activities such as breeding, mating, nesting, hatching or migrating.
Operational and Scientific Monitoring	Primary response strategy	Primary response strategy	Primary response strategy	**Stag Crude and MDO**: Applicable for marine environment contacted by hydrocarbons either by floating, dissolved or entrained.

5. RESOURCING REQUIREMENTS

The resourcing requirements to meet the capability needed to respond to the worst-case credible spill associated with Stag activities have been considered within this OPEP for each response strategy (Sections 11 to 19) and are summarised in Appendix E. This worst-case response needs assessment is based on the Stag Crude spill of 120 m^3 over 12 hours.

This assessment assumes all response strategies may be deployed simultaneously. However, in a real spill event, deployment of response strategies will be based on an operational SIMA, and consequently it is unlikely that all response strategies would be deployed at the same time. To fulfill the required roles, resources have been selected from the various available oil spill support organisations and pools of specialist personnel available to Jadestone within the industry.

The personnel numbers in Appendix E represent the operational requirements and include allowance for an additional 50% of personnel to cover shift changes and manage responder fatigue. Trained response personnel would be delegated to field team leader or supervisor tasks, whereas team members and crews would be sourced from a combination of the following:

- Ad-hoc training for labour-hire personnel for specific response strategy needs on a just-in-time basis
- Where skilled personnel are required (e.g. for vessel crews to support containment and recovery), team members would be sourced from marine service provider contracts but work under the guidance of trained team leaders/supervisors.

6. COST RECOVERY

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

PART B – RESPONSE IMPLEMENTATION

This OPEP should be implemented in conjunction with the Jadestone Incident Management Team Response Plan (IMTRP) (JS-70-PLN-F-00008). Section 3 of the IMTRP provides guidance on the incident management process which is shown in Figure B-1.

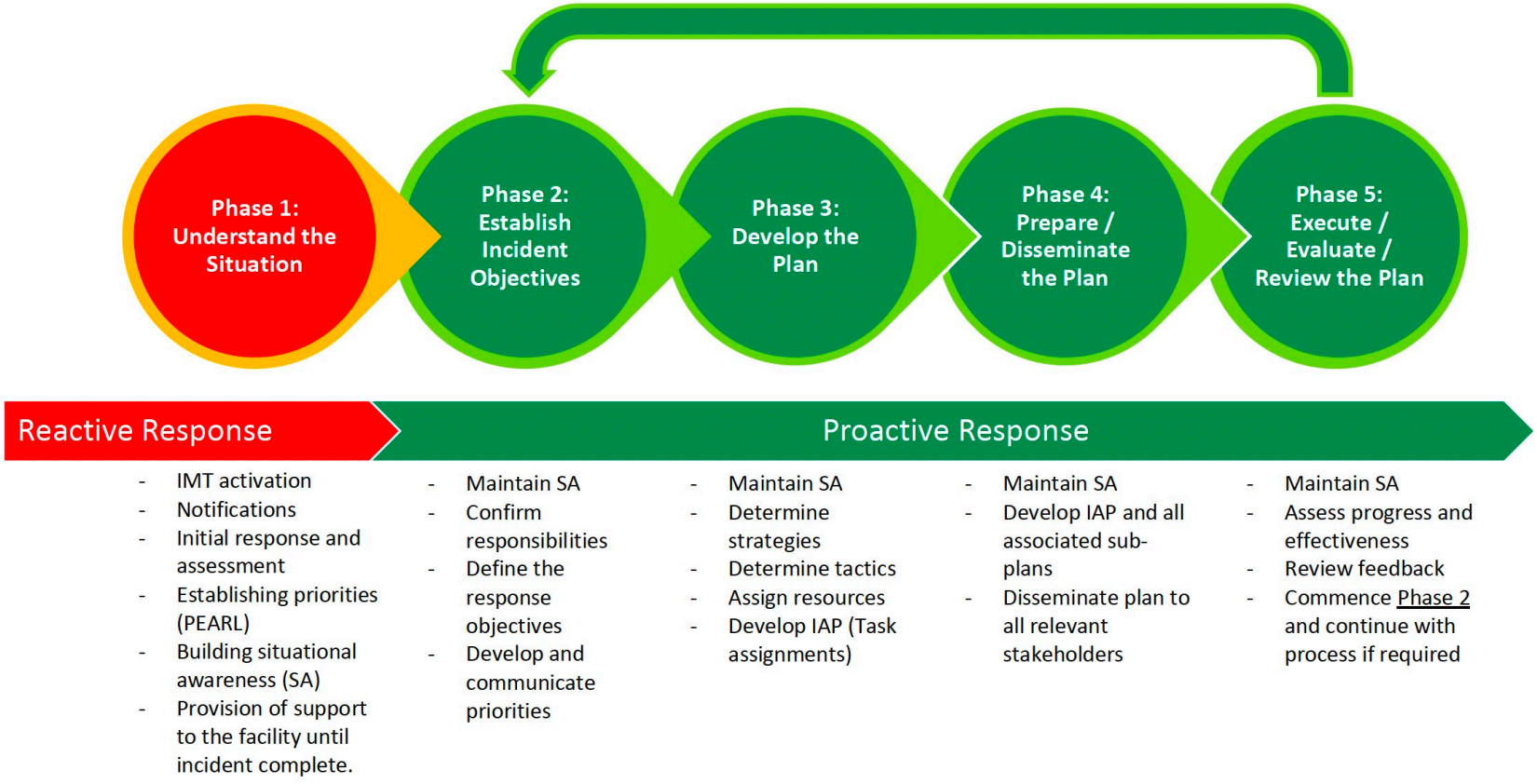

Figure B-1: Jadestone's Incident Management Process

7. INCIDENT ACTION PLAN

Jadestone's IMT use the incident management planning process described in Section 5 of the IMTRP to develop IAPs.

The IAP formally documents and communicates the:

- Incident objectives
- Effectiveness of the response strategies
- Status of assets
- Operational period objectives
- The response strategies approved by the IMT Leader during response planning.

It is the responsibility of the IMT to evaluate the response strategies provided in the OPEP based on real time information. The actual response may not always adopt all response options; this is based on the individual circumstances of the spill and the outcomes of the Operational SIMA. The Operational SIMA and IAP process is implemented throughout the response by the IMT to assess the appropriate response strategies and implement these in a controlled manner to ensure the health and safety of operational personnel, minimise environmental impacts and implement an effective response.

The Operational SIMA is revised for each operational period and informs the preparation of the corresponding IAP. The IAP is developed and implemented by the IMT for each defined operational period following the initial first-strike IAP, notifications, and activations defined in OPEPs. An operational period is the period scheduled for execution of actions specified in the IAP. The IAP is refreshed when conditions change and can have multiple objectives, strategies and tactics.

7.1 Monitoring Performance of IAP

As IAPs are implemented, their performance is monitored through IMT communication with in-field response personnel (e.g. surveillance personnel, vessel masters, air-attack supervisors, team leaders etc.) who report on the effectiveness of the response strategies. Communication to the IMT is both verbally and through logs/ reports/ photos sent throughout the response.

The performance objectives and standards for response strategies and tactics are documented in the IAP. Performance against the objectives and standards are assessed through field observations and response monitoring and recorded in the IAP in the next operational period. Response strategies that are effective in obtaining the IAP objectives are continued or increased, while ineffective strategies are scaled back or ceased.

8. NOTIFICATION OF OIL SPILL RESPONSE ORGANISATIONS AND SUPPORT AGENCIES

The IMT Leader may activate external support if required, to assist with Jadestone incident response activities. Resources offered by these support organisations and instructions on when and how to activate them are provided in Table 8-1. The Incident Management Contact List on the Jadestone intranet page contains the contact numbers for all agencies listed in Table 8-1. This document is regularly reviewed and updated.

Table 8-1: List of spill response support notifications

Organisations	Timeframe for Notification	Activation Instructions	Resources available	Person Responsible for Activating
AMOSC Duty Officer (24 hours / 7 days per week)	As soon as possible but within two hours of IMT being notified of incident	Step 1. Notify AMOSC that a spill has occurred. Put on standby as required – activate if spill response escalates in order to mobilise spill response resources consistent with the AMOSPlan. Step 2. Email confirmation and a telephone call to AMOSC will be required for mobilisation of response personnel and equipment. Only a Jadestone call-out authority (registered with AMOSC) can activate AMOSC and will be required to supply their credentials to AMOSC. A signed Service Contract must also be completed by the Jadestone call-out authority and returned to AMOSC. Step 3. AMOSC will provide a Contract Note, which Jadestone must sign and return to AMOSC before mobilisation.	AMOSC equipment lists are available via the AMOSC Members Hub webpage: https://amosc.sharepoint.com/sites/HUB/SitePages/CollabHome.aspx AMOSC can arrange for transport of their equipment and dispersant to Dampier FOB	IMT Leader (or delegate)
OSRL Duty Manager	Within two hours of IMT being notified of incident	Step 1. Phone OSRL Duty Manager in Singapore and request assistance from OSRL. Step 2. Send written notification to OSRL as soon as possible after verbal notification. Step 3. Upon completion of the OSRL incident notification form, OSRL will plan and place resources on standby.	Jadestone has a Service Level Agreement with OSRL, which includes the provision of support functions, equipment and personnel to meet a wide range of scenarios. At minimum OSRL will provide technical support to the IMT and place resources on standby Further details available on the OSRL webpage.	IMT Leader (or delegate)

Organisations	Timeframe for Notification	Activation Instructions	Resources available	Person Responsible for Activating
Monitoring Service Provider	As per Operational and Scientific Monitoring initiation criteria (Tables 9-1 and 9-2 of the Joint Industry OSM Framework [APPEA, 2021])	Refer to Stag Field OSM-BIP (GF-70-PLN-F-00003) for full activation instructions. Step 1. Obtain approval from IMT Leader to activate Monitoring Service Provider for OSM. Step 2. Verbally notify Monitoring Service Provider Duty Manager followed by submission of Call Off Order Form. Step 3. Monitoring Service Provider initiates OSM Activation and Response Process, as outlined in Stag Field OSM-BIP (GF-70-PLN-F-00003).	Trained personnel as per Contract	Planning Lead (or delegate)
Waste Service Provider	As required	Phone call to the Primary Contact Person. In the event the Primary Contact Person is not available, the Secondary Contact Person will be contacted.	Waste management contractor's waste management equipment are summarised in its Waste Management Plan.	Planning Lead (or delegate)
Aviation Service Provider	As required	Phone call	Fixed wing aircraft and crew	Logistics Lead (or delegate)
Transport and Logistics Service Provider	As required	Phone call	Assistance with mobilising equipment and loading vessels	Logistics Lead (or delegate)
Vessel Service Provider	As required	Phone call	Vessels and crew	Logistics Lead (or delegate)

9. EXTERNAL NOTIFICATIONS AND REPORTING

Depending on the type and nature of the incident, various external notifications will be required. The IMT Leader must ensure that notifications (where required) are completed and managed as part of an ongoing incident.

Table 9-1 outlines the external reporting requirements specifically for oil spill incidents outlined within this OPEP in Commonwealth and State jurisdictions, noting that regulatory reporting may apply to smaller Level 1 spills that can be responded to using on-site resources as well as larger Level 2/3 spills. There are also additional requirements for Vessel Masters to report oil spills from their vessels under relevant marine oil pollution legislation (e.g. MARPOL). This includes, where relevant, reporting oil spills to AMSA (Rescue Coordination Centre), and WA DoT (MEER unit).

The Incident Management Contact List on the Jadestone intranet page contains the contact numbers for all agencies listed in Table 9-1. This document is regularly reviewed and updated.

Table 9-1: Regulatory notification and reporting requirements

Agency / Authority	Notification Type and Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
NOPSEMA Reportable Incidents					
NOPSEMA (Incident Notification Office)	Verbal notification within 2 hours Written report as soon as practicable, but no later than 3 days	*Petroleum and Greenhouse Gas Storage Act 2006* Offshore Petroleum Greenhouse Gas Storage (Environment) Regulations 2009 (as amended 2020)	A spill associated with the activity that has the potential to cause moderate to significant environmental damage[6]	Jadestone IMT Planning Lead	Incident reporting requirements: https://www.nopsema.gov.au/environmental-management/notification-and-reporting/
National Offshore Petroleum Titles Administrator (NOPTA) (Titles Administrator)	Written report to NOPTA within 7 days of the initial report being submitted to NOPSEMA	Guidance Note (N-03000-GN0926) Notification and Reporting of Environmental Incidents	Spill in Commonwealth waters that is reportable to NOPSEMA	Jadestone IMT Planning Lead	Provide same written report as provided to NOPSEMA
Level 1-3 Spills					
AMSA (Rescue Coordination Centre (RCC))	Verbal notification without delay to include:	National Plan for Maritime Environmental Emergencies	All slicks trailing from a vessel All spills to the marine environment	Vessel Master	Incident reporting requirements: https://www.amsa.gov.au/marine-environment/marine-pollution/mandatory-marpol-pollution-reporting

[6] A reportable incident is defined by the OPGGS (E) Regulations as 'an incident relating to the activity that has caused, or has the potential to cause, moderate to significant environmental damage'. For the purpose of determining whether an incident is a reportable incident, the Titleholder considers any incident that causes, or has the potential to cause, a consequence severity rating of 3 or greater to be a reportable incident.

Agency / Authority	Notification Type and Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
	• name of ship/s involved • time, type and location of incident • quantity and type of harmful substance • assistance and salvage measures • any other relevant information • written POLREP form, within 24 hours of request from AMSA		All spills where National Plan equipment is used in a response		Online POLREP – https://amsa-forms.nogginoca.com/public/
Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) (Director of monitoring and audit section)	Email notification as soon as practicable	*Environment Protection and Biodiversity Conservation Act 1999*	If Matters of National Environmental Significance (MNES) are considered at risk from a spill or response strategy, or where there is death or injury to a protected species	Jadestone IMT Planning Lead	N/A
Parks Australia (24 hour Marine Compliance Officer)	Verbal notification as soon as practicable	*Environment Protection and Biodiversity Conservation Act 1999*	All actual or impending spills which occur within a marine park or are likely to impact on an Australian marine park	Jadestone IMT Planning Lead	Not applicable, however the following information should be provided: Titleholder's details Time and location of the incident (including name of marine park likely to be affected)

Agency / Authority	Notification Type and Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
					Proposed OPEP response arrangements Details of the relevant IMT contact person.
Australian Fisheries Management Authority (AFMA)	Verbal phone call notification within 24 hours of incident		Fisheries within the EMBA Consider a courtesy call if not in exposure zone	Jadestone IMT Planning Lead	N/A
WA Waters					
WA Department of Transport (WA DoT) (MEER Duty Officer)	Verbal notification within two hours Follow up with Pollution Report (POLREP) as soon as practicable after verbal notification If requested, submit Situation Report (SITREP) within 24 hours of request	Emergency Management Regulations 2006 State Hazard Plan: Maritime Environmental Emergencies Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements	Notify of actual or impending Marine Pollution Incidents (MOP) that are in, or may impact, State waters. Emergency Management Regulations 2006 define MOP as an actual or impending spillage, release or escape of oil or an oily mixture that is capable of causing loss of life, injury to a person or damage to the health of a person, property or the environment.	Jadestone IMT Planning Lead	WA DoT POLREP: https://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-PollutionReport.pdf WA DoT SITREP: https://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-SituationReport.pdf
WA Department of Mines, Industry Regulation and Safety (DMIRS)	Verbal phone call within 2 hours of incident being identified Follow up written notification within 3 days	Regulations 28, 29 and 30 of the Petroleum (Submerged Lands)	All actual or impending spills in State waters	Jadestone IMT Planning Lead	Environmental and Reportable Incident/ Non-compliance Reporting Form http://www.dmp.wa.gov.au/Environment/Environment-reports-and-6133.aspx

Agency / Authority	Notification Type and Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
(Petroleum Environment Duty Officer)		(Environment) Regulations 2012 Guidance Note on Environmental Non-compliance and Incident Reporting			
Department of Biodiversity Conservation and Attractions (State Duty Officer and Pilbara Regional Office)	Verbal notification within 2 hours	WA Oiled Wildlife Response Plan	Notify if spill has the potential to impact or has impacted wildlife in State waters (to activate the Oiled Wildlife Advisor)	Jadestone IMT Planning Lead	N/A
Department of Primary Industry and Regional Development (DPIRD) Fisheries	Verbal phone call notification within 8 hours	-	Fisheries within the EMBA Consider a courtesy call if not in exposure zone	Jadestone IMT Planning Lead	N/A
Department of Water and Environmental Regulation (DEWR) Pollution Watch Hotline	Initial verbal or electronic notification of the discharge as soon as practicable Written notification of the incident to the CEO of the DWER, copied to	*Environmental Protection Act 1986* (Section 72) Environmental Protection (Unauthorised	Call DWER 24 hour Pollution Watch hotline *Environmental Protection Act*: Spill or discharge of hydrocarbons to the environment that has caused, or is likely to cause pollution,	Jadestone IMT Planning Lead	Reporting requirements: https://www.der.wa.gov.au/your-environment/51-reporting-pollution/110-reporting-a-life-threatening-incident-or-pollution-emergency

Agency / Authority	Notification Type and Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
	the local DWER Industry Regulation Office, as soon as practicable	Discharge) Regulations 2004	or material or serious environmental harm (Level 2 / 3 spills) Environmental Protection (Unauthorised Discharge) Regs.: Unauthorised discharge (where there is potential for significant impact or public interest) to		
Stakeholders (including relevant persons)					
Prescribed Body Corporate (PBCs) with coastline adjacent to spill trajectory	For a level 2 or 3 spill, if oil spill trajectory modelling shows potential contact with the WA coastline, relevant PBCs will be notified within 24 hours of oil spill modelling trajectory confirmation (verbal or written).	Not applicable	Level 3 spill heading towards relevant parties' interests	Jadestone IMT Planning Lead	Not applicable

10. OPERATIONAL SIMA

An Operational SIMA is an iterative process that is used to help guide the preparation of IAPs during a response, so that most effective combination of response strategies with the least detrimental environmental impacts can be identified, documented and executed.

An outline of an Operational SIMA process is provided in Figure 4-1 and considerations to help refine the Operational SIMA are provided in Table 10-1. Real-time data from monitor and evaluate and operational monitoring activities will be incorporated into the Operational SIMA, so that the IMT can adjust the response according to the effectiveness of the strategies and tactics that occurred during each operational period.

Following implementation of the initial (first strike) response actions (Table A-1 to Table A-3), the Strategic SIMA and evaluation of response strategies (Table 4-8) will form the basis for the initial Operational SIMA.

The initial Operational SIMA will be a priority action for the Planning Section once they are activated but may be based on limited information. However, the overall response effort should not be delayed due to a lack of some information. The initial Operational SIMA can be revised when more information becomes available.

The Planning Section is responsible for completing the Operational SIMA and to determine if outputs from the Strategic SIMA are still appropriate. The Operational SIMA should be revised during each new Operational Period and should incorporate all relevant monitor and evaluate data (Section 11), weather and ocean conditions, and operational monitoring data (Section 19.1) and should be used to inform and refine the IAPs. As part of the assessment, the Planning Section will need to consider the potential impacts that each of the suitable response strategies may on the environmental values of the receptors at risk of contact from the spill (Appendix D), noting that response strategies are not used in isolation.

Table 10-1: Operational SIMA Considerations

Response Strategy	Considerations

Monitor and evaluate (and components of operational monitoring)	• Which monitor and evaluate tactics will provide reliable and accurate data for the individual spill?
	• What sensitive receptors are in the current or anticipated trajectory?
	• What is the assessed volume and size of the spill?
	• Is the product weathering as anticipated?
	• What data is being returned from operational monitoring and how can this be used to aid decision making?
	• How do the response options and tactics seem to be influencing the spill?
	• Shoreline assessment (only):
	  ○ Will access to remote shorelines be safe and feasible?
	  ○ Will assessment teams disturb sensitive seasonal nesting species?

Containment and recovery	• Are metocean conditions favourable for the available equipment? • Will the spill thickness be adequate for recovery when containment and recovery packages arrive on site?
Chemical dispersant application	• How long will the spill thickness be favourable for dispersant application? • Is the mobilisation time within the Window of Opportunity? • Has the approval for chemical dispersant spraying been granted by the appropriate authorities? • Is the product too weathered for dispersants to be effective?

Response Strategy	Considerations
	• What Dispersant-to-Oil Ratio (DOR) is required for this strategy to be effective on this product? • What are the metocean conditions and how would this affect the DOR? • What dispersant types are most effective on the particular product spilt? • Can the conditions in Section 15.3 be met? • Are there any seasonal receptors that could be adversely affected by dispersant application? • What are the likely long-term effects of hydrocarbons on shoreline receptors (e.g. mangroves) over effects on sub-surface receptors (e.g. coral and benthic habitats)? Consider recovery rates of different receptor types).
Protection and deflection	• Have the protection priorities been ground-truthed and are there seasonal receptors that should be prioritised for protection? • Are conditions (e.g., tides, current, sea state) favourable for this strategy to be effective in open ocean environments immediately surrounding the emergent sensitivities (reefs)? • Can tactics be deployed in time? • Will access to the shallow intertidal areas on top of emergent sensitivities be safe and feasible? • Can the IMT access suitable shallow draft vessels to safely establish booming arrangements (e.g. does the vessel have ability to transfer anchors and booms; does it have adequate tie-points?). • Is there potential that reefs could be damaged from anchor drag?
Shoreline clean-up	• What volumes and/or concentrations of hydrocarbons are present or expected on the shoreline and what would be the impact to leave the product to weather naturally (taking into consideration the effects of MDO as a lighter hydrocarbon type – high evaporation rates but more toxic and greater ability to penetrate sediments)? • Have the protection priorities been ground-truthed and are there seasonal receptors that should be prioritised for protection? • Will access to remote shorelines be safe and feasible? • Will responders disturb sensitive seasonal nesting species? • Would it reduce overall impacts to send small teams of clean-up personnel?
Oiled wildlife response	• Is there adequate monitoring for wildlife, taking into consideration temporal and spatial species-specific considerations? • Are known species breeding or nesting? • What level of wildlife impact has occurred or is expected to occur? • What wildlife response strategies are feasible and safe?

11. MONITOR AND EVALUATE STRATEGY

11.1 Initiation and Termination Criteria

Environmental Performance Objective	To acquire and maintain situational awareness and assess the effectiveness of response options during a spill event to inform IMT decision making.	
Applicable Hydrocarbons	Stag Crude	✓ (1)
	MDO	✓ (1)
Initiation Criteria		
Tracking buoy	Immediately once an oil spill is confirmed	
Oil spill trajectory modelling	Immediately once Level 2/3 oil spill is confirmed	
Visual surveillance (aerial and vessel surveillance)	Immediately once Level 2/3 oil spill is confirmed	
Satellite surveillance	Immediately once Level 2/3 oil spill is confirmed	
Termination Criteria		
Tracking buoy	Tracking buoy is no longer required to inform response planning.	
Oil spill trajectory modelling	Spill fate modelling will continue for 24 hours after the source is under control and a surface sheen is no longer observable. Specifically, a 'silvery/grey' sheen, as defined by the Bonn Agreement Oil Appearance Code, is no longer observable; or Until no longer beneficial to predict spill trajectory and concentration; or As directed by the relevant Control Agency.	
Visual surveillance (aerial and vessel surveillance)	When the spill is no longer visible to surveillance personnel. Specifically, a 'silvery/grey' sheen, as defined by the Bonn Agreement Oil Appearance Code, is no longer observable; or As advised by relevant Control Agency.	
Satellite surveillance	Satellite monitoring will continue until no further benefit is achieved from continuing; or As advised by relevant Control Agency.	

11.2 Overview

Monitor and evaluate involves the collection and evaluation of information to provide and maintain situational awareness in the event of a spill. Monitor and evaluate activities should be conducted throughout the spill response, as the data obtained provides the IMT with ongoing information on the spill's location, movement and extent, and verifies the outputs of oil spill trajectory modelling. Visual observations are important for validating sensitive receptors at risk of impact from the spill and the effectiveness of spill response operations. Monitor and evaluate data should be used by the IMT when updating response (operational) SIMAs and in the development of IAPs.

The monitor and evaluate response strategy includes a range of tactics which may be suitable for the spill scenarios covered by this OPEP. The relevance and suitability of the following tactics will need to be considered when preparing the Operational SIMA for individual spills.

- Deployment of tracking buoy(s) – requires a buoy to be deployed to the water at the leading edge of the spill to track the movement of the spill.

- Oil spill trajectory modelling – uses computer modelling (e.g. SIMAP) to estimate the movement, fate and weathering of spills.
- Visual observation (via aerial and/or vessel surveillance) – requires trained observers to identify and characterise spills. Survey platforms typically include aircraft and/or vessels. Is also used to ground truth oil spill trajectory modelling and monitor the effectiveness of response options.
- Satellite surveillance – uses satellite technology to identify and track oil spills.

Note: Shoreline clean-up assessment is included as an operational monitoring scope and is included in the Stag Field OSM-BIP (GF-70-PLN-F-00003).

11.3 Implementation Guide

Table 11-1 provides guidance to the IMT on the actions and responsibilities that should be considered when implementing this response strategy.

The On-Scene Commander and/or IMT Leader of the designated Control Agency is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 11-1: Implementation Guidance – Monitoring, Evaluation and Surveillance

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Tracking buoy/s					
Initial actions	On Scene Commander	Direct personnel to deploy buoy from the facility or vessel.	Note deployment details, including serial number of the deployed tracking buoy, and weather conditions in incident log. Buoy should be deployed as close as possible to the leading edge of the spill (personnel and vessel safety is priority and must be considered by Vessel Master prior to selecting this tactic).	Deploy within one hour of being notified of spill.	☐
	On Scene Commander	Inform IMT that buoy has been deployed and provide IMT with current weather conditions.	-	-	☐
	Planning Lead	Verify deployment of tracking buoy using tracking buoy login details.	Tracking buoy login details held in Jadestone's IMT Portal.	-	☐
	Planning Lead	Ensure tracking buoy location is added to the Common Operating Picture/Status Boards.	-	-	☐
	Planning Lead	Ensure deployment of tracking buoy is captured in Incident Log.	-	-	☐
Ongoing actions	Planning Lead	Use tracking buoy data to regularly update Common Operating Picture/Status Boards in IMT.	-	-	☐
	Planning Lead	Provide tracking buoy data to spill trajectory provider (RPS) to improve the accuracy of spill model.	Provide to RPS with other monitor and evaluate, and operational monitoring data as it becomes available, but as a minimum at the end of each operational period.	-	☐
	Planning Lead	Consider deployment of additional tracking buoys.	Liaise with On Scene Commander to determine requirements for additional buoys.	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Oil spill trajectory modelling (OSTM)					
Initial actions	Planning Lead	Contact AMOSC and/or RPS Group Duty Manager to execute OSTM service contract and commence trajectory modelling.	-	Activate within 4 hours of IMT being convened for a Level 2/3 spill notification	☐
	Planning Lead	Complete and submit the hydrocarbon spill modelling request form to RPS Group Duty Manager (if required). Call RPS and confirm receipt of hydrocarbon spill modelling request form.	Note actions in incident log.	Modelling to be undertaken within 2–4 hours of the request being sent to RPS Group, then every operational day during the spill response.	☐
	Planning Lead	Update incident log with request for OSTM and estimated time of delivery.	-	-	☐
	Planning Lead	If chemical dispersants are considered applicable strategy for spill scenario, request modelling provider to model how dispersant addition affects the distribution and concentration of floating oil, subsea oil and shoreline loading.	-	-	☐
Ongoing actions	Planning Lead	Request RPS to provide daily trajectory modelling, plus three day forecast outputs throughout the duration of the response. Integrate data into Common Operating Picture/Status Boards.	-	-	☐
	Planning Lead	Provide available data from other monitor and evaluate activities (i.e. visual surveillance, satellite data) and operational monitoring (where available) to RPS at the end of each operational period, to improve spill trajectory model accuracy.	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Visual surveillance (if selected)					
Aerial surveillance Note: Flights will only take place during daylight under visual flight rules.					
Initial actions	Operations Lead	Contact AMOSC to commence deployment of aerial surveillance and trained aerial observers. Note: It is possible that the initial surveillance flight will not include a trained aerial surveillance observer, as they may take up to 48 hours to deploy. Initial flights can be conducted using a standard crew and initial surveillance should not be delayed waiting for trained personnel. Ensure all safety requirements are met prior to deployment.	Trained observers should be familiar with the Bonn Agreement Aerial Operations Handbook (Part III) (Bonn Agreement, 2016). A Visual Surveillance Observation Log template is provided in Appendix G. Trained aerial observers are available from AMOSC (24 hours mobilisation time), AMSA National Response Team (via the National Plan) and through mutual aid arrangements from operators with trained staff.	Within two hours of initial AMOSC activation	☐
	Logistics Lead Operations Lead	Obtain approval from IMT Leader to initiate aerial surveillance activities, and then contact aviation provider confirm availability of aerial surveillance platform to conduct initial surveillance flight.	If an aviation asset is available near spill location, utilise this where possible to gather as much information about the spill. If aviation asset is not available at or near spill location, IMT is to seek available resources through existing contractual arrangements. Ensure aviation asset has sufficient endurance to be deployed to surveillance location. There should be an attempt to obtain the following data during initial surveillance: • name of observer, date, time, aircraft type, speed and altitude of aircraft • location of slick or plume (GPS positions, if possible)	Completed Visual Surveillance Observation Logs to be sent to IMT within one hour of observations being completed.	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
			• spill source • size of the spill, including approximate length and width of the slick or plume • visual appearance of the slick (e.g., colour) • edge description (clear or blurred) • general description (windrows, patches etc.) • wildlife, habitat or other sensitive receptors observed • basic metocean conditions (e.g., sea state, wind, current) • photographic/video images		
	Operations Lead	Obtain approval from IMT Leader to commence surveillance flights in the vicinity of the facility.	Operations Section is to assume primary coordination for all flights.	-	☐
	Operations Lead	Once initial flight is complete determine if additional flights are required.	-	-	☐
	Operations Lead	In addition to arranging initial flight, mobilise aircraft and trained observers to the spill location to undertake surveillance activities. Ensure all safety requirements are met.	Aerial platform should be capable of providing the following: • immediate accessibility from Karratha or Exmouth airport/s • capability to fly at 150 feet • sufficient range for deployment to the spill location • provision of aircraft crew for 1 x aircraft and space for at least one trained aerial observer	-	☐
	Operations Lead	All records to be relayed to Planning Lead when aircraft returns from observation flight.	Visual observations from aircraft have inherent subjectivity due to the effect of the angle of insolation on the surface of the ocean. Optical	Completed Visual Surveillance Observation Logs to be sent to IMT within one hour of	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	On Scene Commander		techniques are also dependent on cloud cover and daylight. Where possible, a verbal report via radio/telephone en-route providing relevant information should be considered if the aircraft has long transits from the spill location to base.	observations being recorded.	
	Operations Lead On Scene Commander	Aerial Observers shall note fauna sightings in the Observation Log (Appendix G)	The location and details of each sighting should be recorded with coordinates and a cross-reference to photographic imagery captured.	-	☐
Ongoing actions	Planning Lead	Use aerial surveillance data to update Common Operating Picture/Status Boards, incorporating relevant information into the IAP.	-	-	☐
	Operations Lead	Develop a flight schedule for ongoing aerial surveillance.	Frequency of flights should consider information needs of IMT to help maintain the Common Operating Picture and determine ongoing response operations Coordination of all aviation operations is essential. Therefore, flight schedule is to cover all planned aviation operations on a daily basis.	-	☐
Vessel surveillance Note: Vessel-based surveillance is only effective if sea state conditions are calm and the spill is observable.					
Initial actions	Operations Lead	Determine if there are any vessels available to follow spills and aid surveillance activities.	Support vessels may be able to provide surveillance.	-	☐
	Operations Lead	Provide IMT initial report on estimated spill volumes and movement based on visual observation (if possible).	Preliminary observations are intended to provide initial projections of spill trajectory and scale prior to more detailed modelling and surveillance. These observations should be immediately verified by	Completed Visual Surveillance Observation Logs (Appendix G) to be sent to IMT within one hour of	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
			more detailed surveillance. A Visual Surveillance Observation Log template is provided in Appendix G.	observations being recorded.	
Ongoing actions	Operations Lead	If vessel surveillance is feasible, ensure surveillance data is regularly incorporated into the Common Operating Picture.	-	-	☐
Satellite Surveillance (if selected)					
Initial actions	Planning Lead	Notify AMOSC Duty Officer to request initiation of satellite services via KSAT (OSRL subscription available as a secondary option) and provision of daily imagery	-	Request made within 6 hours of IMT being convened Access to KSAT Satellite imagery within 60 mins of notification	☐
	Planning Lead	Combine satellite data with other optical imagery (aerial surveillance, vessel-based observations) to mitigate issues of angle of insolation, thick cloud cover and night	Satellite derived data can be used to broaden aerial survey data in terms of both spatial and temporal scale and provide images	-	☐
Ongoing actions	Planning Lead	Request satellite imagery be provided every 48 hours throughout the duration of the response and integrate data into Common Operating Picture/Situation Boards	-	-	☐
General					
Ongoing actions	Planning Lead Environment Unit Lead	Use monitor and evaluate data to periodically reassess the spill and modify the response (through the IAP), as required	Incorporate relevant information into Operational SIMA	-	☐

11.4 Resource Capability

Table 11-2 provides a list of resources that may be used to implement this strategy.

Table 11-2: Resource Capability – Monitoring, Evaluation and Surveillance Strategy

Resources	Source	Quantity Available	Location	Mobilisation Timeframe
Tracking buoys	Jadestone	2	Stag Facility	Within one hour of spill notification
	AMOSC	4 4	Fremantle Geelong	24 hours
OSTM	RPS via AMOSC Contract	Minimum of 1 model per day	Perth and Brisbane – digital	2–4 hours from activation of OSTM
Aerial surveillance aircraft	Jadestone contracted aviation provider	2 x contracted (1 x primary + 1 x backup) + additional as required	Karratha	Spill surveillance initiated within <10 hours (daylight dependent) of IMT being convened
Aerial surveillance personnel	AMOSC staff and Industry Mutual Aid personnel	5 x AMOSC staff Additional trained Industry Mutual Aid personnel	Perth, Geelong and regional WA	<24–48 hours
Unmanned Aerial Surveillance (UAV) drones and pilots	AMOSC OSRL – Third Party UAV provider	1 x pilot and UAV 2 x qualified remote pilots and UAVs, however response is on best endeavour	Geelong Perth and regional WA	<48 hours OSRL – depending on the port of departure, one to two days if within Australia
Surveillance vessels	Jadestone contracted vessel providers	Availability dependent upon Jadestone and vessel provider activities.	Vessels mobilised from Dampier, Exmouth or offshore location. Locations verified through AIS Vessel Tracking Software.	Vessel surveillance initiated within 24 hours of request from IMT

Resources	Source	Quantity Available	Location	Mobilisation Timeframe
Satellite surveillance	KSAT – activated through AMOSC MDA – activated through OSRL	Dependent upon overpass frequency (TBC on activation)	Digital	Data available within 24 hours, then every 6–24 hours thereafter depending on satellite positions.

11.5 Environmental Performance

Table 11-3 lists the environmental performance standards and measurement criteria for this strategy.

Table 11-3: Environmental Performance Standards and Measurement Criteria – Monitoring, Evaluation and Surveillance

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS06	Maintain contracts with third-party providers to provide access to suitably qualified and competent personnel and equipment to assist in the implementation of monitor and evaluate tactics	AMOSC Master Services Agreement
		OSRL Service Level Agreement
		Access to National Plan resources through AMSA
		Contract is maintained which enables access to tracking buoy services
		Aviation and vessel contracts in place for the duration of the activity
EPS07	Tracking buoy available and maintained according to manufacturer specifications for duration of the activity	Records demonstrate that tracking buoys are available and maintained according to manufacturer specifications for the duration of the activity
Response Implementation (only required in the event of a spill)		
EPS08	Deploy tracking buoy close to leading edge of spill (providing it is safe to do so) within 1 hour of On Scene Commander being made aware of the spill	Records indicate that tracking buoy deployed close to leading edge of spill within 1 hour of On Scene Commander being made aware of the spill
EPS09	Provide available data from monitor and evaluate activities to oil spill trajectory modelling provider at the end of each operational period to help improve spill model accuracy	Records indicate that at the end of each operational period available data from monitor and evaluate activities was submitted to oil spill trajectory modelling provider to help improve spill model accuracy
EPS10	Completed Visual Surveillance Observation Logs to be sent to IMT within one hour of observations being recorded.	Records indicate that completed Visual Surveillance Observation Logs sent to IMT within one hour of observations being completed.
EPS11	Available monitoring data incorporated into the Common Operating Picture and Operational SIMA at the end of each operational period to aid in response decision making	Incident Log shows available monitoring data incorporated into Common Operating Picture and Operational SIMA at the end of each operational period
EPS12	Response operations conducted during daylight hours only	Incident Log
EPS13	Response vessels stand-off at night with lighting required for safety only	Incident Log

12. SOURCE CONTROL

12.1 Initiation and Termination Criteria

Environmental Performance Objective	To minimise the total volume of spilled oil into the marine environment	
Applicable Hydrocarbons	Stag Crude	✓ (1)
	MDO	✓ (1)
Initiation Criteria		
Stag Facility releases	Notification of a spill from the Stag Facility	
Vessel collision	Notification of a spill from a vessel	
Termination Criteria		
Stag Facility releases	When release of hydrocarbons into the marine environment has ceased and the workplace environment is deemed environmentally safe and free of hydrocarbons	
Vessel collision	When release of hydrocarbons into the marine environment has ceased and the workplace environment is deemed environmentally safe and free of hydrocarbons	

12.2 Overview

In the event of a process incident such as loss of integrity, process upset, failure or damage, the pump will be stopped upon detection of the leak and relevant operations will cease as per the Stag Incident Response Plan (GF-00-PR-F-00041). For incidents involving the Marine Breakaway Coupling, 'petals' would be activated that would seal the leak in ~11 seconds. The hydrocarbon remaining in the transfer line may escape to the environment as well as any hydrocarbon released prior to the transfer operation being stopped. For bunker transfer this has been estimated at a maximum volume of 5 m^3 (representing a 60 m^3/hour pump rate and a worst-case release duration of up to five minutes) as bunkers are taken with a watchman on deck of the supply vessel and a pump stop at the bunker station. For a subsea pipeline loss of integrity, the worst-case release volume is estimated at 120 m^3 Stag crude. Were a pipeline loss of containment to occur, the system will be shutdown and the Emergency Pipeline Repair Plan (GF-09-PLN-L-00039) implemented. Scope and timing of a pipeline repair would be subject to a number of both technical and commercial considerations but would likely follow the below high-level sequence of events:

- Leak discovered;
- Leak inspected (by Remotely Operated Vehicle, as soon as possible), leaking segment flushed, isolated or both;
- Repair options evaluated
- Repairs executed or pipeline isolated/preserved for (future) abandonment; and
- Pipeline brought back into service (when repaired) and pipeline inspection regime updated accordingly.

If a rupture or leak occurs in the topside processing equipment, the wellhead and topside valves will automatically close and production will cease in accordance with the Safety Critical Elements Performance Standards Report (GA-70-REP-F-00007). Shut off valves are regularly serviced and tested to ensure they will work properly if required. Released oil will be captured in the CPF's bunds, which have closed drainage systems that deliver drainage water (which may contain hydrocarbon contamination) to a designated

storage tank. The third-party tanker and support vessels also have closed drainage systems for capture of onboard leaks.

The spilt hydrocarbons contained onboard the third-party tanker or support vessels will be controlled and cleaned up in accordance with each vessels SOPEP, which is compliant with MARPOL 73/78 Annex 1- *Prevention of Pollution by Oil under the Protection of the Sea (Prevention of Pollution from Ships) Act 1983*. The mitigation measures within each SOPEP include:

- Pumping operations ceased immediately following the spill
- Valve/s closed
- System receiving product is immediately shut down following a spill
- Drainage network is closed as soon as practicable following the spill to prevent discharge/ spillage to the ocean
- Make necessary repairs to pipe to prevent further leakage
- Use spill kit to clean-up spills on platform and/or vessel
- Store any clean up waste in bunded area for onshore disposal.

Collected fluids are processed and treated to meet the OIW content specification of <30 mg/L prior to discharge. Areas used for the permanent or temporary storage of bulk fuels and/ or chemicals are either fully bunded by sealing deck drains or secondary containment is provided to prevent accidental discharges to the ocean. Bunding is also located beneath the refuelling hose connections, operational equipment, and fuel tanks on the supply vessel. Closed drains on the platform and third-party tanker will isolate a spill that falls in these areas from the marine environment.

In the event hydrocarbon is spilt onto the decks of the vessel/ platform, the relevant SOPEP, or Jadestone's Stag Incident Response Plan (GA-90-PR-F-00041) in the case of the CPF, will be implemented. Sorbent materials are used from spill kits onboard the vessel/ platform to mop up hydrocarbon on deck. Soiled sorbent materials are bagged and disposed to shore. Before washing down the deck after excess oil has been cleaned up, the OIM/ Vessel Master will confirm that the drainage network is closed and will not discharge to the ocean.

Section 7 of Stag Drilling and Stag Field Operations EP describes the environmental risks and management for unplanned events associated with the Stag Facility.

12.3 Implementation Guide

Table 12-1 provides guidance to the IMT on the actions and responsibilities that should be considered when implementing this response strategy.

The On-Scene Commander and/or IMT Leader is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 12-1: Implementation Guidance – Source Control

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Loss of pipeline integrity (subsea)					
Initial actions	IMT Leader	Refer to the Jadestone Emergency Pipeline Repair Plan (JS-09-PLN-L-00001)	-	-	☐
Fuel tank rupture (vessel collision)					
Initial actions	Vessel Master	Refer to the individual vessel's SOPEP and the Stag Incident Response Plan (GF-00-PR-F-00041).	The following activities would be evaluated immediately for implementation, providing it is safe to do so and if they are consistent with the vessel-specific SOPEP and associated procedures: • Reduce the head of fuel by dropping or pumping the tank contents into an empty or slack tank. • Consider pumping water into the leaking tank to create a water cushion to prevent further fuel inventory loss. • If the affected tank is not easily identified, reduce the level of the fuel in the tanks in the vicinity of the suspected area if stability of the vessel will not be compromised. • Evaluate the transfer of fuel to other vessels. • Trim or lighten the vessel to avoid further damage to intact tanks. • Attempt repair and plugging of hole or rupture.	-	☐

12.4 Environmental Performance

Table 12-2 lists the environmental performance standards and measurement criteria for this strategy.

Table 12-2: Environmental Performance Standards and Measurement Criteria – Source Control

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS14	Stag Incident Response Plan (GF-00-PR-F-00041) is reviewed annually	Records demonstrate that the Stag Incident Response Plan (GF-00-PR-F-00041) has been reviewed annually
EPS15	Vessels associated with the activity have a SOPEP or Shipboard Marine Pollution Emergency Plan (SMPEP) that outlines steps taken to combat spills	Audit records and inspection records demonstrate that vessels have a SOPEP or SMPEP
Response Implementation (only required in the event of a spill)		
EPS16	Stag Incident Response Plan (GF-00-PR-F-00041) activated as soon as possible from when OSC is made aware of the incident	Incident log
EPS17	Actions to control spill associated with a vessel incident followed in accordance with the vessel-specific SOPEP	Records demonstrate that actions to control spill associated with a vessel incident followed in accordance with the vessel-specific SOPEP

13. NATURAL RECOVERY

Natural recovery is the process of letting hydrocarbons degrade naturally in the environment, either offshore or onshore. This section addresses offshore natural recovery, including degradation on or in the water column. There are no initiation or termination criteria, nor capability required to implement it apart from supporting strategies such as monitor and evaluate and operational monitoring.

Oil on the ocean disperses and breaks up via several processes. Natural processes acting on the oil such as evaporation, dissolution, dispersion into the water column, biodegradation and photo oxidisation reduce the volume of oil over time. Evaporation can be the most important mechanism to reduce the volume of oil, especially in the short term. Approximately 60–80% of a MDO spill will generally evaporate over the first two days, depending upon the prevailing conditions and spill volume.

Whilst offshore natural recovery involves no direct response activities to mitigate the spill, it may be an appropriate response strategy to compliment other intervention-based response strategies; or as a primary response strategy if other strategies are likely to cause a greater impact than leaving the oil to degrade naturally. It may also be the only viable response strategy during inclement weather (e.g. tropical cyclones), as responding could place personnel at risk.

Table 13-1 provides guidance on when natural recovery may be a suitable response option. There is no implementation guide provided for this response option, as no direct tasks are required. However, if natural recovery is selected as a suitable response strategy, the Operational SIMA would need to confirm that natural recovery remains a suitable response strategy throughout the spill response.

Table 13-1: Recommendations – Natural Recovery

Recommended	Not Recommended
• For light, non-persistent hydrocarbons, such as ITOPF Group 1–2 hydrocarbons (e.g. MDO, condensate, hydraulic oil) • Product is weathering rapidly due to environmental conditions (e.g. high energy coastline, wave action) • Product is too thin for effective use of dispersants or containment and recovery • If responding during inclement weather conditions would place response personnel at risk	• For persistent hydrocarbons, such as ITOPF Group 3–4 hydrocarbons (Crude oil, Intermediate Fuel Oil, Heavy Fuel Oil) • Environmental conditions are not favourable for rapid degradation (e.g. calm seas) • Slick is continuous enough and thick enough to treat with dispersants or via containment and recovery methods

14. CONTAINMENT AND RECOVERY STRATEGY

14.1 Initiation and Termination Criteria

Environmental Performance Objective	Implement containment and recovery tactics to reduce the volume of floating hydrocarbons and to reduce hydrocarbon contact with shorelines	
Applicable Hydrocarbons	Stag Crude	✓ (2)
	MDO	×
Initiation Criteria		
• Notification of a Level 2 Stag Crude spill; and • Operational SIMA demonstrates that the response strategy is likely to result in a net environmental benefit		
Termination Criteria		
• Operational SIMA has determined that this strategy is unlikely to result in an overall benefit; and • Agreement is reached with Jurisdictional Authorities to terminate the response		

14.2 Overview

Containment and recovery aims to remove floating hydrocarbons from the sea surface to limit spread and reduce adverse impacts. For containment and recovery to be an effective option, the operating environment must be suitable (Refer to Table 14-1) so that the equipment can perform efficiently, and response personnel can safely operate the equipment. Containment and recovery is more effective when a sufficient oil thickness can be achieved by the containment booms (minimum of 50 g/m^2), which is often limited to Group 3 and 4 (ITOPF) hydrocarbons. Table 14-1 provides applicability criteria on when containment and recovery may be a suitable response option.

The following tactics can be used in isolation or in combination to contain and recover hydrocarbons:

- Containment booming – involves the use of a variety of booming techniques to concentrate and contain hydrocarbons to enable recovery
- Oil recovery – uses a variety of techniques to remove corralled hydrocarbons from the environment, such as skimmers and pumps; and sorbent materials (passive recovery)
- Transfer and storage of oily liquids – uses a variety of techniques to transfer hydrocarbons to primary and secondary storage. Insufficient oily waste storage can lead to a suspension in operations

Containment and recovery operations are recognised to have low recovery rates in the emergency spill response industry when compared against estimated total spill volumes; the Macondo incident in 2009 (Gulf of Mexico) had an estimated containment and recovery rate of approximately 4% of the total volume of oil spilled, and the MV Erika oil tanker spill in 1999 (Atlantic Ocean) had an estimated containment and recovery rate of 6% (IPIECA-IOPG, 2015b). The Montara well blowout of 2009 had a higher recovery rate due to calm metocean conditions – 10% of the total oil spilled was estimated to be contained and recovered (Montara Commission of Enquiry, 2010) and with only two units in operation throughout the duration of the response (AMSA, 2010).

Spill modelling results from the worst-case (120 m^3) Stag Crude spill indicate that floating oil concentrations exceeding 50 g/m^2 are limited to 1 km from the spill site in both seasons (winter and summer). Therefore, containment and recovery has only been included as a secondary response strategy in case there are areas observed at suitable thickness, and as deemed beneficial by the operational SIMA.

Table 14-1: Containment and Recovery Application Criteria

Criteria	Recommended	Not Recommended
Spill characteristics	• Patchy slick • Extended operations • Surface concentrations >50 g/m² (BAOAC of 4) at a minimum, 200 g/m² (BAOAC of 4/5) is optimal	• Situation dependent • Surface thickness <50 g/m² (BAOAC <4)
Hydrocarbon type	• Group 3 hydrocarbons and above • Persistent components of Group 1 and 2 hydrocarbons may be suitable	• Minor to moderate spills of Group 1 and 2 hydrocarbons are likely to weather rapidly. High volatiles of these hydrocarbons may be a safety risk to personnel
Operating environment	• Waves <1 m for nearshore containment and recovery systems • Waves <1.8 m for offshore systems • Winds <20-25 knots	• Wave heights exceed 1.8 m • Current >0.75 knots at boom face[7]

14.3 Decanting

Decanting involves discharging wastewater back into a boomed area adjacent to the vessel, where it can pass through a skimmer again to maximise the recoverability of oil content. Decanting is an important tool needed to make efficient use of waste management resources which are often a limiting factor in containment and recovery. The reduction of overall waste in some circumstances can create an environmental benefit which outweighs the minimal impact caused by the release of water with very low concentrations of oil.

The *Pollution of Waters by Oils and Noxious Substances (POWBONS) Act 1986*; section 8 allows for decanting for combating specific pollution incidents. Additionally, Annex 1 of MARPOL (Regulation 9) allows for decanting for combating specific pollution events to minimise the damage from pollution. Under both MARPOL and POWBONS decanting must be approved by the relevant Jurisdictional Authority. In WA State waters this is DoT (as the Hazard Management Agency under the *Emergency Management Act 2005*) and in Commonwealth waters this is AMSA. Approval will be sought if decanting is required.

To minimise the potential for recovered oil being released while the water is decanted, the following practices are recommended (IPIECA-IOGP, 2013):

- The temporary storage device should, prior to use, be checked to ensure that it is not contaminated with residues from any products or substances that may previously have been stored in that device, to ensure no unauthorised discharges occur
- Appropriate settling time should be allowed to enable gravity separation to occur prior to decanting. Settling times will vary depending on the oil type. Studies have shown that settling times for different oil types range from 30–60 minutes
- Where possible, employ the use of internal baffles in the temporary storage device to help speed up the separation and prevent re-mixing of the oil and water
- Water should be discharged either into a secondary storage container (if available) or within a boomed area with a recovery device (skimmer) so that any residual oil can be recovered

[7] Boom angle can be adjusted to reduce current drag; some systems are designed to operate in higher- current environments.

- Visual monitoring should be undertaken at the discharge point whilst decanting to ensure that only water is released. If possible, the oil/water interface in the storage container should be monitored to ensure that only the water is being drawn
- Dependent on the environmental and socio-economic sensitivity of the area affected by the spill, and any other response activities that are taking place, it is advised to identify the area(s) that decanting will be undertaken.

If decanting approval is not obtained through AMSA/DoT, the complete collected oil and water will remain in the collection tanks, and all will be treated as collected waste. In this event, the duration of containment and recovery operations may be reduced due to restricted available storage.

14.4 Implementation Guide

Table 14-2 provides guidance to the IMT on the actions and responsibilities that should be considered when implementing this response strategy.

The On-Scene Commander and/or IMT Leader of the designated Control Agency is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 14-2: Implementation Guidance – Containment and Recovery

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Initial actions	Planning Lead Environment Unit Lead	Conduct Operational SIMA to determine if containment and recovery is likely to result in a net environmental benefit and achieve the Environmental Performance Outcome (Section 14.1) of reducing the volume of floating hydrocarbons and to reduce hydrocarbon contact with shorelines.	Refer to Table 10-1 for guidance on Operational SIMA.	Operational SIMA undertaken within 12 hours of IMT being convened	☐
Booming and recovery (if selected)					
Initial actions	Operations Lead	Confirm conditions are suitable for containment and recovery activities	Refer to Table 14-1	-	☐
	Logistics Lead	Contact AMOSC and AMSA to commence mobilisation of trained personnel and equipment (if required)	At least one trained Oil Spill Responder shall be stationed on the containment and recovery vessel, as Team Leader of that operation. Ensure all equipment mobilisation is coordinated noting need for AMOSC/AMSA equipment in support of other response strategies	-	☐
	Logistics Lead	Arrange for suitable vessels to travel to FOB for onloading of trained personnel and equipment	-	-	☐
	Logistics Lead	Activate Waste Management Provider and/or vessel providers to supply adequate waste storage	-	Activate within 4 hours of containment and recovery being identified as a suitable response strategy	☐
	Operations Lead	Assess monitor and evaluate, and other operational monitoring data to identify	Focus on contain and recover activities to areas of slick that threaten priority receptors and are of a sufficient	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
		operational area for containment and recovery deployments	thickness whereby containment and recovery activities will be effective. Noting that safety restrictions for personnel from volatile organic compounds may restrict operations close to the spill source.		
Ongoing actions	Operations Lead	Coordinate the dispatch of operationally ready (all equipment and personnel on board) vessel via the IAP	Liaise with AMOSC if additional equipment or replacements are required.	-	☐
	Operations Lead	Maintain operational zones and provide updates to Vessel Masters on most suitable locations for contain and recover activities	Continue to utilise aerial surveillance data to inform the location of operational zones	-	☐
	Operations Lead Logistics Lead	Develop waste transfer process to secondary vessels/barge to enhance C&R vessel operational time, reduce port visits for waste unloading and reduce contamination.	Consider location and size/ type of waste collection vessel/barge and suitability of equipment and waste receptacles for dynamic lifts. Waste transfer to go to Dampier Port.	-	☐
Decanting (if approved – refer to Section 14.3)					
	Planning Lead	Obtain decanting approval from AMSA (Commonwealth waters) or DoT (WA waters).	Under both MARPOL and POWBONS, decanting must be approved by the relevant Jurisdictional Authority where the discharge will occur. Approval should be sought to discharge water that has separated from oil into the apex of the already deployed containment boom system (with operational skimmer). This will increase the oil strong capacity of storage tanks.	-	☐
	Operations Lead	Ensure personnel onboard the vessels are familiar with decanting procedure approved by the relevant authority AMSA (Commonwealth waters) or DoT (WA waters).	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Operations Lead	Ensure there is sufficient temporary storage for oily wastewater onboard vessel.	-	Prior to commencing decanting operations	☐
	Operations Lead	Commence decanting operations, ensuring that any discharged water is directed into the apex of the already deployed containment boom system (with operational skimmer).	Determine optimum retention/settling time for hydrocarbon being recovered. Refer to IPIECA-IOGP (2013) for additional guidance	-	☐
Ongoing actions	Vessel Master/s	Record volumes of all water decanted	This information must be supplied to the relevant jurisdictional authority	-	☐
	Vessel Master/s	Manage any solid waste generated	-	-	☐

14.5 Resourcing Requirements

This strategy will mobilise containment and recovery teams available to Jadestone by arrangements with AMOSC. As spill modelling from the worst-case (120 m^3) Stag Crude spill predicts minimal floating oil concentrations (only exceeding 50 g/m^2 within 1 km from the spill site), there is limited ability to utilise containment and recovery as an effective spill response strategy. It is highly likely that conducting containment and recovery operations within 1 km of the spill would present significant safety risks to responders, therefore operations would be limited to opportunistic containment and recovery of windrows (patches) of oil a safe distance away from the spill site. Therefore, Jadestone has determined the maximum resourcing requirements for this strategy as up to two containment and recovery packages. One package (if using a J-sweep configuration) consists of:

- Two vessels (one deployment vessel and one towing vessel)
- Two Vessel Masters (one for the deployment vessel and one for the tow vessel)
- One trained Supervisor/Team Lead
- Four vessel deployment crew
- Two x 200 m offshore boom reel
- One offshore skimmer
- If the deployment vessel does not have integrated storage capacity, additional on-deck or towable waste storage of 42.3 m^3 per day.

Boom encounter rate (BER) is a concept used in response planning to estimate the amount of oil that may be encountered by booming arrays and contained ready for recovery by skimmers. Formula for estimating BER is described in the Technical Guideline for the Preparation of Marine Pollution Contingency Plans for Marine and Coastal Facilities (AMSA, 2015). Containment calculations have been made using the AMSA Boom Encounter Rate formula:

$$\mathbf{BER} = (\mathbf{LB} \times \mathbf{0.3}) \times \mathbf{V} \times \mathbf{T}$$

Where:

- BER is the boom encounter rate (BER)
- LB is the length of boom deployed (assumed as 2 x 200 m lengths of conventional boom)
- 0.3 represents the opening of boom array (also called the swathe) and is considered to be 30% of the total boom length
- V is the velocity of the vessel and is assumed for planning purposes to be 0.75 knots
- T is the average thickness of oil (mm) from indicative planning targets table. Assuming 50 g/m^2 (0.047).

Therefore:

- BER = (400 x 0.3) x 0.75 x 0.047 = 4.23 m^3
- 4.23 m^3 is the amount of oil 1 system can encounter in 1 hour @ 50 g/m^2
- For planning purposes one Containment and Recovery 'Package' has the capacity to collect over a 10-hour day:
    - Two vessels with 400 m offshore boom, 1 x offshore skimmer = 42.3 m^3/day.

Two Containment and Recovery Packages equates to 84.6 m^3 per day.

Jadestone has the ability to mobilise one containment and recovery system by Day 2 and two systems by Day 3. Two systems have the ability to recover more than the estimated volume of oil available by Day 3. However, containment and recovery systems could be retained after this period to recover any fragmented sections of the spill, if deemed suitable via an Operational SIMA. If post-spill trajectory modelling indicates that shoreline accumulation will occur, containment and recovery vessels can be directed towards protecting those shorelines and priority receptors.

The vessels and crew are accessed from a combination of companies that Jadestone currently holds MSAs with, call-off contracts and in consultation with Jadestone's approved marine broker. Trained supervisors will be sourced from AMOSC core group.

Active booming systems can be deployed to allow containment and recovery operations without the need for an additional skimming system (where deployed). Active booming systems are available through AMOSC and would be prioritised for mobilisation.

For planning purposes, the vessel speed of 1 knot was chosen as this allows for more manoeuvrability and targeting of oil windrows. In support of containment and recovery operations it is intended to establish a Logistics Base in Dampier utilising support provided by the current contracted Jadestone logistics support service provider.

14.6 Resource Capability

Table 14-3 provides a list of resources that may be used to implement this strategy.

Table 14-3: Resource Capability – Containment and Recovery Strategy

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
AMOSC offshore containment and recovery boom and offshore skimmers	AMOSC	2 x 200 m Offshore Boom on Hyd. Reel 15 x Ro Boom (200 m) 1 x Current Buster Boom System 1 x Speed Sweep system 6 x LWS 500 Weir Skimmer 1 x GT 185 Weir Skimmer	Broome – 2 (Offshore Boom) Exmouth – 2; Fremantle – 6 Geelong – 7 Geelong – 1 Geelong – 1 Fremantle – 3; Geelong –3 Exmouth – 1	Response via duty officer within 15 minutes of first call; AMOSC personnel available within one hour of initial activation call. Equipment logistics varies according to stockpile location.
AMSA Offshore containment and Recovery Boom AMSA Offshore Skimmers	AMSA	8 x RO Boom (200 m) 4 x Vikoma Hi Sprint Boom 8 x LWS 500 Weir Skimmer 2 x DESMI Termite Skimmer	Karratha – 4; Fremantle – 4 Karratha – 2; Fremantle – 2 Fremantle – 4; Karratha – 4 Fremantle – 1; Karratha – 1	Access to National Plan equipment through AMOSC Equipment.
Industry Mutual Aid offshore containment and recovery boom Industry Mutual Aid oil skimmers	Industry Mutual Aid	Offshore Booms and Weir Skimmers	WA – NWS	Access to Industry Mutual Aid through AMOSPlan and facilitated by AMOSC.
OSRL offshore containment and recovery boom and offshore oil skimmers	OSRL (Guaranteed access to 50% by type of equipment available. Additional access considered on a	37 x Ro Boom (200 m) 2 x Hi Sprint Boom (300 m) 15 x Current Buster Boom System 50 x Offshore recovery skimmers	Singapore, UK, Bahrain, Fort Lauderdale	Response via Duty Officer within 10 minutes of first call. Equipment mobilisation times vary according to stockpile location.

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
	case-by-case basis.)			
AMOSC offshore waste storage	AMOSC	4 x Lancer Barges (25 m^3 each) 6 x Deck Bladders (25 m^3 each)	Fremantle –2; Geelong – 2 Fremantle –3; Geelong – 3	
AMSA offshore waste storage	AMSA	8 x Vikoma Flexidam (10 m^3 each) 5 x Canflex Sea Slug (10 m^3 each) 4 x Vikoma Frost Barge (25 m^3 each) 2 x Covertex tow tank (20 m^3 each)	Fremantle –4; Karratha –4 Fremantle –3; Karratha – 2 Fremantle –2; Karratha – 2 Karratha – 2	Access to National Plan equipment through AMOSC. Equipment mobilisation times vary according to stockpile location.
Waste storage, transport and disposal	Via Contracted Waste Service Provider/s	Refer to Waste Management (Section 19.2) for details on Jadestone's waste service provider	Perth Karratha	<24 hours
Offshore containment and recovery deployment vessels, towing vessels and vessel crew Waste transfer vessels/barges for waste oil storage and transfer	Jadestone contracted vessel providers	Varies – check through vessel contractors / Jadestone vessel tracking system.	Exmouth, Dampier, NWS locations, Singapore	Varies subject to location / availability
Personnel (field responders) for containment and recovery	AMOSC Staff	Total – 12	Fremantle – 5 Geelong – 7	Response via duty officer within 15 minutes of first call. Timeframe for availability of AMOSC personnel dependent on location of spill and transport to site
	AMOSC Core Group	As per monthly availability (minimum 84)	Office and facility location across Australia	Location dependent. Confirmed at time of activation.
	OSRL response personnel	18 responders guaranteed 80 responders may be approved under best endeavours	Various international locations	5 personnel available from 2–3 days, remaining personnel available from 4–5 days (subject to approvals/ clearances)

14.7 Environmental Performance

Table 14-4 lists the environmental performance standards and measurement criteria for this strategy.

Table 14-4: Environmental Performance Standards and Measurement Criteria – Containment and Recovery

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS18	Maintain contracts with third-party providers to provide access to suitably qualified and competent personnel and equipment to assist in the implementation of containment and recovery tactics	AMOSC Master Services Agreement
		OSRL Service Level Agreement
		Contract in place with Waste Management Provider
		Access to National Plan resources through AMSA
		Vessel contracts in place for the duration of the activity
Response Implementation (only required in the event of a spill)		
EPS19	Prepare Operational SIMA to determine if containment and recovery is likely to result in a net environmental benefit	Records demonstrate that an Operational SIMA was completed and indicated containment and recovery was likely to result in a net environmental benefit
EPS20	Contact AMOSC and/or AMSA within 2 hours of IMT being convened to commence mobilisation of trained personnel and equipment for containment and recovery operations	Records demonstrate that IMT contacted AMOSC and/or AMSA within 2 hours of IMT being convened to commence mobilisation of trained personnel and equipment for containment and recovery operations
EPS21	Activate Waste Management Provider and/or vessel providers within 4 hours of containment and recovery being identified as a suitable response strategy	Records indicate that Waste Management Provider and/or vessel providers activated within 4 hours of containment and recovery being identified as a suitable response strategy
EPS22	IMT to utilise aerial surveillance, spill trajectory modelling, and other operational monitoring data to identify the most suitable operational area for containment and recovery deployments	Records indicate IMT assessed aerial surveillance, spill trajectory modelling, and other operational monitoring data to identify the most suitable operational area for containment and recovery deployments
EPS23	Obtain approvals from relevant Jurisdictional Authority prior to commencing decanting operations	Incident Log/ Copy of Approval
EPS24	Decanting shall only be undertaken under the supervision of trained personnel	Incident Log
EPS25	Response operations conducted during daylight hours only	Incident Log
EPS26	Response vessels stand-off at night with lighting required for safety only	Incident Log
EPS27	Offshore Equipment washdown confined to hot zone	Incident Log

15. SURFACE CHEMICAL DISPERSANT APPLICATION STRATEGY

15.1 Initiation and Termination Criteria

Environmental Performance Objective	Implement surface dispersant application to enhance biodegradation and dispersion of hydrocarbons to reduce the impact of surface hydrocarbons on protection priorities	
Applicable Hydrocarbons	Stag Crude	✓ (2)
	MDO	×
Initiation Criteria		
• Notification of a Level 2/3 Stag Crude spill • Operational SIMA demonstrates that the response strategy is likely to result in a net environmental benefit		
Termination Criteria		
• Application of chemical dispersants will cease when dispersant efficacy is no longer providing a net environmental benefit as assessed through the SIMA process, and • Agreement is reached with Jurisdictional Authorities to terminate the response		

15.2 Overview

Dispersants are chemicals sprayed onto oil spills from aircraft or vessels to accelerate the process of natural dispersion. They are designed to separate the oil particles on the water's surface and help dispersion in the water column (as small droplets) to speed up the process of natural biodegradation. Chemical dispersants can be used to:

- Decrease the volume of floating oil
- Reduce the volume of oil accumulating on shorelines
- Reduce the quantity of waste created from various response strategies.

Chemical dispersants can decrease the risk of oil impact to shorelines but can increase the risk to pelagic wildlife through entrained oil. A SIMA will be used to assist in assessing the exchange of one risk to another.

Surface application of dispersants is considered to be a secondary response strategy for Stag Crude (Refer to Table 4-8). Modelling predicts that the WCS of Stag Crude (120 m^3) would only reach the minimum surface thickness required (50 g/m^2) for effective dispersant application within 1 km of the spill source (RPS, 2020), providing very limited opportunity (if any) for application. However, this strategy has been included in this OPEP in case any treatable fragments of oil persist.

15.3 Application Limitations

Dispersant should only be applied under the following conditions:

- When Operational NEBA/SIMA identifies a positive benefit;
- Surveillance confirms hydrocarbon spill thickness supports use of dispersants (e.g. BAOAC 4 to 5);
- In water depths greater than 20 m;
- When there are no EPBC Act Listed migratory species evident in the immediate application zone;
- Within State waters following approval from WA DoT (Section 15.4); and
- Within Australian Marine Parks following approval from the Director of Parks Australia.

The application of chemical dispersants should occur as soon as possible to ensure that chemical dispersant is applied to the freshest oil. The WCS scenario for Stag is an instantaneous spill meaning that there is a finite volume of oil to treat and there is no ongoing release of hydrocarbons.

During dispersant operations, if the metocean currents are being directed toward shallow coastal areas, the application area must be far enough away to allow for sufficient chemical dispersal before contact with the 20 m depth contour. This is to be evaluated through post-spill oil spill trajectory modelling requests for chemical dispersion characteristics throughout the application operation. The SMPC (WA DoT) shall be notified of dispersant operations and predicted application area by the Planning Lead so that an assessment of movement of dispersed oil into State Waters can be made (Section 15.4).

Small breakaway patches of Stag Crude identified by surveillance operations are ideally treated by vessel-based chemical dispersant systems, whereas the larger slicks of oil are more suitably targeted by aerial application systems.

15.4 Use of Dispersant in WA State Waters

During a response to either a shipping or offshore petroleum activity hydrocarbon pollution incident in State waters, regardless of source, the use of dispersants requires the written consent of the HMA. Where the application of dispersant in adjacent waters could impact State waters, the DoT requests early notification. This notification is to be provided to DoT through the HMA (or SMPC) if activated.

In seeking the consent of the HMA/SMPC to use dispersants in State waters, the Incident Commander is expected to have had the option assessed by a panel formed within the IMT. This panel should be chaired by the Incident Controller and include the participation of the State Environmental Scientific Coordinator (ESC). The involvement of the CSIRO or other subject matter experts on the panel should also be considered. In formulating its position on the potential use of dispersants, the panel is to use the decision-making process outlined in the AMSA Protocol for Obtaining Approval for the Application of Oil Spill Control Agents to Oil at Sea or on Shorelines (AMSA, 2022b). This process must be documented, and a record retained within the IMT.

The HMA/SMPC will confirm the recommendation of the ESC, who may grant or refuse consent for the use of dispersants in State waters. In granting consent, the HMA/SMPC may attach conditions to the consent. It should be noted that the consent can be removed by the HMA/SMPC at any time. It should also be noted that other restrictions on dispersant use may still apply, such as:

- The dispersants must be listed on the National Oil Spill Control Agent Register administered by AMSA and consistent with the Protocol for Obtaining Approval for the Application of Oil Spill Control Agents to Oil at Sea or on Shorelines
- Once consent is provided, the DoT Incident Controller will direct the actual use of the dispersant in accordance with the operational situation at the time
- Consent may be specific to geographic boundaries, times or weather conditions.

Note: In Commonwealth Waters, NOPSEMA provides prior approval of dispersant use upon acceptance of the EP/OPEP that identifies dispersants as a suitable response strategy.

15.5 Dispersant Selection and Stockpiles

Critical to the performance and effectiveness of the chemical dispersant is the weathering state of the hydrocarbon. Semi-Quantitative Effectiveness Test (SQT) results for Stag Crude, referenced to the analysis of the crude in its present state from reservoir (Stag crude is significantly degraded from reservoir), indicate that chemical dispersants would be best applied (also referred to as the Window of Opportunity) within the first 72 hours (three days) of a spill before the crude becomes too weathered for effective application. The SQT method applied to the Stag crude has shown an average of 40% effectiveness of the three types of

chemical dispersant available through AMSA and AMOSC on the NorthWest Shelf with the maximum effectiveness of 60%.

Given these results, Jadestone has prioritised the use of Dasic Slickgone NS and Corexit 9500. There is sufficient stock of these dispersants in Exmouth and Dampier (Table 15-4) (via AMOSC and AMSA) to last the duration of application (three days). Refer to Table 15-4 for a list of available dispersant stockpiles.

Dasic Slickgone NS and Corexit 9500 are listed as approved in the National Plan for Maritime Environmental Emergencies Register of Oil Spill Control Agents (OSCA). If in-field efficacy testing revealed these dispersant types were ineffective, then Jadestone would prioritise the use of other listed OSCA dispersants. If at any time other chemical dispersants not listed as approved on the OSCA register, were to be considered for use, then they will be assessed for acceptability using Jadestone's Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033) prior to application, and only used if evaluated to be an acceptable level of risk.

15.6 Dispersant Efficacy Monitoring

To assess the effectiveness of dispersant application, Jadestone will use the Joint Industry Operational Monitoring Plan (OMP): Surface Chemical Dispersant Fate and Effectiveness Assessment (Refer to OSM-BIP). This assessment is conducted after the initial shake jar test and is largely based on the Special Monitoring of Applied Response Technologies (SMART) protocol (NOAA, 2006).

The SMART protocol assists in characterising the nature and extent of surface dispersed oil, aids in the validation and accuracy of plume trajectory models and allows for rapid quantification of data to enable the IMT to make decisions about continuation of dispersant application. The IMT will assess the effectiveness of continued dispersant use against an operational SIMA assessment.

The SMART protocol for surface dispersants allows for the acquisition of more robust data using fluorometry. This protocol includes the following tiers (which may be conducted at the same time) and are explained further in OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment:

- Tier I: Visual Monitoring – requires the use of trained or experienced personnel to conduct visual monitoring of dispersant efficacy after a dispersant has been applied to the spill in-situ. This monitoring is usually performed after the shake jar test. If the shake jar test shows the dispersant to be effective, then a 'test spray' is performed and observed using this protocol, before full-scale deployment of dispersant spraying occurs. Tier I gives rapid (but qualitative) results and is used as the initial monitoring method until additional resources and equipment are deployed to conduct Tier II and III monitoring. It should be noted that visual monitoring does not provide any details on particle sizes (required to understand the stability of the suspension) nor does it indicate the overall loadings of oils into the water column (an indicator of both efficacy and the likelihood of toxic impacts). Visual observations may be taken by vessel and/or aircraft and will be used to assess whether dispersant application is successful in dispersing hydrocarbons. The effectiveness of the aerial based chemical dispersion strategy is communicated to the Operations Lead via the Air-Attack Supervisors. As per industry standard practice, initial dispersant use decision making for surface application (Day 1 – Day 3/4) will be supported using these visual monitoring techniques and thereafter on-water monitoring techniques, such as fluorometry will be deployed.
- Tiers II and III: On-water monitoring (subject to dispersant use after day 3-4) – requires the use of trained or experienced personnel to conduct on-water monitoring using CTD meter, fluorometer and water quality samples (collected as per operational/scientific water quality monitoring (See OSM-BIP).

15.7 Implementation Guide

Table 15-1 provides guidance to the IMT on the actions and responsibilities that should be considered when implementing this response strategy.

The On-Scene Commander and/or IMT Leader of the designated Control Agency is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Table 15-1: Implementation Guidance –Surface Chemical Dispersant Application

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Planning and Mobilisation of Dispersant Resources (relevant for vessel and aerial application)					
Initial actions	Planning Lead Environment Unit Lead	Conduct Operational SIMA to determine if surface dispersant application is likely to result in a net environmental benefit and achieve the Environmental Performance Outcome (Section 15.1) of enhancing biodegradation and dispersion of hydrocarbons to reduce the impact of surface hydrocarbons on protection priorities	Refer to Table 10-1 for guidance on Operational SIMA. Liaise with Support Agencies (e.g. AMOSC) as part of Operational SIMA. Obtain estimates on transit times to spill location to help determine if window of opportunity is viable given transit times to the spill location. Evaluate hydrocarbon spill trajectory modelling when available.	Operational SIMA undertaken within 4-8 hours of IMT being convened (noting timeframe difference to other strategies due to limited window of opportunity for dispersant application)	☐
	Planning Lead	Ensure necessary approvals are obtained (Section 15.4). Liaise with WA DoT prior to commencing aerial dispersant application in Commonwealth waters that could impact upon State waters	The use of dispersants in State waters requires the written consent of the HMA. The application of dispersant in Commonwealth waters that could impact State waters requires early notification. Notification is to be provided to DoT through the HMA (or SMPC if activated).	Prior to dispersant application	☐
	Planning Lead	If Operational SIMA indicates that there is an overall environmental benefit develop a Surface Dispersant Plan (IAP sub-plan)	Consider including the following information in the Surface Dispersant Plan: • Operational zones for application • Exclusion zones • Locations to deploy personnel and equipment • Frequency of application (sorties/day) • List of resources (personnel and equipment) required • Logistics involved in deploying equipment, personnel and dispersants • Availability and arrival of aircraft into Learmonth	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
			• Timeframes to undertake deployment • Effectiveness testing– aerial and/or vessel – Refer to Section 15.6 • Health and safety considerations Note: All surface chemical dispersant operations will occur during daylight hours only		
	Logistics Lead	<u>Mobilise AMSA Resources</u> After initial AMSA notifications are complete, contact AMSA and request mobilisation of required dispersant stocks into Dampier	Will likely require Jadestone to make transport arrangements Mobilisation of AMSA resources needs to be coordinated across all response strategies where support is required Dispersant Stocks – Refer to Table 15-4	AMSA Dampier based dispersant stockpiles to be prioritised for mobilisation to Dampier Port and/or Karratha airport for loading onto vessels / aircraft, as appropriate	☐
	Logistics Lead	<u>Mobilise AMOSC Resources</u> After initial AMOSC notifications are complete, contact AMOSC Duty Officer and confirm requirements for the following resources: • Access to, and mobilisation of, required AMOSC dispersant stocks and associated equipment into Dampier (AMOSC will arrange through their contracted transport provider) • Arrange for AMOSC to develop logistics plan for supplies of dispersant • Activation of the Fixed Wing Aerial Dispersant Capability (FWADC)	Dispersant Stocks – Refer to Table 15-4 Refer to the FWADOps Plan (AMOSC, 2022) and Aerial Dispersant Operations Plan for Marine Oil Spills Off the WA Coastline (AMOSC, 2020) AMOSC will arrange deployment of appropriate aircraft to a designated airstrip close to the spill location (e.g. Dampier), and arrange for pilots, Air-Attack Supervisors, observation aircraft (one per two attack aircraft) and trained observers.	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
		(AMOSC will activate this on behalf of Jadestone and assume operational control) • Provision of trained spill responders to support operations (AMOSC Staff and Core Group) • Confirm with AMOSC that there is labour at Dampier for loading / unloading dispersant and planes			
	Planning Lead	Activate Joint Industry OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment via the Monitoring Services Provider (Refer to OSM-BIP [GF-70-PLN-F-00003])	Initiation criteria for OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment is as follows: • Application of dispersant has been selected as a response option. Therefore, this OMP requires immediate activation via the OSM-BIP (GF-70-PLN-F-00003). Note that the 'shake test' assessment does not form part of OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment and is usually performed as an initial assessment of dispersant efficacy.	Activate as soon as possible if this response strategy is likely to be selected	☐
	Logistics Lead	Source vessel/s for dispersant application and mobilise to nearest port for loading equipment and personnel (Dampier).	Vessel based dispersant operations require two AFEDO (or equivalent) spray systems per vessel. Spray arms need to be secured to vessel by welding or chains as determined by the vessel master.	-	☐
	Logistics Lead	Mobilise dispersant operations Team Leaders and Team Members (AMOSC staff/ Industry Core Group) to designated port and/or airport.	Each vessel undertaking dispersant application is to be staffed with personnel trained in dispersant application. Aircraft to be flown by experienced pilots.	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Logistics Lead	Mobilise vessel-based dispersant application equipment, initial dispersant shake test kits and dispersant to designated port.	Refer to Table 15-3 for equipment locations. Engage Jadestone's logistics provider to assist with transportation of equipment. Note that the 'shake test' assessment does not form part of OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment and is usually performed as an initial assessment of dispersant efficacy.	-	☐
	Planning Lead	<u>Aerial dispersant mobilisation</u> AMOSC, in consultation with the IMT to prepare an Air Operations Plan in accordance with the Aerial Dispersant Operations Plan for Marine Oil Spills Off the WA Coastline (AMOSC, 2020) and submit to AMSA prior to commencement of any FWADC aircraft operations Confirm progress of FWADC activation following activation by AMOSC	Ensure flight schedule in Air Operations Plan considers requirements for other activities such as aerial surveillance sorties.	-	☐
Ongoing actions	Logistics Lead	Stand up staff/facilities to support resource mobilisation. • Arrange accommodation pilots • Arrange aviation fuel	Provide relevant information regarding estimated arrival times/dates into Dampier	-	☐
	Logistics Lead	Confirm all arrangements with respect to loading equipment/dispersant and embarking spill response personnel aboard vessels	Provide relevant information regarding estimated arrival times/dates into Dampier	-	☐
	Planning Lead	Update Surface Dispersant Plan (IAP sub-plan) with availability of personnel and all equipment	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Vessel-based dispersant application (if selected)					
Initial actions	Planning Lead Operations Lead	Use latest aerial surveillance reports to determine priority areas for dispersant application an define operational area for response.	Use real-time or most recent visual surveillance observation data on hydrocarbon location and thickness to develop operational zones for vessel dispersant operations	-	☐
	Operations Lead	Identify safety requirements and controls associated with spraying dispersants and working over hydrocarbons	During spraying operation position all personnel forward of the spray arms or upwind of the spray. This includes all vessel deck activities associated with spray arm or hand lance applications of dispersant. In either case the relative slow speed of a vessel and the spray application of dispersant could expose personnel to a breathable mist cloud. Wind across the deck could also increase exposure potentials. Deck crew must be protected against liquid mist exposures and breathing exposures refer to relevant dispersant Safety Data Sheets	-	☐
	Operations Lead	Ensure shake jar test is conducted in-field to determine likely effectiveness of dispersant application and report results to IMT		-	☐
	Operations Lead	Dependent upon the results of the shake jar test, conduct test spray using vessel spray system. Monitor for efficacy using the SMART Protocol (Section 15.6) as described in OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment and provide results to the IMT.	Initial monitoring is likely to only include Tier I (visual monitoring) of the SMART Protocol. Observers trained in visual observation techniques should be used.	-	☐
	Incident Commander	If dispersant application is shown to be effective and approved for ongoing use by	Use real-time or most recent visual surveillance observation data to develop operational zones for vessel dispersant operations.	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Operations Lead Planning Lead	the IMT Leader, continue vessel operations and defining operational area.	Refer to Section 15.3 for application area limitations, which shall apply unless directed otherwise by the WA DoT (for areas within State Waters) or the Director (or delegate) of Parks Australia (for areas within an Australian Marine Park).		
	Operations Lead	Complete daily dispersant application log forms	-	-	☐
Ongoing actions	Incident Commander Operations Lead Planning Lead	Reassess dispersant use, utilising the Operational SIMA process for each operational period. Cease application if no net environmental benefit.	-	-	☐
	Operations Lead Planning Lead	Maintain operational zones and provide updates to Vessel Masters on most suitable locations for application.	-	-	☐
	Operations Lead	Complete daily safety analysis	-	-	☐
Aerial dispersant application (if selected)					
Initial actions	Planning Lead	Finalise Fixed Wing Air Operations Plan and Air Operations Plan in consultation with AMOSC, AMSA, Aerotech First Response and other stakeholders	Ensure flight schedule in Air Operations Plan considers requirements for other activities such as aerial surveillance sorties	Air Operations Plan completed and submitted to AMSA within 12-18 hours of initial activation	☐
	Operations Lead	Ensure shake jar test is conducted in-field to determine likely effectiveness of dispersant application and report results to IMT	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Operations Lead	Dependent upon the results of the shake jar test, aircraft to conduct a test spray (if vessel-based test if unavailable). Monitor for efficacy using the SMART Protocol (Section 15.6) as described in OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment and provide results to the IMT.	Initial monitoring is likely to only include Tier I (visual monitoring) of the SMART Protocol. Observers trained in visual observation techniques should be used.	-	☐
	Planning Lead Operations Lead	Using real-time or most recent visual surveillance observation data, develop operational zones for aerial dispersant operations	Focus on applying dispersant to areas of slick that threaten priority receptors and are of a sufficient thickness whereby chemical dispersants will be effective	-	☐
	Operations Lead	If dispersant application is shown to be effective and approved for ongoing use by the IMT Leader, and suitability of Air Operations Plan is confirmed with AMOSC, commence aerial dispersant application operations in the defined operational area	-	-	☐
	Operations Lead	Complete daily dispersant application log forms	-	-	☐
Ongoing actions	Operations Lead Environment Unit Lead	Continue to monitor and assess the effectiveness of surface dispersant application	Dispersant efficacy testing will be performed via OMP: Surface Chemical Dispersant Fate and Effectiveness Assessment and will be conducted by the Monitoring Services Provider who will provide results to the IMT	-	☐
	Environment Unit Lead	Conduct operational SIMA during each operational period to reassess effectiveness of application rates and dispersant efficacy	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Planning Lead Operations Lead	Develop flight plans for next operational period	-	-	☐
	Operations Lead	Complete daily safety analysis	-	-	☐

15.8 Resource Requirements

Based on the weathering properties of Stag Crude being in the range of 20-60% in the first 24 hours, the amount of oil available to be dispersed is conservatively estimated to be 80% of the released volume (80% of 120 m^3 = 96 m^3).

The Dispersant to Oil Ratio (DOR) can range from 1:10 through to 1:50 or even less depending on the oil and dispersant types. For planning purposes, a DOR of 1:25 has been used because it is an accepted ratio to start with and can be adjusted depending on effectiveness.

The sections below provide an estimate of resourcing required to apply dispersants to the remaining 96 m^3 of Stag Crude. These estimates are based on both aerial and vessel application occurring, comprising one FWAD Aircraft and one surface application vessel.

However, in reality dual application is unlikely as there may be safety issues associated with simultaneous operations for an instantaneous small scale spill. Therefore, these estimates below are a conservative over-estimation of the resource requirements.

15.8.1 Fixed wing aerial dispersant (Air Tractor) operations

Operations are likely to be conducted out of Karratha to the Stag Facility. All dispersant required will be mobilised to Karratha in support of all aerial dispersant operations.

It is estimated that two hours (approx.) will be required to complete each flight operation, including dispersant loading / aircraft refuelling / transit to-from spill location.

Operations to be conducted during daylight hours only – therefore based on an estimated 10 hours of daylight, each aircraft will conduct approximately three sorties each day.

Aircraft would be mobilised from any of the 4 airbases around Australia (Batchelor [NT], Jandakot [WA], Parafield [SA]; and Scone [NSW]) and would have wheels up in four hours from locations around Australia. Mobilisation times depend on the flight time from the location of the aircraft.

Various aircraft types are included under the provision of the FWADC. For planning purposes, a minimum payload of 3,000 L (3 m^3) has been used with respect to aircraft to be mobilised in support of the response.

Using the above assumptions, one aircraft could apply approximately 9 m^3 of dispersant per day.

15.8.2 Vessel based dispersant operations

Vessel dispersant operations are likely to be conducted out of Dampier Port to the Stag Facility. Vessels would be fitted with two spray systems that can deliver 1 m^3/hour spray rate (dispersant diluted with sea water).

Vessel based dispersant operations would also be conducted during daylight hours only. Based on an estimated 8 hours of spraying = 8 m^3 /vessel (sea water and dispersant) could be applied by one vessel per day.

15.8.4 Dispersant budget

Table 15-2 provides a dispersant budget, noting application requirements via vessel and air can easily meet demand by Day 2 due to the relatively small volume of the spill.

Table 15-2: Estimated Dispersant Application Budget

Day	Volume of oil (m^3) available for treatment by dispersant (after weathering)	Max. volume of dispersant required (m^3) based on volume of oil available and DOR	Arrival of dispersant in Dampier (m^3)	Aerial application capability (m^3)	Vessel application capability (m^3)
1	96	3.8	20	0	0
2	88	3.5	20	9	8
3	81	3.2	Not required as dispersant likely to be no longer amenable	9	8

The total amount of dispersant required for surface application over three days is 10.5 m^3.

This volume can be met using the AMSA dispersant stock available in Dampier and AMOSC stock in Exmouth (Table 15-4).

15.9 Resource Capability

Table 15-3 provides a list of resources that may be used to implement this strategy.

Table 15-3: Resource Capability – Surface Dispersant Application

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
Vessel-based dispersant application				
Vessel dispersant spray systems	AMOSC	Afedo Spray systems (application rate for one arm delivers between 100 and 150 L/min [6–9 m^3/hour])	Exmouth – 1 Broome – 2 Fremantle – 5 Geelong – 4	Response via duty officer within 15 minutes of first call; AMOSC personnel available within one hour of initial activation call. Equipment logistics varies according to stockpile location.
		Vikospray	Exmouth – 1 Fremantle – 1 Geelong – 2	
		Boom vane	Fremantle – 1 Geelong – 1	
		Helibucket	Fremantle – 1 Geelong – 1	
Vessel dispersant spray systems	Industry mutual aid	Afedo – 5 Double and single spray arms – 4	Onslow – 1, Karratha – 1, Exmouth – 2; Dampier – 1 Exmouth – 4	Access to Industry Mutual Aid through AMOSPlan and facilitated by AMOSC.
Vessel dispersant spray systems	AMSA	Afedo Spray systems (application rate for one arm estimated at 130 L/min [7.8 m^3/hour])	Karratha – 2 Fremantle – 2 Darwin – 2 Adelaide – 2 Melbourne – 2	Access to National Plan equipment through AMOSC Equipment.

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
			Sydney – 2 Brisbane – 2 Townsville – 2 Devonport – 2	
	OSRL	Various systems – 10 (additional systems available at other global bases)	Singapore	Response via Duty Officer within 10 minutes of first call. Equipment mobilisation times vary according to stockpile location
Vessels for dispersant application and vessel crew	Jadestone contracted vessel providers	Varies – check through vessel contractors / Jadestone vessel tracking system	Exmouth, Dampier, NWS locations, Singapore	Varies subject to location / availability
Aerial dispersant application				
Aerotech First Response fixed wing aircraft, pilots and ground crew	AMOSC – Fixed Wing Aerial Dispersant Contract	4 under FWADC contract Additional aircraft potentially available through Aerotech First Response	Operations from designated airbase Aircraft initially mobilised from 4 bases around Australia: • Jandakot (WA) • Batchelor (NT) • Parafield (SA) • Scone (NSW)	4 x air contractors to have wheels up in four hours from locations around Australia. Mobilisation times depend on the flight time from the location of the aircraft
FWADC operational personnel incl. Air Attack Supervisor and Dispersant Coordinator	AMOSC and subcontractors via Fixed Wing Aerial Dispersant Contract	AMOSC staff + contractors, as per AMOSC FWADOps Plan (AMOSC, 2022) (Refer to Appendix F)	AMOSC Fremantle AMOSC Geelong	Response via duty officer within 15 minutes of first call; timeframe for availability of AMOSC personnel dependent on location of spill and transport to site Air Attack Supervisor within 2 hours of initial notification to AMOSC

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
Aerial surveillance and reconnaissance (SAR))	Jadestone contracted aviation provider/s	2 x contracted (1 x primary + 1 x backup) + additional as required	Karratha	Wheels up within 4 hours of notification
Aerial and vessel-based dispersant application				
Personnel (field responders) for shoreline protection	AMOSC Staff	Total – 12	Fremantle – 5 Geelong – 7	Response via duty officer within 15 minutes of first call. Timeframe for availability of AMOSC personnel dependent on location of spill and transport to site
	AMOSC Core Group	As per monthly availability (minimum 84)	Office and facility location across Australia	Location dependent. Confirmed at time of activation.
	OSRL response personnel	18 responders guaranteed 80 responders may be approved under best endeavours	Various international locations	5 personnel available from 2–3 days, remaining personnel available from 4–5 days (subject to approvals/ clearances)

Table 15-4: Dispersant supply stock locations and volumes

Owner	Stockpile Locations	Dispersant Volume (m^3)	Dispersant Type[8]	Total Volume (m^3)
AMSA	Adelaide	10	Slick Gone EW	355
		10	Slick Gone NS	
	Brisbane	10	Slick Gone NS	
		10	Slick Gone EW	
	Townsville	10	Slick Gone EW	
		15	Slick Gone NS	

[8] All dispersants listed above are on the AMSA Oil Spill Control Agents (OSCA) list. Corexit is in Transitional Acceptance meaning that it is deemed to be OSCA registered on the basis that it has met previous acceptance requirements and is available for use for National Plan responses until used or disposed of.

Owner	Stockpile Locations	Dispersant Volume (m^3)	Dispersant Type[8]	Total Volume (m^3)
	Dampier	10	Slick Gone EW	
		10	Slick Gone NS	
	Darwin	10	Slick Gone EW	
		10	Slick Gone NS	
	Devonport	10	Slick Gone NS	
		10	Slick Gone EW	
	Fremantle	48	Slick Gone NS	
		52	Slick Gone EW	
	Horn Island	10	Slick Gone NS	
	Melbourne	10	Slick Gone EW	
		10	Slick Gone NS	
	Sydney	45	Slick Gone NS	
		55	Slick Gone EW	
AMOSC	Broome	14	Ardrox 6120	511
	Exmouth	75	Slick Gone NS	
	Welshpool (WA)	8	Slick Gone NS	
		27	Corexit 9500	
		500 (SFRT stockpile[9] 50%)	Slick Gone NS	
	Altona North (Victoria)	75	Slick Gone NS	

[9] As per the AMOSPlan, there is a provision made by the SFRT Steering Committee to provide up to 250m^3 of dispersant into a surface spill response, given certain provisions are met in the first instance by AMOSC (AMOSC 2017).

Owner	Stockpile Locations	Dispersant Volume (m^3)	Dispersant Type[8]	Total Volume (m^3)
		62	Corexit 9500	
TOTAL (access agreements in place)				**866**

15.10 Environmental Performance

Table 15-5 lists the environmental performance standards and measurement criteria for this strategy.

Table 15-5: Environmental Performance Standards and Measurement Criteria – Surface Dispersant Application

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS28	Maintain contracts with third-party providers to provide access to suitably qualified and competent personnel, equipment and dispersant to assist in the implementation of surface dispersant application tactics	AMOSC Master Services Agreement
		OSRL Service Level Agreement
		Access to National Plan resources through AMSA
		Vessel contracts in place for the duration of the activity
Response Implementation (only required in the event of a spill)		
EPS29	IMT have confirmed that Operational SIMA supports the use of surface dispersants to reduce adverse impacts to protection priorities	Operational SIMA Incident log IAP
EPS30	Operational SIMA undertaken within 4-8 hours of IMT being convened and daily thereafter to determine if chemical dispersion will have a net environmental benefit. SIMA is to be included in development of following period Incident Action Plan	Operational SIMA Incident log IAP
EPS31	Dispersant should only be applied under the following conditions: • When Operational SIMA identifies a positive benefit; • Surveillance confirms hydrocarbon spill thickness supports use of dispersants (e.g. BAOAC 4 to 5); • In water depths greater than 20 m; • When there are no EPBC Act Listed migratory species evident in the immediate application zone; • Within State waters following approval from WA DoT (Section 15.4); • Within Australian Marine Parks following approval from the Director of Parks Australia.	Operational SIMA Incident log IAP Communications records
EPS32	Only chemical dispersants that are listed as approved on the National Plan Oil Spill Control Agent (OSCA) list or are evaluated as acceptable as per Jadestone's Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033) are to be used	Records demonstrate that only chemical dispersants that are listed as approved on the National Plan Oil Spill Control Agent (OSCA) list or were evaluated as acceptable as per Jadestone's Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033) were used

No.	Performance Standard	Measurement Criteria
EPS33	If dispersant application is approved by the Incident Commander, a test spray will be conducted to assess dispersant effectiveness	Incident log
EPS34	Each vessel shall have one person who has been trained in the operation of vessel-based dispersant systems and monitoring dispersant effectiveness	Incident log
EPS35	AMOSC, in consultation with IMT to complete an Air Operations Plan and submit to AMSA within 12-18 hours of initial activation to enable activation of the FWADC	Air Operations Plan
EPS36	If EPBC Act-listed migratory species such as humpback whales or whale sharks are observed in the immediate vicinity of dispersant operations, application will cease until the animal has not been sighted for a period of 30 minutes	Incident log
EPS37	A record of the dispersant types, location of application, and volumes applied will be kept throughout the response	Incident log Dispersant log
EPS38	Response operations conducted during daylight hours only	Incident Log
EPS39	Response vessels stand-off at night with lighting required for safety only	Incident Log

16. SHORELINE PROTECTION AND DEFLECTION STRATEGY

16.1 Initiation and Termination Criteria

Environmental Performance Objective	Implement protection and deflection tactics to reduce hydrocarbon contact with shorelines	
Applicable Hydrocarbons	Stag Crude	✓ (2)
	MDO	×
Initiation Criteria		
• Level 2 or 3 spills where shorelines with PPAs will potentially be impacted; or • Operational SIMA demonstrates that the response strategy and selected tactics are likely to result in a net environmental benefit; and • Requested by the relevant Control Agency.		
Termination Criteria		
• Operational SIMA has determined that this strategy is unlikely to result in an overall benefit to the affected shoreline/s; and • Control Agency decides to terminate the response strategy.		

16.2 Overview

Protection and deflection tactics are utilised to divert hydrocarbons away from sensitive shoreline receptors and are more effective if they are deployed ahead of spill contact. They are typically used to protect smaller, high priority sections of shoreline. The relevant Control Agency has operational responsibility for the implementation of shoreline protection activities. PPAs are identified in Table 4-6 but will need to be confirmed by the relevant Control Agency when the Operational SIMA is prepared.

Information gathered during monitor and evaluate activities, and operational monitoring (including OMP: Shoreline Clean-up Assessment) and assessed through an Operational SIMA will guide the selection of protection and deflection locations and techniques. Initiation of suitable tactics will need to be confirmed by the Control Agency, prior to deployment. Common tactics used as part of the shoreline protection and deflection strategy include:

- Shoreline booming – involves the use of a variety of booming techniques to exclude oil (exclusion booming), divert oil to a collection point where it can be removed from the environment (diversion booming) and redirecting flow of oil away from a priority area (deflection booming).
- Berms, dams and dikes – uses sandbags or embankments to exclude oil from sensitive areas
- Shoreside recovery – uses nearshore skimmers to collect oil corralled by nearshore booms (also used during shoreline clean-up).
- Passive recovery – uses sorbent booms or pads to collect oil and remove it from the environment. This can be used as a pre-impact tactic where sorbents are laid ahead of the spill making contact with the shoreline.
- Non-oiled debris removal – involves the removal of debris (e.g. seaweed) from the shoreline to prevent it being oiled, which in turn reduces impacts to wildlife and the volumes of waste produced during shoreline clean-up activities.

16.3 Implementation Guide

The locations for nearshore protection and deflection operations will be evaluated by the relevant Control Agency throughout the incident response and will consider monitor and evaluate data and the PPAs. In addition, the information obtained from monitor and evaluate activities will be used by the IMT in the development of the Operational SIMA to inform the most effective protection tactics (if any) to apply to individual sites. This will also consider the feasibility and effectiveness of selected tactics.

Deployment of equipment and personnel is to be at the direction of the WA DoT as the Control Agency in WA State waters.

Table 16-1 provides guidance to the IMT on the actions and responsibilities that should be considered to support the Control Agency if they implement this response strategy. The Control Agency is responsible for the implementation of the response and therefore, depending on the circumstances of the spill, may determine that some tasks be varied, should not be undertaken or should be reassigned.

16.3.1 Operational Considerations

The effectiveness of shoreline protection and deflection tactics will be dependent upon local bathymetry, metocean and wind conditions. Protection booms should only be installed in areas where tidal currents are below 0.75 knots.

Shoreline protection and deflection tactics should be led by personnel trained in operational oil spill response techniques, to ensure selection of the most suitable tactics and equipment for individual locations.

In some offshore locations the water may be sufficiently calm to install fixed booms in deep water to assist in the protection of highly sensitive areas where shoreline clean-up may be very difficult to effectively achieve. This will be considered to protect remote islands that are difficult to access or are inaccessible, however, the large tidal range will result in high velocity water (especially at Montebello Islands) and may exceed the operating parameters of booms.

Jadestone will review existing regional shoreline response plans at the time of a spill, including those available via mutual aid from other operators, to assist in the preparation of an appropriate shoreline response plan and capability. This will be undertaken in consultation with State / Territory Control Agencies and OSROs, considering the practicalities, likely success and risks associated with a shoreline operation in remote locations.

Table 16-1: Implementation Guidance – Shoreline Protection and Deflection

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Initial actions	Planning Lead	Notify relevant authorities if there are likely to be any impacts on shorelines. Refer to Table 9-1 for details on notifications. Refer to Section 2.2 for details on Control Agency responsibilities.	-	-	☐
	Planning Lead	Collect and provide monitor and evaluate data, other operational monitoring data and existing sensitivity information/mapping to Control Agency for confirmation of PPAs and Operational SIMA.	-	-	☐
ACTIONS BELOW ARE INDICATIVE ONLY AND ARE AT THE FINAL DETERMINATION OF THE CONTROL AGENCY					
Initial actions	Planning Lead Environment Unit Lead	In conjunction with Control Agency, conduct Operational SIMA to determine if protection and deflection is likely to result in a net environmental benefit and help to achieve the Environmental Performance Outcome for this strategy (Section 16.1) of reducing hydrocarbon contact with shorelines.	Use information from shoreline assessments and any tactical response plans for the area. Refer to Table 10-1 for guidance on Operational SIMA. Shoreline Clean-up Assessment Teams are responsible for preparing field maps and forms detailing the area surveyed and making specific clean-up recommendations. The condition of affected shorelines will be constantly changing. Results of shoreline surveys should be reported as quickly as possible to the IMT and Control Agency to help inform real-time decision making.	Within 12 hours of IMT being convened (and impacts to shorelines are likely)	☐
	Planning Lead	In consultation with Control Agency, engage a Heritage Advisor to provide advice on any sites of cultural significance that may be affected directly by the spill, or indirectly through implementation of spill	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
		response measures e.g. deployment areas for clean-up personnel and equipment.			
Ongoing actions	Planning Lead	If Operational SIMA indicates that there is an overall environmental benefit, develop a Shoreline Protection Plan (IAP Sub-Plan) for each deployment area	Shoreline Protection Plan may include (but not be limited to): • Priority nearshore and shoreline areas for protection (liaise with Control Agency for direction on locations) • Locations to deploy protection and deflection equipment • Permits required (if applicable) • Protection and deflection tactics to be employed for each location • List of resources (personnel and equipment) required • Logistical arrangements (e.g. staging areas, accommodation, transport of personnel, shift rotation requirements) • Timeframes to undertake deployment • Access locations from land or sea • Frequency of equipment inspections and maintenance (noting tidal cycles and tactics used, as some tactics require constant supervision) • Waste management information, including logistical information on temporary storage areas, segregation, decontamination zones and disposal routes • No access and demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird nesting/roosting areas and turtle nesting habitat (utilise existing roads and tracks first)	Develop Shoreline Protection Plan, if required, within 12 hours of SIMA confirming an overall environmental benefit	☐
	Operations Lead	Upon direction of Control Agency deploy shoreline protection response teams and	-	Commence deployment within	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Logistics Lead	equipment to each shoreline location selected and implement response as per Shoreline Protection Plan (IAP sub-plan).		12 hours of completion of Protection and Deflection Plan (IAP sub-plan)	
	Operations Lead	Nominated Shoreline Response Team Leader to report back on effectiveness of response strategy to Control Agency and IMT.	-	-	☐
	Planning Lead	In conjunction with Control Agency conduct regular Operational SIMA to confirm effectiveness of tactics and demonstrate benefit of continuing to implement shoreline protection and deflection activities.	-	-	☐

16.4 Resourcing Requirements

Protection and deflection resource capability requirements have been determined using modelling outputs from the worst-case credible spills. The resourcing requirements presented in Table 16-2 are for capability analysis only and would be revisited should a spill occur.

Table 16-2 presents resourcing requirements using the stochastic modelling results for shoreline accumulation ≥100 g/m². The only PPA predicted to be contacted is Montebello Islands.

In the event of an actual spill, Jadestone will use initial monitor and evaluate data (e.g. trajectory modelling and aerial surveillance) to determine where resources should be allocated. This may include directing resources to conduct shoreline assessment at locations not identified as PPAs, to determine if protection and clean-up activities may be required at these receptors.

For planning purposes, one protection and deflection operation consist of:

- Boom (shore sealing, self-inflating and/or solid flotation to suit the specific site)
- Ancillary equipment and vessels (if required, noting shallow draft vessels may be required for some locations)
- 2 trained oil spill responders to lead the operation
- 5 personnel / labour hire to deploy and maintain the booms.

Table 16-2: Shoreline protection resource requirements for PPAs based on stochastic modelling

Priority Protection Area	Min. time to shoreline oil accumulating ≥100 g/m² (days)	Oiled shoreline length at concentrations ≥100 g/m² in worst replicate simulation (km)	Recommended number of shoreline protection and deflection operations
Montebello Islands	1.1	25	2-3

16.5 Resource Capability

Table 16-3 provides a list of resources that may be used to implement this strategy.

Table 16-3: Resource Capability – Shoreline Protection and Deflection Strategy

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
AMOSC nearshore equipment[10]	AMOSC	Beach Guardian (25 m lengths) Total – 98	Broome – 4 Exmouth – 20 Fremantle – 23 Geelong – 51	Response via duty officer within 15 minutes of first call; AMOSC personnel available within one hour of initial activation call. Equipment logistics varies according to stockpile location.
		Zoom Boom (199 x 25 m lengths) Total – 28	Broome – 8 Exmouth – 20	
		HDB Boom (2 x 200 m lengths) Total – 171	Fremantle – 30 Geelong – 141	
		Curtain Boom (58 x 30 m lengths) Total – 60	Broome – 2 Fremantle – 18 Geelong – 40	
		Passive weir skimmer Total – 3	Exmouth – 1 Fremantle – 1 Geelong – 1	
		GT 185 skimmer Total – 2	Exmouth – 1 Geelong – 1	
		Desmi 250 weir skimmer Total – 1	Geelong – 1	

[10] Resource totals shown here are correct at the time of publication. IMT personnel should refer to latest equipment reports via the AMOSC Members Login - https://amosc.com.au/member-login/ (Login details and equipment report locations are provided in Jadestone's IMT Portal)

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
		Ro-skim weir boom Total – 2	Geelong – 2	
AMSA nearshore equipment[11]	AMSA	Canadyne inflatable Total – 5	Karratha – 5	Access to National Plan equipment through AMOSC
		Structureflex inflatable Total – 25	Karratha – 10 Fremantle – 15	
		Versatech zoom inflatable Total – 18	Karratha – 5 Fremantle – 13	
		Slickbar – solid buoyancy Total – 2	Karratha – 2	
		Structureflex – solid buoyancy Total – 13	Karratha – 3 Fremantle – 10	
		Ancillaries to support above equipment	Karratha and other locations around Australia	
		Structureflex – land sea Total – 60	Karratha – 30 Fremantle – 30 other locations around Australia	
OSRL	OSRL	Air-skirt boom, beach sealing boom, inshore recovery skimmers, and a range of ancillaries to support above equipment	OSRL global stockpiles in UK, Singapore, Bahrain and Fort Lauderdale	Response from OSRL Duty Manager within 10 minutes. Equipment logistics varies according to stockpile location.
Personnel (field responders) for shoreline protection	AMOSC Staff	Total – 12	Fremantle – 5 Geelong – 7	Response via duty officer within 15 minutes of first call. Timeframe for availability of AMOSC personnel

[11] Resource totals shown here are correct at the time of publication. IMT personnel should refer to latest equipment reports via the AMSA website - https://www.amsa.gov.au/marine-environment/pollution-response/national-environmental-maritime-operations

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
				dependent on location of spill and transport to site
	AMOSC Core Group	As per monthly availability (minimum 84)	Office and facility location across Australia	Location dependent. Confirmed at time of activation.
	OSRL response personnel	18 responders guaranteed 80 responders may be approved under best endeavours	Various international locations	5 personnel available from 2–3 days, remaining personnel available from 4–5 days (subject to approvals/ clearances)

16.6 Environmental Performance

Table 16-4 lists the environmental performance standards and measurement criteria for this strategy.

Table 16-4: Environmental Performance Standards and Measurement Criteria – Shoreline Protection and Deflection

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS40	Maintain contracts with third-party providers to provide access to suitably qualified and competent personnel and equipment to assist in the implementation of shoreline protection tactics	AMOSC Master Services Agreement
		OSRL Service Level Agreement
		Access to National Plan resources through AMSA
		Vessel contracts in place for the duration of the activity
Response Implementation (only required in the event of a spill)		
EPS41	Prepare Operational SIMA in conjunction with Control Agency (if applicable) to determine if shoreline protection is likely to result in a net environmental benefit	Records demonstrate that an Operational SIMA was completed with Control Agency (if applicable) and indicated shoreline protection was likely to result in a net environmental benefit
EPS42	If Operational SIMA indicates that there is an overall environmental benefit, support Control Agency (if applicable) in the development of a Shoreline Protection Plan (IAP sub-plan)	Shoreline Protection Plan (IAP sub-plan) is dated and indicates preparation done in conjunction with Control Agency (if applicable) and prior to shoreline protection operations commencing
EPS43	Shoreline protection activities will be implemented under the direction of the Control Agency (if applicable)	Records demonstrate that shoreline protection activities implemented under the direction of the Control Agency (if applicable)
EPS44	Response operations conducted during daylight hours only	Incident Log
EPS45	Response vessels stand-off at night with lighting required for safety only	Incident Log

17. SHORELINE CLEAN-UP STRATEGY

17.1 Initiation and Termination Criteria

Environmental Performance Objective	Implement shoreline clean-up tactics to remove stranded hydrocarbons from shorelines in order to reduce impact on protection priorities and facilitate habitat recovery	
Applicable Hydrocarbons	Stag Crude	✓ (2)
	MDO	×
Initiation Criteria		
• Level 2 or 3 spills where shorelines with protection priorities will potentially be impacted; or • Operational SIMA demonstrates that the response strategy and selected tactics are likely to result in a net environmental benefit; and • Requested by the relevant Control Agency.		
Termination Criteria		
• Operational SIMA has determined that this strategy is unlikely to result in an overall benefit to the affected shoreline/s; and • Control Agency decides to terminate the response strategy.		

17.2 Overview

The relevant Control Agency has operational responsibility for the implementation of shoreline clean-up activities. PPAs are identified in Table 4-6 but will need to be confirmed by the relevant Control Agency when the Operational SIMA is prepared.

Shoreline clean-up aims to remove hydrocarbons from shorelines and intertidal habitat to achieve a net environmental benefit. Removal of these hydrocarbons helps reduce remobilisation and contamination of wildlife, habitat and other sensitive receptors. Shoreline clean-up is often a lengthy and cyclical process, requiring regular surveys (via OMP: Shoreline Clean-up Assessment) to monitor the effectiveness of clean-up activities and assess if they are resulting in any adverse impacts.

The locations for shoreline clean-up operations will continue to be evaluated by the relevant Control Agency throughout the incident response and will take into account monitor and evaluate data, operational monitoring data and the PPAs identified.

The relevance and suitability of individual tactics (or tactics used in combination) will need to be considered when preparing the Operational SIMA for individual spills. Initiation of suitable tactics will need to be confirmed by the Control Agency, prior to deployment.

- Natural recovery – involves leaving the oil on the shoreline and allowing it to degrade naturally over time
- Manual and mechanical removal – requires the use of machinery, hand tools (or a combination) to remove hydrocarbons and oiled materials
- Washing, flooding and flushing – involves using water, steam, or sand to flush hydrocarbons from impacted shoreline areas
- Sediment reworking and surf washing – uses various methods to move oiled material into the intertidal zone where the hydrocarbons are washed out by wave action.

The information obtained from Shoreline Clean-up Assessment Teams should be used by the IMT and Control Agency in the development of the Operational SIMA to inform the most effective clean-up tactics (if

any) to apply to individual sites. A minimum threshold of ≥100 g/m^2 (concentration of accumulated hydrocarbons on shorelines) is used to determine the lower limit for commencing clean-up operations (Table 4-7).

17.3 Implementation Guide

The locations for shoreline clean-up operations will be evaluated by the relevant Control Agency throughout the incident response and will consider monitor and evaluate data and the PPAs. In addition, the information obtained from monitor and evaluate activities will be used by the IMT in the development of the Operational SIMA to inform the most effective shoreline clean-up tactics (if any) to apply to individual sites. This will also consider the feasibility and effectiveness of selected tactics.

Deployment of equipment and personnel is to be at the direction of the WA DoT as the Control Agency in WA State waters.

Table 17-1 provides guidance on tasks and responsibilities that Jadestone will undertake to support the Control Agency should they implement this response strategy. The Control Agency is responsible for the implementation of the response and therefore, depending on the circumstances of the spill, may determine that some tasks be varied, should not be undertaken or should be reassigned.

17.3.1 Operational Considerations

Large scale operations involving large numbers of personnel may cause adverse environmental impacts at sensitive shoreline locations. The constant removal of hydrocarbons mixed with sand and debris, even via manual removal can result in a removal of large volumes of substrate (e.g. sand, pebbles). If intrusive clean-up is conducted frequently, over a long period of time and along contiguous lengths of coastline, this may result in geomorphological changes to the shoreline profile and adverse impacts to shoreline invertebrate communities which provide an array of ecosystem services (Michel *et al*. 2017).

An Operational SIMA should consider the safety constraints and ecological sensitivities of these shorelines (Refer to considerations presented in Table 10-1). If an Operational SIMA deems clean-up is likely to result in a net environmental benefit, it may be beneficial for operations to be conducted by smaller teams (max 10 people/team) over a longer period. Intermittent manual treatment (<20 visits/month) and use of passive recovery booms is likely to be more effective than intrusive methods (e.g. intrusive manual removal >20 visits/month). Although this may take longer to undertake the clean-up, the benefits often outweigh the impacts as smaller teams are more targeted, recover more hydrocarbons and less sand and debris, reducing trampling of hydrocarbons into the shore profile and will minimise ecological impacts on the shorelines and their sensitive species.

It should also be noted that it is generally not feasible to move response equipment into and out of mangroves, tidal flats and delta environments without causing excessive damage. Even foot traffic must be minimised, either by laying down wooden walkways or relying on vessel-based activities as much as possible (API, 2020). This is important as the Montebello Islands are identified as a priority protection area for Stag activities and include offshore mangrove communities, which are globally unique due to their offshore location.

Clean-up endpoints should be established in consultation with key stakeholders (e.g. Parks Australia, WA DBCA) early in the clean-up process, and should take into account the net environmental benefit of the clean-up operation at individual sites.

Table 17-1: Implementation Guidance – Shoreline Clean-up

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Initial actions	Planning Lead	Notify relevant authorities if there are likely to be any impacts on shorelines. Refer to Table 9-1 for details on notifications. Refer to Section 2.2 for details on Control Agency responsibilities.	-	-	☐
	Planning Lead	Collect and provide monitor and evaluate data, operational monitoring data and existing sensitivity information/mapping to Control Agency for confirmation of PPAs and Operational SIMA.	-	-	☐
ACTIONS BELOW ARE INDICATIVE ONLY AND ARE AT THE FINAL DETERMINATION OF THE CONTROL AGENCY					
Initial actions	Planning Lead	In conjunction with Control Agency, conduct Operational SIMA to determine if shoreline clean-up is likely to result in a net environmental benefit and help to achieve the Environmental Performance Outcome for this strategy (Section 17.1) of reducing impact on shoreline protection priorities and facilitating habitat recovery.	Use information from shoreline assessments and any tactical response plans for the area. Refer to Table 10-1 for guidance on Operational SIMA. Shoreline Clean-up Assessment Teams are responsible for preparing field maps and forms detailing the area surveyed and making specific clean-up recommendations. The condition of affected shorelines will be constantly changing. Results of shoreline surveys should be reported as quickly as possible to the IMT and Control Agency to help inform real-time decision making.	Within 12 hours of IMT being convened (and impacts to shorelines are likely)	☐
	Planning Lead	In consultation with Control Agency, engage a Heritage Advisor to provide advice on any sites of cultural significance that may be affected directly by the spill, or indirectly through implementation of spill response measures e.g. deployment areas for clean-up personnel and equipment.	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Planning Lead	If Operational SIMA indicates that there is an overall environmental benefit, develop a Shoreline Protection Plan (IAP Sub-Plan) for each deployment area	Shoreline Protection Plan may include (but not be limited to): • Priority nearshore and shoreline areas for protection (liaise with Control Agency for direction on locations) • Locations to deploy protection and deflection equipment • Permits required (if applicable) • Protection and deflection tactics to be employed for each location • List of resources (personnel and equipment) required • Logistical arrangements (e.g. staging areas, accommodation, transport of personnel, shift rotation requirements) • Timeframes to undertake deployment • Access locations from land or sea • Frequency of equipment inspections and maintenance (noting tidal cycles and tactics used, as some tactics require constant supervision) • Waste management information, including logistical information on temporary storage areas, segregation, decontamination zones and disposal routes • No access and demarcation zones for vehicle and personnel movement considering sensitive vegetation, bird nesting/roosting areas and turtle nesting habitat (utilise existing roads and tracks first)	Develop Shoreline Protection Plan, if required, within 12 hours of SIMA confirming an overall environmental benefit	☐
	Operations Lead Logistics Lead	Upon direction of Control Agency deploy shoreline protection response teams and equipment to each shoreline location	-	Commence deployment within 24 hours of completion of Protection and	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
		selected and implement response as per Shoreline Protection Plan (IAP sub-plan).		Deflection Plan (IAP sub-plan)	
Ongoing actions	Operations Lead	Nominated Shoreline Response Team Leader to report back on effectiveness of response strategy to Control Agency and IMT.	-	-	☐
	Planning Lead	In conjunction with Control Agency conduct regular Operational SIMA to confirm effectiveness of tactics and demonstrate benefit of continuing to implement shoreline protection and deflection activities.	-	-	☐

17.4 Resourcing Requirements

Shoreline clean-up resource capability requirements have been determined using modelling outputs from the worst-case credible spills. The resourcing requirements presented in Table 17-2 are for capability analysis only and would be revisited should a spill occur. The actual level of deployment of equipment and personnel for clean-up will be commensurate to the spatial extent of shoreline contact, the volume of oil arriving and the sensitivity and access constraints of the shoreline in question.

In addition, deployment will be under the direction of the relevant Control Agency and the advice of shoreline clean-up specialists from AMOSC Core Group and National/State response teams. Shoreline clean-up assessments (OSM-BIP) will provide information to guide the clean-up strategy and deployment of resources.

Table 17-2 presents resourcing requirements using the stochastic modelling results for shoreline accumulation ≥100 g/m². The only PPA predicted to be contacted is Montebello Islands.

In the event of an actual spill, Jadestone will use initial monitor and evaluate data (e.g. trajectory modelling and aerial surveillance) to determine where resources should be allocated. This may include directing resources to conduct shoreline assessment at locations not identified as PPAs, to determine if protection and clean-up activities may be required at these receptors.

For planning purposes, one shoreline clean-up team would consist of 1 Team Leader and 10 Team Members. The Team Leader would require to be trained in oil spill response operational procedures, however team members could include personnel from Jadestone's labour hire contracts.

Table 17-2: Shoreline clean-up resource requirements for PPAs based on stochastic modelling

Priority Protection Area	Min. time to shoreline oil accumulating ≥100 g/m^2 (days)	Accumulated oil on shoreline in worst replicate simulation at or above 100 g/m^2 (m^3)	Number of shoreline clean-up teams recommended (1 team per 10 m^3/day)	Number of shoreline clean-up responders required (10 per team)	Potential waste generated (worst replicate simulation) including bulking factor of 10 (m^3)
Montebello Islands	1.1	68	3-4	30-40	680

17.5 Resource Capability

Table 17-3 provides a list of resources that may be used to implement this strategy.

Table 17-3: Resource Capability – Shoreline Clean-up Strategy

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
Manual clean-up tools	Hardware suppliers	As available	Karratha, Exmouth, Perth	24–48 hours from shoreline clean-up being determined as a suitable response strategy
AMOSC clean-up equipment[12]	AMOSC	Shoreline kits – 2	Fremantle – 1 Geelong – 1	Response via duty officer within 15 minutes of first call; AMOSC personnel available within one hour of initial activation call. Equipment logistics varies according to stockpile location.
		Shoreline flushing kit and shoreline impact kit – 3	Fremantle –1; Geelong – 2	

[12] Resource totals shown here are correct at the time of publication. IMT personnel should refer to latest equipment reports via the AMOSC Members Login - https://amosc.com.au/member-login/ (Login details and equipment report locations are provided in Jadestone's IMT Portal)

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
		Decontamination stations – 3	Fremantle –1; Exmouth –1; Geelong – 1	
		Waste storage Fast tanks – (9,000 L and 3,000 L)) – 9 Vikotank (13,000 L) Lamor (11,400 L) IBCs (1 m^3)	Broome, Geelong, Fremantle, Exmouth	
AMSA clean-up equipment[13]	AMSA	Decontamination stations – 4	Karratha – 2; Fremantle – 2	Access to National Plan equipment through AMOSC
		Waste storage Fast tanks – (10 m3) Structureflex – (10 m3) Vikoma – (10 m3)	Karratha, Fremantle, Darwin, and other locations across Australia	
Personnel (field responders) for shoreline clean-up	AMOSC Staff	Total – 12	Fremantle – 5 Geelong – 7	Response via duty officer within 15 minutes of first call. Timeframe for availability of AMOSC personnel dependent on location of spill and transport to site
	AMOSC Core Group	As per monthly availability (minimum 84)	Office and facility location across Australia	Location dependent. Confirmed at time of activation.
	OSRL response personnel	18 responders guaranteed 80 responders may be approved under best endeavours	Various international locations	5 personnel available from 2–3 days, remaining personnel available from 4–5 days (subject to approvals/ clearances)

[13] Resource totals shown here are correct at the time of publication. IMT personnel should refer to latest equipment reports via the AMSA website - https://www.amsa.gov.au/marine-environment/pollution-response/national-environmental-maritime-operations

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
	Jadestone labour hire personnel	As per availability	Australia wide	Subject to availability (72–96 hours)

17.6 Environmental Performance

Table 17-4Table 17-4 lists the environmental performance standards and measurement criteria for this strategy.

Table 17-4: Environmental Performance Standards and Measurement Criteria – Shoreline Clean-up

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS46	Maintain contracts with third-party providers to provide access to suitably qualified and competent personnel and equipment to assist in the implementation of shoreline clean-up tactics	AMOSC Master Services Agreement
		OSRL Service Level Agreement
		Access to National Plan resources through AMSA
		Vessel contracts in place for the duration of the activity
Response Implementation (only required in the event of a spill)		
EPS47	Prepare Operational SIMA in conjunction with Control Agency (if applicable) to determine if shoreline clean-up is likely to result in a net environmental benefit	Records demonstrate that an Operational SIMA was completed with Control Agency (if applicable) and indicated shoreline clean-up was likely to result in a net environmental benefit
EPS48	If Operational SIMA indicates that there is an overall environmental benefit, support Control Agency (if applicable) in the development of a Shoreline Clean-up Plan (IAP sub-plan)	Shoreline Clean-up Plan (IAP sub-plan) is dated and indicates preparation done in conjunction with Control Agency (if applicable) and prior to shoreline clean-up operations commencing
EPS49	Shoreline clean-up activities will be implemented under the direction of the Control Agency (if applicable)	Records demonstrate that shoreline clean-up activities implemented under the direction of the Control Agency (if applicable)
EPS50	Response operations conducted during daylight hours only	Incident Log
EPS51	Response vessels stand-off at night with lighting required for safety only	Incident Log

18. OILED WILDLIFE RESPONSE STRATEGY

18.1 Initiation and Termination Criteria

Environmental Performance Objective	Implement oiled wildlife response in accordance with the WA Oiled Wildlife Response Plan and Manual to prevent or reduce impacts, and to humanely treat, house, and release or euthanise wildlife.	
Applicable Hydrocarbons	Stag Crude	✓
	MDO	✓
Initiation Criteria		
• Monitor and evaluate activities shows that wildlife has been contacted or is at risk of contact from hydrocarbons		
Termination Criteria		
• Operational SIMA has determined that this strategy is unlikely to result in an overall benefit to the affected shoreline/s; and • Control Agency decides to terminate the response strategy.		

18.2 Overview

The short-term effects of hydrocarbons on wildlife may be direct such as the external impacts from coating or internal effects from ingestion and inhalation. OWR includes wildlife surveillance/reconnaissance, wildlife hazing, pre-emptive capture and the capture, cleaning, treatment, rehabilitation, release and post-release monitoring of animals that have been oiled. In addition, it includes the collection, post-mortem examination, and disposal of deceased animals that have succumbed to the effects of oiling.

Long-term effects of a spill on wildlife may be associated with loss/degradation of habitat, impacts to food sources, and impacts to reproduction. An assessment of such impacts is covered in Section 7.5.4 of the Stag Drilling EP and 7.5.3 of the Stag Field Operations EP and post-spill via scientific monitoring (Section 19.1).

For a petroleum activity spill in Commonwealth waters, Jadestone act as the Control Agency and will be responsible for the entire wildlife response. The WA Oiled Wildlife Response Plan (WAOWRP) (DBCA, 2022a) and accompanying WA Oiled Wildlife Response Manual (WA OWR Manual) (DBCA, 2022b) will be referred to for guidance for coordinating an OWR when Jadestone is the Control Agency.

For spills in State waters, Jadestone will conduct the initial first-strike response for wildlife and continue to manage those operations until DBCA is activated, and formal hand over occurs. Following formal handover, Jadestone will function as a support organisation for the OWR and will be expected to continue to provide planning and resources as required.

18.3 Implementation Guide

The OWR first strike plan (initial 48 hours) (Table 18-1) provides guidance to the IMT and Wildlife Division Co-ordinator on the tasks and responsibilities that should be considered when implementing an OWR when Jadestone is the Control Agency or prior to formal hand over to the relevant Control Agency.

The OWR first strike plan focuses on notifications, wildlife reconnaissance and response preparation. Preventative actions, such as hazing, along with capture, intake and treatment require a higher degree of planning, approval (licences) and skills and will be planned for and carried out under the IAP Wildlife Subplan.

Table 18-1: Implementation Guidance – Oiled Wildlife Response

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
First strike plan (0–48 hours): situational awareness, notifications and activation of Wildlife Division					
Initial actions	Operational monitoring personnel	Situational Awareness Personnel conducting monitor and evaluate, and operational monitoring activities shall report wildlife sightings in or near the spill trajectory (including those contacted with hydrocarbons or at risk of contact) and report them to the IMT	Record all reports of wildlife potentially impacted and impacted by spill. Record the following: • Time / date • Location / GPS coordinates • Access to location • Number of individuals (estimate) • Species (if known) • Condition of impacted animals (if available) • Take photographs of the affected wildlife and / or affected surrounds, if possible	<2 hours of becoming aware of potential impacts to wildlife	☐
	On Scene Commander	Inform the IMT if wildlife has been contacted by hydrocarbon or are at risk of contact	-	-	☐
	Planning Lead	External Notifications (also covered in Table 9-1) If wildlife has been contacted by hydrocarbon or are at risk of contact (based on monitor and evaluate outputs): • In State waters, DoT • In State waters, notify the DBCA State Duty Officer (who will then activate the DBCA OWA) • In State waters, notify the Pilbara DBCA regional office	DoT is the Control Agency for OWR in State Waters (DBCA will receive formal notification following the activation of the SHP-MEE)	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
		• Notify DCCEEW if there is a risk of death or injury to a protected species (including Matters of National Environmental Significance [MNES]).			
	Planning Lead	If wildlife has been contacted by hydrocarbon or are at risk of contact (based on monitor and evaluate outputs): • Notify the AMOSC Duty Manager (who will then activate the AMOSC OWA)	Obtain approval from the IMT Leader before activating AMOSC OWA. Under the WAOWRP arrangement, DBCA and AMOSC may request assistance from each other if their internal pool of trained personnel or expertise for wildlife response has been exhausted.	-	☐
	Operations Lead	Activate Wildlife Division If wildlife has been contacted by oil or are at risk of contact (based on monitor and evaluate outputs) activate the oiled wildlife response sub-division within Operations by appointing a Wildlife Division Co-ordinator with the support of the IMT Leader	-	<24 hours of becoming aware of potential impacts to wildlife	☐
ACTIONS BELOW ARE INDICATIVE ONLY AND ARE AT THE FINAL DETERMINATION OF THE CONTROL AGENCY					

Initial actions	Wildlife Division Co-ordinator	Determine if targeted wildlife reconnaissance (beyond operational monitoring/ monitor and evaluate) is required (situation dependent)	Determine the requirement for targeted wildlife reconnaissance and associated personnel and equipment requirements.
			Refer to the following guidance documents for further information on wildlife reconnaissance:
			• WA OWR Manual:
			  ○ P1 OWR Procedure: Phase 1 Wildlife Reconnaissance
			  ○ G-1: OWR Strategies by Fauna Group
			• Forms:
				<48 hours of becoming aware of potential impacts to wildlife	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
			○ F1-1 Oiled Wildlife Reconnaissance: Observation Record Note Any interactions involving nationally listed threatened fauna may require approval from DCCEEW as interactions with such species is controlled by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Environment Protection and Biodiversity Conservation Regulations 2000. In WA State waters, preventative actions involving wildlife constitute fauna "disturbance" under the *Biodiversity Conservation Act 2016* and require authorisation through DBCA unless undertaken by licensed personnel. No action specifically targeted at wildlife should occur without this authority.		
	Wildlife Division Co-ordinator	Determine if the establishment of an OWR field station is required (situation dependent) • Personnel and equipment requirements	OWR Field Station Consider possible location and logistical requirements for setting up a field station Refer to the following guidance documents for further information on setting up an OWR Field Station: • WA OWR Manual: ○ P4 OWR Procedure: Phase 4 Wildlife Field Processing • WAOWRP: ○ Appendix A – Equipment		☐
	Wildlife Division Co-ordinator	Handover control to External Control Agency	Prepare to hand over control of the OWR to the relevant control agency if a protracted response is likely. Continue to provide updates on progress and support the development of the IAP Wildlife Subplan to ensure that site considerations and constraints are adequately		☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
			captured and considered in the ongoing response planning.		
Ongoing actions	Wildlife Division Co-ordinator Logistics	Mobilise required resources	-	-	☐
BEYOND FIRST STRIKE AND IF FORMAL HANDOVER HAS NOT YET OCCURRED (ACTIONS BELOW ARE INDICATIVE ONLY AND ARE AT THE FINAL DETERMINATION OF THE CONTROL AGENCY)					
Ongoing actions	Wildlife Division Co-ordinator Planning Lead	Prepare IAP Wildlife Subplan	Initial IAP Wildlife Subplan should • Assess the situation and determine the level of wildlife impact (low / medium / high) • The DBCA OWA and AMOSC OWA should be consulted when determining the initial magnitude of impact • Determine if there are spill activities / tactics that may benefit or adversely impact the OWR • Determine wildlife response priorities • Determine if any deterrence / hazing measures may be applicable (i.e. likely to result in a net benefit) followed by the development of a Preventative Actions Plan • Anticipate number of oiled wildlife requiring rescue and development of a Capture Plan • Bridge to the operational phases, procedures and guidelines in the WA OWR Manual (as outlined in Table 18-2) and relevant to the scale of the OWR	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
	Wildlife Division Co-ordinator Planning Lead	Based on the IAP Wildlife Subplan, develop a list of equipment and resources that will be required to implement the plan and provide it to the Logistics Lead	-	-	☐
	Logistics	Mobilise equipment and personnel to required location(s)	Refer to Table 18-5 for available equipment and personnel	-	☐

Table 18-2: OWR IAP Operational Phases and Corresponding Section of the WA OWR Manual

IAP Wildlife Operational Phases	Relevant Procedures, Guideline, Appendices and Forms of the WA OWR Manual
Wildlife impact assessment	Refer to Table 18-4
Reconnaissance (Phase 1)	P1 OWR Procedure: Phase 1 Wildlife Reconnaissance Forms: • F1-1 Oiled Wildlife Reconnaissance: Observation Record
Preventative (Phase 2)	P2 OWR Procedure: Phase 2: Preventative Actions Forms: • F2-1 oiled Wildlife Preventative Actions: Observation Record
Search and rescue (Phase 3)	P3 OWR Procedure: Phase 3 Wildlife Rescue A-6 Cleaning and Disinfection Forms and tags: • F3-1 Oiled Wildlife Rescue- Collection Record • L3-1 Oiled Wildlife Rescue- Collection Tag
Field processing and transport (Phase 4)	P4 OWR Procedure: Phase 4 Wildlife Field Processing G4-: OWR Euthanasia Plan A-6 Cleaning and Disinfection Forms: • F4-1 Individual Animal Chain of Custody Record • F4-2 Oiled Wildlife Admission Log • F4-3 Oiled Wildlife Live Animal Assessment • F4-4 Animal Transport Log
Setting up a primary care facility	G-6: Setting up a Primary Care Facility
Intake- processing/admission, triage, stabilisation and pre-wash care (Phase 5)	P5i OWR Procedure: Phase 5 Intake- Admissions and Live Animal Processing G4-: OWR Euthanasia A-6 Cleaning and Disinfection Forms: • L5-1 Wildlife Intake – Oil Sample Evidence • L5-2 Wildlife Intake – Photo Evidence Live Animal • L5-5 Wildlife Intake – Photo Memory Card Evidence
Carcass collection, necropsy storage, carcass sampling	P5ii OWR Procedure: Phase 5 Intake- Dead Animal Processing A-6 Cleaning and Disinfection Forms: • F5-1 Wildlife Intake – Oil Sample Chain of Custody • F5-2a Wildlife Intake – Necropsy Form – Birds • F5-2b Wildlife Intake – Necropsy Form – Sea Turtles • F5-2d Wildlife Intake – Necropsy Form – Cetaceans and Dugongs • F5-2e Wildlife Intake – Necropsy Form – Other Reptiles • F5-2f Wildlife Intake – Necropsy Form – Other Mammals • L5-3 Wildlife Intake – Photo Evidence – Dead Animal

IAP Wildlife Operational Phases	Relevant Procedures, Guideline, Appendices and Forms of the WA OWR Manual
	• L5-4 Wildlife Intake – Processing – Animal Tissue Sample • L5-5 Wildlife Intake – Photo Memory Card Evidence
Cleaning (Phase 6)	P6 OWR Procedure: Phase 6 Wildlife Cleaning A-6 Cleaning and Disinfection Form: • F6-1 Oiled Wildlife Cleaning Room Record
Rehabilitation (Phase 7)	P7 OWR Procedure: Phase 7 Rehabilitation A-6 Cleaning and Disinfection Forms: • F7-1 Oiled Wildlife Rehabilitation Daily Progress Record • F7-2 Oiled Wildlife Rehabilitation – Pool Observation Record • F7-3 Oiled Wildlife Rehabilitation – Waterproofing Record • F7-4 Daily Rounds and Laboratory Record
Release and post-release monitoring (Phase 8)	P8 OWR Procedure: Phase 8 Release
Health and Safety	G1: Workplace Health and Safety G2: Biosecurity in Oiled Wildlife Response A-6 Cleaning and Disinfection Other references: National Wildlife Biosecurity Guidelines
OWR termination and demobilisation	N/A

18.4 Resourcing Requirements

18.4.1 Wildlife Priority Protection Areas

French-McCay (2002), based on a review of existing literature at the time, determined lethal thresholds for floating and shoreline oil for the external coating of wildlife to be 10 g/m^2 for floating, and 100 g/m^2 for shoreline accumulation. It should however be noted that toxicity thresholds for wildlife are likely to be highly variable due to differences in species sensitivity, type of hydrocarbon, type of exposure (ingestion or external oiling), life-stage, and on-water versus land habitat.

For planning purposes, determination of wildlife priority protection areas is based on stochastic modelling of the worst-case spill scenarios at 10 g/m^2 for floating, and 100 g/m^2 for shoreline accumulation (acknowledging that impacts to wildlife may occur at lower concentrations), the known presence of wildlife, and in consideration of the following:

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

The intent of the identification of wildlife priority protection areas and associated wildlife data is to:

- Prioritise sites for reconnaissance

- Provide reconnaissance and rescue teams with a board estimation of what fauna they should expect to find in a particular location.

At the time of a spill, identification and allocation of priority of wildlife priority protection areas should also take into consideration any key biological activities. Depending on the timing of a spill, certain species could be more impacted by a hydrocarbon spill because of key biological activities such as breeding, mating, nesting, hatching or migrating.

The Montebello Islands are the main wildlife priority protection area for Stag activities with key sensitivities outlined in Table 18-3.

Table 18-3: Key sensitivities of the Montebello Islands

Key sensitivities
Turtles: loggerhead (*Caretta caretta*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbracata*), flatback (*Natator depressus*) are common in the waters surrounding the Montebello Islands (Burbidge *et al*. 2000) and nesting occurs for the following species (Commonwealth of Australia, 2017): Green turtle- major nesting Nov – Mar (peak: Dec-May) on locations with sandy beaches Flatback- minor nesting occurs Oct-Mar (peak: Nov-Jan) Hawksbill- major nesting occurs all year (peak Oct-Jan), Ah Chong Island, Southeast Island, Trimouille and elsewhere.
Birds: (Burbidge *et al.* 2000) *Seabirds* Wedge-tailed shearwater (*Puffinus pacificus*) significant breeding historically reported on Ah Chong, Gossypium, Brooke, Flag, Gardenia and SouthEast Islands. Silver gull (*Larus novaehollandiae*) breeding historically reported on Brooke and SouthEast. Caspian tern (*Sterna caspia*) common breeding resident historically on Ah Chong, Alpha, Bluebell, Dandelion, Flag, Foxglove, Islet to south of Hermite, Ivy, Kunzea, Marri Islands, Primrose, Renewal and Trimouille. Roseate tern (*Sterna dougallii*) significant historical breeding historically reported on Dahlia, Dandelion, Pimelia, Myoporum, Gannet, Fig Islands and Bloodwood. Fairy tern (*Sterna nereis*) historical breeding on Fairy Tern Island and Hibbertia. Crested tern (*Sterna bergii*) significant historical breeding on Daisy, Epsilon and Flag. *Waterbirds* Historically moderately common: pied cormorant (*Phalacrocarax varius*), Australian pelican (*Pelecanus conspicillatus*), Historically common: eastern reef egret (*Egretta sacra*), osprey (*Pandion haliaetus*) *Shorebirds* Historically moderately common: whimbrel (*Numenius phaeopus*), greenshank (*Tringa nebularia*), common sandpiper (*Actitis hypoleucos*), ruddy turnstone (*Arenaria interpres*), red-necked stint (*Calidris ruficollis*) Historically common: bar-tailed godwit (*Limosa lappanica*), grey-tailed tattler (*Heteroscelus brevipes*), beach stone-curlew (*Esacus neglectus*), pied oystercatcher (*Haematopus ostralegus*), sooty oystercatcher (*Haematos fuliginosus*)

18.4.2 Magnitude of wildlife impact

Given the distribution and behaviour of wildlife in the marine environment, a spill which only impacts Commonwealth offshore waters is likely to result in limited opportunities to rescue wildlife. In such instances, continued wildlife reconnaissance for rescue opportunities, carcass recovery, sampling of carcasses that cannot be retrieved and scientific monitoring are more likely to be the focus of response efforts. In contrast, a spill which results in shoreline accumulation is likely to result in far greater wildlife impacts and opportunities to rescue wildlife.

The stochastic modelling for the worst-case spill scenarios for Stag activities shows that the probability of shoreline contact is relatively low (Section 4.3), however, if shoreline impact were to occur it is predicted that high wildlife impacts are possible (using the WAOWRP [DBCA, 2022a] Guide for Rating the Wildlife Impact of an Oil Spill [Table 18-4]).

Table 18-4: Guide for Rating the Wildlife Impact of an Oil Spill (DBCA, 2022a)

Wildlife Impact Rating	Low	Medium	High
What is the likely duration of the wildlife response?	<3 days	3–10 days	>10 days
What is the likely total intake of animals?	<10	11–25	>25
What is the likely daily intake of animals?	0–2	2–5	>5
Are threatened species, or species protected by treaty, likely to be impacted, either directly or by pollution of habitat or breeding areas?	No	Yes- possible	Yes- likely
Is there likely to be a requirement for building primary care facility for treatment, cleaning and rehabilitation?	No	Yes- possible	Yes- likely

18.5 Resource Capability

The indicative personnel required for a high impact-rated response is 93 personnel (as per the WAOWRP) (DBCA, 2022a), however depending on the number and species impacted, may require many more. Jadestone's current arrangements could support a large scale OWR (requiring >93 personnel) mainly through support staff, such as, non-technical wildlife support roles (management, logistics, planning, human resourcing, transporter, cleaners, trades persons, security etc). These roles could be filled by Jadestone personnel and labour hire agencies that can provide workers that undergo an induction and basic training. In addition, many of the roles required for an OWR require technical expertise and Jadestone will need to activate OWR arrangements with AMOSC and OSRL to fulfil roles, as well as make contractor arrangements for accessing skilled wildlife personnel at the time of a spill.

Table 18-5: Resource Capability – Oiled Wildlife Response

OWR strategy	Equipment/personnel	Location	Mobilisation Timeframe	Consideration
Reconnaissance	Rotary wing aircraft and flight crew	Karratha	Wheels up within 4 hours of activation	Identify any synergies with surveys required for Monitor and Evaluate and Scientific Monitoring activities
	Drones and pilots	Local WA hire companies	48 hours	
	Contracted vessels and vessels of opportunity	Exmouth, Dampier, NWS locations	Varies subject to location / availability	
Preventative actions	2 x AMOSC Wildlife fauna hazing and exclusion kits 3 x AMOSC Wildlife fauna hazing and capture kits 1 x AMOSC Breco buoy	1 x Fremantle, 1 x Geelong 3 x Fremantle 1 x Fremantle	48 hours	Mainly effective for bird species Requires relevant WA licence approval
Rescue and field processing	4 x AMOSC Oiled Fauna Kits (basic medical supplies, cleaning/rehab, PPE)	1 x Fremantle, 1 x Exmouth, 1 x Broome, 1 x Geelong	48 hours	Wildlife handling and first aid should only be done by persons with appropriate skills and experience or under the direction of DBCA
	50% of OSRL OWR response packages (Wildlife Search and Rescue kits / Cleaning and Rehab. kits (including field first aid)	5 x Singapore, 2 x Bahrain, 7 x UK, 5 x Fort Lauderdale	Location dependent	-

OWR strategy	Equipment/personnel	Location	Mobilisation Timeframe	Consideration
Transport	Contracted vessels and vessels of opportunity	Dampier, other regional locations in WA and Northern Territory	Subject to availability and location	Transport of oiled animals by aeroplane or helicopter may be restricted due to Civil Aviation Safety Authority (CASA) regulations; such transport will depend on the level of oiling remaining on animals. Therefore, consultation with the air transport provider must take place before transport to ensure the safest and most efficient means of transport
Primary care facility	OWR container/mobile washing facility 2 x AMOSC 4 x AMSA	AMOSC – 1 x Fremantle, 1 x Geelong AMSA 1 x Dampier, 1 x Darwin, 1 x Devonport, 1 x Townsville	Location dependent	OWR container could be placed on the deck of a suitably sized vessel for field processing in remote locations (benefits associated with temperature regulation and access to water and electricity) An OWR container on a vessel could also be used to aide transport form offshore islands
	AMOSC call off contract with DWYERTech NZ – a facilities management group	New Zealand	Availability within 24 hours of call-off	-
Personnel	1x AMOSC Oiled Wildlife Advisor	Perth, Australia	48 hours	-
	60 x AMOSC OWR Strike Team Members	Australia wide	48 hours	
	AMOSC MOU with Phillip Island National Park (PINP) (best-endeavours availability)	Victoria, Australia	Best-endeavour availability	
	Jadestone labour hire arrangements for access to non-technical personnel	Australia wide	Subject to availability (72–96 hours)	Non-technical personnel would receive an induction, on-the-job training and work under the supervision of an experienced supervisor

OWR strategy	Equipment/personnel	Location	Mobilisation Timeframe	Consideration
	Via OSRL Access to 24/7 technical advice (remote or on-site) from the Sea Alarm Foundation Access to OWR assessment service from the Global Oiled Wildlife Response Service (GOWRS) consisting of a ready-to-deploy team of 4 specialists in Operations/Planning, Field & Capture, Rehab & Facilities, Vet/Incident-specifics.	Belgium Various locations in northern and southern hemisphere		Sea Alarm: Upon notification able to provide remote advice and option to mobilise a Sea Alarm Technical Advisor on-site during an incident GOWRS: Mobilised on a best endeavours basis

18.6 Environmental Performance

Table 18-6 lists the environmental performance standards and measurement criteria for this strategy.

Table 18-6: Environmental Performance Standards and Measurement Criteria – Oiled Wildlife Response

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS52	Maintain access to oiled wildlife response equipment and personnel	AMOSC Master Services Agreement
		OSRL Service Level Agreement
		Access to National Plan resources through AMSA
Response Implementation (only required in the event of a spill)		
EPS53	Initiate OWR first strike plan within 12 hours of IMT being convened	Incident Log
EPS54	OWR undertaken in accordance with the WA Oiled Wildlife Response Plan and the WA Oiled Wildlife Response Manual	Incident Log
EPS55	Establish OWR structure within IMT within 24 hours of OWR risk being identified	Incident Log
EPS56	Commence mobilisation of OWR resources within 48 hours of OWR risk being identified	Incident Log
EPS57	Response operations conducted during daylight hours only	Incident Log

19. SUPPORT FUNCTIONS

19.1 Operational and Scientific Monitoring

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

Jadestone has developed a Stag Field OSM-BIP (GF-70-PLN-F-00003) which describes a program of monitoring oil pollution that will be adopted in the event of a hydrocarbon spill incident (Level 2–3) to marine waters. It is aligned to the Joint Industry Operational and Scientific Monitoring Framework (APPEA, 2021) and describes how this Framework applies to the Stag Field activities and spill risks in Australian waters.

The OSM-BIP is structured so that it can provide a flexible framework that can be adapted to individual spill incidents. A series of Operational Monitoring Plans (OMPs) and Scientific Monitoring Plans (SMPs) form part of the Joint Industry Framework and provide detail on monitoring design, standard operating procedures, data management and reporting. Details on personnel, resources, logistics and mobilisation times are outlined in the OSM-BIP. Table 19-1 lists the plans that are relevant to Jadestone's Stag activities and the objective of each monitoring plan.

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

- Operational Monitoring (OM) – which is undertaken during the course of the spill and includes any physical, chemical and biological assessments which may guide operational decisions such as selecting the appropriate response and mitigation methods and / or to determine when to terminate a response activity. This monitoring is additional to the activities (visual surveillance, tracking buoys, oil spill trajectory modelling and satellite tracking) performed as part of the Monitor and Evaluate Strategy (Section 11). The design of operational monitoring requires judgements to be made about scope, methods, data inputs and outputs that are specific to the individual spill incident, balancing the operational needs of the response with the logistical and time constraints of gathering and processing information. There is a need for information to be collected and processed rapidly to suit response needs, with a lower level of sampling and accuracy needed than for scientific purposes. For details on initiation and termination criteria for OMs refer to the OSM-BIP.
- Scientific Monitoring (SM) – which can extend well beyond the termination of response operations. Scientific monitoring has objectives relating to attributing cause-effect interactions of the spill or associated response with changes to the surrounding environment. The SMs will be conducted on a wider study area, extending beyond the spill footprint, will be more systematic and quantitative and aim to account for natural or sampling variation. For further details on the SMs refer to the OSM-BIP.

Jadestone will review the initiation criteria for OMPs and SMPs (Provided in Table 5-1 (OMPs) and Table 6-1 (SMPs) of the Joint Industry Operational and Scientific Monitoring Framework (APPEA, 2021)) during the preparation of the initial IAPs, and subsequent IAPs. If any initiation criteria are met, then that relevant OMP and/or SMP will be activated via the relevant Monitoring Service Provider.

Table 19-1: Operational and Scientific Monitoring Plans Relevant to Stag Activities

Monitoring Plan	Objective
Hydrocarbon properties and weathering behaviour at sea	To 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.
Water quality assessment	To provide a rapid assessment of the presence, type, concentrations and character of hydrocarbons in marine water to assess the extent of spill contact and inform impact predictions for other monitoring plans.
Sediment quality assessment	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 inform impact predictions for other monitoring plans.
Dispersant Effectiveness and Fate Assessment (Surface)	To monitor the effectiveness of chemical dispersants by examining the distribution and fate (surface and subsurface) of chemical dispersants to verify impact and contact predictions for response planning (e.g. Net Environmental Benefit Analysis (NEBA)/ Spill Impact Mitigation Assessment (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.
Rapid marine fauna assessment	To undertake a rapid assessment of marine fauna to understand the species, populations, habitats and geographical locations at greatest risk from potential spill impacts To provide the IMT with information that assists in deciding protection priorities and selecting response options that minimise the potential impact on marine fauna To provide the IMT with information on the effects of response activities on marine fauna Assess and document mortality of fauna during the spill event and response activities Establish the need for scientific monitoring of fauna affected by the spill event and/or response activities.
Shoreline clean-up assessment	Provide information on the physical and biological characteristics of shorelines within the predicted trajectory of the hydrocarbon spill or that have been exposed to the spill Conduct sectorisation of shorelines to aid in response planning and implementation of response activities Inform suitable pre-impact and post-impact response options/activities to minimise the threat posed to sensitive receptors from the spill, taking into account shoreline character Establish clean-up end points for the shoreline Monitor effectiveness of shoreline protection and/or clean-up activities Inform the IMT of any potential or actual impacts to sensitive receptors from response options/activities Inform the IMT of any sensitive receptors that may be relevant to scientific monitoring programs.

Monitoring Plan	Objective
Scientific Monitoring	
Water quality impact assessment	Detect and monitor the presence, concentration and persistence of hydrocarbons in marine waters following the spill and associated response activities. The specific objectives of this SMP are as follows: • Assess and document the temporal and spatial distribution of hydrocarbons and dispersants in marine waters of sensitive receptors • Consider the potential sources of any identified hydrocarbons • Verify the presence and extent of hydrocarbons (both on water and in water) that may be directly linked to the source of the spill • Assess hydrocarbon/dispersant content of water samples against accepted environmental guidelines or benchmarks to predict potential areas of impact • Provide information that may be used to interpret potential cause and effect drivers for environmental impacts recorded for sensitive receptors monitored under other SMPs.
Sediment quality impact assessment	Detect and monitor the presence, concentration and persistence of hydrocarbons in marine sediments following the spill and associated response activities. The specific objectives of this SMP are as follows: • Assess and document the temporal and spatial distribution of hydrocarbons and dispersants in marine sediments of sensitive receptors • Consider the potential sources of any identified hydrocarbons • Verify the presence and extent of hydrocarbons that may be directly linked to the source of the spill • Assess hydrocarbon content of sediment samples against accepted environmental guidelines or benchmarks to predict potential areas of impact.
Intertidal and coastal habitat assessment	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. The specific objectives of this SMP are as follows: • Collect quantitative data to determine short-term and long-term (including direct and indirect) impacts of hydrocarbon (and implementation of response activities) on intertidal and coastal habitats and associated biological communities, post-spill and post-response recovery • Monitor the subsequent recovery of intertidal and coastal habitats and associated biological communities from the impacts of the hydrocarbon release and response activities.

Monitoring Plan	Objective
Seabirds and shorebirds	Document and quantify shorebird and seabird presence; and any impacts and potential recovery from hydrocarbon exposure and response activities. The objectives are to: • Identify and quantify, if time allows the post-spill/pre-impact presence and status (e.g. foraging and/or nesting activity) of shorebirds and seabirds in the study area • Observe, and if possible, quantify and assess, the impacts from exposure of shorebirds and seabirds to hydrocarbons (i.e. post-impact) and to the response activities, including abundance, oiling, mortality, and sub-lethal effects • Identify, quantify and evaluate the post-impact status and if applicable, recovery of key behaviour and breeding activities of shorebirds and seabirds (e.g. foraging and/or nesting activity and reproductive success) over time and with regard to control sites.
Marine mega-fauna assessment – reptiles; whale sharks, dugongs and cetaceans	<u>Reptiles</u> Identify and quantify the status and recovery of marine reptiles, including marine turtles, sea snakes and estuarine crocodiles, related to a hydrocarbon spill and response activities. The objectives are to: • To observe and quantify the presence of marine reptiles (including life stage) within the area affected by hydrocarbons • Where possible, assess and quantify lethal impacts and/or sub-lethal impacts directly related to the hydrocarbon spill or other secondary spill-related impacts (including vessel strike and/or use of dispersants) • Assess the impact of the hydrocarbon spill on nesting turtles, nests, and hatchlings • Understand changes in nesting beach usage by marine turtles following the hydrocarbon spill. <u>Whale sharks, dugongs and cetaceans</u> Identify and quantify the status and recovery of whale sharks, dugongs and cetaceans related to a hydrocarbon spill and response activities. The objectives are to: • Observe and quantify the presence of whale sharks, dugongs and cetaceans within the area that may be affected by hydrocarbons • Where possible, assess and quantify lethal impacts and/or sub-lethal impacts directly related to the hydrocarbon spill or other indirect impacts (including vessel strike and/or use of dispersants and impacts to important habitats) • If applicable, evaluate recovery of key biological activities of impacted species following impacts due to a hydrocarbon spill and undertaking response options.

Monitoring Plan	Objective
Benthic habitat assessment	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 specific objectives of this SMP are as follows: • Collect quantitative data to determine short-term and long-term (including direct and indirect) impacts of hydrocarbon (and implementation of response options) on benthic habitats and associated biological communities, post-spill and post-response recovery • Monitor the subsequent recovery of benthic habitats and associated biological communities from the impacts of the hydrocarbon release.
Marine fish and elasmobranch assemblages assessment	To assess the impacts to and subsequent recovery of fish assemblages associated with specific benthic habitats (as identified in SMP: Benthic Habitat Assessment) in response to a hydrocarbon release and associated response activities. The specific objectives of this SMP are as follows: • Characterise the status of resident fish populations associated with habitats monitored in SMP: Benthic Habitat Assessment that are exposed/contacted by released hydrocarbons • Quantify any impacts to species (abundance, richness and density) and resident fish population structure (representative functional trophic groups) • Determine and monitor the impact of the released hydrocarbons and potential subsequent recovery to residual demersal fish populations.
Fisheries impact assessment	To 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 will have an impact on the fishing and/or aquaculture industry. The specific objectives of this SMP are as follows: • Assess any physiological impacts to important fish and shellfish species and if applicable, seafood quality and safety • Assess targeted fish and shellfish species for hydrocarbon contamination • Provide information that can be used to make inferences on the health of fisheries and the potential magnitude of impacts to fishing industries (commercial, aquaculture and recreational).
Heritage features assessment	To detect changes in the integrity of significant shipwrecks as a result of a hydrocarbon release and/or associated response activities.
Social impact assessment	To assess the extent, severity and likely persistence of impacts on cultural, commercial, recreational and/or industrial users from a hydrocarbon release and associated response activities. The specific objective of this SMP is as follows:

Monitoring Plan	Objective
	• Determine direct and indirect impacts of a hydrocarbon or chemical spill and associated response activities on cultural, commercial, recreational and/or industrial users and identify areas where monitoring may need to continue for an extended period of time following termination of the response.

19.1.1 Environmental Performance

Table 19-2 lists the environmental performance standards and measurement criteria for the following Environmental Performance Outcome.

Table 19-2: Environmental Performance Standards and Measurement Criteria – Operational and Scientific Monitoring

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS58	Maintain contracts with third-party provider/s to provide access to suitably qualified and competent personnel and equipment to assist in the implementation of monitoring	Contract with Monitoring Service Provider/s
EPS59	Obtain monthly capability reports from Monitoring Service Provider to demonstrate suitable resources are available throughout the activity	Monthly capability reports from Monitoring Service Provider
EPS60	Annual testing of OSM Monitoring Service Provider arrangements and capability	Exercise and testing records
Response Implementation (only required in the event of a spill)		
EPS61	OMPs and SMPs will be activated in accordance with the initiation criteria provided in Table 5-1 of the Joint Industry OSM Framework (APPEA, 2021)	Incident Action Plan and Incident Log confirm OMPs and SMPs are activated in accordance with the initiation criteria provided in Table 5-1 of the Joint Industry OSM Framework (APPEA, 2021)
EPS62	Initiation criteria of OMPs and SMPs will be reviewed during the preparation of the initial Incident Action Plan (IAPs) and subsequent IAPs; and if any criteria are met, relevant OMPs and SMPs will be activated	Incident Action Plan/s
EPS63	Monitoring to be conducted in accordance with the Stag Field OSM-BIP (GF-70-PLN-F-00003)	Incident log and monitoring records
EPS64	Implementation of operational and scientific monitoring will comply with the Minimum Standards listed in Appendix A of the Joint Industry OSM Framework (APPEA, 2021)	Incident log and monitoring records
EPS65	Once post-spill SMP monitoring reports are drafted they will be peer reviewed by an expert panel	Monitoring records
EPS66	OMPs and SMPs will be terminated in accordance with the termination criteria provided in Table 6-1 of the Joint Industry OSM Framework (APPEA, 2021)	Incident Action Plan and Incident Log confirm OMPs and SMPs are terminated in accordance with the termination criteria provided in Table 6-1 of the Joint Industry OSM Framework (APPEA, 2021)

19.2 Waste Management

Waste management is considered a support function to the overall response effort, so has no set objective, initiation or termination criteria. Waste management aims to ensure wastes are handled and disposed of safely and efficiently and prevent contamination of unaffected areas.

The implementation of some spill response strategies will collect and generate waste that will require management, storage, transport and disposal, and may consist of solid and liquid waste.

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.

Waste produced as a result of an oil spill will be managed in accordance with the Jadestone Waste Management Plan – Oil Spill Response Support (JS-70-PR-I-00037), Jadestone HSE requirements, MARPOL 73/78 (as appropriate to vessel class), and relevant Commonwealth and WA regulations.

Where Jadestone is the Control Agency, or at the request of the designated Control Agency, Jadestone will engage its Waste Services Provider to supply waste storage receptacles. The Waste Services Provider will also be requested to finalise its Waste Management Plan to suit the specifics of the spill, which will detail the types and volumes of waste that may be generated, finalise details of waste handling and storage and provide detailed waste disposal plans. The Waste Services Provider will arrange for all personnel, equipment and vehicles to carry out these activities from nominated collection points to licensed waste management facilities. All transport will be undertaken via controlled-waste-licensed vehicles and in accordance with the Environmental Protection (Controlled Waste) Regulations 2004 (WA).

Table 19-3 provides guidance to the IMT on the actions and responsibilities that should be considered when implementing this response strategy.

The On-Scene Commander and/or IMT Leader of the designated Control Agency is ultimately responsible for implementing the response, and may therefore determine that some tasks be varied, should not be implemented or be reassigned.

Information on resource capability for this strategy is shown in Table 19-4.

Table 19-3: Implementation Guidance –Waste Management

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
Initial actions	Logistics Lead	Notify Waste Services Provider of spill and activate services	Refer to the Incident Management Contact List for contact details	Within 12 hours of IMT identifying a requirement for waste storage, collection and/or transport	☐
	Planning Lead	Based on available monitor and evaluate data and response strategies that are likely to be implemented, inform the Waste Services Provider of the type and volumes of initial waste storage requirements to support operations	It is better to overestimate volumes and scale back resources then to underestimate waste volumes	-	☐
	Planning Lead	Request Waste Services Provider to finalise Waste Management Plan to suit the specifics of the incident	All waste stored or transferred should be documented in Waste Management Plan, including details of the volumes and nature of the waste, receiver, staging areas, destination of the waste and records of all regulatory approvals	-	☐
	Environment Lead	Ensure Operational SIMA considers the impact of waste management activities in environmentally sensitive locations	Appropriate controls or avoidance of sensitive locations should be incorporated into Waste Management Plan	-	☐
Ongoing actions	Planning Lead	Ensure Waste Services Provider tracks the following information: • waste movements (e.g. types of receptacles, receival points, temporary storage points, final disposal locations) • volumes generated at each site (including total volume and generation rates) • types of waste generated at each site	-	-	☐

	Responsibility	Task	Further information	Timeframe (if applicable)	Complete
		• approvals obtained (as required).			

Table 19-4: Resource Capability – Waste Management

Resources	Source	Quantity Available	Location / Quantity Available	Mobilisation Timeframe
Waste storage and transport equipment	Waste Services Provider	Waste receptacles (e.g. IBCs, mobile bins, skip bins, hook lift bins, offshore rated bins) as per Jadestone Waste Management Plan – Oil Spill Response Support (JS-70-PR-I-00037)	Dampier, Karratha and other locations in WA and Australia	Within 24–48 hours of activation of Waste Service Provider
	AMOSC	Refer to Table 17-3	Perth, Broome, Geelong and other locations around Australia	Response via duty officer within 15 minutes of first call – AMOSC personnel available within one hour of initial activation call
	AMSA	Refer to Table 17-3	Karratha, Fremantle, Darwin, and other locations across Australia	Access to National Plan equipment through AMOSC
Waste management personnel	Waste Services Provider/s	Personnel as per Jadestone Waste Management Plan – Oil Spill Response Support (JS-70-PR-I-00037)	Dampier, Karratha and other locations in WA and Australia	Within 24–48 hours of activation of Waste Service Provider

19.2.1 Environmental Performance

Table 19-5 lists the environmental performance standards and measurement criteria for this strategy.

Table 19-5: Environmental Performance Standards and Measurement Criteria – Waste Management

No.	Performance Standard	Measurement Criteria
Response Preparedness		
EPS67	Jadestone to maintain contracts with third-party providers to provide access to suitably qualified and competent personnel and equipment to assist in the implementation of waste management activities	Contract maintained with Waste Service Provider
		AMOSC Master Services Agreement
		OSRL Service Level Agreement
		Access to National Plan resources through AMSA
Response Implementation (only required in the event of a spill)		
EPS68	Notify Waste Services Provider of spill and activate services within 12 hours of IMT identifying a requirement for waste storage, collection and/or transport	Records demonstrate that Waste Services Provider notified of spill and services activated within 12 hours of IMT identifying a requirement for waste storage, collection and/or transport
EPS69	Finalise Waste Management Plan to suit the specifics of the incident	Records demonstrate that Waste Management Plan was finalised to suit the specifics of the incident
EPS70	Provision of waste receptacles to support operations at nominated sites, within 24–48 hours of activation of Waste Service Provider	Records demonstrate that waste receptacles provided to support operations at nominated sites, within 24–48 hours of activation of Waste Service Provider
EPS71	Waste Service Provider shall track all wastes from point of generation to final destination	Waste Service Provider tracking records

20. TERMINATION OF THE RESPONSE

Terminating the spill response may involve demobilising personnel and equipment from response locations, post-incident reporting, identifying improvement opportunities, reviewing and updating plans and restocking equipment supplies. Scientific monitoring may continue after response operations have ceased and may be used to inform remediation activities.

The decision to terminate response operations will be made in consultation with the relevant Control Agency and/or Jurisdictional Authority. Other Statutory Authorities may also play an advisory role. Figure 20-1 provides guidance on termination activities.

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

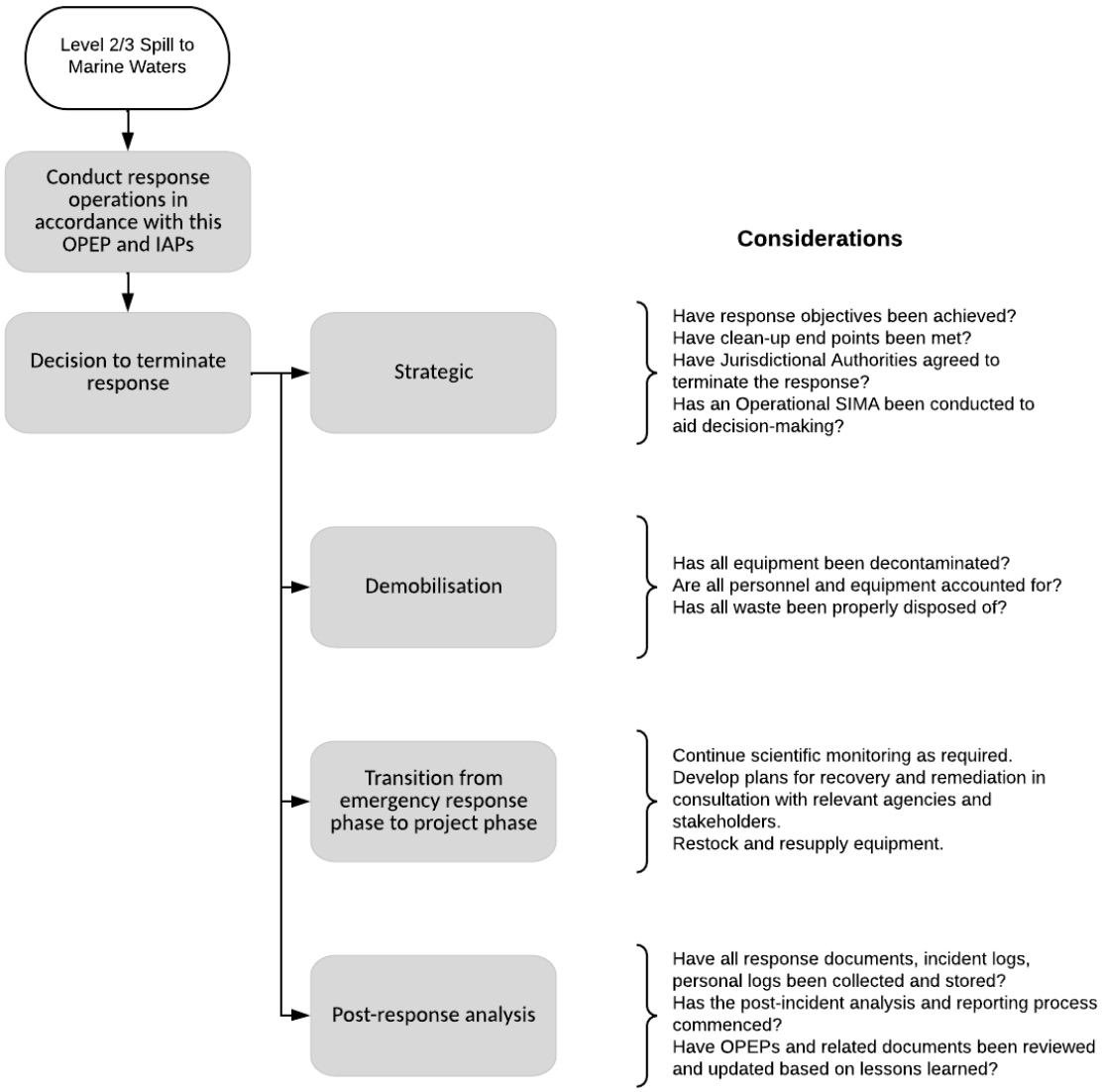

Figure 20-1: Guidance for Response Termination

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22. ABBREVIATIONS

Abbreviation	Meaning
AFMA	Australian Inter-Service Incident Management System
AIIMS	Australasian Inter-Service Incident Management System
ALARP	As Low As Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
BAOAC	Bonn Agreement Oil Appearance Code
BER	Boom Encounter Rate
CALM	Catenary Anchor Leg Mooring
CMMS	Computerised Maintenance Management System
CPF	Central Processing Facility
DBCA	Department of Biodiversity Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEWR	Department of Water and Environmental Regulation
DFAT	Department of Foreign Affairs
DMIRS	Department of Mines, Industry Regulation and Safety (Previously Department of Mines and Petroleum)
DOR	Dispersant to Oil Ratio
DPIRD	Department of Primary Industries and Regional Development
EMBA	Environment that May Be Affected
EP	Environment Plan
EPS	Environmental Performance Standard
ESC	Environment Scientific Coordinator
FOB	Forward Operating Base
FWADC	Fixed Wing Aerial Dispersant Contract
GCT	Group Crisis Team
HMA	Hazard Management Authority
IAP	Incident Action Plan
ICC	Incident Control Centre
IMT	Incident Management Team
IMTRP	Incident Management Team Response Plan
IRP	Incident Response Plan
JSCC	Joint Strategic Coordination Committee
MAE	Major Accident Event
MBC	Marine Breakaway Coupling

Abbreviation	Meaning
MDO	Marine Diesel Oil
MEECC	Maritime Environmental Emergency Coordination Centre
MEER	Maritime Environmental Emergency Response
MODU	Mobile Offshore Drilling Unit
NEBA	Net Environmental Benefit Analysis
NOPSEMA	National Offshore Petroleum Safety and Environment Management Authority
NOPTA	National Offshore Petroleum Titles Administrator
OIM	Offshore Installation Manager
OMP	Operational Monitoring Plan
OM	Operational Monitoring
OPEP	Oil Pollution Emergency Plan
OSC	On-Scene Commander
OSCA	Oil Spill Control Agent
OSM-BIP	Operational and Scientific Monitoring Bridging Implementation Plan
OSRL	Oil Spill Response Limited
OSTM	Oil Spill Trajectory Modelling
OWR	Oiled Wildlife Response
PBC	Prescribed Body Corporate
PPA	Protection Priority Area
POLREP	Pollution Report
RCC	Rescue Coordination Centre (Canberra, Australia)
SEMC	State Emergency Management Committee
SIMA	Spill Impact Mitigation Assessment
SHP-MEE	State Hazard Plan for Maritime Environmental Emergencies
SLA	Service Level Agreement
SOPEP	Ship Onboard Pollution Emergency Plan
SM	Scientific Monitoring
SMART	Special Monitoring of Applied Response Technologies
SMP	Scientific Monitoring Plan
SMPC	State Maritime Pollution Coordinator
SMPEP	Shipboard Marine Pollution Emergency Plan
UAV	Unmanned Aerial Vehicle
WA	Western Australia
WA DOT	Western Australian Department of Transport
WAOWRP	Western Australian Oiled Wildlife Response Plan
WCS	Worst-case Spill

APPENDIX A HYDROCARBON PROPERTIES

Stag Crude

Stag Crude Oil is a medium crude composed of hydrocarbons which will begin to evaporate at different rates on exposure to the atmosphere. Evaporation rates will increase with temperature, but in general, about 0.5% of the oil mass should evaporate within the first 12 hours (BP < 180 °C); a further 16.0% should evaporate within the first 24 hours (180 °C < BP < 265 °C); and a further 40.8% should evaporate over several days (265 °C < BP < 380 °C). The whole oil has an asphaltene content of 14%, indicating a moderate propensity for the mixture to take up water to form water-in-oil emulsion over the weathering cycle.

Change in the mass balance calculated for Stag crude weathering under low (5 knots) and constant wind (Figure A-1) indicates that approximately 14% of the oil volume would evaporate within 12 hours. The remaining oil would weather at increasingly slower rate as the mixture becomes proportionally enriched by compounds with longer carbons chains, hence higher boiling points. Once all volatile compounds have evaporated, only the residual compounds will remain, and weathering rates would slow significantly, with further reduction reliant upon slower biological and photochemical processes. At the end of the seven days, approximately 68% of the crude is predicted to remain on the sea surface.

Under the variable-wind case (Figure A-2), where the winds are of greater strength in general, greater entrainment of Stag crude into the water column is indicated. Approximately 24 hours after the spill, around 42% of the oil mass is forecast to have entrained and 11% is forecast to have evaporated. A reduced proportion of the oil (32%) is forecasted to be floating on the water surface after the seven days, in comparison to the constant-wind case.

Marine Diesel Oil

ITOPF (2023) categorises MDO as a light group II hydrocarbon. In the marine environment, a 10% residual of the total quantity of MDO spilt will remain after the volatilisation and solubilisation processes associated with weathering, although this amount will slowly decay over time. Some heavy components contained within the MDO will have a strong tendency to physically entrain into the upper water column in the presence of moderate winds (i.e. >12 knots) and breaking waves, but can re-float to the surface if these energies abate.

Change in the mass balance calculated for MDO weathering under the constant wind case (Figure A-3) indicates that approximately 34.4% of the oil volume is predicted to evaporate within 24 hours. Under calm conditions, the majority of the remaining oil on the water surface will weather at a slower rate due to the MDO being comprised of the longer-chain compounds with higher boiling points. Evaporation shall cease when the residual compounds remain, and they will be subject to more gradual decay through biological and photochemical processes.

Under the variable-wind case (Figure A-4), where the winds are of greater strength on average, entrainment of MDO into the water column is predicted to increase. Approximately 24 hours after the spill, 83.0% of the oil mass is forecast to have entrained and a further 11.4% is forecast to have evaporated, leaving only a small proportion of the oil floating on the water surface (~1.3%).

The increased level of entrainment in the variable-wind case result in a higher percentage decaying at an approximate rate of 3.1% per day with or ~21.9% after 7 days, compared to <0.4% per day and a total of 2.6% after 7 days for the constant-wind case. Given the proportion of entrained oil and the tendency for it to remain mixed in the water column, the remaining hydrocarbons will decay over time scales of several weeks.

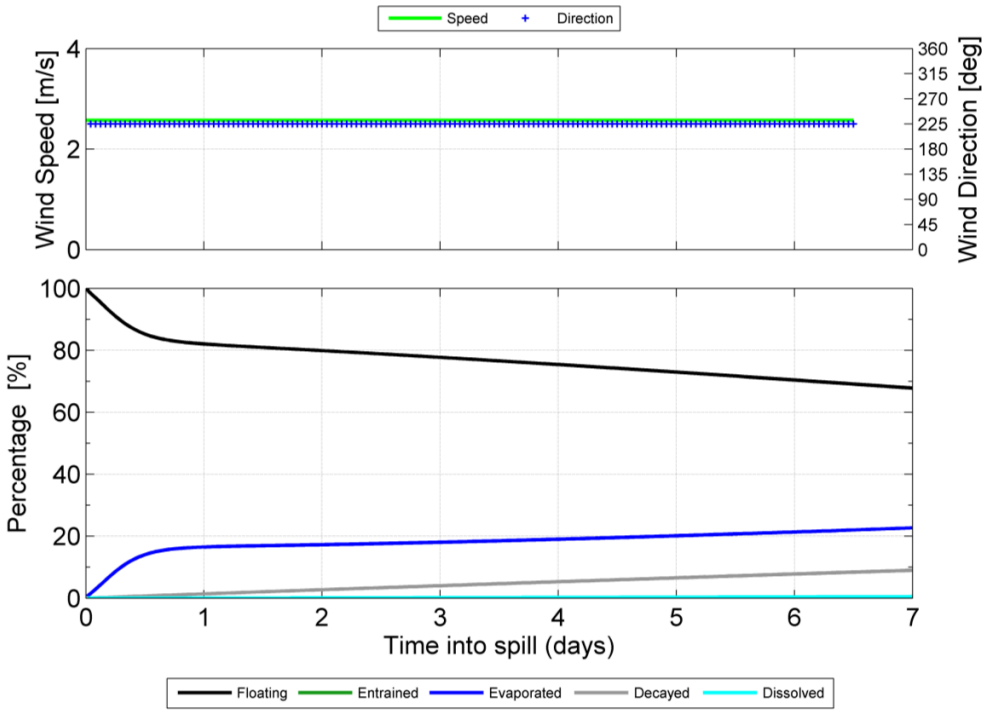

Figure A-1: Proportional mass balance plot representing the weathering of Stag crude spilled onto the water surface as a one-off instantaneous release and subject to a constant 5 knot (2.6 m/s) wind at 27 °C water temperature and 25 °C air temperature (RPS, 2020).

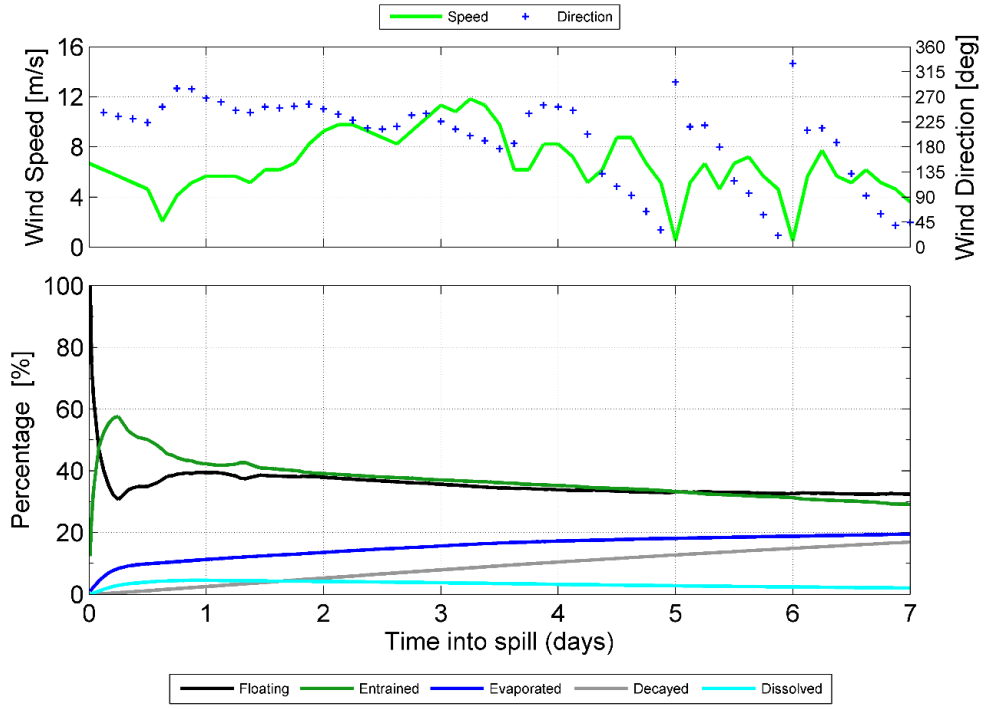

Figure A-2: Proportional mass balance plot representing the weathering of Stag crude spilled onto the water surface as a one-off instantaneous release and subject to variable wind at 27 °C water temperature and 25 °C air temperature (RPS, 2020).

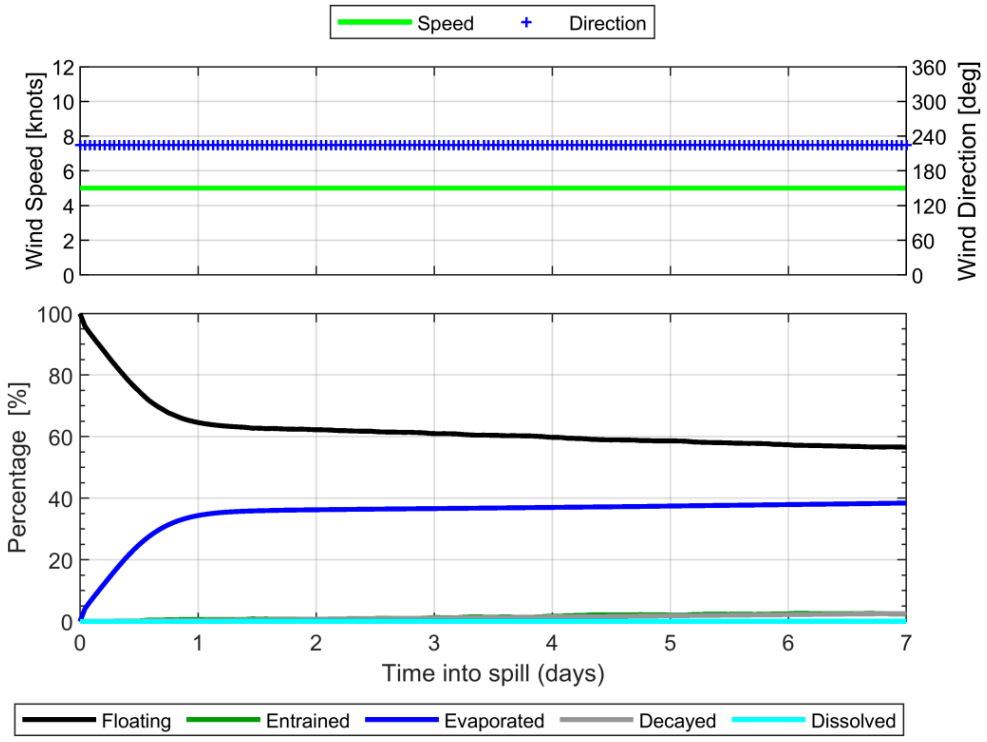

Figure A-3: Proportional mass balance plot representing the weathering of the MDO spilled onto the water surface as a one-off instantaneous release and subject to a constant 5 knots wind at 27°C water temperature and 25°C air temperature (RPS, 2023).

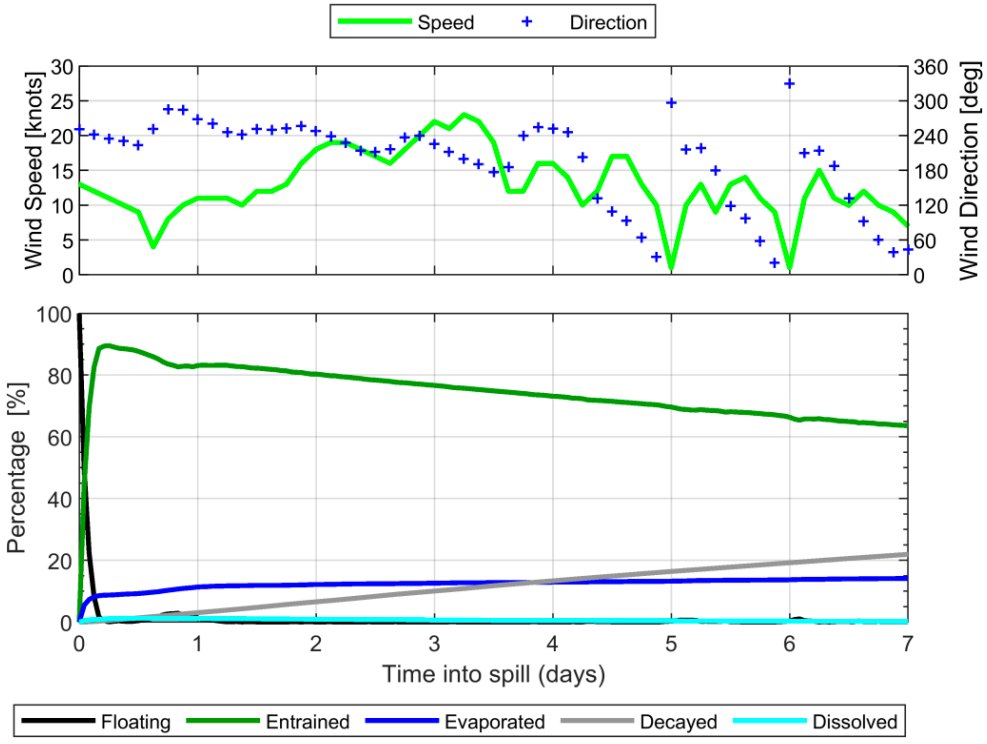

Figure A-4: Proportional mass balance plot representing the weathering of MDO spilled onto the water surface as a one-off instantaneous release and subject to variable winds (up to 24 knots) at 27°C water temperature and 25°C air temperature (RPS, 2023).

APPENDIX B IMT ROLES AND RESPONSIBILITIES

The following tables (Table B-1 to Table B-4) describe the roles and responsibilities of IMT Lead positions. Specific information relating to the Group Crisis Team and the IRT roles and responsibilities are provided in respective crisis management and incident response plans.

Table B-5 outlines the key roles and responsibilities of Jadestone personnel required to be positioned in the State Maritime Environmental Emergency Coordination Centre (MEECC)/ DoT IMT in the event of a Level 2/3 spill. Table B6 outlines the roles and responsibilities of DoT personnel to be positioned within Jadestone's IMT. Duty Cards for all roles are provided in the IMTRP Appendix B – IMT Duty Cards.

Table B-1: IMT Leader key roles and responsibilities

DUTY CARD 1: IMT LEADER
ROLE
The IMT Leader has overall responsibility for the management the incident response. The IMT Leader will be the initial point of contact for the Corporate Office.
RESPONSIBILITIES
• Take charge and exercise leadership, including the establishment of the incident management structure • Set objectives for the incident response, considering the safety of all personnel as a priority • Develop and approve plans and strategies to control the incident • Implement the IAP and monitor its progress • Provide information and warnings to communities so that they can make informed decisions • Establish effective liaison and cooperation with all relevant agencies, affected communities and others external to the IMT • Obtain and maintain human and physical resources required for the resolution of the incident • Apply a risk management approach, and establish systems and procedure for the safety and welfare of all response personnel • Ensure effective communications with the Group Crisis Team Leader, when activated • Ensure appropriate financial delegations are in place and these delegations are made known to the appropriate response personnel. • Ensure relief and recovery considerations are addressed • Ensure collaborations between all organisations supporting the response
SPECIFIC TASKS
Initial Actions

☐ Obtain briefing on incident from the OSC (or IRT contact) and review initial assessment
☐ Activate the necessary members of the IMT
☐ Proceed to IMT Room
  o Ensure IMT Room is fully set-up before incident management commences
☐ Notify the Country Manager (CM) first, then following this, call and notify the CEO (if unable to reach Country Manager after two attempts, continue to call CEO, continue to reach CM), as link into Group Crisis Team as appropriate Support Country Manager in seeking Group Crisis Team guidance/support
  o Support Country Manager in seeking Group Crisis Team guidance/support

DUTY CARD 1: IMT LEADER

- Support Country Manager in scheduling ongoing contact

☐ If an oil spill, confirm spill level

Determine Incident Objectives and general direction for managing the incident

☐ Establish the immediate priorities:

- Define IMT aim and objectives
- If necessary, confer with government agencies to agree on common incident objectives and priorities

☐ Chair initial IMT briefing

- Communicate priorities to the IMT
- Confirm ongoing means of communications with OSC has been established to Operations function
- Confirm which key stakeholders need to be notified, responsibility for notification and ongoing liaison including regulatory authorities
- Confirm with Planning Lead that all appropriate log-keeping, issues and actions, and status boards are maintained.
- If required, give direction to HR/Admin on HR expectations to: Employee communications, Victim / next of kin support, affected contractors

Ongoing Actions

☐ Refer to and follow the Incident Management Process as described at Section 5.0 of the IMTRP

☐ Use the STAKEHOLDER MANAGEMENT Form – See IMT-AU in Microsoft Teams – to assist with tracking stakeholder contact.

☐ Hold regular IMT updates

- Time out, phones switched to time out mode
- Every 30 minutes initially (as a guide)
- Monitor effectiveness of response and review issues and actions and priorities.
- With Planning Lead, establish short-term/long-term recovery goals, milestones and resource requirements
- Brief Corporate Office as required

☐ Delegate Responsibilities

- Allow yourself to focus on key stakeholder liaison and setting strategic objectives for next operational period

☐ Determine duration and structure of incident response operations

- Decide duration of current operational period (start thinking of when to stand down or next day operations)
- Identify additional personnel needs to maintain 24-hour support.

Notifications and media strategy

☐ Confirm that required notifications are made and updates provided

- Ensure communications with governments/regulators are regular and proactive
- Consider need for additional senior management liaison / high level briefing with regulators
- Ensure that internal notifications are made

☐ The Media Support Team decide on the position the asset/company adopts:

- Ensure an initial pre-approved media holding statement is prepared
- Agree on message content and timing of release to media, internal audiences, regulators, community leaders etc.
- Be prepared to deal with rapid media interest and possible presence at scene

DUTY CARD 1: IMT LEADER
Stand Down
☐ Communicate end of IMT response to all relevant internal and external parties
☐ Provide copies of all incident related documents and logs to the Log Keeper
☐ Stand down those people not required in managing ongoing recovery process
☐ Hold debrief of IMT, specialist advisors, support teams and receive feedback
☐ Review any capability gaps and opportunities for improvement in the response
☐ Review and approve the incident report
☐ Commission post-incident investigation
☐ Ensure accepted recommendations have been incorporated into the IMTRP

Table B-2: Operations Lead key roles and responsibilities

DUTY CARD 2: OPERATIONS
ROLE
Reports to IMT Leader and is responsible for activating and supervising tactical response operations in the field. Implements the operational plans to achieve response objectives and protect people, the environment and property
RESPONSIBILITIES
• Obtain a briefing from the IMT Leader or the position that you report to • Establish the Operations Section appropriate to the size and complexity of the incident • Appoint unit coordinators as required and delegate tasks • Manage the personnel within the Operations Section • Develop and maintain an effective register of all resources, required, en route, allocated to and released from the incident • Adjust the structure of the Operations Section throughout the incident • Provide a safe working environment for personnel within the Operations Section • Establish and maintain a log of activities and decisions for the Operations Section • Communicate Section performance to the IMT Leader or the position you report to • Prepare shift handover and brief incoming Operations Lead • Manage the continuity of Operations activities across shift changes • Consider sources of local knowledge and information relevant to the incident. • Identify new and emerging risks for the incident and address these in the IAP • Collect, collate and store incident records • Maintain a personal log of activities and decisions made • Conduct handover briefing
SPECIFIC TASKS
Initial Actions
☐ Identify and locate OSC – obtain all available information on the situation ☐ Agree call schedule with the OSC ☐ Use the INCIDENT STATUS Form – see IMT-AU in Microsoft Teams

DUTY CARD 2: OPERATIONS
☐ Assess incident, including incident potential
☐ Start a personal log
Ongoing Actions
☐ Propose and agree immediate priorities with the IMT Leader
☐ Update Planning Lead on situation for development of the Incident Action Plan
☐ Work with Logistics to identify logistical support requirements
☐ Identify issues and actions required for the next period – mark and track on display boards
☐ Source and provide technical information and support required by the response teams.
☐ Develop strategy (i.e. what we are attempting to achieve)
☐ Identify tactics/breaking down tactics into manageable tasks (i.e. how we are going to implement strategy)
☐ Confer with response contractors / consultants for equipment and techniques
☐ Allocate tactical resources based on strategy requirements
☐ Provide updates to the display boards to reflect current operations in the field
☐ Resource additional technical support as required
Stand Down
☐ Attend the IMT debrief
☐ Provide copies of all incident related documents and logs to the Log Keeper
☐ Monitor the demobilisation of response teams

Table B-3: Logistics Lead key roles and responsibilities

DUTY CARD 4: LOGISTICS
ROLE
Reports to IMT Leader and manages all logistics and procurement requirements for the response
RESPONSIBILITIES
• Assist with setup and coordination of the incident control centre (ICC) • Obtain a briefing from the IMT Leader or the position that you report to • Establish the Logistics Section appropriate to the size and complexity of the incident • Appoint unit coordinators as required and delegate tasks • Manage the personnel within the Logistics Section • Provide mobilisation and demobilisation for equipment and services • Adjust the structure of the Logistics Section throughout the incident • Provide a safe working environment for personnel within the Logistics Section • Establish and maintain a log of activities and decisions for the Logistics Section • Communicate Section performance to the IMT Leader • Prepare shift handover and brief incoming Logistics Lead • Manage the continuity of Logistics activities across shift changes • Consider sources of local knowledge and information relevant to the incident. • Identify new and emerging risks for the incident and address these in the IAP

DUTY CARD 4: LOGISTICS
• Collect, collate and store incident records • Maintain a personal log of activities and decisions made • Conduct handover briefing
SPECIFIC TASKS
Initial Actions
☐ Mobilise any additional resources or specialist advisors ☐ Determine and supply immediate incident resource and facility needs ☐ Establish communications, exchange information and coordinate activities with Logistic Supply Base(s) ☐ Use and maintain the Resources Summary sheet – Appendix E and in OneNote– to track resources ☐ Start a personal log
Ongoing Actions
☐ Establish contact and coordinate logistics-related activities with other agency logistics personnel ☐ Review logistics requirements for proposed tactics for upcoming operational period ☐ Advise other Functions on resource availability to support incident needs ☐ Coordinate and process requests for additional resources ☐ Work with the Operations Lead to track and display incident resources and facilities ☐ Confer with IMT Leader for acquisition or release of major / costly resources or services ☐ Provide responders in the field with adequate food, drink, medical assistance, communications, clothing, transportation (land, water and air), sanitary and sleeping arrangements, security and other requirements ☐ Ensure that responders are supplied with the proper PPE ☐ Provide management and security support for incident facilities such as: ○ personnel and equipment staging areas ○ warehouse and maintenance facilities; camps; heli-bases etc. ☐ As appropriate to the incident, work with the Operations and Planning Functions, contractors and government agency personnel to plan, permit and operate waste handling and disposal and injured wildlife rehabilitation facilities ☐ Identify long-term service and support requirements for planned and expected operations ☐ Recommend the reassignment or deactivation of incident resources
Stand Down
☐ Arrange for transportation of equipment and personnel in conjunction with demobilization ☐ Attend the IMT debrief ☐ Provide copies of all incident related documents and logs to the Log Keeper

Table B-4: Planning Lead key roles and responsibilities

DUTY CARD 3: PLANNING
ROLE
Reports to the IMT Leader and manages the IMT related planning functions for the response
RESPONSIBILITIES
• Assist with setup and coordination of the incident control centre (ICC) • Obtain a briefing from the IMT Leader or the position that you report to • Establish the Planning Section appropriate to the size and complexity of the incident • Appoint unit coordinators as required and delegate tasks • Manage the personnel within the Planning Section • Adjust the structure of the Planning Section throughout the incident • Provide a safe working environment for personnel within the Planning Section • Establish and maintain a log of activities and decisions for the Planning Section • Communicate Section performance to the IMT Leader • Prepare shift handover and brief incoming Planning Lead • Manage the continuity of Planning activities across shift changes Checklist • Consider sources of local knowledge and information relevant to the incident. • Identify new and emerging risks for the incident and address these in the IAP • Monitor effectiveness of risk mitigation strategies • Provide strategic advice to the IMT based on information received • Prepare the IAP for the next operational period and any longer-term planning required • Disseminate the IAP throughout the incident management structure • Develop changeover and demobilisation plans and manage their implementation • Develop and review the Communications Plan and its implementation • Regularly communicate progress of strategies and the IAP to the IMT Leader • Collect, collate and store incident records • Maintain a personal log of activities and decisions made • Conduct handover briefing
SPECIFIC TASKS
Initial Actions
☐ Assist the IMT Leader to maintain and use the BRAINSTORMING/PLANNING Form – see IMT-AU in Microsoft Teams ☐ Mobilise any additional resources or specialist advisors immediately required to commence recovery planning ☐ Ensure Log Keeper is in place and the IMT is maintaining an auditable documentation trail ☐ Consider need to activate Environmental Support ☐ Setup and maintain a document retention process for all response documentation ☐ Start a personal log
1 Ongoing Actions
☐ Drive and monitor the incident management process ☐ Oversee and coordinate the actions of the Environmental Support Team. ☐ Prepare the Incident Action Plan (IAP):   ○ Establish time for next operational period (generally starting the next morning for 24-hour duration)

DUTY CARD 3: PLANNING
○ Create Incident Objectives for next operational period and submit to IMT Leader for approval ○ Create Meeting Schedule and advise IMT Leader on planning process issues ○ Develop plans for recovery operations to implement tomorrow, the next day, next week etc. ☐ Consolidate the IAP and assemble for final approval and signoff
2 Stand Down
☐ Ensure team members and supports complete any outstanding log/record keeping ☐ Ensure all log sheets are collected before the team leaves the room. (All notebooks to be copied and / or originals to be retained) ☐ Arrange for copies of all email traffic and incident files to be collated and stored. ☐ Consider need to photograph IMT room and key display boards before it is tidied ☐ Contribute to the development of the incident report.

Table B-5: Environment Unit Lead key roles and responsibilities

DUTY CARD 3: ENVIRONMENT UNIT LEAD
ROLE
Reports to the Planning Lead and manages the environmental related planning functions for the response
RESPONSIBILITIES
• Manage the personnel within the Environment Unit • Conduct Operational Spill Impact Mitigation Assessment (SIMA) using guidance in the OPEP • Manage oil spill trajectory modelling requests and dissemination of information to IMT (spills only) • Provide IMT interface to Operational and Scientific Monitoring Team (spills only) • Prepare shift handover and brief incoming Environment Unit Lead • Manage the continuity of Environment Unit activities across shift changes Checklist • Consider sources of local environmental knowledge and information relevant to the incident • Identify new and emerging environmental risks for the incident and address these in the IAP • Maintain a personal log of activities and decisions made • Conduct handover briefing
SPECIFIC TASKS
Initial Actions
☐ Conduct Operational SIMA ☐ Confirm protection and monitoring priorities using latest Monitor and Evaluate data (i.e. aerial surveillance, tracking buoy, spill trajectory modelling) ☐ Activate Operational and Scientific Monitoring Service Provider to set up Operational and Scientific Monitoring Team ☐ Analyse data received from Operational and Scientific Monitoring Team (this task may be delegated to OSM Management Team) and ensure the information is incorporated into the current/next operating period's Incident Action Plan ☐ Start a personal log

DUTY CARD 3: ENVIRONMENT UNIT LEAD	
1	**Ongoing Actions**
☐	Provide overarching technical advice to IMT
☐	Ensure available monitoring data is incorporated into the Operational SIMA at the end of each operational period to aid in response decision making
2	**Stand Down**
☐	Manage scientific monitoring components once spill operations have been terminated (or delegate as appropriate)
☐	Arrange for copies of all email traffic and incident files to be collated and stored.
☐	Contribute to the development of the incident report.

Table B-6: Roles and responsibilities of Jadestone personnel positioned in State Maritime Environmental Emergency Coordination Centre (MEECC)/ DOT IMT

Key Roles	Responsibilities
CMT Liaison Officer	• Provide a direct liaison between the Jadestone and the State MEECC • Facilitate effective communications and coordination between the Jadestone Group Crisis Team Leader and the SMEEC • Offer advice to SMEEC on matters pertaining to Jadestone crisis management policies and procedures
Deputy Incident Controller	• Provide a direct liaison between the DoT IMT and the Jadestone IMT • Facilitate effective communications and coordination between the Jadestone IMT (W) Leader and the DoT Incident Controller • Offer advice to the DoT Incident Controller on matters pertaining to the Jadestone incident response policies and procedures • Offer advice to the Safety Coordinator on matters pertaining to Jadestone safety policies and procedures particularly as they relate to Jadestone employees or contractors operating under the control of the DoT IMT
Deputy Intelligence Officer	• As part of the Intelligence Team, assist the Intelligence Officer in the performance of their duties in relation to situation and awareness • Facilitate the provision of relevant modelling and predications from the Jadestone IMT • Assist in the interpretation of modelling and predictions originating from the Jadestone IMT • Facilitate the provision of relevant situation and awareness information originating from the DoT IMT to the Jadestone IMT • Facilitate the provision of relevant mapping from the Jadestone IMT • Assist in the interpretation of mapping originating from the Jadestone IMT • Facilitate the provision of relevant mapping originating from the Jadestone IMT
Deputy Planning Officer	• As part of the Planning Team, assist the Planning Officer in the performance of their duties in relation to the interpretation of existing response plans and the development of incident action plans and related sub plans • Facilitate the provision of relevant IAP and sub plans from the Jadestone IMT • Assist in the interpretation of the Jadestone OPEP from Jadestone • Assist in the interpretation of the Jadestone IAP and sub plans from the Jadestone IMT • Facilitate the provision of relevant IAP and sub plans originating from the DoT IMT to the Jadestone IMT • Assist in the interpretation of Jadestone's existing resource plans • Facilitate the provision of relevant components of the resource sub plan originating from the DoT IMT to the Jadestone IMT • (Note this individual must have intimate knowledge of the relevant Jadestone OPEP and planning processes)
Environment Support Officer	• As part of the Intelligence Team, assist the Environmental Coordinator in the performance of their duties in relation to the provision of environmental support into the planning process • Assist in the interpretation of the Jadestone OPEP and relevant TRP plans • Facilitate in requesting, obtaining and interpreting environmental monitoring data originating from the Jadestone IMT

Key Roles	Responsibilities
	• Facilitate the provision of relevant environmental information and advice originating from the DoT IMT to the Jadestone IMT
Deputy Public Information Officer	• As part of the Public Information Team, provide a direct liaison between the Jadestone Media team and DoT IMT Media team • Facilitate effective communications and coordination between Jadestone and DoT media teams • Assist in the release of joint media statements and conduct of joint media briefings • Advise on appropriate Aboriginal engagement and management strategies in the event of potential exposure of Aboriginal heritage sites, lands or waters to hydrocarbon spills, or for the potential access of responders to Aboriginal heritage sites or lands • Assist in the release of joint information and warnings through the DoT Information and Warnings team • Offer advice to the DoT Media Coordinator on matters pertaining to Jadestone media policies and procedures • Facilitate effective communications and coordination between Jadestone and DoT Community Liaison teams • Assist in the conduct of joint community briefings and events • Offer advice to the DoT Community Liaison Coordinator on matters pertaining to Jadestone community liaison policies and procedures • Facilitate the effective transfer of relevant information obtained from through the Contact Centre to the Jadestone IMT
Deputy Logistics Officer	• As part of the Logistics Team, assist the Logistics Officer in the performance of their duties in relation to the provision of supplies to sustain the response effort • Facilitate the acquisition of appropriate supplies through Jadestone's existing OSRL, AMOSC and private contract arrangements • Collects Request Forms from DoT to action via the Jadestone IMT • (Note this individual must have intimate knowledge of the relevant Jadestone logistics processes and contracts)
Deputy Operations Officer	• As part of the Operations Team, assist the Operations Officer in the performance of their duties in relation to the implementation and management of operational activities undertaken to resolve an incident • Facilitate effective communications and coordination between the Jadestone Operations Section and the DoT Operations Section • Offer advice to the DoT Operations Officer on matters pertaining to Jadestone incident response procedures and requirements • Identify efficiencies and assist to resolve potential conflicts around resource allocation and simultaneous operations of Jadestone and DoT response efforts
Deputy Waste Management Coordinator	• As part of the Operations Team, assist the Waste Management Coordinator in the performance of their duties in relation to the provision of the management and disposal of waste collected in State waters • Facilitate the disposal of waste through Jadestone's existing private contract arrangements related to waste management and in line with legislative and regulatory requirements • Collects Waste Collection Request Forms from DoT to action via the Jadestone IMT
Deputy Finance Officer	• As part of the Finance Team, assist the Finance Officer in the performance of their duties in relation to the setting up and payment of accounts for those services acquired through Jadestone's existing OSRL, AMOSC and private contract arrangements

Key Roles	Responsibilities
	• Facilitate the communication of financial monitoring information to the Jadestone to allow them to track the overall cost of the response • Assist the Finance Officer in the tracking of financial commitments through the response, including the supply contracts commissioned directly by DoT and to be charged back to Jadestone
Deputy Division Commander	• As part of the Field Operations Team, assist the Division Commander in the performance of their duties in relation to the oversight and coordination of field operational activities undertaken in line with the IMT Operations Section's direction. • Provide a direct liaison between Jadestone's Forward Operations Base/s (FOB/s) and the DoT FOB • Facilitate effective communications and coordination between Jadestone Division Commander and the DoT Division Commander • Offer advice to the DoT Division Commander on matters pertaining to Jadestone incident response policies and procedures • Assist the Safety Coordinator deployed in the FOB in the performance of their duties, particularly as they relate to Jadestone employees or contractors • Offer advice to the Safety Coordinator deployed in the FOB on matters pertaining to Jadestone safety policies and procedures

Table B-7: Roles and responsibilities of DoT personnel to be positioned in Jadestone's IMT/Group Crisis Team

Key Roles	Responsibilities
DoT Liaison Officer	• Facilitate effective communications between the SMEEC and Incident Controller and Jadestone's appointed Group Crisis Team Leader and Incident Controller • Provide enhanced situational awareness to DoT of the incident and the potential impact on State waters • Assist in the provision of support from DoT to Jadestone • Facilitate the provision technical advice from DoT to Jadestone's Incident Controller as required
Media Liaison Officer	• Provide a direct liaison between Jadestone's Media team and DoT IMT Media team • Facilitate effective communications and coordination between Jadestone and DoT media teams • Assist in the release of joint media statements and conduct of joint media briefings • Assist in the release of joint information and warnings through the DoT Information and Warnings team • Offer advice to the Jadestone Media Coordinator on matters pertaining to DoT and wider Government media policies and procedures

APPENDIX C IMT TRAINING AND COMPETENCY REQUIREMENTS

IMT Role	Training										
	IMO 3 – Oil Spill Response – Command & Control Priority Level (1)	IMO 2 – Oil Spill Response Management Priority Level (1)	Coordinate Incident Response (PMAOMIR418) Priority Level (1)	Manage Incident Response Information (PMAOMIR322/PMAOMIR320) Priority Level (1)	Jadestone Incident Management Team Introduction (Online Module) Priority Level (2)	IMT Duty Roster Orientation Priority Level (2)	IMT Oil Spill Response Workshop (Annual) Priority Level (3)	*IMT MAE Drill (Quarterly) Priority Level (3)	** Oil Spill Response Functional Exercise (Annual) Priority Level (3)	***Targeted Oil Spill Refresher Workshop (as required) Priority Level (3)	Media Awareness
IMT Leader	M	-	M	M	M	M	M	M	M	R	R
Operations Lead	-	M	-	M	M	M	M	M	M	-	-
Planning Lead	-	M	-	M	M	M	M	M	M	M	-
Logistics Lead	-	M	-	M	M	M	M	M	M	-	-

Priority Levels: (1) Pre-join; (2) 0–3 months; (3) 0–12 months

Key:

M – mandatory R – recommended

** to participate or be an observer in a minimum of one drill per year*

*** to attend a minimum of one within 3 year IMO certification period*

**** to attend a minimum of three per year pro rata from starting time*

APPENDIX D POTENTIAL IMPACTS FROM RESPONSE STRATEGIES TO ENVIRONMENTAL VALUES OF THE IDENTIFIED PROTECTION PRIORITY AREAS

Protection Priority Area / Receptors	No controls	Monitor and evaluate	Source control	Natural recovery	Containment and recovery	Surface dispersant application	Shoreline protection and deflection	Shoreline clean-up	Oiled wildlife response
Montebello Islands (DoT Cells 318 and 319. Refer to Table 4-6 and Table 18-3 for additional information on receptors for this location)									
Turtles									
Mangroves									N/A
Birds									
Coral reefs and other subsea benthic primary producers							N/A	N/A	N/A
Marine mammals									
Socio-economic									

Legend	
	Beneficial impact
	Possible beneficial impact dependent upon the situation (e.g. timeframes and metocean conditions)
	Negative impact
N/A	Not applicable for the environmental value / receptor or not applicable for hydrocarbon type.

APPENDIX E WORST-CASE OIL SPILL SCENARIO RESPONSE NEEDS ASSESSMENT

Response Strategy and Tactic	Capability	Response Need Requirement			Capability Providers and Sources				
		Week 1	Week 2	Week 3 onwards	Jadestone	AMOSC (Staff, 3rd party contracts, equipment)	AMOSC Industry Core Group	OSRL (Staff, 3rd party contracts)	Mutual aid, NRT, Contractors and Service Providers
IMT									
IMT personnel	Trained personnel	38	38	38	21	5	3	9	-
IMT personnel for WA DoT (as per IGN)	Trained personnel	11	11	11	3	-	8	-	-
Operational Monitoring									
Satellite tracking buoys	Buoys	2 buoys	4 buoys	4 buoys	2 buoys Stag Facility	4 buoys	-	-	-
Oil Spill Trajectory Modelling	Spill Model	7 trajectory and weathering models	7 trajectory and weathering models	7 trajectory and weathering models per week	-	RPS via AMOSC Master Services Agreement (MSA)	-	-	-
Aerial surveillance	Aircraft	1 primary and 1 backup aircraft	1 primary and 1 backup aircraft	1 primary and 1 backup aircraft	-	-	-	-	2 aircraft – Jadestone aviation contract
	Aerial observers	2 observers	2 observers	2 observers		1 observer	1 observer		

Response Strategy and Tactic	Capability	Response Need Requirement			Capability Providers and Sources				
		Week 1	Week 2	Week 3 onwards	Jadestone	AMOSC (Staff, 3rd party contracts, equipment)	AMOSC Industry Core Group	OSRL (Staff, 3rd party contracts)	Mutual aid, NRT, Contractors and Service Providers
	Flight crew	1 crew	1 crew	1 crew	-	-	-	-	1 flight crew – Jadestone aviation contract
Vessel surveillance	Vessels	1 vessel	1 vessel	1 vessel	-	-	-	-	1 vessel via Jadestone marine contracts
	Observer	1 observer	1 observer	1 observer	-	1 observer	-	-	-
UAVS	Short range UAVs with cameras/video	2 UAVs	2 UAVs	2 UAVs	-	2 x pilots and UAVs (3rd party)	-	2 x pilots and UAVs (3rd party, best endeavours)	-
Surface Chemical Dispersant									
Vessel based surface application	Spray vessel and crew	1 vessels	Not required	Not required	-	-	-	-	1 vessel and crew via Jadestone marine contracts
	Spray systems	2 systems per vessel	Not required	Not required	1 Afedo 2 roof mounted systems	2 spray systems	-	-	-

Response Strategy and Tactic	Capability	Response Need Requirement			Capability Providers and Sources				
		Week 1	Week 2	Week 3 onwards	Jadestone	AMOSC (Staff, 3rd party contracts, equipment)	AMOSC Industry Core Group	OSRL (Staff, 3rd party contracts)	Mutual aid, NRT, Contractors and Service Providers
	Trained personnel – 1 per vessel	1 trained person	Not required	Not required	-	-	1 trained person	-	-
Aerial surface application	Fixed Wing Aerial Dispersant aircraft	1 spray aircraft	Not required	Not required	-	1 spray aircraft	-	-	-
	Dispersant (volume required = 10.5 m^3)	10.5 m^3	Not required	Not required	-	10 m^3 (Exmouth)	-	-	AMSA 10 m^3 (Dampier)
	Air attack supervisor (AAS)	1 aircraft 1 AAS	1 aircraft 1 AAS	1 aircraft 1 AAS	-	1 AAS (via AMOSC/AMSA contract – see Appendix F)	-	-	Contract with aviation services provider
	Search and Rescue	1 aircraft and crew	1 aircraft and crew	1 aircraft and crew	-	-	-	-	Contract with aviation services provider
Containment and Recovery									
Containment and Recovery Systems	Vessels	4 vessels	4 vessels	Not required	-	-	-	-	Jadestone marine contracts

Response Strategy and Tactic	Capability	Response Need Requirement			Capability Providers and Sources				
		Week 1	Week 2	Week 3 onwards	Jadestone	AMOSC (Staff, 3rd party contracts, equipment)	AMOSC Industry Core Group	OSRL (Staff, 3rd party contracts)	Mutual aid, NRT, Contractors and Service Providers
	Containment and recovery system	2 systems	2 systems	Not required	-	2 systems	-	-	-
	Trained spill responders (team leaders) – 1 vessel master, 1 supervisor	4 vessel masters 2 supervisors	4 vessel masters 2 supervisors	Not required	-	-	2 supervisors	-	Vessel contracted: 4 vessel masters
	Containment and recovery deployment crew – 4 members per team	8 deployment crew	8 deployment crew	Not required	-	-	-	-	Vessel contracted: 8 deployment crew
	Waste storage	56.4 m^3/day	-	-	-	IBCs, bladders, inflatable storage bags of varying capacity	-	IBCs, bladders, inflatable storage bags of varying capacity	Waste Service Provider – 300 m^3 within 48 hours, building over first week, if required
Protection and Deflection									
Protection and Deflection Packages	Shoreline protection package – Consists of	2-3 packages	2-3 packages	2-3 packages	-	2-3 packages via AMOSC MSA (including	-	-	-

Response Strategy and Tactic	Capability	Response Need Requirement			Capability Providers and Sources				
		Week 1	Week 2	Week 3 onwards	Jadestone	AMOSC (Staff, 3rd party contracts, equipment)	AMOSC Industry Core Group	OSRL (Staff, 3rd party contracts)	Mutual aid, NRT, Contractors and Service Providers
	nearshore booms and ancillary equipment					access to AMSA equipment)			
	Vessels, including shallow draft vessels and crew	2-3 vessels	2-3 vessels	2-3 vessels	-	-	-	-	2-3 vessels via Jadestone marine contracts
	Trained spill responders (team leaders) – 2 leads per team	4-6 team leaders	4-6 team leaders	4-6 team leaders	-	-	4-6 team leads	-	-
	Protection and deflection team members – 5 members per team	10-15 team members	10-15 team members	10-15 team members	-	-	-	-	10-15 team members from Jadestone vessel provider
Shoreline Clean-up									
Shoreline Clean-up Packages	Trained spill responders (team leader) – 1 per team	3-4 team leaders	3-4 team leaders	3-4 team leaders	-	-	4 team leads	-	-
	Clean-up team members – 10	30-40 team members	30-40 team members	30-40 team members	-	-	-	-	30-40 people from Jadestone

Response Strategy and Tactic	Capability	Response Need Requirement			Capability Providers and Sources				
		Week 1	Week 2	Week 3 onwards	Jadestone	AMOSC (Staff, 3rd party contracts, equipment)	AMOSC Industry Core Group	OSRL (Staff, 3rd party contracts)	Mutual aid, NRT, Contractors and Service Providers
	members per team								labour hire contracts
	Clean-up equipment (hand tools, shoreline flushing equipment, decontamination equipment)	3-4 packages (make-up will be dependent upon location contacted)	3-4 packages (make-up will be dependent upon location contacted)	3-4 packages (make-up will be dependent upon location contacted)	-	4 packages	-	-	-
	Waste storage	Waste storage bins, skips, containers, bags	Waste storage bins, skips, containers, bags	Waste storage bins, skips, containers, bags	-	-	-	-	Waste Management Contractor
Oiled Wildlife Response									
Oiled Wildlife Response	Trained OWR responders OWR equipment	Indicative personnel requirement of 93 personnel (Refer to Section 18.5)			-	AMOSC Equipment AMOSC – 1 x OWR Advisor AMSA – 4 OWR containers / washing facilities; Call off contract with	-	1 x Technical Advisor (via Sea Alarm) Global Oiled Wildlife Response Service (best endeavour	DoT – 1 OWR container/ washing facility 60 x OWR Strike Team Members Additional non-technical OWR personnel and technical personnel accessed via Jadestone

Response Strategy and Tactic	Capability	Response Need Requirement			Capability Providers and Sources				
		Week 1	Week 2	Week 3 onwards	Jadestone	AMOSC (Staff, 3rd party contracts, equipment)	AMOSC Industry Core Group	OSRL (Staff, 3rd party contracts)	Mutual aid, NRT, Contractors and Service Providers
						DWYERtech Response NZ; MOU with Phillip Island National Park (best endeavours)		s) = 4 wildlife response experts	labour hire contracts
Operational and Scientific Monitoring									
Operational and Scientific Monitoring	Refer to OSM-BIP								
Response need (personnel) [14]					**24**	**8**	**25**	**14**	**127**
Response need including + 50% for shift changes and fatigue management					**36**	**12**	**38**	**21**	**191**
Total personnel available					**40**	**17** [15]	**84** [16]	**18 + 80** [17]	**As per contracts**

[14] Totals do not include resources obtained via contracts this Provider has with 3rd party resources, as these amounts are sourced external to this listed Provider.

[15] As per AMOSC training and competency matrix. Includes technical, incident management and operational advice and assistance available under AMOSPlan. September 2024 AMOSC report indicated 17 AMOSC Staff were available (AMOSC members website).

[16] Target to maintain at least 84 members (Ref.: AMOSC Core Group Program and Policies). September 2024 Core Group report indicated 100 personnel were available (AMOSC members website).

[17] As per OSRL training and competency matrix. 18 responders guaranteed; 80 responders may be approved under best endeavours available under OSRL SLA. June 2022 OSRL audit confirmed exceedance of these numbers globally.

APPENDIX F FWADC AERIAL DISPERSANT APPLICATION – FIELD RESOURCING REQUIREMENTS

Aerial dispersant resource	No. required per aircraft	No. aircraft	Total no. required	Source of personnel
Support location (AMOSC FWADC Airbase FOB, likely to be Darwin [IATA: DRW])*				
FOB Commander*	*n/a*	*n/a*	1	AMOSC FWADC contract
Airbase Manager*			1	AMOSC FWADC contract
Safety Officer*			1	AMOSC FWADC contract
Dispersant Operations Coordinator*			1	AMOSC FWADC contract
Dispersant Loading Crew*			2	AMOSC FWADC contract
Log/Admin*			1	AMOSC FWADC contract
Airbase FOB total:			**7**	
AMOSC FWADC Dispersant Ops. Group (at sea ops. at application site)				
Dispersant Application Air Tractors				
Air Tractor Pilot*†	1	3	3	AMOSC FWADC contract
Air Tractor First Officer*†	1	3	3	AMOSC FWADC contract
Air Attack				
Secondary Overhead Aircraft Pilot†	1	1	1	Jadestone contracted
Secondary Overhead Aircraft First Officer†	1	1	1	Jadestone contracted
Air Attack Supervisor*	1	1	1	AMOSC FWADC contract
Dispersant Group total:			**9**	
Total personnel:			**16**	

* These roles as per Aerotech First Response (AFR)/ AMOSC/ Core Group fixed wing aerial response personnel resourcing in AMOSC FWADOps Plan (*AMOSC, 2020*).

† As stated in the FWADOps Plan, these roles are subject to Civil Aviation Safety Authority (CASA) requirements. The numbers stated above are reasonable estimates.

APPENDIX G OBSERVER LOGS

Vessel visual observer log | Note: Send to IMT within one hour of observations being completed.

Survey Details						
Date	Start time	End Time	Observers			
Incident			Area of Survey			
Vessel type	Call sign					
Weather Conditions						
Wind speed (knots)			Wind direction			
Cloud cover (%)			Visibility			
Time high water			Current direction			
Time low water			Current speed (nM)			
Slick Details						
Slick grid parameters by lat/long			Slick grid parameters (vessel speed)		Slick grid dimensions	
Length Axis	Width Axis		Length Axis		Width Axis	Length	nm
Start Latitude	Start Latitude		Time (seconds)		Time (seconds)	Width	nm
Start Longitude	Start Longitude					Length	nm
End Latitude	End Latitude		Vessel Speed (knots)		Vessel Speed (knots)	Width	nm
End Longitude	End Longitude					Grid area	km^2
Visual appearance slick						
Colours, emulsification etc.						

Any marine fauna or other activities observed

Aerial surveillance observation log | Note: Send to IMT within one hour of observations being completed.

Date	Incident	Aircraft type	Call sign	Start time	End time	Av altitude/ air speed
Wind speed (kts)	**Wind direction**	**Visibility (nm)**	**Cloud base (ft)**	**Sea state**	**Observer name/s**	**Spill source**
Survey start /end coordinates	**Survey start time**	**Survey end time**	**Time high tide**	**Time low tide**	**Current speed (nm)**	**Current direction**
Notes (e.g. remote sensing used, wildlife or sensitive receptors observed, any response activities observed):						

Slick details

Slick	Time local	Slick (centre or start)		Slick (end)		Slick Orient Degrees	Oil slick length			Oil slick width			Area km^2	Coverage %	Oiled area km^2
		LAT N/S	LONG E/W	LAT N/S	LONG E/W		SOG KT	Time seconds	Distance km	SOG KT	Time seconds	Distance km			
A															
B															
C															
D															

Slick	Oil appearance coverage – %						Min. volume – m^3	Max. volume – m^3	Type of detection (etc. visual, IR)	Edge description (clear or blurred)	General description (windrows/patches)
	1	2	3	4	5	other					
A											
B											
C											
D											

NOTE: Ground Speed (SOG) is the speed of the aircraft relative to the ground (sea) measured in knots (kt). One knot is one nautical mile (nm) per hour. 1 kt = 1 nm per hour = 1.85 Kilometres (km) per hour = 0.03 km (31 m) per minute = 0.0005 km per second

The Bonn Agreement Oil Appearance Code (BAOAC)			
No	**Oil appearance**	**Min. Volume m^3 / km^2**	**Max. Volume m^3 / km^2**
1	Sheen	0.04	0.30
2	Rainbow	0.30	5.00
3	Metallic	5.00	50.0
4	Discontinuous true colour	50.0	200
5	True colour	200	>200