Stag Field Operations Oil Pollution Emergency Plan
GF-70-PLN-I-00001
Rev 8

FACILITY	GF - Stag Field
REVIEW INTERVAL	12 Months

Rev No	Date	Approval		
		Owner	**Reviewer**	**Approver**
		Emergency Response Lead	**HSE Manager - Perth**	**Operations Manager**
0	4/11/2016	D. Uden	M. Patt	M. Robertson
1	21/12/2016	D. Uden	M. Patt	M. Robertson
2	22/05/2017	M. Craig	M. Patt	M. Robertson
3	28/07/2017	M. Craig	M. Patt	M. Robertson
4	18/10/2017	A. Gibbons	J. Williams	M. Robertson
5	13/06/18	M. Craig	J. Williams	M. Robertson
5a	05/07/18	M. Craig	J. Williams	M. Robertson
5.01	18/06/2019	M. Craig	H. Astill	O. Hobbs
5.02	26/03/20	T. Coolican	H. Astill	O. Hobbs
6	31/08/2020	M. Patt	H. Astill	T. Coolican
7	19/01/2021	M. Patt	H. Astill	T. Coolican
8	16/03/2021	M. Patt	H. Astill	T. Coolican
		M. Patt	*H. Astill*	*T. Coolican*

Holders of Controlled Copies:

- Perth Office – General Manager
- Stag Central Production Facility – OIM
- AMOSC
- Vessel Master
- Australian Maritime Safety Authority
- WA Department of Transport

UNCONTROLLED WHEN PRINTED

JADESTONE ENERGY (AUSTRALIA) PTY LTD
Level 8, 1 St Georges Terrace, Perth, Western Australia 6000
Telephone: +61 8 9486 6600 Website: www.jadestone-energy.com (ACN: 613 671 819)

REVISION HISTORY

Revision	Author / Editor	Amendment
0	M. Walker	Document creation
1	M. Walker	Revision 1 for submission to NOPSEMA.
2	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	M. Walker / M. Patt	Revision 3 for submission to NOPSEMA.
4	M. Walker / M. Patt	Updates to chemical dispersion strategy and address NOPSEMA OMR comments.
5	H. Astill	Updates to contractual changes (TSA completion, RPS APASA); alignment with updates to OSRA
5a	H. Astill	Updates after review of legislative framework elements. No MoC required.
5.01	M. Patt	Updates after annual review. No MoC required.
5.02	S. Kenwery	Annual review – Table 7-1. Tracker buoy logins. S9.4 & Table 15-1. No MoC required.
6	L. Sands / M. Patt	Revision for submission to NOPSEMA for tanker operations
7	L. Sands / M. Patt	Revision for submission to NOPSEMA to address comments
8	L. Sands / M. Patt	Revision for submission to NOPSEMA to address DoT comments

CONTENTS

Figures

Tables

KEY DOCUMENTS

Company-wide:

JADESTONE ENERGY INCIDENT MANAGEMENT TEAM RESPONSE PLAN (IMTRP) JS-70-PLN-F-00008	Risks and Hazards Incident Management Structure Incident Management Process Incident Management Team Incident initial assessment and orientation Information management Stand down and debrief Administration Statutory requirements Defining the spill level Oil spill response cycle Termination and recovery Oiled Wildlife Response Scientific Monitoring Waste Management

Facility-specific:

[This document] **STAG FIELD OPERATIONS OIL POLLUTION EMERGENCY PLAN (OPEP)** JS-70-PLN-I-00001	Incident Action Plan (First 48-hour operational period) Stag Facility Operations and oil spill risks Sensitivities and Response Priorities Resource Requirements Response Strategies: Source Control Operational Monitoring Chemical Dispersant Containment and Recovery Protection and Deflection Shoreline Clean-up Oiled Wildlife Response Operational Performance Standards and Measurement Criteria Appendices: Observation logs Oil on Water Classification Diesel fuel properties Stag Crude Assays Spill response planning scenario assumptions FWADC Joint Standard Operating Procedure Shoreline Assessment Form

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 3 and Section 1.2 and 3 of EP
Location (Lat/Long and Easting Northing)	Refer to Table 3-1		
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
Worst Case Spill Scenarios	**Scenario**	**Worst case spill volume**	Section 4
	Surface release of MDO from bunker transfer	5 m^3	
	Surface release of Stag Crude from MBC activation during offtake activity at offtake hose	0.07 m^3	
	Subsea release of Stag Crude from the underbuoy hose at the CALM buoy (30 min release)	86.5 m^3	
	Pinhole leak of Stag Crude - subsea pipeline or flowline from damage or corrosion (12 hour release)	15 m^3	
	Surface release of Stag Crude from damage to the offtake hose between the CALM buoy and third-party tanker (30 mins)	17.2 m^3	
	Vessel collision/ Loss of integrity: surface release of MDO from maintenance support vessel	250 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		Section **Error! Reference source not found.**

Parameter	Information	Further Information
	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. **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 "persistent hydrocarbons", which are unlikely to evaporate and 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.	
Priority Receptors	• Dampier Archipelago; • Montebello Islands; • Lowendal Islands; • Barrow Island; and • Eighty Mile Beach.	Section 5

PART A – REGULATORY

1. PURPOSE

The purpose of this Oil Pollution Emergency Plan (OPEP) is to detail Jadestone Energy's oil pollution preparedness and response arrangements for the Stag Field Operations Environment Plan (GF-70-PLN-I-00002) (the Stag EP).

2. OBJECTIVES

The objectives of this OPEP in relation to the unplanned release of hydrocarbons arising from activities within the Stag Field are:

- To safely limit the adverse environmental effects to the marine environment;
- To define the capability requirements for response activities;
- To demonstrate arrangements for sufficient capability to respond in a timely manner and for the duration of the oil pollution incident; and
- To provide guidance to the IMT in relation to spill response implementation.

3. SCOPE

This OPEP applies to oil spill risks associated with operational activities at the Stag Field described in Section 8.4 to 8.6 of the EP. Oil spill risks associated with drilling activities are not within the scope of this plan. A schematic of the Stag Field is provided in Figure 3-1.

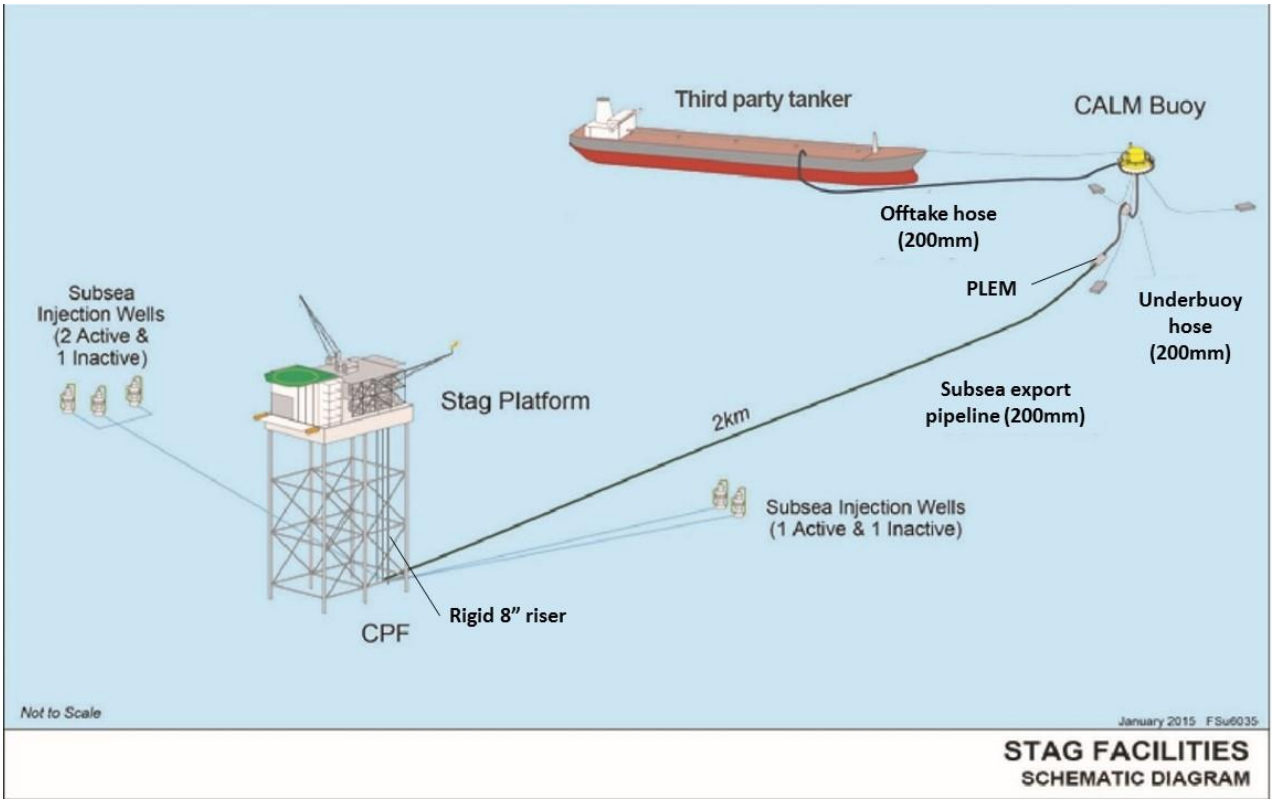

Figure 3-1: Schematic of the Stag Field Facilities

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 Stag Central Processing Facility (CPF) and the CALM buoy are provided in Table 3-1.

Table 3-1: Stag CPF and the CALM Buoy Coordinates

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

The geographical scope of this OPEP, which effectively covers the greatest area identified by stochastic spill modelling, extends approximately 500 km north, 500 km west, 350 km north-east, 300 km south-west and 40 km south of the Operational Area.

Section 5 of the Stag Field Environment Plan (GF-70-PLN-I-00002) (the Stag EP) includes 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 3-2Table 3-2

Table 3-2: 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)

4. SPILL SCENARIOS AND CONTEXT

An environment risk assessment (ERA) was undertaken as part of the Stag EP. Workshops were conducted that identified possible hazards with the potential for routine or non-routine (unplanned) loss of hydrocarbons to the marine environment. Each of these hazards has been assessed with selected control measures to reduce the likelihood of hydrocarbon losses to the marine environment to ALARP. Refer to Sections 8.4, 8.5 and 8.6 of the Stag EP which contain a summary of all the spill scenarios identified and assessed.

This OPEP has been prepared for the spill scenarios as summarised in Table 4-1 with a focus on the Level 2 scenario. The scenarios modelled represent most likely and worst case scenarios as defined by the National Plan for Maritime Emergencies (AMSA, 2020), however Jadestone understands that other scenarios are possible, such as a Level 1 spill, and as such Jadestone has made provisions in spill response to guide decision makers for all types of hydrocarbon spillages, at any Level.

When considering the likely behaviour of the hydrocarbons in the receiving marine environment and the total potential volumes of the spill scenarios listed in Table 4-1.

During the Stag operations activities, the following hydrocarbons may be unintentionally released to the marine environment: oily water, marine diesel, hydraulic oils and lubricating fluids, or crude oil. The following sub-sections describe the spill modelling parameters.

4.1.1 Marine Diesel

In the marine environment, marine diesel will behave as follows:

- Will spread rapidly to low thickness levels in the direction of the prevailing wind and waves;
- Evaporation is the dominant process contributing to the fate of spilled diesel from the sea surface and will account for 60 to 80% reduction of the net hydrocarbon balance within 48 to 72 hours;

- The evaporation rate of diesel will increase in warmer air and sea temperatures such as those present around Stag platform; and
- Due to the low specific gravity of marine diesel, it does not sink and accumulate on the seafloor as pooled or free oil unless adsorption occurs with sediment. However, it is possible for the diesel oil that is dispersed by wave action to form droplets that are small enough to be kept in suspension and moved by the currents.

ITOPF (2018) categorises diesel as a light group II hydrocarbon. In the marine environment, a 5% residual of the total quantity of diesel spilt will remain after the volatilisation and solubilisation processes associated with weathering. For details on the properties of diesel, refer to Appendix A3. Refer to Section 8.6.2 of the EP for a further description of diesel properties, modelling and impact.

4.1.2 Stag Crude Oil

Stag oil is a medium crude composed of hydrocarbons that have a wide range of boiling points and volatiles at atmospheric temperatures, and 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 A4.

Table 4-1: Identified Scenarios for Hydrocarbon Releases to the Marine Environment

Scenario Level; Spillage Type and NatPlan Defined Level	Scenario No.	Hydrocarbon Type	Source / Cause	Total Potential Volume
Level 1 / Most Likely Spill (MLS)				
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	Diesel fuel	Release of diesel fuel from bunker transfer	5 m^3
	N/A	Stag Crude	MBC activation during offtake activity at offtake hose (30 mins)	0.07 m^3
Level 2 / Most Likely Spill (MLS)				
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 damage to the offtake hose between the CALM buoy and third-party tanker (30 mins)	17.2 m^3
	4	Diesel fuel	Vessel collision/ Loss of integrity: surface release from maintenance support vessel	250 m^3

5. PREDICTED SPILL TRAJECTORY AREA, SENSITIVITIES AND RESPONSE PRIORITIES

Potential shoreline contact and response priorities were identified using spill modelling results and this information has been used to inform the spill assessment process and development of an Incident Action Plan (IAP). The five shoreline locations that were identified as priority protection areas based on modelling thresholds described in the Stag EP, as shown in Figure 5-1 are:

- Dampier Archipelago;
- Montebello Islands;
- Lowendal Islands;
- Barrow Island; and
- Eighty Mile Beach.

The response strategies identified in this OPEP will be adopted in the IAP process as required to protect the environmental values of this area.

Refer to the Stag EP for protection priorities and spill modelling summary including impact descriptions of sensitive locations from surface oil, entrained oil and dissolved aromatic threshold concentrations. Section 5 of the Stag EP describes the existing environment at the operational area and within the potential spill trajectory area, and identifies the protected areas and fauna that may be impacted by a spill.

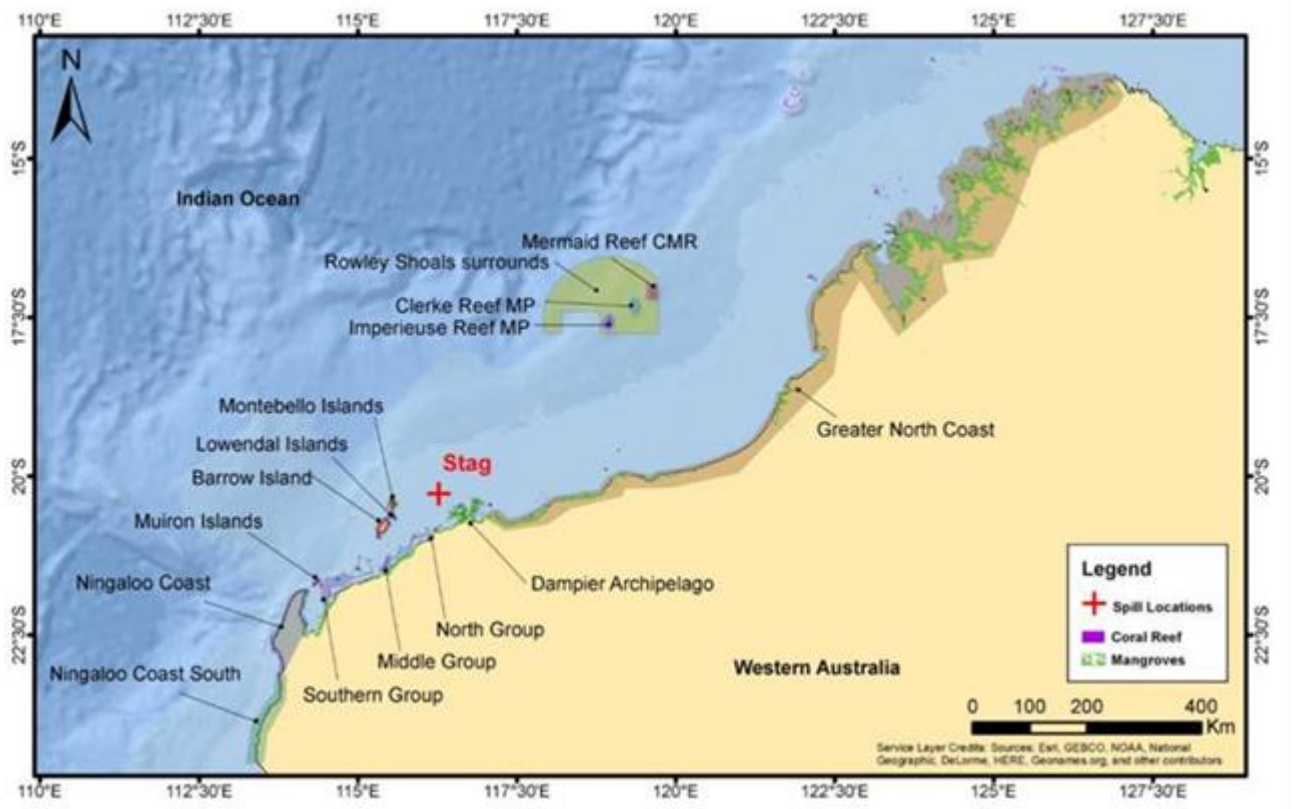

Figure 5-1: Location of Sensitive Receptors Used in Spill Modelling

5.1 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 contact, 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 (refer Section 10 of the OPEP for the 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. For the modelling replicate with maximum oil accumulation on shorelines a reduction of the proportion of oil ashore is predicted in some locations.

6. APPLICABILITY OF RESPONSE STRATEGIES

The response strategies outlined in this OPEP have been developed by Jadestone utilising risk assessments to identify credible worst case spill scenarios, expected/calculated release rates, known information of hydrocarbon types and behaviour, and expected partitioning of the hydrocarbon within the marine environment with an estimate of the volume of persistent oil.

This information has been modelled to give a theoretical zone of spread that is used to identify potential sensitive receptors and response strategies required to reduce the consequences of a spill to ALARP. The response strategies are assessed using a NEBA process so the most effective response strategies with the lowest environmental consequences can be identified, documented and prepared for.

Table 8-13 in the EP describes the decision to adopt or not a spill response strategy, and the potential environmental benefit of that strategy for Stag crude. An ALARP discussion regarding each oil spill response strategy is provided in the Stag EP.

Table 6-1 shows the operational considerations for response strategies and applicability to the two potential oil types that could be spilled, and operational considerations for incident action plans (IAPs).

The response strategies described in Sections 8 to 140 contain both a description of the response strategy and decision-making criteria; and guidance for implementation of the response strategy.

Action Plans and mobilisation of resources to respond to the spill is presented in Part B of this OPEP.

Appendix A7 (Incident Management Guidance) of this document provides a summary of Jadestone Energy's Incident Management Team and guidance on the incident response and management. The response and management is fully detailed in Jadestone's Incident Management Team Response Plan (JS-70-PLN-F-00008).

Table 6-1: Applicability of Oil Spill Response Strategies

OSR strategy	Scenario No.			Operational Considerations
	1-2 (Subsea release Stag Crude)	3 (Surface release Stag Crude)	4 (Surface release MDO)	
Source Control	Primary response strategy	Primary response strategy	N/A	*Scenarios 1-3* 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). *Vessel collision* In the event of a vessel spill, the Vessel Master would revert to the Ship Oil Pollution Emergency Plan (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.
Operational Monitoring	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, shoreline assessment) 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

OSR strategy	Scenario No.			Operational Considerations
	1-2 (Subsea release Stag Crude)	3 (Surface release Stag Crude)	4 (Surface release MDO)	
				dispersant. 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. 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 (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.
Containment and Recovery	Primary response strategy	Primary response strategy	Not recommended	**Stag Crude:** Applicable for Stag Crude as it is a more persistent hydrocarbon and has a relatively slow rate of weathering. 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 would result in the removal of floating hydrocarbons from the environment. **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	Secondary response strategy	Secondary response strategy	Not recommended	**Stag Crude**: Will be considered if a spill is predicted to contact sensitive shorelines and resources can be deployed effectively, safely and would not result in more harm than if

OSR strategy	Scenario No.			Operational Considerations
	1-2 (Subsea release Stag Crude)	3 (Surface release Stag Crude)	4 (Surface release MDO)	
Deflection				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 IC (as Control Agency) approval is required before commencing protect and deflect activities in State waters. **MDO**: Modelling indicates no shoreline contact 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 NEBA. 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 contact above moderate shoreline accumulation thresholds (>100 g/m^2).
Oiled Wildlife Response	Secondary response strategy	Secondary response strategy	Secondary response strategy	**Stag Crude and MDO**: Applicable for marine animals that come close to the spill when on the water and shorelines. Care to be taken not to drive marine animals into spill or split up the pods, schools, and flocks. Applicable for oiled marine animals. Difficult to do for large marine animals or poisonous animals such as sea snakes, however this response must always be assessed.

OSR strategy	Scenario No.			Operational Considerations
	1-2 (Subsea release Stag Crude)	3 (Surface release Stag Crude)	4 (Surface release MDO)	
Scientific Monitoring (See IMTRP Appendix A)	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.

6.1 Operational NEBA

Following implementation of the initial (first strike) response, the information in Table 6-1 will aid in the development of the initial Operational NEBA. The Action Plan tables in Section 17 include considerations to help complete the Operational NEBA.

It should be noted that the initial Operational NEBA may be based on limited information; however, the overall response effort should not be delayed due to a lack of some information. The Operational NEBA can always be revised when more information is provided to the Planning Lead.

The Planning Lead is responsible for completing the Operational NEBA and to determine if outputs from the Strategic NEBA are still appropriate. The Operational NEBA should incorporate post-spill trajectory modelling data, surveillance data, operational monitoring data and should be incorporated into the IAP.

6.2 Response Resource Planning

Spill response planning to identify a suitable combination of response strategies involves estimating required resources and an assessment of the capability required to support the response. Capability to support the minimum resources required has been planned for and is presented in **Error! Reference source not found.**.

Some spill scenarios are predicted to contact shorelines. The remoteness and nature of the shorelines contacted places a priority on offshore response strategies that reduce the volume of oil to shore. The primary response strategies will be:

- Source Control will reduce the length of time the oil is released into the marine environment;
- Operational monitoring is the first response strategy implemented to enable Jadestone to gain and maintain situational awareness;
- Surface chemical dispersant application implemented because of the predicted benefit demonstrated through efficacy testing; and
- Containment and recovery operations complement the dispersant strategy by being able to target areas of floating oil that have not dispersed.

The mix of resources presented in **Error! Reference source not found.** provides a basis from which complementary response strategies can be undertaken for protection priorities with a reasonable prospect for positive outcomes.

Spill response planning assumptions take into consideration:

- The weathering properties of Stag Crude are well understood however this does not negate the influence of real time variables on the rate of evaporation and emulsification.
- Approximately 32 to 68% of the volume of Stag oil spilled is expected to evaporate over the first seven days (% dependent upon wind variability).

An overview of the equipment and dispersant available to Jadestone from national and international stocks and approximate mobilisation times is provided in Table 6-2.

Table 6-2: Oil Spill Response Equipment

Agency	Stockpile Locations	Equipment
Jadestone	• Supply vessel	Computerised Management Maintenance System (CMMS) provides up-to-date equipment lists for the various stockpile locations
AMOSC	• Broome • Exmouth	AMOSC equipment and dispersant lists are available via the Member Login webpage:

Agency	Stockpile Locations	Equipment
	• Fremantle • Geelong • Industry Mutual Aid register	• AMOSC website: https://amosc.com.au/member-login/ AMOSC can arrange for transport of their equipment and dispersant to Dampier FOB.
AMSA	• ACT • Adelaide • Brisbane • Dampier • Darwin • Devonport • Fremantle • Gladstone • Horn Island • Karratha • Melbourne • Sydney • Townsville	AMSA equipment and dispersant lists are available on the AMSA website via the following links: • Equipment: https://amsa-forms.nogginoca.com/public/equipment.html?loc=%2Fapi%2Fv1%2Fasset%2F2616201 • Dispersant: https://amsa-forms.nogginoca.com/public/dispersant.html?loc=%2Fapi%2Fv1%2Fasset%2F2544502 • Fixed Wing Aircraft: https://amsa-forms.nogginoca.com/public/aircraft-avilability.html
Waste Management Contractor	• Darwin • Broome • Port Hedland • Karratha • Perth	Waste management contractor's waste management equipment are summarised in its Waste Management Plan.

7. RESOURCES REQUIRED FOR A WCS SPILL EVENT AT STAG

Table 7-1: Resources Required for a WCS Spill Event at STAG

Response tactic	Capability details	Capability required within 48 hrs	Additional capability required within 7 days	Additional capability required within 14 days	Total required	Providers and quantities	Arrangement
Operational monitoring							
Satellite tracking	Satellite tracking buoy	2 buoys	None	None	2 buoys	Satellite buoy provider	Contract with satellite tracking buoy services provider
Modelling	OSTM	2 trajectory and weathering models	7 trajectory and weather models	None	9 model outputs	RPS APASA	AMOSC MSC
Aerial surveillance	Aircraft	1 aircraft	2 aircraft	None	2 aircraft	Jadestone aviation contract	Contract with aviation services provider
	Aerial observers	1 observer	2 observers	None	2 observers	AMOSC Core group	AMOSplan
Vessel surveillance	Vessel of opportunity or contracted	1 vessel	None	None	1 vessel	Jadestone marine contracts	MSAs with vessel providers subject to availability
	1 observer	1 observer	None	None	1 observer	Vessel of opportunity	Master of vessel
Fluorometry	Towable fluorometers	2-5 fluorometers	None	None	2-5 fluorometers	Jacobs Environmental or CSIRO	Scientific Monitoring Plan PO and CSIRO via AMSA MOU
UAVs	Short range UAVs with cameras/video	2 UAVs	2 UAVs	None	4 UAVs	Approach service providers at the time when required	Readily sourced and mobilised

Response tactic	Capability details	Capability required within 48 hrs	Additional capability required within 7 days	Additional capability required within 14 days	Total required	Providers and quantities	Arrangement
Shoreline and coastal habitat assessment	Trained team leaders and team members trained on site (3 members per team)	5 team leaders, 10 team members (total 15 people)	As determined by OSTM	As determined by OSTM	15 people (5 team leaders, 10 team members)	DoT, AMOSC and AMSA trained shoreline assessment team leaders. Labour hire contract	AMOSplan, DoT State Response Team, AMSA MOU Contract with Labour hire services provider
Chemical dispersant application							
Aerial application	FWADC and pilots	One spray aircraft	None	None	Rollout plan timing indicates that an aircraft can be on-site at Karratha within 18 hrs. Additional aircraft (x3) can be onsite by 48 hrs	FWADC contractor	AMSA (through contract with AMOSC)
	Dispersant (at Karratha airport)	10 m^3	20 m^3	None	30 m^3	AMSA 10 m^3 Dampier AMOSC 20 m^3 Exmouth Refer to Table 10-3 for dispersant budget	AMSA MOU AMOSC membership
	Air attack observation	1 aircraft 1 observer	None	None	1 air attack surveillance aircraft 1 observer	Jadestone aircraft contracts	Contract with aviation services provider

Response tactic	Capability details	Capability required within 48 hrs	Additional capability required within 7 days	Additional capability required within 14 days	Total required	Providers and quantities	Arrangement
	Search and rescue	1 aircraft and pilot	None	None	1 aircraft and pilot	Jadestone aircraft contracts	Contract with aviation services provider
Vessel application	Support vessels	One spray vessel	None	None	One spray vessel	Jadestone marine contracts	MSAs with vessel providers subject to availability
	Personnel	1 trained responder Vessel crew to assist with deployment	None	None	1 trained responder Vessel crew to assist with deployment	AMOSC Jadestone marine contracts	AMOSC membership MSAs with vessel providers subject to availability
	Spray systems afedo spray system per vessel	2 systems per vessel	None	None	2 spray systems	Jadestone equipment	Jadestone
	Dispersant (at Dampier port)	None	See aerial application	See aerial application	See aerial application	See aerial application	AMSA MOU AMOSC membership
	Spotter plane	1 aircraft 1 observer	None	None	1 aircraft 1 observer	Jadestone aerial contracts	Contract with aviation services provider
Containment and recovery							

Response tactic	Capability details	Capability required within 48 hrs	Additional capability required within 7 days	Additional capability required within 14 days	Total required	Providers and quantities	Arrangement
Booms	Offshore system	One system	One system	None	Two systems	AMOSC AMSA OSRL Vessel Broker	AMSA MOU AMOSC membership OSRL membership Contracts MSA Call off contracts Jadestone marine broker
Personnel	Trained oil spill responders	2 x trained responders Vessel crew	2 x trained responders Vessel crew	None	4 x trained responders Vessel crew	AMOSC core group AMSA NRT	AMSA MOU AMOSC membership
Protection and deflection							
Booms	Nearshore and land sea booms	Shoreline protection boom Intertidal protection boom and ancillaries	Shoreline protection boom Intertidal protection boom Solid flotation boom Shoreline and intertidal boom ancillaries	None	Shoreline protection boom Intertidal protection boom Solid flotation boom Shoreline and intertidal boom ancillaries	AMOSC AMSA	AMSA MOU AMOSC membership
Nearshore skimmers	Skimmers capable of operating in nearshore marine environment.	One	Four	None	Five	AMOSC AMSA	AMSA MOU AMOSC membership
Vessels	Small support craft	1 vessel	4 vessels	None	10 vessels	Jadestone marine contracts	MSAs with vessel providers subject to availability

Response tactic	Capability details	Capability required within 48 hrs	Additional capability required within 7 days	Additional capability required within 14 days	Total required	Providers and quantities	Arrangement
Personnel	Trained oil spill responders	2 trained responders 5 labour hire and/or AMOSC mutual aid personnel	8 trained responders 16 labour hire and/or AMOSC mutual aid personnel	None	10 trained responders 24 labour hire and/or AMOSC mutual aid personnel	AMOSC core group AMSA NRT	AMSA MOU AMOSC membership
Shoreline clean-up							
Personnel	Trained shoreline team leaders and team members/labourers trained on site. Mobilise to site ready for deployment at first site from day 2.	2 Teams (2 Trained shoreline team leaders and 18 team members/labourers trained on site)	5 Teams (5 Trained shoreline team leaders and 45 team members/labourers trained on site)	As determined by OSTM	7 teams (7 trained shoreline team leaders and 63 team members/labourers trained on site)	Labour hire contract Global Spill Control AMOSC core group DoT AMSA	Contract with labour Hire providers Global Spill Control AMOSC membership AMSA MOU
Waste	Bins, containers, bags Mobilise to site ready for deployment at first site from day 2.	15 x 3 m^3 Waste skips 15 x IBCs	As determined by OSTM	As determined by OSTM	15 x 3 m^3 Waste skips 15 x IBCs	Waste contractor	Contract with waste contractor

Response tactic	Capability details	Capability required within 48 hrs	Additional capability required within 7 days	Additional capability required within 14 days	Total required	Providers and quantities	Arrangement
Shoreline clean up equipment	Kits		Shoreline Clean-up Kits (Decontamination, Beach Wash Down, Initial IAP Support and Beach Clean-up Kits) Rope Skimmer and Collection Trailer 4 x Fast tanks Oil Vacuum Collection	Shoreline Clean-up Kits (Decontamination, Beach Wash Down, Initial IAP Support and Beach Clean-up Kits)		AMOSC AMSA	AMSA MOU AMOSC membership
Oiled wildlife response	Refer to Section 14						AMSA MOU AMOSC membership DBCA and DBCA network

Personnel required to support the IMT functions and response strategies are grouped according to source and skill base.

- Jadestone group are sourced directly from within Jadestone.
- AMOSC and AMOSC Core Group members are specifically trained in oil spill response and are identified as those who fulfil team leader roles and who can train team members if required.
- National Response team (NRT) include trained personnel from AMSA and State/Territory response teams.
- Mutual Aid / contractors / service providers group is made up of industry members, i.e. staff of other Titleholders; contract personnel; or service providers who can fulfil team member roles and don't necessarily have oil spill response training, for example labour hire.

Table 7-2 provides a summary of the cumulative personnel resource requirement across the sources.

Table 7-2: Cumulative Personnel Requirement Across Response Activities and Source

Function	TOTAL Personnel required – team members or labour hire	Jadestone	AMOSC Core Group	Mutual Aid /Contractors/Service providers
IMT functions	**38**	21 (3 x 7)	8 (2 x 4)	-
WA DoT IMT (IGN)	**11**	3	8	
Monitor and evaluate	**17**	-	7	10
Chemical dispersant operations	**7**	-	3	4
Containment and recovery	**10**	-	2	8
Protection and deflection	**35**	-	10	25
Shoreline clean-up	**70**	-	7	63
TOTAL personnel required and source	**188**	**24**	**45**	**110**

8. SOURCE CONTROL STRATEGY

The initial and highest priority response to an oil spill incident is to prevent or limit further oil loss into the marine environment, if safe to do so. In most circumstances, the net benefit of source control outweighs impacts of further oil being released into the marine environment. However, further risks may arise due to increased vessels and rigs and the associated increased health and safety risks for the team involved in the response.

8.1 Initiation and Termination Criteria

Tactics	Initiation criteria	Termination criteria
Emergency shutdown	Notification of spill	Release of oil ceased, spilled oil that has been contained is cleaned up and disposed of
Implementation of SOPEP		

The IMT will gather surveillance information from those involved in preventing further release of hydrocarbons to the marine environment and ensure that the appropriate source control actions are being undertaken.

8.2 Tasks for Process Incident

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/h pump rate and a worst-case release duration of up to five mins) 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 leak the worst-case release volume is estimated at 15 m^3 Stag crude. Should a pipeline leak occur, the system will be shutdown and the Emergency Pipeline Repair Plan (GF-09-PLN-L-00039) will be implemented.

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 Shipboard Oil Pollution Emergency Plan (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; and
- 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 8 of Stag EP describes the environmental risks and management for unplanned events associated with the operational activities.

8.3 Tasks for Vessel Collision

Accidental release of hydrocarbons from support vessels to the marine environment is managed the Vessel Master in accordance with MARPOL 73/78 Annex 1 – Prevention of Pollution by Oil under the Protection of the Sea (Prevention of Pollution from Ships) Act 1983.

9. OPERATIONAL MONITORING STRATEGY

A combination of methods has been identified as appropriate to characterise the released hydrocarbon, estimate the extent of the spill, measure oil volume and concentration on or in the water and locate oil along shorelines.

Understanding the behaviour and likely trajectory of an oil spill is critical to evaluate the appropriate response strategy. In some situations, after operational monitoring activities have been employed, leaving the oil to naturally dissipate and degrade may be considered the most appropriate option if any further response is a risk to increasing the environmental impact, or presents a significant safety risk.

9.1 Common Operating Picture (COP)

The ability of the IMT to manage and coordinate response operations will be heavily reliant on being able to compile and effectively manage all the information and data provided as part of the operational monitoring strategy. To achieve this a Common Operating Picture (COP) will be utilised, consisting primarily of geographical and geospatial information.

9.2 Operational Monitoring Plan

The IMT will coordinate the operational monitoring requirements, and ensure that all monitoring activities are conducted safely and effectively.

9.3 Initiation and Termination Criteria

Tactic	Initiation Criteria	Termination Criteria
Tracking buoys	Immediately once Level 2 oil spill is confirmed	Tracking buoy no longer required to inform common operating picture.
Vessel surveillance	Immediately once Level 2 oil spill is confirmed	Vessel surveillance reports no longer required to inform common operating picture
Aerial surveillance	Immediately once Level 2 oil spill is confirmed	IAP no longer requires aerial surveillance to inform common operating picture; and Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response
Oil Spill Trajectory Modelling (OSTM)	Immediately once Level 2 oil spill is confirmed	Modelling no longer required to inform common operating picture; and Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response
Fluorometry	Dispersant application has occurred	Dispersant application no longer being undertaken; and Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response
Shoreline and coastal habitat assessment	Immediately once Level 2 oil spill is confirmed	When all shoreline segments have reached status of no further action be taken (NFA); and Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the

Tactic	Initiation Criteria	Termination Criteria
		response
UAV deployment	OSTM predicts shoreline impact to inaccessible area not able to be covered by aerial or vessel surveillance tasks.	UAV surveillance no longer required to inform common operating picture.

9.4 Tactics

The following tactics are sufficient for supplying all required information to inform response decisions to reduce impacts resulting from the worst-case potential spill, from the Stag Operations, to ALARP:

- Vessel surveillance;
- Aerial surveillance;
- Tracking buoys;
- Satellite imagery;
- Spill fate modelling;
- Fluorometry;
- Shoreline and coastal habitat assessment using Shoreline Clean-up Assessment Technique (SCAT) surveys; and
- UAVs.

9.4.1 Tracking Buoy Deployment

Satellite tracking buoy deployment is to be initiated within one hour of spill notification and placed within or as close as is safely allowable to the plume to follow the movement of a surface spill in the marine environment.

Note: Buoys are not to be dropped from a height of greater than 10m to water surface.

Satellite tracking buoys can be deployed directly from the Platform (below 10m) or mobilised via available support vessels as directed by the OIM. There are two tracking buoys available on the Stag Facility.

The time taken to deploy the tracking buoys will depend on the location they are sourced from and transit time for the vessels to deploy or retrieve. After initial deployment additional buoys will be deployed on a regular basis as determined by the IMT to best support the building and maintenance of situational awareness.

Tracker buoys are deployed under the direction from the IMT Leader, by following the appropriate standard operating procedure (SOP). Once deployed it is essential that confirmation of a successful deployment is provided back to the IMT.

Deployed buoys will be tracked online by the IMT and spill fate modelling service provider. On completion of spill monitoring using tracking buoys, the buoys are to be retrieved by a vessel.

Normal procedure will be for the deployment of a single tracking buoy on Day 1 and the second approximately 24 hours later. On being deployed all buoys will be checked to be operational through the online website. All buoy data will be used to assist with understanding the local metocean conditions. Additional buoys will be sourced as part of the response, however if required buoys can be collected and redeployed.

9.4.2 Vessel Surveillance

Direct observations from the field support vessels or other vessels can be used to assess the location and visible extent of the spill from hydrocarbon incidents, to verify modelling predictions and trajectories, and to support other response strategies.

Note: Vessel-based surveillance is only effective if sea state conditions are calm and the spill is observable.

A decision on the suitability of the metocean conditions will be made (OIM / Vessel Master / IMT) and direction provided to available vessels. Vessel surveillance is to be instructed by the OIM (Level 1) or IMT (Level 2). Vessel surveillance observations will be used by the IMT in conjunction with all other operational monitoring information (Level 2) to confirm location and extent of the spill, which will in turn assist with the development of appropriate response strategies.

The nearest support vessel to the release location will be mobilised upon notification of incident. Vessels currently on hire to Jadestone will be initially selected for vessel surveillance duties with other vessels provided from Jadestone's contracted vessel providers.

Reporting requirements will be as follows:

- Information to be provided to the OIM (Level 1) or IMT (Level 2);
- Essential information to be reported will include:
    - Spill location (latitude & longitude);
    - Length and width of slick;
    - Visual appearance of the slick (colours, emulsification etc);
    - Associated weather conditions in vicinity of the spill (wind speed/direction, sea state, swell);
    - Any marine fauna or other activities observed; and
    - Photographic images.

All information is to be compiled into a Vessel Surveillance Log (refer Appendix A1.) which will be sent to the OIM/IMT within an hour of the observations being taken.

9.4.3 Aerial Surveillance

Direct observations from aircraft can be used to assess the location, estimated volume and visible extent of the spill from hydrocarbon incidents, in order to verify modelling predictions and trajectories, and to support other response strategies.

Trained Aerial Observers will be sourced through the AMOSplan arrangements and deployed to the response location, however, should a delay in their arrival be anticipated, a surveillance flight will be conducted utilising available aircraft crew.

A decision on the suitability of the meteorological conditions will be made by the aircraft captain, who will relay this decision to either the OIM (Level 1) or IMT (Level 2) to receive appropriate tasking. Aerial surveillance observations will be used by the IMT in conjunction with all other operational monitoring information (Level 2) to confirm location and extent of the spill, which will assist with the development of appropriate response strategies or modification to existing strategies.

Note: Specific meteorological limits will vary depending on the type of aircraft being flown.

Reporting requirements will be as follows:

- Information to be provided to the OIM (Level 1) or IMT (Level 2);
- Essential information to be reported will include:

- Spill location (latitude & longitude);
- Length and width of slick;
- Visual appearance of the slick (colours, emulsification etc) using the Bonn Oil Appearance Code (refer to Appendix A2);
- Associated weather conditions in vicinity of the spill (wind speed/direction, sea state, swell);
- Any marine fauna or other activities observed; and
- Photographic images.

All information is to be compiled into an Aerial Surveillance Log (refer Appendix A1) which will be sent to the OIM/IMT within an hour of the aircraft returning to its operating base. 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.

Flight Schedules are to be developed in support of response operations. The frequency of flights will be sufficient to ensure the information collected during each flight (i.e. observer log and spill mapping) meets the information needs of the IMT to validate spill location, dispersion and the information needs of fate modelling.

Note: Flights will only take place during daylight under visual flight rules (VFR).

A recording of the spill extent is made by outlining the approximate two-dimensional extent of the slick(s) on a map template, including GPS coordinates of extent, the time observations were made and date noted on the map template.

The trained Aerial Observer or the IMT will make estimations of thickness based on visual sighting or the photographic images respectively. Thickness estimates are to be based on the Bonn Agreement Oil Appearance Code.

Photographic or video records taken by the Aerial Observers for each fauna sighting and the location and details of each sighting are recorded with a cross-reference to photographic imagery captured. The Aerial Surveillance Marine Fauna Sighting Record Sheet is provided in Appendix A1.

9.4.4 Oil Spill Trajectory Modelling

OSTM provides a simulated trajectory of the spill based on historic and actual metocean data. This modelling will be provided in the form of a geospatial information system (GIS) format so that it can be easily integrated into the COP.

OSTM will be provided by RPS APASA via AMOSC. The IMT will contact AMOSC and confirm request of modelling services. OSTM will start within two hours of submission of the request.

On a daily basis, RPS APASA will provide three-day forecast outputs Jadestone. More frequent updates can be provided if weather conditions are highly variable or change suddenly. Data from aerial surveillance is to be provided to RPS APASA who are contracted to undertake modelling 24/7 to verify and adjust fate predictions of the spill and improve predictive accuracy.

9.4.5 Fluorometry

Fluorometry surveys are used to inform of presence of oil in water near sensitivities. Surveys will be run across the expected plume extent, as well as vertically through the water column. This allows a far greater area of coverage than discrete sampling, aiding in the detection and delineation of entrained oil.

This will allow continuous monitoring of entrained oil covering a large area and will provide near real-time three-dimensional data on the distribution of entrained oil to enable decision making within the IMT. Similarly, other sources of monitoring data (e.g. spill fate modelling) can be used in near real-time to inform the path of the sub surface glider.

In the event that sub surface fluorometers are unavailable or cannot cover the required scale of operation, towed fluorometers towed behind vessels will be used as an alternative or complementary approach. Jadestone has engaged Jacobs Environmental as a supplier of sub surface gliders with fluorometer sensors for the monitoring of entrained oil following an oil spill. Multiple towed fluorometers are also available from CSIRO. If required, within 24 hours, 5 fluorometers could be mobilised to support monitoring of chemical dispersant program.

9.4.6 Shoreline and Coastal Habitat Assessment

Shorelines are highly variable and some (i.e. non-rocky shores and medium- to high-energy shorelines) can be quite dynamic. To assist in determining which clean-up methods are most appropriate for those areas exposed to hydrocarbons, it is necessary to obtain information about shoreline character (topography, complexity, exposure etc.), source oil characteristics and distribution, and shoreline processes and redistribution of any oil.

Shoreline clean-up assessment technique (SCAT) surveys provide a mechanism by which to record shoreline exposure to stranded oil (see Appendix A5 for shoreline assessment forms). The outcome of SCAT surveys is to provide a rapid assessment of:

- Shoreline character;
- Distribution of coastal habitat/fauna;
- Level of oil contamination and oil characteristics (if oil present); and
- Any constraints to responding to shoreline (e.g. access and safety constraints).

The information collected through SCAT surveys is used to inform appropriate shoreline response strategies, in particular termination criteria for response actions.

A shoreline assessment comprises the following tasks:

- Assessment of shoreline character, habitats and fauna including:
    - shoreline structured biotic habitats;
    - distribution of fauna;
    - shoreline energy and processes;
    - shoreline substrate;
    - shoreline form; and
    - access/ safety constraints.
- Assessment of shoreline oiling (if present):
    - surface distribution and cover;
    - subsurface distribution;
    - oil type, thickness, concentration and physical character; and
    - sampling of oil for laboratory analysis.

9.4.7 Resource Rationale for Operational Monitoring

Aerial surveillance, tracking buoys and oil spill trajectory modelling are the primary operational monitoring tactics used to determine the extent of the spill. They are designed to provide real time observational data for the IMT and to validate response planning. Resources allocated for these tasks are sufficient to provide observations and predictions to the IMT within a reasonable timeframe. Vessel surveillance, UAVs and fluorometry are secondary tactics which can be used to complement the information gathered through the primary tactics.

SCAT is made up of three members per team and are assumed to be able to cover at least 10 km per day. This distance may be more, especially if UAVs are employed to cover shorelines that have access limitations. Jadestone has used the OSTM data for shoreline contact to plan worst case shoreline and habitat assessment personnel requirements (Table 9-1). No priority receptors are predicted to have more than 10 km of shoreline length contacted at concentrations greater than 100 g/m^2.

Dampier Archipelago has the longest length of shoreline contact (10 km) and presents the greatest resource requirement of 3 personnel (1 team of 3 members each) and Montebello Islands presents the minimum contact time. Team leaders will be sourced from AMOSC and will be trained in shoreline assessment techniques. Team members can include personnel who have completed basic training prior to mobilisation.

It should be noted that a single spill will not contact all shorelines listed in Table 9-1. In preparing for this capability, Jadestone will be able to meet lesser shoreline assessment requirements for other locations.

Table 9-1: Resource Rationale for Shoreline Assessment Personnel

Receptor	Minimum time to shoreline oil at >100g/m^2 (days)	Oiled shoreline at concentrations >100 g/m^2 in worst replicate simulation (km)	Number of SCAT teams required
Dampier Archipelago	7	10	1
Montebello Islands	1.4[1]	8	1
Lowendal Islands	26	4	1
Barrow Island	26	2	1
Eighty Mile Beach	14	4	1

Note: SCAT numbers not to be added up as spill will not contact all receptors modelled. Number required based on direction of spill and timeframes to contact.

[1] All results presented in this table are from Scenario 1 (subsea release of 86.5 m3) for the period September to February, with the exception of Montebello and Lowendal Islands which are the same scenario but the period of March to August.

10. CHEMICAL DISPERSION STRATEGY

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 surface waters 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 floating oil;
- Reduce the impact to shorelines; and
- Reduce the quantity of waste created.

Jadestone will apply chemical dispersants to Stag Crude as soon as practically possible to maximise the application rate over 72 hours from release to be within the Window of Opportunity. Due to the variability in effectiveness, Jadestone will monitor the effectiveness to assess whether to continue application through the NEBA process.

Chemical dispersants can decrease the risk of oil impact to shorelines, but can increase the risk to pelagic wildlife through entrained oil. NEBA will be used to assist in assessing the exchange of one risk to another. The Planning Team will be required to complete the Risk Assessment step in the IAP process and consider:

- Is it safe to conduct chemical dispersant operations?
- Is the oil dispersible? (existing understanding of Stag Crude)
- Is the environment suitable for chemical dispersant operations? (water depth, weather)
- Does the oil texture allow for chemical dispersant operations? (thickness, appearance)
- Are the resources available for deployment?
- Is the mobilisation time within the Window of Opportunity?
- Has the approval for chemical dispersant spraying been granted by the appropriate authorities?
- The geographic constraints listed in Section 10.7

10.1 Initiation and Termination Criteria

Table 10-1: Initiation and Termination Criteria Chemical Dispersant Tactics

Tactic	Initiation criteria	Termination criteria
Mobilising dispersant	Immediately when Level 2 spill incident (Stag Crude) is confirmed	When there is no net environmental benefit of continuing dispersant application; and Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response
Aerial application of dispersant via FWADC aircraft	Immediately when Level 2 spill incident (Stag Crude) is confirmed	When there is no net environmental benefit of continuing dispersant application Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response
Vessel based application of dispersant	Immediately when Level 2 spill incident (Stag Crude) is confirmed	When there is no net environmental benefit of continuing dispersant application

Tactic	Initiation criteria	Termination criteria
		Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response
Dispersant efficacy testing	Assessment commences immediately when a Level 2 spill incident (Stag Crude) is confirmed	When dispersant is no longer being applied.

10.2 Chemical Dispersant Action Plan

The following tactics are considered for surface chemical dispersant operations are:

- Aerial application of dispersant; and
- Vessel based application of dispersant.

The Surface Chemical Dispersion Action Plan (Section 17.6) is activated at the initial stage of the incident so that resources can be mobilised and ready for use. As the incident progresses, chemical dispersant use is continually reassessed through the NEBA and IAP processes.

10.3 Dispersant Selection

Critical to performance and effectiveness of the chemical dispersant is the weathering state of the oil it is being applied to. 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 (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%.

Given these results, Jadestone has prioritised the use of Dasic Slickgone NS and Corexit 9500. There are sufficient stockpiles of Slickgone NS and Corexit 9500 to sustain dispersant application for the three days of application (Table 10-2).

10.4 Tasks for Mobilising Chemical Dispersants

Access to the National Plan stockpiles is via AMOSC and AMSA. The IMT will request the delivery of chemical dispersant stocks to the Dampier Port (vessel-based application) and Karratha airport (FWADC application) from AMOSC and AMSA stockpiles. AMSA chemical dispersant located in Dampier will begin arriving at Dampier Port for initial loading onto dispersant application vessels within 6 hours of mobilisation activation. AMOSC dispersant stocks located in Exmouth are to be road transported from Exmouth to Dampier Port and Karratha airport within 18 hours.

There are sufficient dispersant stocks in Exmouth and Dampier to last duration of application (three days). Refer to

Table 10-3 for the dispersant application budget.

Table 10-2: Chemical Dispersant Inventory as at November 2020

Owner	Stockpile Locations	Dispersant Volume (m^3)	Dispersant Type	Total Volume (m^3)
Jadestone	Darwin Supply Base	13	Slick Gone NS	15
	Montara FPSO	2	Slick Gone NS	

Owner	Stockpile Locations	Dispersant Volume (m^3)	Dispersant Type	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	
	Karratha	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	Exmouth	75	Slick Gone NS	747
	Fremantle	8	Slick Gone NS	
		27	Corexit 9500	
		500 (SFRT stockpile)	Slick Gone NS	
	Geelong	75	Slick Gone NS	
		62	Corexit 9500	
TOTAL (access agreements in place)				**1,117**

Note: 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.

10.5 Tasks for Aerial Application of Chemical Dispersants

Jadestone has access to AMSA's Fixed Wing Aerial Dispersant Capability (FWADC) via its membership with AMOSC. If this capability is required, AMOSC will activate its contract with AMSA, which shall provide Jadestone with aircraft and dispersants.

AMSA will deploy appropriate aircraft to a designated airstrip close to the spill location (e.g. Karratha Airport), and arrange for pilots, Air-Attack Supervisors, observation aircraft (one per two attack planes), trained observers, and the Search and Rescue Department for on-site emergency preparedness.

Arrival time of the aircraft will depend on flight time and will include a four-hour lead time for 'wheels up' from initial request. Aerial chemical dispersant application will commence within 24 hours (using worst case response time) of initial AMSA notification (daylight and weather condition dependent). Aerotech 1st Response can have three FWADC aircraft at Karratha airport 18 hours after activation and another three

aircraft to Karratha within 48 hours after activation, although due to the size of the spill, only one aircraft is required.

The IMT is to develop an "Air Operations Plan" in accordance with the Joint Standard Operating Procedure (JSOP) which is to be submitted to AMSA prior to commencement of any National Plan Fixed Wing Aerial Dispersant Contract (FWADC) aircraft operations.

10.6 Tasks for Vessel-Based Application of Chemical Dispersant

Vessel based chemical dispersant application is activated within 120 mins of Level 2 confirmation. Jadestone uses a contracted offshore support vessel (OSV) as the Stag operations supply vessel, to assist with vessel dispersant application. The trained crew aboard can mobilise to Dampier (depending on location, the vessel may be in field or in transit to/from Dampier) for pick-up of dispersant and equipment. This is likely to be the first vessel on-site applying dispersants.

The key steps in mobilising this response are:

- Mobilise supply vessel to Dampier Port to receive dispersant, load and ship to the dispersant spray vessels at the spill location (if required); and
- Maintain chemical dispersant supplies to dispersant application vessels at spill location until dispersant application terminated.

Spraying systems deliver chemical dispersant uniformly to the floating oil to maximise dispersant/ oil mixing and minimise wind drift. As such, if mixing is evident in sea surface waters, this will improve the effectiveness of chemical dispersant applied to floating oil. Where sea surface conditions are calm, agitation of the sea surface will be undertaken by vessels to create mixing. Where this is not successful, a reduction in oil/ water mixing will result and containment and recovery operations are to be implemented instead.

Vessel based dispersant operations require two afedo spray systems per vessel. Spray arms need to be secured to vessel by welding or chains as determined by the vessel master. One spray system consumes approximately 500 L/hr of dispersant meaning that for four vessels spraying for eight hours per day (daylight 10 hours operation to include travel to site), with two spray systems per vessel, and dilution of dispersant as applied means 4 m^3 of dispersant per day will be required for one vessel.

One AMOSC Core Group Responder is to be dispatched to each vessel to oversee operations. These personnel have been trained in the operation of vessel-based dispersant systems and are competent in the setup of dispersant spraying systems.

The effectiveness of the vessel based chemical dispersion strategy is communicated to the Operations Lead via Core Group Responders on-board the vessels with spray equipment. The Operations Lead is responsible for terminating application when chemical dispersants are no longer effective.

10.7 Chemical Dispersant Application Area and Timing

All chemical dispersant operations will occur during daylight hours only.

- At no time, can chemical dispersant be applied:
- In waters shallower than 20 m (LAT);
- Within 10 km of water shallower than 20 m;
- Within exclusion zones for offshore facilities;
- Within a Marine Park boundary or its buffer; and/or
- Within State Waters unless approved by the HMA.

The application of chemical dispersants will occur as soon as possible to ensure that chemical dispersant is applied to freshest oil. The WCS scenario for Stag is an instantaneous spill meaning that there is finite volume of oil to treat and ongoing release of oil is not occurring.

During ongoing operations, if the currents are directed toward the shallow parts of the coast, the application area must be far enough away to allow for sufficient chemical dispersal before contact with the 20 m contour. This is to be evaluated through RPS modelling requests for chemical dispersion characteristics throughout the application operation. The HMA will be notified of dispersant operations and predicted application area by the Planning Team Lead so that an assessment of movement of dispersed oil into State Waters can be made.

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 the aerial application systems.

10.8 Tasks for Dispersant Effectiveness Monitoring

Chemical dispersant effectiveness is shown in Figure 10-1. The effectiveness of the aerial based chemical dispersion strategy is communicated to the IMT via the Air-Attack Supervisors, who are supplied by AMSA through the FWADC. Air-Attack Supervisors will advise the IMT if chemical dispersant application operations are to be terminated.

Ongoing chemical dispersant application is to be determined using a the IAP process which involves a NEBA assessment, through the visual monitoring of the effectiveness of chemical dispersant applied, oil characteristics, predicted fate of the plume (updated daily), environmental conditions (sea state and weather) and surrounding environmental/ social/ cultural sensitivities. The NEBA will be re-evaluated daily during an incident to assess varying net benefits and impacts. Chemical dispersants are only to be applied if there is net benefit to the highest-ranking priority resources.

Underdosing	Effective Concentration	Over-dose
Applying too little dispersant will mean that the spray run will be ineffective and temporary herding may occur which may be caused by the bow wave. Oil will remain on the surface in its normal state.	When the dispersant is effective a grey or coffee coloured plume will be visible in the water. There may also be a noticable movement of oil from the surface into the water column.	Spraying too much dispersant or spraying on clear water will result in a cloudy white plume appearing in the water.

Figure 10-1: Effective and Ineffective Dispersant Application

10.9 Resource Rationale for Chemical Dispersant Application

An estimation of the resources required for the chemical dispersant strategy was undertaken and an analysis is provided below.

10.9.1 **Calculations** - Volume of oil to be treated

Based on the weathering properties of the oil being in the range of ~17% to 65% in the first 12 hours and ~20 to 53% in the first 24 hours, the amount of oil available to be dispersed is conservatively considered to be **75%** of the released volume (75% of 86.5 m^3 = 65 m^3).

10.9.2 **Calculations - Volume of dispersant required**

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; and

For planning purposes, a DOR of 1:25 is used because it is an accepted ratio to start with and can be adjusted depending on effectiveness.

10.9.3 **Assumptions - Fixed wing aerial dispersant (Air Tractor) operations**

Operations will be conducted out of Dampier to the Stag Facility. Based on standard aircraft endurance of 4 hours;

All dispersant required will be mobilised to Dampier in support of ALL aerial dispersant operations;

Two hours (approx.) required to complete each flight operation (dispersant loading/aircraft refuelling/transit to-from spill location);

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

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

10.9.4 **Assumptions - Vessel based dispersant operations**

Vessels fitted with two spray systems = 1,000 L/hr spray rate (dispersant diluted with sea water);

Dispersant operations to be conducted during daylight hours only – based on an estimated 8 hrs spraying = 8,000 L/vessel (sea water and dispersant); and

One vessel will require 8 m^3 dispersant.

10.9.5 **Dispersant budget**

The total amount of dispersant required for surface application over three days is 7.2 m^3.

This volume can be met using the dispersant stock available in Dampier. Additional stocks can be brought in from Exmouth, if required.

Table **10-3** shows additional stocks being mobilised to Dampier as a contingency.

A combination of delivery systems was assessed and the optimum to meet the need most efficiently was by utilising:

- One FWADC air tractor; and
- One vessel.

Jadestone can meet daily dispersant requirements from Day 2.

The FWADC aircraft and vessels are considered the primary platform for dispersant application operations because of the ability to treat specific areas of oil with dispersant at the required dosage and droplet size.

Table 10-3 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 10-3: Dispersant application budget

Day	Volume of oil (m^3) available for treatment by dispersant (after weathering)	Maximum volume of dispersant required (m^3) based on volume of oil released and DOR	Arrival of dispersant in Dampier (m^3)	Aerial application capability (m^3)	Vessel application capability (m^3)
1	65	2.6	10	0	0
2	60	2.4	30	9	8
3	55	2.2	Not required	9	8

11. CONTAINMENT AND RECOVERY STRATEGY

Booms and skimming equipment can be used to create physical barriers on the water surface to contain and recover the oil spill where information and predictive spill fate modelling indicate a likely threat to environmental, social and cultural sensitivities. Effective containment and recovery provides significant environmental benefit by removing floating oil and thereby decreasing the likelihood of oiling wildlife and reducing the amount of oil reaching shorelines.

Containment is the name for using booms (inflatable or solid) to corral oil usually in the offshore environment near the hydrocarbon source. Once contained, an attempt to recover the hydrocarbons from the surface waters can be undertaken. The response is only feasible in certain conditions that include:

- Weather and sea state: containment and recovery equipment is only effective in calm conditions. Effectiveness is variable depending on equipment type, but is generally only considered effective below 20 knots of wind, wave heights less than 1.5 m and currents less than 2 knots (Stevens & Aurand, 2008);
- Adequate surface thickness of hydrocarbons: 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; and
- Suitable oil type and characteristics: containment of fresh, volatile oil should not be attempted due to its low flash point. No attempt should be made until the safety of the area has been established. Containment of lighter oils such as diesel is often not viable because they evaporate and dissipate quickly.

If this option is deemed suitable through assessments and situational awareness (NEBA, trajectory to sensitivities, weather, seas state, oil type), significant logistical support will be required that will include suitable vessels, experienced crew, booms and skimmers, pumps, on-board storage for recovered oil and aircraft to direct the vessel to the areas with the thickest floating oil. In addition to logistical support requirements, containment activities are inherently inefficient due to the spreading characteristics of oil on water.

11.1 Initiation and Termination Criteria

Tactic	Initiation criteria	Termination criteria
Offshore containment and recovery	Immediately when Level 2 spill incident (Stag Crude) is confirmed.	When boom encounter rate (BER) is less than 10m^3 per hour
Offshore waste storage and collection	When offshore containment and recovery is initiated.	When all oily waste water temporarily stored offshore has been transferred to intermediate waste storage on land.

11.2 Tactics

- Offshore containment and recovery

11.3 Tasks for Containment and Recovery

In the initial response, Jadestone will mobilise ocean booms and hydraulic power pack equipment from AMSA Dampier, then from AMOSC in Exmouth. This provides the shortest timeframe for implementation. Requirements for additional resources can be assessed during the spill. If conditions and equipment are proving successful, then further activity will be implemented with vessels on contract to Jadestone using equipment (booms and pumps) from AMOSC and AMSA, and personnel from the AMOSC core group and National and State Response team (through AMSA).

Each vessel conducting containment and recovery is to be manned with a team of trained (minimum two) AMOSC Core Group Oil Spill Responders who will be tasked with controlling the operations and implementing in a safe and responsible method. The Team Leader has the responsibility of evaluating the effectiveness of the containment and recovery operations and communicating the information to the Operations Lead. The Operations Lead has the authority to demobilise or stand vessels off in the event of ineffective operations.

11.4 Tasks for Offshore Waste Storage and Collection

Activation of the Jadestone waste management contract will enable waste to be collected, stored and disposed of. Waste management is also discussed in the Jadestone Incident Management Team Response Plan (JS-70-PLN-F-00008).

Assuming favourable conditions, containment and recovery vessels operating offshore will collect floating oil using booms and skimmers. Skimmers will pump collected oily waters to IBCs or Iso-containers, where oily water will be allowed to settle such that the water phase will be suitable for over board discharge (decanting, if permitted) back into the collected oil behind the boom (to prevent secondary impacts of low concentration oil in water).

Oily waste water recovered through skimming can be up to 40 m^3 per team per day. Decanting into boomed areas has the potential to reduce the volume of waste water collected. Depending on storage configuration, waste collected may be collected by vessels transiting the operational area, or may return to Dampier for offloading.

11.5 WA DoT Requirements for Offshore Decanting of Waste Water

During offshore containment and recovery operations there is generally a large amount of water that is collected with the oil. This water can be decanted back into a boomed area to reduce waste and create more valuable storage area. 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.

Under the POWBONS Act; s. 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 minimize the damage from pollution. Under both MARPOL and POWBONS decanting must be approved by the government in whose jurisdiction the discharge will occur. In WA State waters this is DoT (as the Hazard Management Agency under the Emergency Management Act 2005) and in Commonwealth waters this is the Australian Maritime Safety Authority (AMSA).

To minimise the potential for recovered oil being released while the water is decanted, the following practices are recommended (IPIECA/OGP, 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 ranges 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;

- 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; and
- 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.

11.6 Resource Rationale for Containment and Recovery

This strategy will mobilise containment and recovery teams available to Jadestone by arrangements with AMOSC and AMSA. Worst case spill modelling indicates that these teams would initially be deployed from Dampier for rapid response close to the spill site.

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).

11.6.1 Amount of oil available to recover

Table 11-1 is used for planning purposes to identify the number of containment and recovery systems likely to be required. This information should be used as a guide only, as the amount of oil available to recover may vary from the volumes provided below.

The weekly volumes provided in Table 11-1**Error! Reference source not found.** are based on the weathering rates provided in Section 4.1.2.

Table 11-1: Containment and Recovery Plan Calculation

Day	Oil available to recover (m^3) after weathering and recovery	C&R Systems needed (assume 1 system = 40 m^3 oily waste water per day recovered)	C&R systems Jadestone can access	Potential volume of oil recovered (m^3) per day
1	65	2	0	0
2	60	2	1	40
3	15	2	2	80
As required	Fragmented windrows	2	2	80

11.6.2 Containment of oil

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 (400 m);
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 0.7 knot (1852 m/hr); and
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 0.7 x 0.047 = 4 m^3;

4 m^3 is the amount of oil 1 system can encounter in 1 hour @ 50 g/m^2; and

For planning purposes one "Containment & Recovery" system equates to over a 10 -hour day:

- Two x vessels with 400 m offshore boom, 1 x offshore skimmer @ min. 4 m^3/hour.

11.6.3 Resources

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 will be retained after this period to recover any fragmented sections of the spill. If the trajectory modelling indicates that shoreline contact 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 MSA's with, call-off contracts and in consultation with Jadestone's approved marine broker. Personnel will be sourced from AMOSC core group (115+), and National Response Team personnel (>63) to be accessed through AMSA.

Active booming systems are deployed to allow containment and recovery operations without the need for an additional skimming system (where deployed). This allows for greater effectiveness and continued skimming operations. Active booming systems are available through AMOSC and would be prioritised for mobilisation. Rapid sweep systems are also deployed, which allow containment and recovery operations to be undertaken at speeds of up to 3 knots. This allows for greater encounter rates and surface coverage.

For planning purposes, the vessel speed of 0.7 knots 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.

12. PROTECTION AND DEFLECTION STRATEGY

Booms can be used to create physical barriers to protect sensitive receptors. This option is often used in nearshore environments in close proximity to the area requiring protection. It can be installed in deeper water further from the protection priority with the intent of taking the oil off its trajectory path to the sensitive receptor.

This strategy involves a combination of nearshore booming using vessel-based operations ('nearshore operations') while the spill remains on a predicted shoreline impact trajectory, and the placement of shoreline boom around areas to:

- Protect sensitive shorelines;
- Deflect the oil back to ocean or to easier locations for shoreline clean-up;
- Reduce the volume of oil impacting sensitive shoreline habitats to ALARP; and
- Align the response strategy with NEBA.

Much of the potential deployment locations are characterised with large tidal movements (>10m), which would result in tidal currents exceeding boom capabilities. Protection booms will only be installed in areas where the tidal currents are below 0.75 knots.

Protection and deflection activities are advised for slicks greater than 100 g/m^2. Modelling shows that the oil decreases below the 100 g/m^2 threshold rapidly when the oil is at the surface, thereby constraining minimum arrival times to relatively low values or no contact for this threshold (i.e. low oil persistence at concentrations >100g/m^2 due to evaporative losses and spreading).

It should be noted that operationally the effectiveness of this strategy will vary depending on the level of contact at different locations. Operational monitoring data will provide important information for response decision making. If a tangible, positive outcome is demonstrated, and if health and safety risks are not disproportionate to the environmental benefit achieved in mobilising the response, a protect and deflect operation may be possible. Jadestone have provided guidance within this OPEP in the event the IMT is required to mobilise equipment and personnel to potentially contacted shorelines, prior to that identified in the oil spill modelling.

12.1 Initiation and Termination Criteria

Tactic	Initiation criteria	Termination criteria
Nearshore booming	When OSTM indicates shoreline contact	When shoreline receptors no longer able to be protected by nearshore booming.

12.2 Tactics

Given the remoteness and nature of the shorelines potentially contacted, Jadestone has prepared a protection and deflection response that caters for the priority receptors and can move to other locations as required. Deployment is subject to safety concerns of operations in high tidal influence and shallow waters; and possible grounding issues of small vessels, so must therefore be assessed under a NEBA.

The locations for initial nearshore protection and deflection operations will be evaluated by the IMT through observations and modelling during the incident response. Locations identified for potential shoreline impact are to be cross-referenced with the shoreline sensitivity and feature mapping data available through the DoT Oil Spill Response Atlas (OSRA).

As deflection and protection operations will occur in State/Territory Waters, the Hazard Management Agency (HMA) will direct the response operations to locations identified in the Jadestone OPEP or as determined by real time data and State/Territory priorities receptors.

If deployment of protection and deflection booms is considered feasible and effective, inspections and maintenance of the booms are to be timed based on tidal cycles and are to be undertaken by response personnel to ensure locations and formations are maintained so that they remain effective in achieving objectives.

The range of protection and deflection methods include nearshore booms (beach guardian, zoom boom, short curtain boom and sorbent boom) anchored close to the identified priority receptor areas, or open water booms (deep curtain ocean boom) placed at significant distances from shorelines to deflect the open water pathway of the oil to force the oil to miss the predicted shoreline requiring protection.

Operational monitoring and Incident Action Planning will guide the response to prioritise protection of sensitive key features. The protection and deflection response are to be scaled to be commensurate to the risk posed by an actual incident. The results of spill fate modelling will provide the accumulated oil and shoreline contact information which will enable calculation of the required amount of protection and deflection equipment.

Initial deployment of equipment and personnel is to be from the AMSA, State/Territory and AMOSC stockpiles and Core Group. Depending on actual conditions and possible responses to the reduce impacts to ALARP, further deployments of resources can be implemented through the AMSA National Plan shoreline response equipment stockpiles and NRT personnel, as agreed with by AMSA and Jadestone and implemented by the relevant Incident Management Team.

While equipment and personnel mobilisation are occurring, operational monitoring is continuing and the results sent to the IMT within two hours of teams returning to their operating base. The most up-to-date information will then be communicated to the protection and deflection teams to guide the selection of the operational locations.

The HMA will advise on priority receptors aided by the oil spill trajectory modelling to locations with the most likely impact. Deployment locations will be selected from the closest facilities to where priority receptors are identified.

The effectiveness of the protection and deflection strategy to achieve performance objectives against the IAP objectives is to be communicated to the IMT by a nominated Shoreline Response Team Leader. The IMT has the responsibility to extend or terminate the response in consultation with the HMA.

12.3 Resource Rationale for Protection and Deflection

OSTM outputs assisted in identifying priority receptors. Pre-deployment of resources at locations in which Protection Priorities are identified in modelling would not be practical as:

- OSTM outputs show shoreline contact for 100 spill simulations, meaning that not all shorelines contacted in modelling will be contacted in an actual spill event;
- There are no facilities for storage and maintenance of booms and ancillaries, vessels, waste storage and PPE at all priority receptors;
- The time for oil to contact priority receptors provides sufficient time to access regional and local resources based on real time modelling; and
- The effectiveness of the dispersant strategy and containment and recovery strategy will inform the nature and scale of protection and deflection activities through the IAP process.

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

- Boom (shore sealing, self-inflating and solid flotation);
- Ancillary equipment and vessels (if required);
- 2 trained oil spill responders; and
- 5 personnel / labour hire to deploy the booms.

Jadestone will access to resources via AMOSC, AMSA and DoT. Jadestone could purchase equipment and store at Dampier, however, this is costly and the limiting factor for response timeframes is accessing the required number of people.

12.4 Priority Receptors

In locations along the Pilbara Coastline, shoreline access is often restricted and much of the coastline is only accessible via vessel, making it difficult to access suitable locations to install protection booms. For these areas the removal of oil using offshore Containment and Recovery, together with the application of dispersants, is the key strategy for preventing shoreline impacts.

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 large mangrove stands that are difficult to access, however, the large tidal range will result in high velocity water and may exceed the operating parameters of booms.

The minimum time for oil contact at a priority receptor at 100g/m^2 is 1.4 days with most areas on a scale of more than 2 weeks.

This provides time for pre-assessment of shoreline areas for which oil may contact, noting sensitive receptor locations, fauna presence (e.g. nesting turtles and birds) and morphology of shorelines/creek systems. These aspects change seasonally, and a pre-assessment window provides the ability for up to date information to be considered when formulating a specific plan for shoreline protection.

Priority receptor	Minimum time to shoreline oil at >100g/m^2 (days)	Oiled shoreline length at concentrations >100 g/m^2 in worst replicate simulation (km)
Dampier Archipelago	7	10
Montebello Islands	1.4[2]	8
Lowendal Islands	26	4
Barrow Island	26	2
Eighty Mile Beach	14	4

[2] All results presented in this table are from Scenario 1 (subsea release of 86.5 m3) for the period September to February, with the exception of Montebello and Lowendal Islands which are the same scenario but the period of March to August.

13. SHORELINE CLEAN-UP STRATEGY

In the event of hydrocarbon spills with potential shoreline contact, operational monitoring will identify possible impact areas. The IMT will assess if shoreline clean-up activities will be beneficial in accelerating the return of the shorelines to baseline conditions. As shoreline clean-up operations occur in State Waters, and the arrangements under State plans, the HMA (DoT) will implement Jadestone's planned shoreline operations and response techniques to reduce impacts to ALARP. Jadestone, in combination with the mutual aid arrangements of the AMOSPlan are to provide all necessary equipment and resources to enable DoT to undertake shoreline activities.

13.1 Initiation and Termination Criteria

Tactic	Initiation criteria	Termination criteria
NEBA of shoreline response strategies	When SCAT surveys recommend shoreline clean-up activities.	When SCAT surveys recommend no further action be taken (NFA).
Shoreline clean-up and waste management	When NEBA of shoreline strategies recommends shoreline clean-up activities.	When SCAT surveys recommend no further action be taken (NFA). Agreement has been reached with the Jurisdictional Authority relevant to the spill to terminate the response

13.2 Tactics

- Undertake a NEBA of shoreline response strategies utilising findings from SCAT surveys; and
- Implement shoreline clean-up and waste management

13.3 Tasks

For planning purposes, Jadestone uses a minimum threshold of 100g/m^2 (concentration of accumulated hydrocarbons on shorelines) to determine the lower limit for effective clean-up operations.

Once SCAT surveys of key shorelines have been completed, the results would help inform an operational NEBA and suitable response tactics for that location. Response tactics may include manual bagging of stranded oil where access can be gained, surf washing where wave action and sandy beaches are accessible by machinery, tilling and turning the sand to aid bioremediation where wave action is not strong enough to drive surf washing, rock flushing with high volume low pressure sea water, or leaving the weathered oil in-situ to breakdown where access for man or machinery is not possible.

Shoreline habitats in the region predominantly comprise of high relief rocky shoreline, sandy beaches, inter-tidal reefs, and mudflats/mangrove habitats. Macroalgal and seagrass beds will be avoided when assessing shoreline clean-up response tactics and the less intrusive options of natural attenuation and bioremediation will be preferred.

Information on shoreline type obtained from SCAT surveys will contribute toward the NEBA process. Each likely shoreline impact will be evaluated through observations and modelling, and shoreline response teams will be deployed and positioned as per those observations. Through information gathered and assessed by the IMT and HMA, the movement of floating oil towards shorelines is to be identified and clean-up tactics implemented to reduce the consequences to shoreline habitats to ALARP. A summary of shoreline clean-up techniques is provided in Table 13-1.

Intrusive shoreline clean-up techniques have the potential to damage sensitive shorelines. Given that the majority of the mainland shoreline contacted consists of tidal mangroves and saltmarshes, and the islands predicted to be contacted are also inhabited by tidal mangroves and sensitive species, the appropriateness of clean-up will be determined as opposed to natural attenuation. Selection of the shoreline clean-up methods and controls to prevent further damage from the clean-up activities are to be undertaken in consultation with the HMA and selected based on NEBA.

Jadestone will have an agreed process which allows for stakeholder input into the termination criteria as per AMSA Guidance NP-GUI-025 2015. The degree of damage from shoreline clean-up activities is to be managed to ALARP, considering net environmental benefit of the clean-up activity.

AMOSC Core Group Responders may be substituted with NRT personnel as agreed by AMSA with Jadestone. AMSA will be a member of the IMT and will confirm and approve NRT personnel deployment as they deem necessary to reduce impacts to ALARP.

Table 13-1: Shoreline clean-up techniques

Method	Description
Mechanical clean-up	Mechanical clean-up techniques may utilise several equipment types. It is best to use equipment in the way for which it was designed. Front end loaders, bulldozers and elevating scrapers can all be used to rework beach sediment (e.g. cobble, pebble, and boulder) or to push such sediments into the shoreline for cleaning by waves. **Note**: Vehicles should not be allowed to pass over oiled sediment since this tends to result in the burial of oil into sediment.
Manual clean-up	Manual clean-up is the preferred option for cleaning inaccessible shorelines or those where mechanical clean- up is undesirable. Manual clean-up is slower than mechanical clean-up but generally results in the removal of much less sediment. Hence disposal requirements are reduced. Equipment is usually basic and consists of wheelbarrows, rakes, buckets, shovels, plastic bags (industrial strength) or other temporary storage. The requirements for manual beach clean-up are highly variable but generally a 10-person team, plus 1 supervisor is required to recover 10 m^3 of oil in one day.
Low pressure flushing	Low pressure flushing can be used, with care, to remove surface oils from most beach type surfaces. It is important that refloated oil is collected in booms or other containment devices and recovered using skimmers or sorbents. Generally low pressure flushing does not result in the emulsification of oils and so sorbents may be used. It is preferable to check the condition of refloated oil and choose a suitable skimming device and pump. It is important also that refloated oil does not pass over clean sediment.
High pressure flushing	High-pressure washing is to be used only on artificial surfaces such as wharves, jetties etc. This method tends to emulsify oil and consequently the use of sorbents to collect refloated oil is not recommended. Oil, which is removed from surfaces, can be collected within light inshore booms or onshore using Shore Guardian or a similar boom. Oil can be recovered using vacuum systems or skimmers. Material and labour requirements are highly variable and will depend on the extent of oiling, the speed with which cleaning is expected to proceed, the type of substrate and the ease with which containment can be achieved.
Enhanced bioremediation (sediment reworking)	Machinery is used to breakup large paddies of stranded oil on beaches and to till and turn the oiled sands to aerate the sandy sediment and enhance the biological breakdown of the oil. This can be applied to oil that has deposited on sands above the normal high-tide area, typically during large storms, and there is little likelihood of the water reaching the stranded deposits.
Monitoring of natural attenuation and bioremediation	By implementing shoreline clean-up methods described above, the amount of oil remaining stranded on shorelines will be reduced to ALARP; the remaining oil will be very difficult to access or remove and the activity is no longer preferred under NEBA when compared to the impacts of the intrusive clean-up methods. In addition, and assessed under NEBA, some areas of coastline will not be subjected to any clean-up methods due to access issues or possible impacts from the clean-up activities. It's at this point that monitoring of natural attenuation and bioremediation become the selected clean-up methods under a NEBA assessment. These areas will be monitored until no visible oil is remaining in the impacted area.
Supplementary equipment	

Method	Description
Sorbents	Two types of sorbent materials can be used; (1) loose, powdered or granular sorbents, or (2) solid, pads, rolls or sheets. Each of these may be either of synthetic or natural fibre. As a general rule, loose sorbent materials are not used because they are difficult to recover. However, there are occasions when this is not considered to be a problem, such as in high-energy areas where oily sorbent materials can be expected to be washed from surfaces and dissipated to sea. Of course, oil too is likely to be washed off such shorelines, to dissipate. Solid sorbents may be used in the form of sorbent booms to recover light oil films or as pads or rolls to absorb free oil from the surface of sediments in cases where vacuum systems cannot gain access or where oil is too fluid for manual recovery.
Vacuum systems	Vacuum systems may be portable hand operated systems or vacuum trucks. Vacuum systems tend to pick up large volumes of water with the oil and so it is preferable to use them on oil pooled on the sediment surface or to remove oil from containers or dams in which the water has been decanted. One method to minimise the amount of water removed from the beach is to use light, portable vacuum systems to deposit oil-water into temporary storage containers on the beach, allow settling time and to decant the water. Large units can then be used to collect the oil from these containers and transport oil to storage sites. Vacuum systems can also be used in association with deflection booms to recover oil from the sea surface. It is advisable in this case to fit the hose with a broad Manta Ray head.

13.4 Resource Rationale for Shoreline Clean-Up

The combination of machinery for mechanical removal of oil (bulldozers/ scrapers/ front end loaders) and personnel requirements have been considered for each protection priority area based on opportunities for use and sensitivity of shoreline (i.e. may not be used for small offshore islands or for remote rocky or mangrove lined shorelines). Therefore, it is the opportunity for use rather than the availability of machinery and personnel which is considered the limiting factor.

Analysis of the worst replicate simulation for the greatest number of shoreline clean-up responders required, and highest probability for shoreline contact has been used to inform the personnel and waste requirements for shoreline clean-up. It is assumed that planning for the greatest number of teams will meet the requirements of all shoreline contact. Jadestone has planned for a trained oil spill responder and 9 personnel in each shoreline clean-up team and assume that each team can recover 10 m^3 per day. Actual personnel numbers will vary according to the shoreline clean-up techniques recommended by SCAT teams during their field assessment of affected shorelines and the operational NEBA assessment, which will be performed prior to a Shoreline Clean-up Plan (IAP Sub-plan) (Refer to Section 17.9) being developed. The locations and numbers below are presented for capability analysis only and will be revisited should a spill occur.

13.5 Priority receptor

A number of the priority receptors predicted to be contacted under the worst-case replicate simulation includes tropical environments with extensive mangrove communities, deltas and tidal wetlands. The tidal ranges in this region are large (7-10 m) and much of the coastline is remote and inaccessible via road, making many of the shoreline clean-up techniques described unsuitable (e.g. mechanical removal, enhanced bioremediation, vacuum trucks, high pressure flushing) and their use is likely to result in greater environmental impacts than the oil itself. In addition, the remote nature, presence of dangerous fauna (i.e. Saltwater crocodiles and Irukandji jellyfish) present significant safety risks to responders working in these environments.

Large scale operations involving large numbers of personnel may cause adverse environmental impacts at many of these sensitive shoreline locations. The constant removal of oil, even via manual removal can result in a removal 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).

Given the safety constraints and ecological sensitivities of these shorelines, shoreline clean-up operations should be conducted by smaller teams (max 10 people/team) for 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, it is considered that the benefits outweigh the impacts as smaller teams are more targeted, recovering more oil and less sand and debris, reducing trampling of oil into the shore profile and will minimise ecological impacts on the shorelines and their sensitive species.

Table 13-2 presents the maximum daily accumulated oil (m^3) and a worst-case bulking factor for waste for the identified priority receptors. The number of shoreline clean-up teams recommended to treat these shorelines is not based on extensive, intrusive and contiguous removal of oil and waste along all shorelines, but rather use of smaller teams and at lower frequency of visits. Where shoreline based manual removal is safe and deemed advantageous by SCAT teams and operational NEBA, this should be conducted via land access (if possible) or via suitable vessels. However, it should 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).

Table 13-2: Resource Rationale for Shoreline Clean-up Personnel

Receptor	Minimum time to shoreline oil at or above 100 g/m² (days)	Accumulated oil on shoreline in worst replicate simulation at or above 100 g/m² (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) bulking factor of 10 (m^3)
Dampier Archipelago	7	19	2	20	190
Montebello Islands	1.4[3]	33	2	20	330
Lowendal Islands	26	7	1	10	70
Barrow Island	26	2	1	10	20
Eighty Mile Beach	14	7	1	10	70

13.6 Shoreline Clean-up Waste

Shoreline clean-up waste will consist of oil, oiled substrate (e.g. sand, pebbles), oiled debris, oiled sorbents, PPE and animal carcases. Activation of the Jadestone waste management contract will enable clean-up waste to be collected, transported, stored and disposed of. Waste management is also addressed in the IMTRP.

Jadestone's waste management contractor has sufficient onshore temporary waste storage in the form of different volume skip bins, lift bins and hook lift bins, all of which can be mobilised and made available in Dampier within 24-48 hours of activation. Jadestone can also access temporary onshore storage tanks, bladders and containers through its membership with AMOSC.

[3] All results presented in this table are from Scenario 1 (subsea release of 86.5 m3) for the period September to February, with the exception of Montebello and Lowendal Islands which are the same scenario but the period of March to August.

13.6.1 Accessible shorelines

Along the affected accessible shorelines, temporary waste storage will be distributed by telehandlers and readily accessible by clean-up crews. Wastes will then be either collected by operating mobile plant such as excavators, or through manual waste removal (bagged waste), and deposited into these bins.

Waste-related telehandlers will operate collection services along the hot zone, picking up filled bins while returning empty bins for further collection. Wastes collected will initially be consolidated into 10 m^3 skips located within the warm zone. These skips will then be removed from the warm-zone to the temporary holding facility located within the operational areas, for loading onto semi-trailers or road trains pending final disposal to landfill.

For accessible shorelines, the IMT will determine the most suitable method of shoreline clean-up (Refer to Table 13-3) through an Operational NEBA assessment.

13.6.2 Remote Locations/Islands Waste Management

As described in Section 13.5, the majority of shorelines predicted to be impacted from a worst-case credible spill are in areas with limited to no access. Manual removal is the preferred method of clean-up for these areas and will be supported using vessels capable of shoreline landings, smaller machinery (where appropriate) and helicopters to deliver equipment and personnel and remove collected waste.

Access and all clean-up activities will be conducted via vessels or helicopters in front of the primary dune of the impacted shoreline. Jadestone will not access any areas behind the primary dune of impacted offshore islands during any stage of the clean-up operation.

Equipment delivery - If the impacted shoreline can be accessed with a barge and landing craft, crew on the barge will deliver an appropriate number of clean-up packs (to cater for the number of response personnel defined in the IAP) onto the impacted shoreline above the high tide mark. A helicopter will deliver the appropriate number of clean-up packs if barge access is not possible.

Personnel - Response personnel may be transported to the impacted shoreline on a barge. If access is not possible by barge, helicopters may be used to transport personnel. Response personnel will not camp on the islands due to potential for additional impacts from this activity.

Initially, response personnel will shovel the oily waste into small manageable bags (weighing 20–30 kg when full) which will be stored in a lined, temporary storage area until they are removed from the island. The temporary storage area will be located at the bottom of the primary dune and above the Highest Astronomical Tide (HAT) mark.

Waste collection – Response personnel will transfer the small bags of solid oily waste and small drums of liquid waste from the temporary storage area to a container within the barge. All Terrain Vehicles and bobcats may also be used for the same purpose where appropriate. The barge will then steam to the closest service wharf and transfer the waste onto a waste truck supplied by Jadestone's waste management contractor. In areas where a barge cannot access the shoreline, oily waste will be placed in an underslung load and transferred by helicopter to the closest land-based point that has vehicle access for onward movement.

Table 13-3: Shoreline Clean-up Selection Factors by Shoreline Type, Oil Type and Degree of Oiling

Shoreline Type	Type of Oil	Degree of Oiling*	Shoreline Clean-up Tactic			
			Natural Recovery	Manual and Mechanical	Sediment Reworking	Flooding and Flushing
Exposed Rocky Shores	1	Light	☑	☑	☑	☑
		Moderate	☑	☑		☑
		Heavy	☑			☑
	2	Light	☑	☑	☑	☑
		Moderate	☑	☑		☑
		Heavy	☑	☑		☑
	3	Light		☑		☑
		Moderate		☑		☑
		Heavy				☑
Sandy Shores and Beaches	1	Light	☑	☑	☑	☑
		Moderate	☑			☑
		Heavy				☑
	2	Light	☑	☑	☑	☑
		Moderate	☑	☑		☑
		Heavy		☑		☑
	3	Light		☑		
		Moderate		☑		
		Heavy		☑		
Artificial Structures	1	Light	☑	☑		☑
		Moderate	☑	☑		☑
		Heavy		☑		☑
	2	Light	☑	☑		☑
		Moderate	☑	☑		☑
		Heavy		☑		☑
	3	Light		☑		☑
		Moderate		☑		☑
		Heavy		☑		☑
Sheltered Rocky Shores	1	Light	☑	☑	☑	☑
		Moderate	☑	☑	☑	☑
		Heavy				☑
		Light	☑	☑	☑	☑

Shoreline Type	Type of Oil	Degree of Oiling*	Shoreline Clean-up Tactic			
			Natural Recovery	Manual and Mechanical	Sediment Reworking	Flooding and Flushing
	2	Moderate	☑	☑	☑	☑
		Heavy		☑		☑
	3	Light	☑	☑	☑	☑
		Moderate	☑	☑	☑	☑
		Heavy		☑		☑
Mud and Tidal Flats	1	Light	☑	☑		☑
		Moderate	☑			☑
		Heavy				☑
	2	Light	☑	☑		☑
		Moderate	☑	☑		☑
		Heavy				☑
	3	Light	☑	☑		☑
		Moderate	☑			☑
		Heavy				☑
Mangroves and Wetlands	1	Light	☑	☑		☑
		Moderate	☑			☑
		Heavy				☑
	2	Light	☑	☑		☑
		Moderate	☑	☑		☑
		Heavy				☑
	3	Light	☑	☑		☑
		Moderate		☑		☑
		Heavy				☑

14. OILED WILDLIFE RESPONSE

In the event of a spill that will or could potentially oil wildlife, the IMT will activate DBCA and Industry (AMOSC) Oiled Wildlife Advisors (OWAs) as stipulated in Jadestone's Incident Management Team Response Plan (JS-70-PLN-F-00008). These roles ensure minimum standards for Oiled Wildlife Response (OWR), as outlined within the WAOWRP, are met and ensure timely mobilisation of appropriate resources (equipment and personnel) through communication with the wildlife logistics team.

Timely provision of equipment and personnel will be provided by AMOSC through a combination of owned and operated equipment, call-off contracts with suppliers, and the management of industry OWR response personnel (refer Appendix A of the Jadestone Incident Management Team Response Plan (JS-70-PLN-F-00008)). Under the WAOWRP arrangement, the AMOSC OWA may request further assistance from DBCA in the form of trained personnel, and vice versa, if their own expertise has been exhausted.

14.1 Initiation and Termination Criteria

Table 14-1: Initiation and Termination Criteria

Tactic	Initiation criteria	Termination criteria
Wildlife first response Mobilisation of resources Wildlife reconnaissance	Immediately when Level 2 spill incident (Stag Crude) is defined.	When transition into oiled wildlife IAP subplan is complete.
IAP wildlife subplan Wildlife rescue and staging Oiled wildlife response facility Oiled wildlife rehabilitation Oiled wildlife response termination	When oiled wildlife first response has transitioned to IAP subplan development.	When the NEBA for oiled wildlife response activities indicates no further action required (NFA).

14.2 Wildlife first response

The most effective means of preventing wildlife from being impacted by the spill is through the spill response actions taken to minimise the impact area (e.g. containment, clean-up and preventing further discharge of hydrocarbons), In addition, the following two options may be considered:

1. Hazing (the scaring of unoiled wildlife way from oiled habitats/areas) and deterrence
2. Pre-emptive capture (involves removing at-risk wildlife from the spill environment, thereby preventing it from being oiled).

There are positive and negative impacts of these prevention methods, which must be considered when preparing an Operational NEBA in consultation with key stakeholders. Only trained and experienced personnel should conduct hazing. Inexperienced personnel can worsen the situation by ineffectively deploying deterrents, inadvertently disturbing animals into oiled areas, or causing debilitated oiled animals to scatter.

Pre-emptive capture carries with it a high degree of risk due to the difficulty of capturing animals safely and maintaining their health in captivity or during relocation. The decision to undertake pre-emptive capture must be determined based on the best possible animal welfare outcome by comparing the risks associated with oiling against the risks of injury, disease or death of the animal associated with pre-emptive capture activities (IPIECA 2017).

Pre-emptive capture maybe considered when hazing/deterrence methods are not appropriate or not effective; when species/ populations are of high conservation value; where there is a high potential of oiling and associated mortality from oiling; and where likelihood of success of pre-emptive capture activities is high.

The following factors should be considered to identify potential wildlife for pre-emptive capture:

- Species/ population conservation value;
- Population health and vulnerability;
- Response to hazing/deterrence;
- There either has to be existing knowledge about how to house the species in captivity, or information on related species that can be potentially extrapolated;
- Availability of appropriate housing, husbandry and personnel for adequate care in captivity; and
- Availability of appropriate relocation habitat.

14.3 Oiled Wildlife Response Levels and Personnel Requirements

The WAOWRP nominates oiled wildlife response incident Levels based on the scale and severity of oiled wildlife impacts. Table 14-2 provides the indicative level descriptions for Level 1 to Level 6 incidents. The WA OWR Plan also nominates indicative personnel numbers and role requirements for each OWR Level as shown in Table 14-3.

Jadestone is approaching oiled wildlife preparedness in a conservative manner by preparing for a OWR Level 3. The number of personal may change depending on the complexity response (spatial scale and variety of wildlife impacted). Additional personnel will be required as scribes/PAs for key functional positions. The skill level required is indicated as OWR 1-4, these correspond to competency based levels that ensure personnel have adequate knowledge to effectively perform the indicated roles/ functions. These tables are used to guide the planning process; actual resourcing requirements will be guided by situational awareness on the complexity, scale and fauna types involved.

It is expected that for the Stag Field Operations OPEP Jadestone may require 33 skill level 1 personnel. Generally, OWR skill level 1 roles could be filled by wildlife carers known to DBCA and through labour hire agencies that can provide field workers that undergo an induction and basic training. Basic training (over 1 day) for Level 1 OWR personnel can be delivered as just in time training through an arrangement with DBCA.

The remaining personnel at skill levels 2 - 4 and those with specialised skills are expected to be sourced through AMOSC, DBCA, Universities and contractors. At OWR level 3, Jadestone expects to initially establish one staging area and oiled wildlife facility and scale up staging areas as required in response to the location, number of wildlife and different species encountered.

Table 14-2: Oiled Wildlife Response Levels

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

Table 14-3: OWR Response Level and Personnel Numbers

SKILL REQUIREMENT	OWR RESPONSE LEVEL & PERSONNEL NUMBERS					
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
OWR 4	1	1	3	2	2	2
OWR 3	2	0	4	4	4	4
OWR 2	4	9	15	17	18	18
OWR 1	0	14	33	47	84	90
Technicians (i.e Vets)	0	1	2	4	4	4
Other Specified Skills	0	0	2	3	4	4
Total	**7**	**25**	**59**	**77**	**116**	**122**

14.4 Sources of Personnel and Equipment

In the event of a spill impacting wildlife, Jadestone will commence arrangements to mobilise personnel and equipment to fill positions and implement strategies within the WAOWRP. An overview of sources of personnel is provided in Appendix A of the Incident Management Team Response Plan (JS-70-PLN-F-00008).

15. REVIEW OF OPEP

This OPEP shall be reviewed, updated (if required) and submitted to NOPSEMA every 5 years from date of acceptance.

The document may also be reviewed and revised more frequently, if required, in accordance with Jadestone's Management of Change Procedure. This could include changes required in response to one or more of the following:

- On an annual basis (12 monthly); or
- When new testing response arrangements are introduced; or
- When response arrangements are significantly amended; or
- After a significant change to Jadestone's risk profile.

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.

16. CONTROLS

Environmental performance outcomes (EPOs) of the response strategies, control measures, performance standards presented in Table 16-1 are:

- Reduce oil volumes from reaching the shoreline to as low as reasonably practicable; and
- Reduce impacts to marine and coastal fauna through the implementation of the WA Oiled Wildlife Response Plan.

Table 16-1: Operational Performance Standards and Measurement Criteria

Response Element	Control Measures	Performance Standards	Measurement Criteria
Notifications and Activations	AMOSC activation	Verbal notification/activation of AMOSC within 60 mins of IMT activation	Incident Log
	AMSA activation	Verbal notification/activation of AMSA within 60 mins of IMT activation	Incident log
	IMTRP	Complete regulatory notification within designated timeframes	Incident log
	Jacobs activation	Verbal notification/activation of Jacobs within 6 hours of IMT activation	Incident log
Overall spill response	Spill response activities selected on basis of a Net Environmental Benefit Analysis (NEBA) (Incident Management Team Response Plan JS-70-PLN-F-00008)	NEBA undertaken every operational period and considered in development of following period Incident Action Plan.	Incident log
	Stag Field Operations OPEP (GF-70-PLN-I-00001) provides for NEBA, notifications and consultation requirements to ensure net environmental benefit from response	NEBA undertaken every operational period and considered in development of following period Incident Action Plan.	Incident log
		OPEP activated as per OPEP notification table	Incident log
	Jadestone Energy Incident Management	Jadestone IMT comply with Jadestone Energy Incident Management Team Response Plan (JS-70-PLN-F-00008)	Incident log

Response Element	Control Measures	Performance Standards	Measurement Criteria
	Team Response Plan (JS-70-PLN-F-00008) procedure details IMT Core team members, resource pool and responsibilities		
	Vessels comply with MARPOL and protected area sewage disposal requirements	Vessel sewage disposal will meet MARPOL Annex IV requirements. If vessel activities occur within protected areas, discharges will meet marine park management plan requirements and the DoT sewage strategy[4]	Vessel checklist or other confirmation from vessel master that requirements will be met
	Vessels comply with MARPOL requirements for oily water (bilge) discharges	Vessel oily water disposal will meet MARPOL Annex I requirements.	
	Consultation undertaken in accordance with Jadestone Energy Consultation of Relevant Persons Procedure (JS-70-PR-I-00034) prior to deployment in populated areas	Consultation is undertaken with relevant stakeholders prior to deployment of resources to townships and marine/coastal areas.	Consultation records
	Localised Risk Management Assessment undertaken to minimise potential impacts on populated areas	A Risk Management Assessment is undertaken prior to large scale deployment to populated areas	Risk Management Assessment
Source Control	Shipboard Oil Pollution Emergency Plan (SOPEP)	SOPEP activated within 60 minutes of spill incident	Incident Log

[4] http://www.transport.wa.gov.au/mediaFiles/marine/MAC-IS-SewageStrategy.pdf

Response Element	Control Measures	Performance Standards	Measurement Criteria
	Jadestone's Stag Incident Response Plan (GF-00-PR-F-00041)	Stag Incident Response Plan activated within 60 minutes of spill incident	Incident Log
Operational monitoring	Operational Monitoring Plan	Activate Operational Monitoring Action Plan within 60 minutes of IMT activation	Incident Log
	Vessel Surveillance	Vessel Surveillance initiated within 120 minutes following request from IMT	Incident log
		Observation reports submitted to IMT within 60 mins of completing surveillance	Incident log
	Aerial Surveillance	Aerial Surveillance initiated within 6 hours following request from IMT	Incident log
		Two passes per day of spill area by observation aircraft provided from Day 1 of response	Incident log
		Trained Aerial Observers supplied within 48 hours of notification	Incident log
		Flight schedules are maintained throughout response	Incident Action Plan
		Observers completed aerial surveillance observer log following completion of flight	Aerial Observer Logs
		Aerial surveillance continues until termination criteria are met	Incident log
	Tracking Buoys	Tracking buoys deployment to be initiated within one hour of spill notification from On-Scene Commander or Operations Lead, subject to vessel availability and weather conditions is to be initiated within one hour of spill notification	Incident log
		Tracking buoys utilised until termination criteria met	Incident log
	Oil Spill Modelling	Oil Spill modelling commissioned within 24 hours for a Level 2 spill confirmation	Incident Log
		OSTM to commence within approximately three hours of request submission	Incident Log
		Modelling delivered to IMT within 2 hours of request to service provider	Incident Log
		Modelling continues until termination criteria are met	Incident Log
		Fluorometry surveys mobilised within 2 days of initiation	Incident Log

Response Element	Control Measures	Performance Standards	Measurement Criteria
		Daily report including fluorometry results provided to IMT within 24 hours of completing daily survey	Incident Log
	SCAT	Commence deployment of SCAT Teams within 48 hours of becoming aware of potential impacts to shorelines	Incident Log
		Completed SCAT surveys are delivered to IMT within two hours of the Survey Team returning to its operating base	Incident Log
		SCAT surveys undertaken daily at priority locations	Incident Log
Chemical Dispersion	Chemical Dispersion Action Plan (Surface)	NEBA undertaken within two hours of spill and daily thereafter to determine if chemical dispersion will have a net environmental benefit. NEBA is to be included in development of following period Incident Action Plan	Incident Log
		Activate Chemical Dispersant Action Plan within one hour of NEBA demonstrating that dispersant application is likely to result in a net environmental benefit	Incident Log
		A pre-deployment operational assessment of dispersant application location, dosage and equipment use is undertaken	Incident Log/ IAP
		The NEBA for dispersant application will consider the following inputs: • Trajectory of spill and sensitive receptors within EMBA • Dispersant efficacy testing • Forecast spill modelling of naturally and chemically dispersed oil • Consultation with the DoT (HMA)	Incident Log
		At no time, can chemical dispersant be applied: • In waters shallower than 20 m (LAT); • Within 10 km of water shallower than 20 m; • Within restricted zones for offshore facilities; • Within a Marine Park boundary or its buffer; or • Within State Waters unless approved by the HMA.	Incident Log

Response Element	Control Measures	Performance Standards	Measurement Criteria
		Develop a Surface Dispersant Application Plan (IAP Sub-Plan) within 12 hours of NEBA confirming an overall environmental benefit	Incident Log
		Commence mobilisation of resources (equipment, stock, platforms) to support dispersant operations within four hours of Chemical Dispersant Action Plan being activated	Incident Log
		Aerial chemical dispersant application will be available for operation within 18 hours of initial AMSA notification (daylight and weather condition dependent)	Incident Log
		Commence mobilisation of Offshore Support Vessel (OSV) to conduct initial vessel dispersant application within 2 hours of Chemical Dispersant Action Plan being activated	Incident Log
		Commence vessel chemical dispersant application within 24-36 hours of Chemical Dispersant Action Plan being activated	Incident Log
		Each vessel shall have one person who has been trained in the operation of vessel-based dispersant systems and monitoring dispersant effectiveness	Incident Log
		Prioritise the mobilisation and application of dispersants Dasic Slickgone NS and Corexit 9500 prior to other dispersant types	Incident Log
		Chemical dispersant applied in consultation with relevant statutory agencies and HMA	Incident Log
		IMT to complete an Air Operations Plan and submit to AMSA within 12 hours of initial activation to enable activation of the FWADC	Incident Log
			Air Operations Plan
		The effectiveness of the aerial based chemical dispersion strategy is communicated to the Operations Lead via the Air-Attack Supervisor	Incident Log
		Response to continue until NEBA demonstrates no environmental benefit to use chemical dispersants	Incident Log
Offshore Containment and Recovery (C&R)	Containment and Recovery Action Plan	NEBA undertaken within two hours of spill and daily thereafter to determine if containment and recovery will have a net environmental benefit. NEBA is to be included in development of following period Incident Action Plan	Incident Log

Response Element	Control Measures	Performance Standards	Measurement Criteria
		Activate Containment and Recovery Action Plan within one hour of NEBA demonstrating that containment and recovery is likely to result in a net environmental benefit	Incident Log
		Develop a Containment and Recovery Plan (IAP Sub-Plan) within 12 hours of NEBA confirming an overall environmental benefit	Incident Log
		Commence mobilisation of personnel, equipment and vessels within six hours of Containment and Recovery Action Plan being activated	Incident Log
		Commence C&R operations within 24-36 hours of Containment and Recovery Action Plan being activated	Incident Log
		Containment and recovery operations to be managed by a minimum of two trained Oil Spill Responders (per system)	Incident Log
		Review waste management options for C&R within 24 hours of Containment and Recovery Action Plan being activated	Incident Log
		Obtain approvals from relevant Jurisdictional Authority prior to commencing decanting operations	Incident Log
		Oily water collected during offshore containment and recovery to be decanted (if approved) behind boom	Incident Log
		Vessels to maintain minimal lighting required for safety and navigation requirements	Incident Log
		Response vessels compliant with EPBC Act Regulation 8 (cetacean interactions) (Stag Marine Facility Operating Manual GF-90-MN-G-00038, Aviation Procedure JS-83-PR-G-00010)	Incident Log
		Offshore equipment wash-down confined to hotzone	Incident Log
Shoreline Protection and Deflection	Shoreline Protection and Deflection Action Plan	NEBA undertaken within two hours of spill and daily thereafter to determine if Protection and Deflection will have a net environmental benefit. NEBA is to be included in development of following period Incident Action Plan	Incident Log

Response Element	Control Measures	Performance Standards	Measurement Criteria
		Activate Protection and Deflection Action Plan within one hour of NEBA demonstrating that protection and deflection is likely to result in a net environmental benefit	Incident Log
		IMT to confirm priority receptors in consultation with the Control Agency	Incident Log
		Develop a P&D Plan (IAP Sub-Plan) (if required) within 12 hours of NEBA confirming an overall environmental benefit	Incident Log
		Obtain regulatory approvals to access locations for P&D operations within 3 days of spill or 48 hours prior to estimated contact with shoreline environment	Incident Log
		Commence deployment of personnel, equipment and vessels within 6 hours of completion of Protection and Deflection Plan (IAP Sub-Plan)	Incident Log
		Use shallow draft vessels for shoreline and nearshore operations to reduce seabed disturbances	Incident Log
		Nearshore booming and skimming operations conducted during daylight hours only to minimise impacts from light emissions	Incident Log
Shoreline Clean-up	Shoreline Clean-up Action Plan	NEBA undertaken within two hours of spill and daily thereafter to determine if Shoreline Clean-up will have a net environmental benefit. NEBA is to be included in development of following period Incident Action Plan	Incident Log
		Activate Shoreline Clean-up Action Plan within one hour of NEBA demonstrating that clean-up is likely to result in a net environmental benefit	Incident Log
		IMT to confirm priority receptors in consultation with the Control Agency	Incident Log
		Develop a Shoreline Clean-up Plan within 12 hours of NEBA confirming an overall environmental benefit	Incident Log
		Obtain regulatory approvals to access land within 3 days of spill or 48 hours prior to estimated contact with shoreline environment	Incident Log
		Commence deployment of personnel, equipment and vessels within 12 hours of completion of Shoreline Clean-up Plan (IAP Sub-Plan)	Incident Log

Response Element	Control Measures	Performance Standards	Measurement Criteria
		Shoreline Team Lead to consult with SCAT Team and confirm shorelines for appropriate clean-up techniques prior to undertaking clean-up	Incident Log
		Selection of the shoreline clean-up technique appropriate to shoreline type is to be undertaken in consultation with the Control Agency and selected based on SCAT surveys and NEBA	Incident Log
		Shoreline clean-up team members are briefed by shoreline team leads on how to implement the shoreline clean-up techniques including how to prevent damage to shoreline habitat and surrounding laydown/staging areas	Operational Orders
		Clean-up activities in sensitive environments shall be conducted in front of the primary dune and crews will not access behind the primary dune	Incident Log
		Temporary waste storage on remote beaches should be located at the bottom of the primary dune and above the Highest Astronomical Tide (HAT) mark	Incident Log
		Clean-up strategies will be implemented under the direction of the HMA (where relevant)	Incident Log
		A shoreline/ nearshore habitat/ bathymetry assessment is conducted prior to nearshore activities	Incident Log
		Demarcation zones to be established for shoreline operations involving vehicle and personnel movement considering vegetation, bird nesting/roosting areas and turtle nesting timeframes	Incident Log
		Operational restriction of vehicle and personnel movement to limit erosion, compaction and disturbance to birdlife	Incident Log
		Access plans for shoreline operations will prioritise use of existing roads and tracks	Incident Log
		Terrestrial vehicle and equipment deployment via landing barges where there is no existing track access	Incident Log
		A Specialist Advisor is consulted if shoreline operations overlap with areas of cultural or heritage significance.	Incident Log

Response Element	Control Measures	Performance Standards	Measurement Criteria
		Vehicles and equipment are verified as clean and invasive species free prior to deployment to site	Incident Log
		Onshore equipment wash-down occurs in a decontamination area	Incident Log
		Booms are used for containment of shoreline flushing liquids if contaminated flushing has potential to cause secondary impacts in excess of oil dispersion into ocean	Incident Log
		Shoreline team leads shall verify clean-up effectiveness and conduct final evaluations in consultation with SCAT Teams	Incident Log
Oiled Wildlife Response (OWR)	Oiled Wildlife Response Action Plan	NEBA undertaken within two hours of spill and daily thereafter to determine if OWR will have a net environmental benefit. NEBA is to be included in development of following period Incident Action Plan	Incident Log
		Activate OWR Action Plan within one hour of NEBA demonstrating that OWR is likely to result in a net environmental benefit	
		OWR undertaken in accordance with the WA Oiled Wildlife Response Plans and the Regional Oiled Wildlife Response Plans	Incident log
		Establish OWR structure within IMT within 24 hours of OWR risk being identified	Incident Log
		Stand-up OWR capability within 48 hours of OWR risk being identified, and offshore within seven days	Incident Log
		Commence mobilisation of OWR resources within 48 hours of OWR risk being identified	Incident Log
		Prepare IAP oiled wildlife response sub-plan within 12 hours of wildlife reconnaissance confirming potential or realised impacts to wildlife	Incident Log
		Establish OWR facility (staging, rehab) to be offshore within seven days of OWR risk being identified	Incident Log
Waste Management	Waste Management Plan	Activate Waste Management Plan within 12 hours of IMT identifying waste management requirements for any response strategy	Incident Log

Response Element	Control Measures	Performance Standards	Measurement Criteria
		Request to stand up Waste Contractor to arrange waste pickup and transport undertaken immediately following assessment of need for waste management in the response	Incident Log
		All decisions to escalate and de-escalate waste management equipment and personnel shall be approved by the IMT Leader	Incident log
		The IAP process is to be used to determine the required level of response and the quantities and types of waste management equipment required	IAP
		All waste associated with oiled wildlife facilities captured and disposed of in accordance with the WAOWRP	Incident log
		DoT OSCP 2015 Waste Management Sub-Plan Guidance considered as part of the Waste Management Plan – Oil Spill Response Support (JS-70-PR-I-00037)	IAP
		All waste associated with oil spill response activity transported and disposed of in accordance with Environmental Protection (Controlled Waste) Regulations 2004, EP Act 1986 and associated regulations	Waste tracking records
		Compliance with local government municipal waste requirements	Waste consignment records
		Offshore inductions include municipal waste requirements (how to manage domestic waste)	Incident log
		Reduce/ Reuse/ Recycle assessment of collected waste conducted by waste contractor	Waste contractor records
		The Waste Management Operations Team Leader shall communicate daily reports to the Logistics Team Leader to inform of required resources and response effectiveness	Incident Log
		The Logistics Lead shall monitor and record the response to demonstrate all waste management legislative requirements are met	Incident Log
		Demobilisation of the Waste Management Plan will be guided by the IAP	Incident Log
		Waste contractor shall track all wastes from point of generation (Warm-zones and Marinas) to final destination.	Waste contractor records

Response Element	Control Measures	Performance Standards	Measurement Criteria
Scientific Monitoring	Scientific Monitoring Plan (GF-70-PR-I-00035)	Activate Scientific Monitoring Action Plan within 24 hours of Level 2 confirmation	Incident Log
	Competency and Training Management System [JS-60-PR-Q-00015]	Planning Team Lead has the competency to undertake coordination role with environmental service provider	Skills matrix and annual audit of Competency and Training Management system.
Activation of IMT	Incident Management Team Response Plan [JS-70-PLN-F-00008]	IMT members available for an initial IMT assessment briefing within 30 minutes of receiving the activation notification	Incident Log
		IMT members located in Perth will meet physically at the office within 3 hours of receiving the activation notification	Incident Log

PART B – RESPONSE

17. INITIAL INCIDENT ACTION PLANS

In the event of a spill:

- Define the spill level (as per Appendix A of the Jadestone Incident Management Team Response Plan (IMTRP) (JS-70-PLN-F-00008))

Activate Incident Action Plan for the first 48-hour operational period:

- Section **Error! Reference source not found.** for Level 1 spills; or
- Section **Error! Reference source not found.** for Level 2 spills.

17.1 Level 1 Initial Incident Action Plan

LEVEL 1 SPILL INITIAL INCIDENT ACTION PLAN	**Operational Period: First 48 Hours**
Objectives for operational period:	1. Maintain situational awareness
Protection Priorities:	**Spill Response Strategies:**
N/A	1. Source control 2. Operational monitoring

LEVEL 1 SPILL: INITIAL IAP		**Operational Period: First 48 Hours**		
Timeframe (Within)	**Strategies and timeframe**	**Tactics (what is to be done)**	**Task guidance (ref.)**	
			Appendix A IMTRP	**OPEP**
30 mins	Activate the Notifications	Verbal and written notifications	**Section 4.2**	**Appendix A6**
60 mins	Activate source control – vessel or release from offtake hose	Shipboard Oil Pollution Emergency Plan (SOPEP)	-	**Section 80**
		Jadestone's Stag Incident Response Plan (Offshore component) (GF-00-PR-F-00041)		
		Isolate hydrocarbon leak source/shut down equipment as per normal operating practice		
60 mins	Activate operational monitoring to confirm floating oil location and extent, and to confirm spill level and form development of IAP.	Surveillance from tanker / platform	-	**Section 9.4**

17.2 Level 2 Initial Incident Action Plan

LEVEL 2 SPILL	**Operational period: First 48 Hours**

INITIAL INCIDENT ACTION PLAN	
Objectives for operational period	1. Maintain situational awareness 2. Prevent oiling of Protection Priorities
Protection Priorities:	**Spill Response Strategies:**
• Dampier Archipelago; • Montebello Islands; • Lowendal Islands; • Barrow Island; and • Eighty Mile Beach.	1. Source control 2. Operational monitoring 3. Surface chemical dispersion 4. Containment and recovery 5. Nearshore protection and deflection 6. Shoreline clean-up 7. Oiled wildlife response 8. Scientific monitoring

LEVEL 2 SPILL: INITIAL IAP		Operational period: First 48 Hours		
Timeframe (Within)	**Strategies and timeframe**	**Tactics (what is to be done)**	**Task guidance (ref.)**	
			IMTRP	**OPEP**
30 mins	Activate the **Notifications**	Verbal and written notifications	**Appendix A IMTRP (Section 4.2)**	**Appendix A6**
60 mins	Activate **Source Control** – vessel or platform release	Shipboard Oil Pollution Emergency Plan (SOPEP)	-	**Section 0**
		Jadestone's Stag Incident Response Plan (Offshore component) (GF-00-PR-F-00041)		
60 mins	Activate Operational Monitoring Action Plan	Deployment of resources to build and maintain situational awareness	-	**Section 9.4**
2 hours	Activate Surface Chemical Dispersion Action Plan	Mobilisation and deployment of vessel/aerial dispersant equipment, dispersant stockpiles and resources to reduce the volume of oil on the sensitivities (shoreline and surface) and reduce waste generated	-	**Section 10**
3 hours	Activate Containment and Recovery Action Plan	Mobilisation and deployment of vessels, personnel and equipment to reduce volume of oil contacting sensitivities	-	**Section 11**
24 hours	Activate the nearshore Protection and Deflection Strategy Action Plan	Booming configurations to protect sensitivities or deflect oil away from sensitivities	-	**Section 12**
12 hours	Activate Scientific Monitoring Plan	Scientific monitoring plans to be conducted throughout spill response activities as directed by ongoing IAPs.	**Section 8**	-
Within 2 hours of potential shoreline contact	Activate the Shoreline Clean-Up Strategy Action Plan	Shoreline assessment and selection of suitable clean-up techniques for sensitivities Deployment of personnel and resources to clean-up impact locations	-	**Section 13**

LEVEL 2 SPILL: INITIAL IAP		Operational period: First 48 Hours		
Timeframe (Within)	**Strategies and timeframe**	**Tactics (what is to be done)**	**Task guidance (ref.)**	
			IMTRP	**OPEP**
24 hours	Activate the Oiled Wildlife Response Action Plan	Mobilisation of support and resources to manage and coordinate oiled wildlife response operations	**-**	**Section 14**
12 hours	Activate the Waste Management Plan to prepare for managing waste, and safe treatment and disposal of oily contaminated materials	Activation of initial waste collection, storage, and transport options.	**Section 9**	**-**
As the situation dictates	Commence transition to pro-active incident management by the IAP process.	Develop IAPs for subsequent operational periods. Document 'Performance Objectives' and 'Measurement Criteria' against actions in IAPs, and feed performance data into the development of subsequent IAPs. Manage the response documentation and records to ensure sufficient information is available to post-incident cost recovery and litigation processes. Transition to Incident Management Team Response Plan (JS-70-PLN-F-00008).	**Section 6**	**-**

17.3 Notification and Activation

ACTION PLAN: INITIAL NOTIFICATIONS & ACTIVATIONS				
Aim: To provide early notification (and activation if required) to essential support organisations & regulatory agencies.				
Task		**Actions**	**Resources**	**Timeframe**
1. Contact and provide incident information to support and regulatory organisations Responsible Person: IMT Leader to delegate task				
Note: - Notification and/or activation of these support organisations is to be clearly annotated in the IMT Incident Log, additionally, all associated contracts/forms are to be filed. - To reduce confusion, IMT (Log or Ops) is to assume **PRIMARY** point of contact with AMOSC and AMSA - if resources are required				
INITIAL RESPONSE ACTIONS	**Initial Response (Support Organisations)** IMT Leader to direct designated IMT staff to conduct "initial" notifications to relevant support organisations.	**Australian Marine Oil Spill Centre (AMOSC)** Verbal Call AMOSC Duty Officer and provide initial incident notification. An initial call should be completed as soon as possible so that AMOSC can start their own internal preparations for activation. This initial call can be followed up once more information is known and a decision has been made as to what spill response equipment / personnel are going to be required. Signed Contract Note After verbal notification AMOSC will email a copy of Contract Note which will formalise activation. The CN must be signed by an authorised member of staff and returned to AMOSC. **Note:** may also include requirement to access SFRT (see Source Control)	For all - Contact details as per Jadestone Incident Management Contact List: 24hr Phone: 0438 379 328 Office Phone : (03) 5272 1555 Email: amosc@amosc.com.au Jadestone call out authorities to AMOSC are the following: • Country Manager (Australia); • Operations Manager (Australia); • Finance Manager (Australia); • Maintenance & Engineering Manager; and • Incident Management Team (IMT) Leader.	ASAP (< 60mins)

		Australian Marine Safety Authority (AMSA) Verbal Call AMSA and provide initial incident notification. An initial call should be completed as soon as possible for two reasons: a) Incident notification; and b) So that Jadestone can request mobilisation of AMSA resources as quickly as possible. This initial call is to be followed up with a written POLREP	Primary contact (Canberra) 1800-641-792 (02) 6230-6811	ASAP (< 60 mins)
ONGOING RESPONSE ACTIONS	**Notification of Regulatory Organisations** IMT Leader to direct IMT staff to complete required regulatory/compliance notifications.	Complete all relevant verbal and written regulatory notifications listed in Appendix A6 – Regulatory Notifications	Appendix A6 – Regulatory Notifications	To be commenced as soon as practicable, and no later than 2 hours of spill occurring
	Secondary Response (Support Organisations) IMT Leader to direct designated IMT staff to conduct notification/activation of secondary support organisations	**Scientific Monitoring Programme** Call to be made to Scientific monitoring servicer provider providing them with information relating to the incident and intention with respect to activation of the SMP. Call is to be followed up with written confirmation **Waste Management Contractor (Oil Spill Response Waste Management Plan)**	**Refer IMT Contact List** 24 hr Contact details Contact details as per Jadestone Incident Managment Contact List	Scientific monitoring service provider: within 6 hours of spill notification Waste management contractor: within 12 hours of spill notification

17.4 Source Control Action Plan

ACTION PLAN: SOURCE CONTROL			
1. Commence initial response actions Responsible Person: OIM /IMT Leader (to delegate)			
Task		**Resources**	**Timeframe**
INITIAL RESPONSE ACTIO NS	The following actions will be undertaken as an initial response to the relevant source control incident: Vessel spills: • Vessel to undertake initial response actions as per their SOPEP. Facility spills • Implement Stag Incident Response Plan (GF-00_PR-F-00041). Considerations: For spills involving pumping operations, cease pumping immediately and activate Emergency Shutdown Devices; Isolate spill (if possible) and prevent spill to the marine environment; Recover spilt hydrocarbons on Facility using spill kits; Isolate and repair damaged equipment. Pipeline leak • Implement Stag Incident Response Plan (GF-00_PR-F-00041). • Implementation of Emergency Pipeline Repair Plan (GF-09-PLN-L-00039).	Shipboard Oil Pollution Emergency Plan (SOPEP) Stag Incident Response Plan (GF-00_PR-F-00041) Emergency Pipeline Repair Plan (GF-09-PLN-L-00039).	Immediately

17.5 Operational Monitoring Plan

ACTION PLAN: MONITOR AND EVALUATE				
Aim: To build and maintain the most accurate picture regarding the spill and oil lost into the marine environment in the most effective and efficient manner				
Task		**Actions**	**Resources**	**Timeframe**
1. Deployment of satellite tracking buoy (TB) Responsible Person: OIM / IMT (Planning)				
INITIAL RESPONSE ACTIONS	**Deploy and access tracking buoy information** OIM to direct crew to deploy buoy from the facility or a vessel as close as is safe to the leading edge of the spill.	1. OIM (or Rep) to report to IMT as soon as TB has been deployed 2. OIM (or Rep) to provide IMT with current weather conditions at Stag (wind, sea state, current direction) – IMT to log information and add to Common Operating Picture (COP) **3.** IMT to confirm deployment via TB website using associated login information (ensure IMT Leader is briefed). Refer IMT OneNote for Login details for Tracker Buoys. 4. IMT to ensure TB location is added to the COP 5. IMT to ensure deployment of TB is captured in Incident Log **Note:** Buoys are not to be dropped from a height of greater than 10m to water surface.	Satellite tracking buoys – Stag Facility Support vessel if available	Deploy within 1 hour of spill and continually track thereafter
ONGOING ACTIONS	**Deployment of additional tracking buoy** OIM/Vessel Masters to liaise with IMT with respect to the continued deployment of TB.	1. As part the ongoing response the IAP is to include guidance to the OIM (of vessels) with respect to the continued deployment of available TB in support of operational monitoring of the spill 2. Deployed TB are to be continually monitored by the IMT (Planning) and added to the COP as a regular action 3. Deployment of the TB's to captured in Incident Log	Incident Action Plan (IAP)	As detailed within the IAP
2. Commencement of aerial surveillance operations (for Level 2 spills) Responsible Person: OIM / IMT				

INITIAL RESPONSE ACTIONS	**Activation of initial aerial surveillance flights** Source and mobilise available aircraft to commence aerial surveillance of the spill	1. IMT (Log) to contact aviation provider to confirm availability of a helicopter to conduct an initial surveillance flights in vicinity of the spill a. Confirm approx. time flight can depart (or be re-tasked) b. Confirm crew composition – likely a trained observer will not be available. Flight can be conducted using a standard crew and should be flown as soon as practicable. 2. IMT (Plan or Ops) to contact AMOSC (requesting assistance with sourcing trained observers) 3. IMT (Ops) to liaise with the OIM regarding approval to commence surveillance flight in vicinity of the facility 4. IMT (Log/Ops) – once aircraft and crew have been confirmed, IMT Leader is to be updated. 5. IMT (Ops) ensure flight details are captured in the incident log (all details pertaining to the flight) 6. IMT (Ops) to assume primary coordination for flight. Provide with tasking information 7. IMT (Ops) to contact aviation provider and confirm that all safety requirements have been met. Capture in incident log. 8. IMT (Ops) to monitor flight with aviation provider ensuring that the IMT are briefed regularly. Once complete ensure that all relevant information is provided back to the IMT so that it can be assessed, included into the COP and further flights determined. 9. All information should be entered into an Aerial Surveillance Observation Log (refer Appendix A1) which will be sent to the OIM/IMT within an hour of the aircraft returning to its operating base. 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. 10. Aerial Observers shall note fauna sightings in the Aerial Surveillance Marine Fauna Sighting Record Sheet. The location	**Equipment** Helicopters Fixed wing aircraft **Personnel** 1 x Trained Aerial Observer (sourced from AMOSC, AMSA). **Note:** Initial reconnaissance may be completed by an untrained observer while waiting for trained observers to arrive. **Forms and Guidance** Aerial Surveillance Tasking Form Aerial Surveillance Observation Log (refer Appendix A1) Aerial Surveillance Marine Fauna Sighting Record Sheet (refer Appendix A1) **Deliverables** Completed Aerial and Fauna Surveillance Forms Photographs / video footage	Mobilisation of initial surveillance within 6 hours of spill notification (At least 1 aircraft available at airbase within 24 hours of mobilisation request) Trained aerial observers within 48 hours of notification

ACTION PLAN: MONITOR AND EVALUATE				
		and details of each sighting should be recorded with a cross-reference to photographic imagery captured. The Aerial Surveillance Marine Fauna Sighting Record Sheet is provided in Appendix A1. **Note:** if Offshore Support Vessel (OSV) is onsite and tasked to commence dispersant operations all surveillance flights are to be tasked to provide updates of spill location when operating in the same operational zone		

ACTION PLAN: MONITOR AND EVALUATE				
ONGOING RESPONSE ACTIONS	**Ongoing coordination of aerial surveillance flights** Development and coordination of surveillance flights **Note:** Coordination of aviation operations is essential. Therefore, flight-schedule is to cover all planned aviation operations on a daily basis.	IMT (Ops) to develop a flight schedule for ongoing surveillance as required: 1. Source fixed wing aircraft from Jadestone aviation contractor to commence aerial surveillance operations from Day 2 **Note:** A second fixed wing aircraft will be requested from Jadestone aviation contractor to support aerial dispersant operations from Day 2 2. Develop aerial surveillance flight schedule which includes the following operations: a. Aerial surveillance utilising helicopters - Day 1 b. Aerial surveillance using fixed wing from Karratha – Day 2 onwards c. Aerial dispersant operations from Karratha d. Aerial Spotter flights in support of the dispersant application (if required) 3. The frequency of flights will be sufficient to ensure that the information collected during each flight (i.e. observer log and spill mapping) meets the information needs to validate dispersion of the spill and supports ongoing response operations 4. Flight schedule is to ensure that all aircraft operations are conducted safely and support “other” response operations where necessary 5. Aerial surveillance to continue daily until termination criteria are met	Incident Action Plan (IAP)	As per operational period

ACTION PLAN: MONITOR AND EVALUATE				
3. Oil spill trajectory modelling (OSTM) Responsible Person: IMT (Planning)				
INITIAL RESPONSE ACTIONS	**Provision of OSTM to the IMT** Mobilise RPS APASA via AMOSC to produce three day forecast model outputs.	1. IMT (Plan) to contact AMOSC and arrange for oil spill trajectory modelling to be provided. 2. IMT (Plan) update incident log with request for OSTM and estimated time of delivery. 3. Provide RPS with data from aerial surveillance so that they can verify and adjust fate predictions of the spill and improve predictive accuracy. **Ongoing Response Actions** 4. IMT (Plan) to request ongoing OSTM to be provided on a daily basis. To ensure that COP is updated when provided. Receipt of all daily OSTM is to be captured in the incident log. 5. OSTM to continue daily until termination criteria are met	**Deliverables** OSTM three day forecast outputs daily	Contact AMOSC within 24 hours of spill notification OSTM to commence within approximately three hours of request submission Repeat as required

ACTION PLAN: MONITOR AND EVALUATE				
4. Vessel surveillance Responsible Person: OIM or IMT (Operations & Logistics)				
INITIAL RESPONSE ACTIONS	**Mobilisation of vessels to conduct surveillance** Source and mobilise available vessels to commence surveillance of the spill	1. IMT (Ops & Log) to source available vessels to commence surveillance of the spill a) Contracted vessels b) Vessels of opportunity 2. IMT to liaise with OIM with respect to vessels operating in and around the facility 3. Vessels to be tasked to gather the following information about the spill: a) Location (latitude and longitude); b) Size and volume; c) Direction of movement; d) Visual appearance of the slick (colours, emulsification etc); e) Associated weather conditions in vicinity of the spill (wind speed/direction, sea state, swell); f) Any marine fauna or other activities observed; and g) Photographic images. 4. Vessel Master to provide information back to the IMT within 60 mins of completing surveillance: a) Complete Vessel Surveillance Observation Log b) Email completed logs to the IC within an hour of completion. Include photographs and GPS data where available.	**Deliverables** Completed Vessel Surveillance Observation Log and Marine Fauna Sighting Record Sheet (refer Appendix A1) Photographs / video footage	Vessel surveillance initiated within 120 minutes of spill notification Vessel surveillance reports submitted to IMT within 60 mins of completing surveillance

ACTION PLAN: MONITOR AND EVALUATE				
5. Fluorometry Responsible Person: IMT (Planning & Logistics)				
	Mobilise fluorometry via scientific service provider and CSIRO	1. IMT (Plan) to activate scientific services providers. To confirm what logistical requirements will be required to support. 2. IMT (Logistics) to discuss with Planning requirements. Action as required. 3. IMT (Plan) discuss need for additional fluorometers (multiple towed fluorometers are available from CSIRO) 4. Scientific service provider to provide daily fluorometry results to IMT	**Personnel and equipment** 1 x person trained to interpret data 5 x fluorometers **Logistics** Specific requirements to be discussed and confirmed with CSIRO	Mobilised within 2 days of spill notification Fluorometry results provided to IMT within 24 hours of completion of daily survey
6. Shoreline and Coastal Habitat Assessment Responsible Person: IMT (Planning & Logistics)				
	Mobilisation of personnel to conduct Shoreline and Coastal Habitat Assessment Surveys Source and mobilise available personnel and equipment to commence shoreline and coastal habitat assessment	1. IMT (Log) to contact AMOSC to confirm availability of personnel to conduct assessment surveys 2. IMT (Plan or Ops) to contact vessel and equipment providers to support assessment surveys 3. IMT (Ops) to arrange all safety requirements for shoreline assessment survey deployment. Capture in incident log. 4. IMT (Plan) to identify priority locations to deploy shoreline assessment survey teams by consulting the NEBA (e.g. location of priority receptors, seasonal presence) and existing operational monitoring data that will help confirm locations that will be/have been contacted by hydrocarbons. IMT (Ops) to mobilise Survey Teams to commence assessment surveys prior to shoreline contact to obtain pre-contact data, where possible	**Equipment** Vessels Aircraft Aerial survey equipment (e.g. UAVs) All-terrain vehicles **Personnel** Trained Personnel (sourced from AMOSC) **Forms and Guidance** Shoreline and Coastal Habitat Assessment Survey Form (refer Appendix A5) **Deliverables** Completed Shoreline and Coastal Habitat Assessment Survey Form Photographs / video footage	Commence deployment of SCAT Teams within 48 hours of becoming aware of potential impacts to shorelines

ACTION PLAN: MONITOR AND EVALUATE				
		Note: Unmanned Aerial Vehicles (UAVs) may be necessary for some sensitive environments and where personnel safety is at risk (e.g. UXO's at Cartier Island, dangerous fauna in remote locations)		
	Commence Shoreline and Coastal Habitat Assessment Surveys	1. Undertake shoreline assessment (SCAT) ground / aerial survey (depending on access) and sampling as per AMSA / ITOPF / NOAA guidelines (included in Key References above): • Undertake pre-impact survey to obtain baseline information, where possible • Undertake post-impact survey to confirm: i) Levels of oil stranding; ii) Actual impacts to environmental sensitivities; iii) Priorities for clean-up; iv) Resources required to implement a clean-up operation; v) Appropriate cleaning methods according to shoreline conditions and oil loading, i.e.: (1) Natural recovery with monitoring; (2) Beach pre-cleaning; (3) Low pressure flushing; (4) Manual oil/sediment removal; and (5) Vacuum pumping. vi) Safe access locations. 2. Undertake routine surveys during shoreline clean-up operation to assess effectiveness of response. 3. IMT (Ops) to monitor assessment survey operations ensuring that the IMT are briefed regularly. Once initial surveys are complete ensure that all relevant information is provided back to the IMT so that it can be assessed, included into the COP and further surveys determined. 4. IMT to update IAP with survey information, as appropriate. 5. All information should be entered into a Shoreline and Coastal Habitat Assessment Survey Form (refer Appendix A5) which	**Equipment** Camera GPS Spades Tape measures Sampling equipment Vehicles (as required) Aerial survey equipment (e.g. Unmanned Aerial Vehicles (UAVs)) **Personnel** Trained Shoreline Assessment Team Leads (one per team) Team members (2 per team) **Forms / Guidance** Shoreline Assessment Ground Survey Shoreline Assessment Guideline – Ground Surveys AMSA / ITOPF / NOAA guidelines and forms Shoreline Clean-up Methods table (below) **Deliverables** Shoreline assessment survey reports Lab reports	Completed surveys sent to IMT within two hours of the Survey Team returning to its operating base

ACTION PLAN: MONITOR AND EVALUATE				
		will be sent to the IMT within two hours of the Survey Team returning to its operating base. **Ongoing Response Actions** 6. IMT (Plan) to arrange for ongoing Shoreline and Coastal Habitat Assessment Surveys for priority locations to be provided on a daily basis. To ensure that COP is updated when provided. Receipt of all daily Survey Forms are to be captured in the Incident Log.		

17.6 Surface Chemical Dispersant Action Plan

ACTION PLAN: DISPERSANT APPLICATION			
Task		**Resources**	**Timeframe**
NOTE: WA DoT must approve of dispersant application prior to commencement in WA state waters. Also notify WA DoT if any dispersant applied in Commonwealth waters are likely to enter WA waters.			
Task	**Actions**	**Resources**	**Timeframe**
1. **Mobilise dispersant resources** Responsible Person: IMT (Logistics and Operations)			
Aim: To mobilise equipment and resources in support of dispersant operations			

ACTION PLAN: DISPERSANT APPLICATION				
Task			**Resources**	**Timeframe**
INITIAL RESPONSE ACTIONS	**Conduct NEBA**	1. Conduct operational NEBA to determine if dispersant application is likely to result in a net environmental benefit. Considerations may include: • Will the spill thickness be favourable for dispersant application? • Is the product too weathered for dispersants to be effective? • 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? • Will spraying adversely affect any sub-surface receptors? The initial operational NEBA for dispersant application shall consider the following inputs: a) Trajectory of spill and sensitive receptors within EMBA b) Forecast spill modelling of naturally and chemically dispersed oil c) Ecotoxicity data (species protection trigger levels) for dispersed oil (including chemically dispersed oil) (once available) d) Consultation with the HMA **Ongoing Actions** Daily re-evaluation of NEBA to assess varying net benefits and impacts of continuing to apply dispersants and consideration of application rates, dilution rates and dispersant effectiveness. Dispersants should continue to be used until operational NEBA demonstrates net benefit is no longer being achieved through application.	Operational NEBA form Planning Lead	Within 2 hours of spill notification Daily NEBA re-evaluation

ACTION PLAN: DISPERSANT APPLICATION				
Task			**Resources**	**Timeframe**
	Develop Surface Dispersant Plan	1. If NEBA indicates that there is an overall environmental benefit develop a Surface Dispersant Plan (IAP sub-plan) to include the following data: a) Operational zones for application; b) Exclusion zones; c) Locations to deploy personnel and equipment; d) Frequency of application (sorties/day); e) List of resources (personnel and equipment) required; f) Logistics involved in deploying equipment and personnel; g) Timeframes to undertake deployment; h) Effectiveness monitoring; and i) Health and Safety constraints. **Note:** All surface chemical dispersant operations will occur during daylight hours only. 2. Dispersants Dasic Slickgone NS and Corexit 9500 shall be mobilised and applied prior to other dispersant types. If additional dispersant types are likely to be required, IMT shall prioritise the use of dispersants using the following criteria: • Dispersant type listed as approved in the National Plan for Maritime Environmental Emergencies Register of Oil Spill Control Agents (OSCA); and • Jadestone's Chemical Selection Evaluation and Approval Procedure (JS-70-PR-I-00033).	**Personnel** Planning Lead / AMOSC to assist with development of Surface Dispersant Plan (IAP sub-plan) **Deliverables** Surface Dispersant Plan (IAP sub-plan)	Develop a plan, if required, within 12 hours of NEBA confirming an overall environmental benefit

ACTION PLAN: DISPERSANT APPLICATION				
Task			**Resources**	**Timeframe**
INITIAL RESPONSE ACTIONS	**Mobilise resources to support dispersant operations** Commence mobilisation of all required resources to Dampier/Karratha to support vessel/aerial dispersant operations	AMOSC Resources 1. Contact AMOSC Duty Officer (once notification/activation has been completed) and discuss the following support: a) Access to and mobilisation of all AMOSC dispersant stocks and associated equipment into Dampier (AMOSC will arrange through their contracted transport provider); b) Activation of the Fixed Wing Aerial Dispersant Capability (FWADC) from AMSA (AMOSC will activate this on behalf of Jadestone); and c) Provision of trained spill responders to support operations (AMOSC Staff and Core Group). Each vessel shall require one person who has been trained in the operation of vessel-based dispersant systems and monitoring dispersant effectiveness. 2. Ensure that all actions/details are captured in the Resource tracking and Incident log 3. Ensure wider IMT are briefed on actions **Ongoing Response Actions** Following initial activation/mobilisation of support as detail above: 4. Contact AMOSC Duty Officer and request update on all requested actions. 5. Ensure that all logs are updated based on revised information See "Commence vessel dispersant operations" below for ongoing operational guidance	AMOSC Activation to be completed Contract note executed Mobilisation of resources needs to be coordinated across all **PRIMARY** response strategies where support is required. Dispersant Stocks – Refer to Table 10-2	Within 4 hours of spill notification

ACTION PLAN: DISPERSANT APPLICATION				
Task			**Resources**	**Timeframe**
INITIAL RESPONSE ACTIONS		AMSA Resources (via AMOSC) 1. Contact AMOSC and request mobilisation of dispersant stocks from all locations into Dampier/Karratha (will likely require Jadestone to make transport arrangements) 2. Request AMOSC assistance with mobilisation of Air Attack Supervisors into Karratha (Jadestone to arrange logistical support if required) 3. Ensure that all actions/details are captured in the Resource tracking and Incident log 4. Ensure wider IMT are briefed on actions **Ongoing Response Actions** Following initial activation/mobilisation of support as detail above: 5. Contact AMOSC Duty officer and request update on all requested actions. 6. Ensure that ALL logs are updated based on revised information	AMSA Initial notification to be competed FWADC JSOP (Air Ops Plan Template) Mobilisation of AMSA resources needs to be coordinated across all **PRIMARY** response strategies where support is required **Dispersant Stocks** – Refer to Table 10-2	Within 4 hours of spill notification

ACTION PLAN: DISPERSANT APPLICATION				
Task			**Resources**	**Timeframe**
INITIAL RESPONSE ACTIONS	**Mobilise vessels and aircraft to support dispersant operations**	<u>Aerial dispersant mobilisation</u> 1. IMT prepare an Air Operations Plan and submit to AMOSC prior to commencement of any FWADC aircraft operations 2. Confirm progress of FWADC activation 3. Contact Jadestone aviation contractor to arrange for fixed wing aircraft to support aerial dispersant operations from Day 2 4. Ensure in-field efficacy testing is conducted in accordance with section 10.8 **Note:** Jadestone aviation contractor will provide two fixed wing aircraft to support operations: - Aerial surveillance flights (commencing Day 2); and - Aerial dispersant operations (commencing Day 2).	**FWADC JSOP** – primary reference Jadestone aviation contractor	Air Operations Plan submitted to AMSA within 6 hours of initial activation

ACTION PLAN: DISPERSANT APPLICATION				
Task			**Resources**	**Timeframe**
		<u>Vessel dispersant mobilisation</u> IMT (Ops) to complete following actions: 1. Contact OSV – confirm location and ETA to spill location (maximum timeframe is 24-36 hours if alongside Dampier) a) If alongside, to be directed to sail and head directly to spill location (confirm with IMT Leader) b) To test and prepare dispersant application system enroute c) Tasking to be provided prior to arriving on location 2. Liaise with IMT (Log) to commence sourcing of additional vessels into Dampier to support dispersant operations. 3. Ensure in-field efficacy testing is conducted in accordance with section 10.8 **Ongoing Response Actions** 4. Arrange for vessels to be loaded with equipment, dispersant and trained spill responders from AMOSC once alongside Dampier 5. All vessels to be designated with operational zones to conduct dispersant operations 6. Aerial surveillance sorties to provide vessels with updated locations for spills within operational zones.	**Dispersant Stocks** – Refer to Table 10-2 See Commence Vessel Dispersant Operations below **Incident Action Plan (IAP)** – to detail tasking for vessel dispersant operations	Commence mobilisation of ISV within 2 hours of spill notification Commence initial vessel dispersant application within 24 hours of IMT activation (daylight and weather condition dependent)

ACTION PLAN: DISPERSANT APPLICATION				
Task			**Resources**	**Timeframe**
Ongoing Actions	**Activate Dampier logistic support arrangements**	Logistics Yard (Dampier) activation 1. Contact Logistics Yard (Dampier) and stand-up staff/facilities to support resource mobilisation. Provide relevant information regarding estimated arrival times/dates into Dampier once confirmed with service providers 2. Confirm all arrangements with respect to loading equipment/dispersant and embarking spill response personnel aboard vessels alongside Dampier. **Note**: ALL other response equipment required will be coordinated from the Logistics Yard (Dampier) throughout the response.	**Logistics Yard (Dampier)**	Within 6 hours of spill notification

Task			Resources	Timeframe
2. Commence vessel dispersant operations Responsible Person: IMT (Operations and Logistics)				
Ongoing Actions	**Conduct of vessel dispersant operations** Following initial activation/mobilisation of required resources ongoing operations are to be commenced in support of the response	Ongoing vessel dispersant operations 1. Support vessel (ISV) – If not already on station conducting dispersant operations vessel tasking is to be included in IAP for Day 2 2. Confirm build-up of dispersant stocks at Dampier accordance with the Dispersant Mobilisation Plan. 3. Coordinate arrival and availability of vessels as they arrive in Dampier in accordance with Dispersant Mobilisation Plan. 4. Arrange and coordinate transport arrangements to mobilise dispersant and equipment to Dampier port 5. Ensure additional dispersant vessels (if required) become available from Dampier are to be included in the IAP for each operational period. **Note**: Clear guidance to be provided in IAP with respect to: 6. Vessel will be "operationally ready" once dispersant/equipment loaded and trained spill responders are embarked. 7. Focus on application to windrows / spots of surface slick which threaten priority environmental sensitivities. 8. Conduct of visual monitoring to assess effectiveness 9. Completion of dispersant application logs 10. Daily reporting back to IMT on conduct of operations	**Incident Action Plan (IAP)** – Task Assignment to be developed and disseminated in order to commence vessel dispersant operations **Dispersant Stocks** – Refer to Table 10-2	Ongoing from next Operational Period
3. Commence aerial dispersant application Responsible Person: IMT (Operations and Logistics)				

Ongoing Actions	**Conduct of aerial dispersant operations** Following initial activation/mobilisation of required resources ongoing operations are to be conducted in support of the response	<u>Aerial dispersant operations commencement</u> 1. Confirm status of Air Operations Plan implementation in consultation with AMOSC (and AMSA) 2. Liaise with Western Australian Department of Transport prior to commencing aerial dispersant application in Commonwealth waters that could impact upon State waters 3. Upon agreement of suitability of Air Operations Plan from AMOSC/ AMSA commence aerial dispersant application 4. Air Attack Supervisors to ensure IMT Operations Lead is informed on effectiveness of surface aerial dispersant application 5. Confirm build-up of dispersant stocks at Karratha in accordance with the Dispersant Mobilisation Plan 6. Coordinate arrival and availability of additional aircraft as they arrive in Karratha in accordance with Dispersant Mobilisation Plan 7. Arrange and coordinate transport services to mobilise dispersant to Karratha airport 8. Support development of flight schedule (see Operational Monitoring Action Plan) to ensure inclusion of aerial dispersant operations and deconfliction from other planned operations (operational zones allocated) 9. Support ongoing coordination of aviation operations as response continues. **Note**: Air Operations Plan and IAP must ensure the following restrictions are adhered to for dispersant application: a) No application in waters shallower than 20 m; and b) No application within exclusion zones for offshore facilities; and c) No application within an Australian Marine Park boundary or its buffer; and d) No application over in-field responders. Clear guidance to be provided in IAP with respect to:	**Air Operations Plan** – to be implemented for Karratha **Incident Action Plan (IAP)** – Task Assignment to be developed and disseminated to commence vessel dispersant operations **Daily Flight Schedule** – for all aviation operations **Dispersant Stocks** – Refer to Table 10-2	Commence air operations and dispersant application by Day 2

Task			Resources	Timeframe
		e) Focus on application to windrows / spots of surface slick which threaten priority environmental sensitivities. f) Conduct of visual monitoring to assess effectiveness after sorties g) Completion of dispersant application logs h) Daily reporting back to IMT on conduct of operations		

17.7 Containment and Recovery Action Plan

ACTION PLAN: CONTAINMENT AND RECOVERY				
Task		**Actions**	**Resources**	**Timeframe**
1. Mobilise containment and recovery resources Responsible Person: IMT (Logistics and Operations)				
Aim: To mobilise equipment and resources to Dampier in support of containment and recovery (C&R) operations				
INITIAL RESPONSE ACTIONS	**Conduct NEBA**	Conduct operational NEBA to determine if C&R is likely to result in a net environmental benefit. Operational NEBA considerations: • Are metocean conditions favourable for the available equipment? • Will the spill thickness be adequate for recovery? • Is decanting permitted? If not, how will waste volumes be managed? **Ongoing Actions** Daily re-evaluation of NEBA to assess varying net benefits and impacts of continuing to conduct C&R activities	Operational NEBA form Planning Lead	Within 2 hours of spill notification Daily NEBA re-evaluation
	Develop Containment and Recovery Plan	2. If NEBA indicates that there is an overall environmental benefit develop a Containment and Recovery Plan (IAP sub-plan) to include the following data: j) Operational zones; k) Locations to deploy personnel and equipment; l) List of resources (personnel and equipment) required; m) Logistics involved in deploying equipment and personnel; n) Timeframes to undertake deployment; o) Health and Safety constraints.	**Personnel** Planning Lead / AMOSC to assist with development of Containment and Recovery Plan (IAP sub-plan) **Deliverables** Containment and Recovery Plan (IAP sub-plan)	Develop a plan, if required, within 12 hours of NEBA confirming an overall environmental benefit

ACTION PLAN: CONTAINMENT AND RECOVERY				
Task		**Actions**	**Resources**	**Timeframe**
	Mobilise containment and recovery resources IMT to commence mobilisation of C&R resources into Dampier	1. Arrange for mobilisation of C&R equipment to Dampier port AMOSC/AMSA Resources 2. Liaise with AMOSC / AMSA to commence mobilisation of containment and recovery equipment and personnel into Dampier 3. Ensure each vessel has a minimum of two trained personnel onboard who are responsible for controlling operations, ensuring they are implemented safely and effectively **Note:** Ensure all equipment mobilisation is coordinated noting need for AMOSC/AMSA equipment in support of other response strategies 4. Commence mobilisation of vessels to support C&R operations into Dampier a) Bhagwan Athos, AMS, Jetwave and Bhagwan will provide vessels under current Master Service Agreement (MSA) b) Additional vessels to be sourced through Jadestone approved broker 5. Mobilise waste management contractor and request all available IBCs and Iso-containers be sent to Dampier 6. Coordinate and activate arrangements to support loading and embarkation of equipment/personnel from Dampier port 7. Ensure that all actions/details are captured in the resource tracking and Incident log 8. Ensure wider IMT are briefed on actions	**Equipment** Vessels Booms, skimmers, ancillary equipment Waste storage **Personnel** Trained Personnel (sourced from AMOSC, AMSA) – 2 per vessel **Forms and Guidance** Vessel Mobilisation Guide – to be used to support sourcing of vessels into Dampier	Commence mobilisation within 12 hours of spill notification

ONGOING RESPONSE OPERATIONS	**Commence containment and recovery operations** Following initial activation/mobilisation of required resources ongoing operations are to be commenced in support of the response	Containment and Recovery operations commencement IMT (Log): 1. Confirm build-up of C&R resources in Dampier 2. Coordinate arrival and availability of vessels in Dampier 3. Arrange and coordinate transport arrangements to mobilise equipment and personnel to Dampier port IMT (Ops and Plan) 4. Ensure additional vessels (once operationally ready) become available from Dampier are included in the IAP for each operational period. 5. Coordinate operational surveillance support to vessels to ensure they are being directed to priority locations 6. Assess daily operational surveillance information to drive future operational guidance 7. Coordinate vessel operations to support management of oily/water waste recovered by vessels 8. Support development and promulgation of the IAP to meet operational requirements 9. Coordinate daily operations in support of ongoing response 10. Ensure that all actions/details are captured in the Resource tracking and Incident log 11. Ensure wider IMT are briefed on actions on a daily basis **Note**: Clear guidance to be provided in IAP with respect to: - Vessel movements to/from port as required to assist with resupply/waste management/operational maintenance - Vessel will be "operationally ready" once equipment loaded and trained spill responders are embarked - Operations to be conducted in operational zones beyond dispersant operations and in areas which threaten priority environmental sensitivities - Daily reporting requirements back to IMT on conduct of operations and operational status	**Equipment** Vessels Booms, skimmers, ancillary equipment **Personnel** Trained Personnel (sourced from AMOSC, AMSA) – 2 per vessel **Incident Action Plan (IAP)** – Task Assignment to be developed and disseminated in order to commence containment and recovery operations	Commence C&R operations within 24 hours of IMT activation

ACTION PLAN: CONTAINMENT AND RECOVERY				
Task		**Actions**	**Resources**	**Timeframe**
	Manage waste from containment and recovery operations	<u>IMT to assess viability of following options:</u> 1. Option 1 (Preferred option): Subject to approvals from the relevant Jurisdictional Authority (refer to Section 11.5) and weather permitting, decant oil from water in tanks onboard the recovery vessels and discharge the water component overboard within the apex of the containment booms. Then transfer remaining product to IBCs for temporary storage 2. Option 2: Transfer oily waste water (not decanted) to tanks onboard support vessel/s or other recovery vessels for storage and possible treatment **Note**: Environmental approvals must be obtained prior to liquid waste discharge to the environment. Records are to be retained of volumes discharged. 3. Manage solid waste generated: a. Can be temporarily stored on-board the support vessel or facility for transfer to mainland for disposal by a licensed contractor 4. Ensure washdown of offshore equipment is conducted in hot zone's only	**Waste Management Plan** **IMT support** – to be provided by waste management contractor **Waste Management** – controlled waste tracking to be managed throughout	Review options within 48 hours of IMT activation

17.8 Protection and Deflection Action Plan

ACTION PLAN: PROTECTION AND DEFLECTION				
Task		**Actions**	**Resources**	**Timeframe**
1. Engage with relevant stakeholders and develop plan to conduct protection and deflection operations Responsible Person: IMT (Planning)				
ONGOING RESPONSE ACTIONS	**Commence stakeholder engagement**	Notify WA DoT if there are likely to be any impacts on state shorelines. Refer to IMTRP and Appendix A6 for detail on regulatory notifications. **Note:** All shoreline clean-up operations conducted within WA state waters (includes waters around islands) fall under the remit of WA DoT's IMT and associated IAP's. Priority receptors and strategies will be confirmed/implemented under the direction of the Control Agency. Refer to IMTRP for further information on cross jurisdictional arrangements.	**Personnel** WA DoT IMT **Forms and Guidance** WA DoT Offshore Petroleum Industry Guidance Note - Marine Oil Pollution: Response and Consultation Arrangements (WA DoT, 2020)	Within 2 hours of becoming aware of potential impacts to state
NOTE: All protection and deflection activities in the following steps are indicative only – at the direction of the State IMT who will be the Control Agency for the spill in State waters				
	Conduct SCAT	1. Conduct an initial shoreline assessment (i.e. SCAT) (ground / aerial survey depending on access)	Refer to Section 9.4.6 for detail.	Commence deployment of SCAT Teams within 48 hours of becoming aware of impacts to shorelines

	Conduct NEBA	1. Using the latest results of operational monitoring activities, conduct operational NEBA to determine if protection and deflection is likely to result in a net environmental benefit. Operational NEBA considerations: • 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)? • 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 vessel have ability to transfer anchors and booms; does it have adequate tie-points?). • Is there potential that submerged receptors could be damaged from potential anchor drag? **Ongoing Actions** Daily re-evaluation of NEBA to assess varying net benefits and impacts of continuing to conduct protection and deflection activities	Operational NEBA form Planning Lead	Conduct within 2 hours of becoming aware of potential impacts to state / territory waters Daily NEBA re-evaluation

	Develop Protection & Deflection Plan	1. If NEBA indicates that there is an overall environmental benefit of applying this strategy, develop a Protection and Deflection Plan (IAP sub-plan) to include the following data: a) Priority near-shore and shoreline areas for protection (liaise with HMA to confirm priority locations and consult latest operational monitoring data, including SCAT surveys); b) Locations to deploy protection and deflection equipment; c) Method of deployment for each location i.e., exclusion, diversion, river, shore-line sealing booing etc) d) List of resources (personnel and equipment) required; e) Timeframes to undertake deployment; f) Access / egress locations from land or sea; g) Frequency of boom inspections and maintenance (noting tidal cycles). **Note**: Consult AMOSC and State, considering the practicalities, likely success and risks associated with a shoreline operations in remote locations.	**Personnel** AMOSC to assist with state IMT with development of Protection and Deflection Plan (IAP sub-plan) **Deliverables** Protection and Deflection Plan (IAP sub-plan)	Develop a plan, if required, within 12 hours of NEBA confirming an overall environmental benefit
		2. Obtain approvals to access the following areas if response activities are required within: a) World Heritage Areas (from DAWE); b) Commonwealth reserves including AMPs (from DAWE / DNP); c) State reserves (from WA DBCA); d) Aboriginal heritage areas (from WA DAA); and e) International waters (from DFAT). 3. Refer IMTRP Arrangements for regulatory notification and reporting requirements.	**Deliverables** Copy of access approvals	Within 3 days of spill or 48 hours prior to estimated contact with shoreline environment

2. Mobilise protection and deflection resources Responsible Person: IMT (Logistics and Operations)				
	Mobilisation of resources to support operations	1. Commence mobilising protection and deflection equipment in readiness for potential use.	**Equipment** Booming systems Sorbent materials PPE	Commence deployment within 24 hours of completion of Protection and Deflection Plan (IAP sub-plan)
		2. Mobilise support vessels with capabilities to deploy protection and deflection teams and equipment to remote locations via: a) Vessel deployment; and b) Land-side deployment.	**Equipment** <u>Vessels:</u> Flat bottomed or vessels with tenders Capable of accommodating vessel crew plus 12 additional personnel and equipment Capable of deploying booms in waterways and shallow seas **Personnel** <u>Per vessel:</u> Vessel crew 2 x Trained operator / Team Leader(s) (AMOSC, AMSA) 5 x Labourers	Commence deployment within 24 hours of completion of Protection and Deflection Plan (IAP sub-plan)
3. Commence protection and deflection operations Responsible Person: IMT (Operations)				

	Conduct Protection and Deflection operations	1. Commence on-site protection and deflection activities as per the P&D Plan (IAP sub-plan) 2. Nominated Shoreline Response Team Leader to report back on effectiveness to IMT Leader	**Equipment** Booming systems Sorbent materials PPE Vessels **Personnel** Per vessel: Vessel crew 2 x Trained operator / Team Leader(s) (AMOSC, AMSA) 5 x Labourers **Deliverables** Records of equipment used and personnel employed	Commence deployment of personnel, equipment and vessels within 24 hours of completion of Protection and Deflection Plan

17.9 Shoreline Clean-up Action Plan

ACTION PLAN: SHORELINE CLEAN-UP				
Task		**Actions**	**Resources**	**Timeframe**
1. Engage with relevant stakeholders and develop plan to conduct shoreline clean-up if appropriate Responsible Person: IMT (Planning)				
ONGOING RESPONSE ACTIONS	**Commence stakeholder engagement**	Notify WA DoT if there are likely to be any impacts on state shorelines. Notify Director of National Parks if there are likely to be any impacts to Australian Marine Parks. Refer to IMTRP and Appendix A6 for detail on regulatory notifications. **Notes:** • All shoreline clean-up operations conducted within WA state waters (includes waters around islands) fall under the remit of WA DoT's IMT and associated IAP's. Priority receptors and clean-up strategies will be confirmed/implemented under the direction of the Control Agency. • Refer to IMTRP for further information on cross jurisdictional arrangements	**Personnel** WA DoT IMT **Forms and Guidance** WA DoT Offshore Petroleum Industry Guidance Note - Marine Oil Pollution: Response and Consultation Arrangements (WA DoT, 2020)	Within 2 hours of becoming aware of potential contact to state waters
NOTE: All shoreline clean-up operations in the following steps are indicative only – at the direction of the State IMT who will be the Control Agency for the spill in State waters				
	Conduct shoreline assessment	1. Conduct an initial shoreline assessment (i.e. SCAT) (ground / aerial survey depending on access) **Note:** Unmanned Aerial Vehicles (UAVs) may be necessary for some sensitive environments and where personnel safety is at risk	Refer to Section 13.	Commence deployment of SCAT Teams within 48 hours of becoming aware of impacts to shorelines

	Conduct NEBA	1. Using the latest results of operational monitoring activities, (with a focus on SCAT surveys), conduct operational NEBA to determine if shoreline clean-up is likely to result in a net environmental benefit. Operational NEBA considerations: • 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? • Will access to remote shorelines be safe and feasible? • Will responders disturb sensitive nesting species? • Would it reduce overall impacts to send small teams of clean-up personnel? **Ongoing Actions** 2. Daily re-evaluation of NEBA to assess varying net benefits and impacts of continuing to conduct shoreline clean-up activities.	Operational NEBA form Planning Lead	Conduct within 2 hours of becoming aware of potential impacts to shorelines

	Develop Shoreline Clean-up plan	3. If NEBA indicates that there is an overall environmental benefit develop a Shoreline Clean-up Plan (IAP sub-plan) to include the following information: p) Priority near-shore and shoreline areas for protection (liaise with HMA for direction on locations and consult latest operational monitoring data, including SCAT surveys); q) Locations to deploy shoreline clean-up personnel equipment; r) Method of deployment for each location i.e., exclusion, diversion, river, shore-line sealing booming etc) s) Frequency of clean-up (to minimise impacts to geomorphology, receptors) t) List of resources (personnel and equipment) required; u) Logistics involved in deploying equipment and personnel (i.e. vessel-based accommodation, use of barges, landing craft and helicopters in remote environments); v) Timeframes to undertake deployment; w) Health and Safety constraints; x) Access / egress locations from land or sea; and y) Waste management. (see note below). **<u>Plan shall address the following:</u>** • Clean-up activities in sensitive environments shall be conducted in front of the primary dune and crews will not access behind the primary dune • Temporary waste storage on remote beaches should be located at the bottom of the primary dune and above the Highest Astronomical Tide (HAT) mark • Demarcation zones to be established for shoreline operations involving vehicle and personnel movement considering vegetation, bird nesting/roosting areas and turtle nesting timeframes • Access plans for shoreline operations will prioritise use of existing roads and tracks • Terrestrial vehicle and equipment deployment via landing barges where there are no existing track access	**Personnel** AMOSC to assist with State IMT with development of Shoreline Clean-up Plan (IAP sub-plan) **Deliverables** Shoreline Clean-up Plan (IAP sub-plan)	Develop a plan, if required, within 12 hours of NEBA confirming an overall environmental benefit

		• Vehicles and equipment are verified as clean and invasive species free prior to deployment to site • A Specialist Advisor is consulted if shoreline operations overlap with areas of cultural or heritage significance • Onshore equipment wash-down occurs in a decontamination area **Note**: Consult AMOSC and State, considering the practicalities, likely success and risks associated with a shoreline operations in remote locations.		
		4. Obtain approvals to access the following areas if response activities are required within: a) World Heritage Areas (from DAWE); b) Commonwealth reserves including AMPs (from DAWE / DNP); c) State reserves (from WA DBCA); d) Aboriginal heritage areas (from WA DAA); and e) International waters (from DFAT). 5. Refer IMTRP for regulatory notification and reporting requirements.	**Deliverables** Copy of access approvals	Within 3 days of spill or 48 hours prior to estimated contact with shoreline environment

2. Mobilise shoreline clean-up resources Responsible Person: IMT (Logistics and Operations)				
	Mobilisation of all required resources	1. Commence mobilising shoreline clean-up equipment in readiness for potential use.	**Equipment** Manual equipment (i.e. shovels, rakes, buckets, wheelbarrows etc) Mechanical equipment (i.e. tiller, skid steer etc) Sorbent materials Decontamination kit Access vehicles (if required) (i.e. quad bikes, 4WD's etc) Personnel facilities (i.e. PPE, food, water, temporary accommodation, communications network, amenities etc) Waste storage (i.e. portable tanks, IBC's, plastic bags, skip bins etc) and transport **Forms and Guidance** Shoreline Clean-up Plan (IAP sub-plan)	Commence deployment within 24 hours of completion of Shoreline Clean-up Plan
		2. Commence mobilising shoreline clean-up teams: a) Clean-up teams to consist of 10 responders, including one trained Shoreline Responder to act as Team Lead 3. Contact labour hire agencies in Dampier to source labour hire personnel.	**Personnel** Trained Shoreline Responder Team Leads (one per team) Labourers (9 per team) **Forms and Guidance** Shoreline Clean-up Plan (IAP sub-plan)	Commence deployment within 24 hours of completion of Shoreline Clean-up Plan

		4. Mobilise transport with capabilities to deploy shoreline clean-up teams and equipment to remote locations.	**Equipment** Vessels: Flat bottomed or vessels with tenders Capable of accommodating vessel crew plus a minimum of 10 additional personnel and equipment Helicopters **Personnel** Vessel crew Clean-up team as stated above **Forms and Guidance** Shoreline Clean-up Plan (IAP sub-plan)	Commence deployment within 24 hours of completion of Shoreline Clean-up Plan

3. Coordinate shoreline monitoring Responsible Person: IMT (Operations)				
	Prepare to commence Shoreline Clean-up operations	1. Shoreline Team Lead to liaise with SCAT Team to confirm suitable clean-up techniques for surveyed shorelines prior to undertaking clean-up activities 2. Shoreline Team Lead and IMT (Plan) to liaise with HMA to confirm shoreline clean-up techniques based on NEBA and SCAT surveys 3. Shoreline clean-up team members are briefed by Shoreline Team Leads on how to implement the shoreline clean-up techniques including how to prevent damage to shoreline habitat and surrounding laydown/staging areas 4. Shoreline Team Leads shall verify clean-up effectiveness and conduct final evaluations in conjunction with SCAT Teams. **Note:** Clean-up activities shall be implemented under the direction of the HMA (Refer to IMTRP for further information on cross jurisdictional arrangements and HMAs)	**Equipment** Camera GPS Spades Tape measures Sampling equipment Vehicles (as required) Aerial survey equipment (e.g. Unmanned Aerial Vehicles (UAVs)) **Personnel** Trained Shoreline Responder Team Leads (one per team) Labourers (9 per team) **Forms / Guidance** Shoreline Assessment Ground Survey Shoreline Assessment Guideline – Ground Surveys AMSA / ITOPF / NOAA guidelines and forms Shoreline Clean-up Methods table (below) **Deliverables** Shoreline assessment survey reports Lab reports	
5. Set up shoreline clean-up operations Responsible Person: IMT (Operations)				

	Complete preparations for Shoreline Clean-up operations	1. Establish base: a) Set up shelter, communications, amenities, food, water etc; b) Organise equipment and PPE; c) Deliver inductions and training to all personnel as appropriate; d) Define pathways for access / egress to minimise damage to the environment.	**Equipment** As per Shoreline Clean-up Plan (IAP sub-plan) **Personnel** Shoreline clean-up assessment team Government specialists Labour hire **Forms and Guidance** Shoreline Clean-up Plan (IAP sub-plan) **Deliverables** Induction records	Commence deployment within 24 hours of completion of Shoreline Clean-up Plan
5. Commence shoreline clean-up operations Responsible Person: IMT (Operations)				
	Implement plan and conduct Shoreline Clean-up operations	1. Commence shoreline clean-up activities as per the Shoreline Clean-up Plan (IAP Sub-plan) ensuring that the following will occur: a) Adequate supervision of teams; b) Minimise damage to flora and fauna; c) Schedule oil removal activities for cooler times of the day when it is more solid / waxy to minimise the amount of waste that is generated; d) Site is set up suitably to minimise secondary contamination; and e) Correct waste management is implemented.	**Personnel** Shoreline clean-up team leaders and crews WA DoT specialists specialists Labour hire	Commence deployment within 24 hours of completion of Shoreline Clean-up Plan
		2. Monitor the following parameters during implementation to assess effectiveness: a) Ongoing shoreline monitoring; b) Ongoing availability on sufficient resources (personnel and equipment); and c) Waste management (i.e. predicted volumes, minimisation, temporary storage, transport and waste disposal). d) Report back on effectiveness to IMT Leader.	**Deliverables** Progress reports Records of equipment used and personnel employed Records of waste generated Waste disposal receipts	Ongoing until termination of response

17.10 Oiled Wildlife Plan

ACTION PLAN: OILED WILDLIFE RESPONSE				
Task		**Actions**	**Resources**	**Timeframe**
1. Make regulatory notifications and activate the Oiled Wildlife Response Division Responsible Person: IMT (Planning)				
INITIAL RESPONSE ACTIONS	**Complete initial notifications**	Notify DBCA / DAWEif there are likely to be any impacts on wildlife	**Forms and Guidance** Refer to IMTRP for detail on regulatory notifications	<2 hours of becoming aware of potential impacts to wildlife
	Activate OWR capability	1. Activate the oiled wildlife response sub-division within the Operations Division with the support of the IMT Leader: a) IMT Operations Co-ordinator to appoint a Jadestone Oiled Wildlife Advisor (OWA) to be part of the IMT. b) Government resources: i. WA jurisdiction: DBCA will appoint a DBCA OWA to be embedded within the DoT IMT to assist the Jadestone OWA. ii. Commonwealth jurisdiction: DAWE rely on support from respective state / territory statutory authority. 2. Refer to IMTRP for further information on cross jurisdictional arrangements. 3. Refer to Appendix A in the WA OWRP for a description of roles and responsibilities for all positions in the OWR division.	**Personnel** OWA from Jadestone or AMOSC DBCA OWA **Forms and Guidance** WA OWRP	<2 hours of becoming aware of potential impacts to wildlife

ACTION PLAN: OILED WILDLIFE RESPONSE				
Task		**Actions**	**Resources**	**Timeframe**
ONGOING RESPONSE ACTIONS	**Assess potential impact of OWR operations**	1. Conduct a NEBA based on available information to determine if there is an overall environmental benefit in conducting oiled wildlife response activities. This will depend on the following: a) Conservation status of fauna likely to be affected; b) Relevant EPBC Management Plans and specific protection measures for wildlife protected under Part 3 of the EPBC Act, including their habitat; c) Number of wildlife likely to be affected; d) Breeding/nesting status of species likely to be affected; e) Vulnerability and/or recoverability to hydrocarbon type; f) Estimated success of oiled wildlife response activities; and g) Regulator and community expectations.	**Personnel** OWAs to assist with NEBA **Forms and Guidance** NEBA template WA OWRP Wildlife reconnaissance data **Deliverables** NEBA report	Conduct NEBA within 24 hours of potential impacts to wildlife being identified Ongoing every 24 hours thereafter or as required
	Establish OWR structure within IMT	1. If NEBA determines that there is an overall benefit to activating an oiled wildlife response, OWA(s) to assign a Wildlife Division Co-ordinator to establish an appropriately sized OWR division within the IMT: a) Refer to Oiled Wildlife Command Structure b) Consult with OWA on State protection priorities c) Refer to Table 7 in the WA OWRP for indicative wildlife response personnel resourcing. d) Refer to Table 9 in the WA OWRP for personnel numbers available to respond to the various oiled wildlife response levels from WA DBCA and AMOSC. e) Refer to Attachment A in the WA OWRP for a description of roles and responsibilities for all positions in the OWR Division.	**Personnel** Wildlife Division Co-ordinator (WA) Wildlife Division Personnel (WA) **Forms and Guidance** WA OWRP	Within 24 hours of risk being identified

2. Wildlife first strike response

Responsible Person: Oiled Wildlife Advisor with assistance from Wildlife Division Co-ordinator

	Stand up OWR capability	1. Refer to Section 4.1 of the WA OWRP: a) Assess the situation; b) Determine the potential response level (refer to Table 6 Indicative Oiled Wildlife Response Levels in the WA OWRP); c) Determine resources required and available; and d) Mobilise first strike OWR kits.	**Equipment** First strike OWR kits **Forms and Guidance** WA OWRP	Commence within 48 hours of risk being identified Onsite / infield within 7 days of risk being identified
3. Mobilisation of wildlife resources Responsible Person: Wildlife Division Co-ordinator / Wildlife Logistics Co-ordinator				
	Mobilisation of required resources to support OWR operations	1. Refer to Section 4.2 of the WA OWRP: a) Mobilise key personnel within the OWR Division: b) Wildlife Planning Officer to lead planning the OWR response. c) Wildlife Operations Officer to lead the mobilisation of operational resources on site where oiled wildlife is present. d) Wildlife Logistics Officer to mobilise equipment as appropriate for the scale of incident 2. Refer to WA OWRP Section 7 for indications of resources needed for each stage of the OWR.	**Equipment** WA OWRP **Personnel** Wildlife Planning Officer Wildlife Operations Officer Wildlife Logistics Officer **Forms and Guidance** WA OWRP	Mobilise key personnel and commence mobilising equipment within 48 hours of risk being identified

4. Coordinate wildlife reconnaissance Responsible Person: Wildlife Operations and Planning Officer				
	Conduct ALL preparations in support of OWR operations	1. Refer to Section 4.3 of the WA OWRP: a) Wildlife Operations Officer to oversee the Wildlife Reconnaissance Unit and determine the best means for monitoring fauna (via plan, vessel or shoreline survey). b) Wildlife Planning Officer to create a geo-plot of all known wildlife communities in the local area that may be affected. 2. The shoreline clean-up assessment team may be able to have a dual function as the wildlife reconnaissance team.	**Equipment** General: Handheld GPS unit / Digital Camera Binoculars / Spotting scope Field notebook and pencil Geo-plot output including animal communities at risk. Transport: Quad motorbikes or 4wd vehicles Small vessels (less than 12m length) Aerial support (fixed wing or helicopter) **Personnel** Wildlife Reconnaissance Unit **Forms and Guidance** WA OWRP **Deliverables** Survey logs	Commence within 7 days of risk being identified
5. Develop IAP subplan for oiled wildlife response Responsible Person: Wildlife Planning Officer with assistance from Wildlife Division Coordinator				
	Incident action planning to support OWR operations	1. Refer to Section 4.4 of the WA OWRP: a) Based on information from wildlife reconnaissance develop the IAP oiled wildlife response sub-plan including information on: i. Wildlife priorities for protection from oiling; ii. Deterrence measures; iii. Recovery and treatment of oiled wildlife; and iv. Resourcing of equipment and personnel.	**Personnel** • Wildlife Division Co-ordinator **Forms and Guidance** • WA OWRP **Deliverables** IAP	Within 24 hours of wildlife reconnaissance confirming potential or realised impacts to wildlife

6. Wildlife rescuing and staging Responsible Person: Wildlife Operations Officer and Wildlife Logistics Officer				
	Establish rescue and staging	1. Refer to Section 4.5 of the WA OWRP: a) Wildlife Operations Officer to oversee the Wildlife Rescue and Wildlife Staging / Holding Units to undertake the following: i. Pre-emptive capture (refer to Appendix H in WA OWRP) ii. Hazing; and iii. Oiled wildlife rescue, transport and staging (refer to Appendix B, C and D in the WA OWRP). 2. Any deterrence / hazing / pre-emptive capture activities will require licensing authority from WA DBCA DAWE through the OWA.	**Equipment** Wildlife capturing equipment Hazing equipment Staging site Oiled wildlife facility Transport for personnel and wildlife **Personnel** Wildlife Rescue Unit (minimum 3 people) Wildlife Staging / Holding Unit **Forms and Guidance** Wildlife SITREP Form (WA OWRP Appendix J) **Deliverables** Wildlife handling licences / approvals	Ongoing after commencement of capturing wildlife
		3. Record keeping is a critical part of the management of captured wildlife whether pre-emptive or following oiling. Records must be kept from the point of capture and travel with each individual animal. On arrival at the rehabilitation centre the wildlife should be tracked through the system on the treatment record.	**Forms and Guidance** Wildlife Status / SITREP Form (WA OWRP Appendix J)	Ongoing after commencement of capturing wildlife
7. Establishment of an oiled wildlife facility Responsible Person: Wildlife Operations Officer				
	OWR Facility	1. Refer to Section 4.6 of the WA OWRP: Wildlife Operations Officer to oversee the Wildlife Facilities Team to undertake the following: a) Install the oiled wildlife containers (suitable for <50 animals per day). b) Establish an oiled wildlife facility (on land or on vessel) if the response is escalated > 50 animals per day. The procedure for	**Equipment** Refer to WA OWRP Section 7 **Personnel** Wildlife Facilities Unit (minimum 6 people) to include facility development specialist and trades (plumber, electrician and carpenter)	Initial oiled wildlife containers to be onsite / infield within 7 days of risk being identified

		setting up and using an oil wildlife facility is in Appendix E of the WA OWRP. 2. Dampier and Exmouth are the most suitable locations for large scale OWR Facilities in the Pilbara region. On water facilities utilising barges may be established to service more remote areas including the offshore islands.	**Forms and Guidance** WA OWRP	Oiled wildlife facility to be established ASAP, time will vary depending on response level
8. Wildlife rehabilitation Responsible Person: Wildlife Operations Officer				
	Rehabilitation	1. Refer to Section 4.7 of the WA OWRP: Wildlife Operations Officer to oversee the Wildlife Rehabilitation Unit to treat undertake the following: a) Initial treatment of oiled wildlife using the oiled wildlife containers (suitable for <50 animals per day). b) Treat oiled wildlife using oiled wildlife facility. Refer to: i. Figure 12 in WA OWRP: Overview of Oiled Wildlife Rehabilitation ii. Appendix F: Triage and First Aid SOP iii. Appendix G: Cleaning and Drying Wildlife SOP. 2. Release rehabilitated fauna back to their natural habitat. 3. Maintain records of fauna treatment and release.	**Equipment** Oiled wildlife containers Oiled wildlife facility **Personnel** Wildlife Rehabilitation Unit **Forms and Guidance** WA OWRP Wildlife Status / SITREP Form (WA OWRP Appendix J) Wildlife Rescue and Release Form (WA OWRP Appendix J)	Ongoing during response
9. Oiled wildlife response termination Responsible Person: IMT Leader				
	Termination	1. Refer to Section 4.8 of the WA OWRP: Once the decision has been made to terminate oiled wildlife operations (as per termination criteria), the EMT Leader will initiate a staged stand down of functions through the Wildlife Division Co-ordinator in the following order: a) Termination of Wildlife Rescue Unit. b) Termination of Wildlife Staging / Holding Unit.	**Personnel** Wildlife Facilities Unit (minimum 6 people) to include trades (plumber, electrician and carpenter) **Forms and Guidance**	When termination criteria have been met

		c) Termination of Rehabilitation Unit. d) Dismantling or demobilisation of or from temporary oiled wildlife facilities by Wildlife Facilities Unit. 2. Termination of Wildlife Facilities Unit.	WA OWRP	
		3. Once the Wildlife Division has been demobilised, the Wildlife Division Co-ordinator will arrange a hot debrief to analyse their involvement in the wildlife response. Once the major operational phase of the response is completed an 'all agencies' debrief will be organised followed up with a formal report.	**Deliverables** Incident specific OWR report	After termination of oiled wildlife response

	Stand up OWR capability	1. Refer to Section 4.1 of the WA OWRP: a) Assess the situation; b) Determine the potential response level (refer to Table 6 Indicative Oiled Wildlife Response Levels in the WA OWRP); c) Determine resources required and available; and d) Mobilise first strike OWR kits.	**Equipment** First strike OWR kits **Forms and Guidance** WA OWRP	Commence within 48 hours of risk being identified Onsite / infield within 7 days of risk being identified
3. Mobilisation of wildlife resources Responsible Person: Wildlife Division Co-ordinator / Wildlife Logistics Co-ordinator				
	Mobilisation of required resources to support OWR operations	1. Refer to Section 4.2 of the WA OWRP: a) Mobilise key personnel within the OWR Division: b) Wildlife Planning Officer to lead planning the OWR response. c) Wildlife Operations Officer to lead the mobilisation of operational resources on site where oiled wildlife is present. d) Wildlife Logistics Officer to mobilise equipment as appropriate for the scale of incident 2. Refer to WA OWRP Section 7 for indications of resources needed for each stage of the OWR.	**Equipment** WA OWRP **Personnel** Wildlife Planning Officer Wildlife Operations Officer Wildlife Logistics Officer **Forms and Guidance** WA OWRP	Mobilise key personnel and commence mobilising equipment within 48 hours of risk being identified

4. Coordinate wildlife reconnaissance Responsible Person: Wildlife Operations and Planning Officer				
	Conduct ALL preparations in support of OWR operations	1. Refer to Section 4.3 of the WA OWRP: a) Wildlife Operations Officer to oversee the Wildlife Reconnaissance Unit and determine the best means for monitoring fauna (via plan, vessel or shoreline survey). b) Wildlife Planning Officer to create a geo-plot of all known wildlife communities in the local area that may be affected. 2. The shoreline clean-up assessment team may be able to have a dual function as the wildlife reconnaissance team.	**Equipment** General: Handheld GPS unit / Digital Camera Binoculars / Spotting scope Field notebook and pencil Geo-plot output including animal communities at risk. Transport: Quad motorbikes or 4wd vehicles Small vessels (less than 12m length) Aerial support (fixed wing or helicopter) **Personnel** Wildlife Reconnaissance Unit **Forms and Guidance** WA OWRP **Deliverables** Survey logs	Commence within 7 days of risk being identified
5. Develop IAP subplan for oiled wildlife response Responsible Person: Wildlife Planning Officer with assistance from Wildlife Division Coordinator				
	Incident action planning to support OWR operations	1. Refer to Section 4.4 of the WA OWRP: a) Based on information from wildlife reconnaissance develop the IAP oiled wildlife response sub-plan including information on: i. Wildlife priorities for protection from oiling; ii. Deterrence measures; iii. Recovery and treatment of oiled wildlife; and iv. Resourcing of equipment and personnel.	**Personnel** • Wildlife Division Co-ordinator **Forms and Guidance** • WA OWRP **Deliverables** IAP	Within 24 hours of wildlife reconnaissance confirming potential or realised impacts to wildlife

6. Wildlife rescuing and staging Responsible Person: Wildlife Operations Officer and Wildlife Logistics Officer				
	Establish rescue and staging	1. Refer to Section 4.5 of the WA OWRP: a) Wildlife Operations Officer to oversee the Wildlife Rescue and Wildlife Staging / Holding Units to undertake the following: i. Pre-emptive capture (refer to Appendix H in WA OWRP) ii. Hazing; and iii. Oiled wildlife rescue, transport and staging (refer to Appendix B, C and D in the WA OWRP). 2. Any deterrence / hazing / pre-emptive capture activities will require licensing authority from WA DBCA DAWE through the OWA.	**Equipment** Wildlife capturing equipment Hazing equipment Staging site Oiled wildlife facility Transport for personnel and wildlife **Personnel** Wildlife Rescue Unit (minimum 3 people) Wildlife Staging / Holding Unit **Forms and Guidance** Wildlife SITREP Form (WA OWRP Appendix J) **Deliverables** Wildlife handling licences / approvals	Ongoing after commencement of capturing wildlife
		3. Record keeping is a critical part of the management of captured wildlife whether pre-emptive or following oiling. Records must be kept from the point of capture and travel with each individual animal. On arrival at the rehabilitation centre the wildlife should be tracked through the system on the treatment record.	**Forms and Guidance** Wildlife Status / SITREP Form (WA OWRP Appendix J)	Ongoing after commencement of capturing wildlife
7. Establishment of an oiled wildlife facility Responsible Person: Wildlife Operations Officer				
	OWR Facility	1. Refer to Section 4.6 of the WA OWRP: Wildlife Operations Officer to oversee the Wildlife Facilities Team to undertake the following: a) Install the oiled wildlife containers (suitable for <50 animals per day). b) Establish an oiled wildlife facility (on land or on vessel) if the response is escalated > 50 animals per day. The procedure for	**Equipment** Refer to WA OWRP Section 7 **Personnel** Wildlife Facilities Unit (minimum 6 people) to include facility development specialist and trades (plumber, electrician and carpenter)	Initial oiled wildlife containers to be onsite / infield within 7 days of risk being identified

		setting up and using an oil wildlife facility is in Appendix E of the WA OWRP. 2. Dampier and Exmouth are the most suitable locations for large scale OWR Facilities in the Pilbara region. On water facilities utilising barges may be established to service more remote areas including the offshore islands.	**Forms and Guidance** WA OWRP	Oiled wildlife facility to be established ASAP, time will vary depending on response level
8. Wildlife rehabilitation Responsible Person: Wildlife Operations Officer				
	Rehabilitation	1. Refer to Section 4.7 of the WA OWRP: Wildlife Operations Officer to oversee the Wildlife Rehabilitation Unit to treat undertake the following: a) Initial treatment of oiled wildlife using the oiled wildlife containers (suitable for <50 animals per day). b) Treat oiled wildlife using oiled wildlife facility. Refer to: i. Figure 12 in WA OWRP: Overview of Oiled Wildlife Rehabilitation ii. Appendix F: Triage and First Aid SOP iii. Appendix G: Cleaning and Drying Wildlife SOP. 2. Release rehabilitated fauna back to their natural habitat. 3. Maintain records of fauna treatment and release.	**Equipment** Oiled wildlife containers Oiled wildlife facility **Personnel** Wildlife Rehabilitation Unit **Forms and Guidance** WA OWRP Wildlife Status / SITREP Form (WA OWRP Appendix J) Wildlife Rescue and Release Form (WA OWRP Appendix J)	Ongoing during response
9. Oiled wildlife response termination Responsible Person: IMT Leader				
	Termination	1. Refer to Section 4.8 of the WA OWRP: Once the decision has been made to terminate oiled wildlife operations (as per termination criteria), the EMT Leader will initiate a staged stand down of functions through the Wildlife Division Co-ordinator in the following order: a) Termination of Wildlife Rescue Unit. b) Termination of Wildlife Staging / Holding Unit.	**Personnel** Wildlife Facilities Unit (minimum 6 people) to include trades (plumber, electrician and carpenter) **Forms and Guidance**	When termination criteria have been met

		c) Termination of Rehabilitation Unit. d) Dismantling or demobilisation of or from temporary oiled wildlife facilities by Wildlife Facilities Unit. 2. Termination of Wildlife Facilities Unit.	WA OWRP	
		3. Once the Wildlife Division has been demobilised, the Wildlife Division Co-ordinator will arrange a hot debrief to analyse their involvement in the wildlife response. Once the major operational phase of the response is completed an 'all agencies' debrief will be organised followed up with a formal report.	**Deliverables** Incident specific OWR report	After termination of oiled wildlife response

18. REFERENCES

Australian Maritime Safety Authority (AMSA). (2015) Technical Guideline for the Preparation of Marine Pollution Contingency Plans for Marine and Coastal Facilities Australian Maritime Safety Authority, January 2015. Accessed 2nd January 2021 - https://www.amsa.gov.au/sites/default/files/2015-04-np-gui012-contingency-planning.pdf

Australian Maritime Safety Authority (AMSA). 2020. National Plan for Maritime Environmental Emergencies. Australian Maritime Safety Authority, Canberra, Australian Capital Territory. https://www.amsa.gov.au/sites/default/files/amsa-496-national-plan.pdf (Accessed 2nd January 2021)

APASA (2012) Stag Production Facilities Net Environmental Benefit Analysis for the Use of Dispersants

APASA (2017) Jadestone Energy – Stag Oil Spill Modelling Dispersant Application (MAW0512J.001)

American Petroleum Institute (API) (2020) Oil Prevention and Response: Shoreline. Accessed 2nd January 2021 - http://www.oilspillprevention.org/oil-spill-cleanup/shoreline-wetlands-beaches-oil-spill-cle

Bonn Agreement (1998). The Bonn Agreement. http://www.bonnagreement.org/eng/html/welcome.html (Accessed 2nd January 2021).

DoT (2015). Oil Spill Contingency Plan. Prepared by the WA Department of Transport, January, 2015.

DPaW and AMOSC (2014) WA Oiled Wildlife Response Plan https://www.dpaw.wa.gov.au/images/documents/conservation-management/marine/wildlife/West_Australian_Oiled_Wildlife_Response_Plan_V1.1.pdf

DPaW and AMOSC (2014) Pilbara Oiled Wildlife Response Plan https://www.dpaw.wa.gov.au/images/documents/conservation-management/marine/wildlife/PROWRP_20141103.pdf

European Maritime Safety Agency (EMSA) (2010). *Manual on the Applicability of Oil Spill Dispersants – Version 2*. Accessed 2nd January 2021 - http://www.emsa.europa.eu/opr-documents/opr-manual-a-guidelines/item/719-manual-on-the-applicability-of-oil-spill-dispersants.html

Government of Western Australia. (2020). *State Hazard Plan – Marine Environmental Emergencies.* Department of Transport, Perth, Western Australia. Accessed 2nd January 2021 - https://www.transport.wa.gov.au/mediaFiles/marine/MAC_P_StateHazardPlanMaritimeEnviroEmergMEE.pdf

International Petroleum Industry Environmental Conservation Association and International Association of Oil and Gas Producers (IPIECA-IOPG) (2013), The use of decanting during offshore oil spill recovery operations. Oil Spill Response Joint Industry Project - Finding 17. United Kingdom. Accessed 4th January 2021 - http://www.environmentalunit.com/Documentation/07%20Waste%20Management/IPIECA%20JIP-17-Decanting.pdf

International Petroleum Industry Environmental Conservation Association (IPIECA) (2017), Key principles for the protection and care of animals in an oiled wildlife response. IOPG Report 583.

ITOPF (2018). ITOPF Members Handbook 2018/19. Prepared by the International Tanker Owners Pollution Federation Ltd. Accessed 2nd January 2021 - https://www.itopf.org/fileadmin/data/Documents/Company_Lit/ITOPF_Handbook_2018.pdf

International Tanker Owners Pollution Federation (ITOPF). (2014). Technical Information Pape: Clean-up of Oil from Shorelines (TIP07). Accessed 2nd January 2021 at http://www.itopf.com/knowledge-resources/documents-guides/document/tip-7-clean-up-of-oil-from-shorelines/

ITOPF (2015). ITOPF Members Handbook 2011/12. Prepared by the International Tanker Owners Pollution Federation Ltd. http://www.itopf.com/news-and-events/documents/itopfhandbook2011.pdf

Michel, J., Fegley, S., Dahlin, J., and Wood, C., (2017). Oil spill response-related injuries on sand beaches: when shoreline treatment extends the impacts beyond the oil. Marine Ecology Process Series. Vol 576. 203-218.

National Oceanic Atmospheric Administration (NOAA). (2013). Shoreline Assessment Manual. Accessed 2nd January 2021 at https://response.restoration.noaa.gov/sites/default/files/manual_shore_assess_aug2013.pdf

RPS. (2020)

Stevens, L. and Aurand, D. (2008). Criteria for evaluating oil spill planning and response operations. A report to IUCN, the World Conservation Union, by Ecosystem Management Associates, Inc. Technical Report 07-02

Western Australian Parks and Wildlife (DPaW). (2014). Western Australian Oiled Wildlife Response Plan (WA OWRP). Accessed 2nd January 2021 at https://www.dpaw.wa.gov.au/images/documents/conservation-management/marine/wildlife/West_Australian_Oiled_Wildlife_Response_Plan_V1.1.pdf

Western Australian Department of Transport (DoT). (2020). Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements. Accessed 2nd January 2021 at https://www.transport.wa.gov.au/mediaFiles/marine/MAC_P_Westplan_MOP_OffshorePetroleumIndGuidance.pdf

19. ABBREVIATIONS

AIIMS	Australian Inter-Service Incident Management System
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
ALARP	As Low As Reasonably Practicable
APASA	Asia Pacific Applied Science Associates (Marine and Freshwater Environmental Modelling)
AMOSPLAN	A voluntary oil industry mutual aid plan intended to supplement the National Plan, administered by Australian Institute of Petroleum through AMOSC
CPF	Central Processing Facility
DAWE	Department of Agriculture Water and the Environment
DMIRS	Department of Mines, Industry Regulation and Safety (Previously Department of Mines and Petroleum)
DBCA	Department of Biodiversity Conservation and Attractions
DoT	Department of Transport
DoF	Department of Fisheries
EP	Environment Plan
FWADC	Fixed Wing Aerial Dispersant Contract
GIS	Geographic Information System
HAT	Highest Astronomical Tide
HMA	Hazard Management Agency
IAP	Incident Action Plan
IBC	Intermediate Bulk Container
IMO	International Maritime Organisation
ICT	Incident Command Team
IMT	Incident Management Team
ITOPF	International Tanker Owners Pollution Federation
JADESTONE	Jadestone Energy
JSA	Job Safety Analysis
kL	Kilolitres
NEBA	Net Environmental Benefit Assessment
NRT	National Response Team – a group of interstate based individuals with spill response experience across all areas of response activities available to provide support to an Incident Controller
NOPSEMA	National Offshore Petroleum Safety and Environment Management Authority
OIM	Offshore Installation Manager
OIW	Oil in Water
OPEP	Oil Pollution Emergency Plan

OSRA	Oil Spill Response Atlas. National CRA, developed by various State agencies. In WA, WA Transport holds the State OSRA
OSTM	Oil Spill Trajectory Model
OWR	Oiled Wildlife Response
OWRP	Oiled Wildlife Response Plan
POLREP	Pollution Report. A report, reporting a pollution incident
PPE	Personal Protective Equipment
RCC	Rescue Coordination Centre (Canberra, Australia)
SCAT	Shoreline Clean-up Assessment Techniques
SITREP	Means a Situation Report on an actual or potential marine oil pollution incident or response
SMP	Scientific Monitoring Program
SOPEP	Ship Onboard Pollution Emergency Plan
SRT	State Response Team

20. APPENDICES

A1. Observation Logs (vessel, aerial, shoreline)
A2. Bonn Agreement Oil on Water Classification
A3. Diesel Fuel Properties
A4. Stag Crude Assay
A5. Shoreline Assessment Form
A6. Regulatory Notifications
A7. Incident Management Guidance