Stag Field Operations Oil Pollution Emergency Plan

GF-70-PLN-I-00001

Rev 8

A1. Observer logs

Vessel visual observer log

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

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Aerial surveillance observation log

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

Slick details

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

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

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

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

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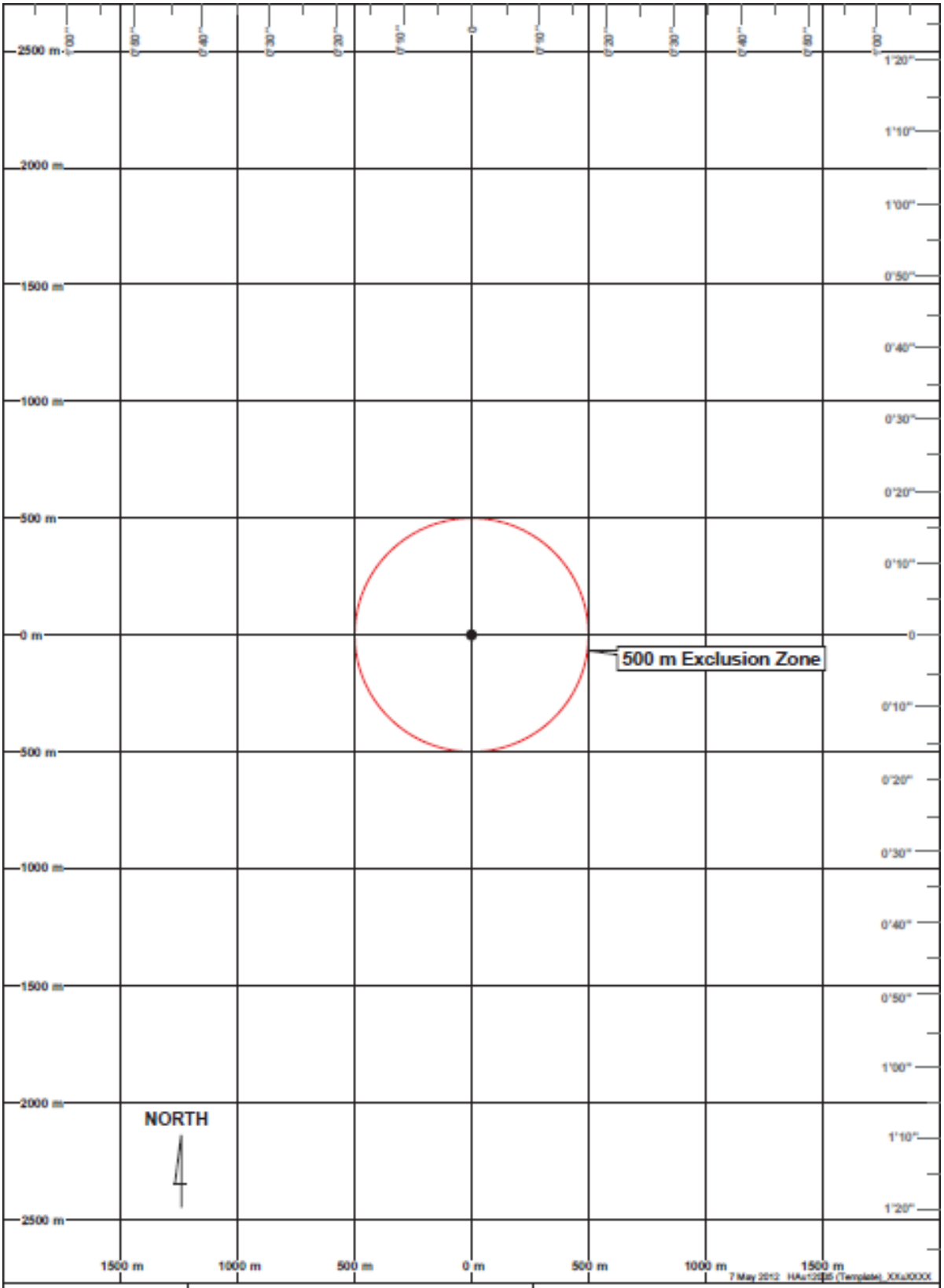
AERIAL SURVEILLANCE SURFACE SLICK MONITORING DIAGRAM



	NAME:	VESSEL / AIRCRAFT:
	DATE / HOUR:	OTHER REFERENCE:

AERIAL SURVIELLANCE MARINE FAUNA SIGHTING RECORD SHEET

Receptor	Type/species	Number	Location	Behaviour / Comments
Cetaceans				
Turtles				
Dugongs				
Sharks				
Sea snakes				
Seabirds				
Vessels				
Other details for each observation location				
Ambient conditions at each location	Date		Photographic record (to include photo ID No., date and time of each photo or video clip, brief description):	
	Time			
	Weather Conditions			
	Visibility (atmospheric)			
	Water turbidity			

Marine Megafauna Assessment Surveys

Triggers

1. Observed proximity of marine megafauna to oil slick or response operations combined with suggestion of significant harm (i.e. not an isolated incident), or
2. Observed incident of harm attributable to oil or theresponse.

Objectives

1. To quantify the presence of megafauna in the response area (i.e. near the oil slick, response vessels or aircraft) or wider region in order to determine the level of potential exposure to oil.
2. To observe and if possible quantify exposure of megafauna to surface oil or to the response.
3. To detect and quantify lethal effects.
4. Observe and to assess the significance of sub-lethal effects (e.g. avoidance behaviour) of this exposure or interactions.

Data Collection and Management

Data to be recorded from aerial megafauna surveys is outlined in the table below.

Resource	**Species**	**Numbers observed**	**Location**	**Behaviour/Comment**
Cetaceans		Adult_____ Juvenile_____ Calf_____	Lat_____ Long____	Direction of movement Proximity to oil Proximity to vessels Identify marks Aversion or other behaviour Carcases
Birds			Lat_____ Long____	Direction of movement Proximity to oil Proximity to vessels Identify marks Aversion or other behaviour Carcases
Other Details for each Observation Location				
Ambient Conditions at Each Location	Date		Photographic/Video Record	Date and time of each
	Time			Photo/video clip number
	Weathering conditions			Brief description
	Visibility			GPS link

Methodology

It is proposed that observations are made during dedicated monitoring flights supported where necessary by ground (vessel-based) surveys. Flights would normally be dedicated to the monitoring of only one fauna group but multi-objective flights may be required.

Observers must have relevant skills and expertise in the identification of the subject fauna and in interpreting their behaviour. Aircraft must have adequate downward visual capability.

A photographic or video record should be taken of each sighting and precise locations recorded on GPS.

A detailed methodology must be developed prior to commissioning this study. The scope and design of the detailed must include the following:

- State objectives;
- Reflect the level and distribution of observed or anticipated exposure and effects i.e.;

  - Geographic distribution

  - Study duration
- Stipulate replicate sampling, statistical analyses, and scientific rigour;
- Stipulate the expected flight frequency; and
- Indicate comparison to be made between impacted and unimpacted (control) habitats/biota, before and after spill observations.

The plane should follow line transects which are surveyed in passing mode (e.g. the plane did not deviate from the flight path.

Pre-implementation Actions

- Identify personnel or agencies with skills to design and undertake scientific monitoring of cetaceans, dugongs, birds, turtles;
- Undertake detailed study including design, budget, schedule and resourcerequirements;
- Identify and assign responsibilities for management of the study; and
- Secure identified resources.

Resource Requirements Checklist

- ¨ Aircraft
- ¨ Species identification manuals
- ¨ Aerial camera (still and video). Video to be GPS linked
- ¨ Expert megafauna observers

Supporting Documents

AFMA Protected Species Identification Guide: http://www.afma.gov.au/wp-content/uploads/2010/06/id_guide.pdf

Shoreline observation log

Survey Details				
Incident	Date	Start time	End Time	Observers

Area of Survey	
Start GPS: LAT_____deg._____LONG_____deg._____min	End GPS: LAT_____deg._____LONG_____deg._____min

Aircraft type	Call sign	Average Altitude	Remote sensing used (if any)

Weather Conditions		
Sun/Cloud/Rain/Windy	Visibility	Tide Height L/M/H
Time high water	Time low water	Other

Shoreline Type - Select only ONE primary (P) and ANY secondary (S) types present					
	Rocky Cliffs		Boulder and cobble beaches		Sheltered tidal flats
	Exposed artificial structures		Riprap		Mixed sand and gravel beaches
	Inter-tidal platforms		Exposed tidal flats		Fine-Medium sand grained beaches
	Mangroves		Sheltered rocky shores		Other
	Wetlands		Sheltered artificial structures		

Operational Features (tick appropriate box)					
	Direct backshore access		Alongshore access		Suitable backshore staging
Other					

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A2. Bonn Agreement Oil on Water Classification

Bonn Agreement Oil Appearance Code

6 Volume Estimation - Oiled Area Measurement

6.1 Trials have shown that both oiled area and specific oil appearance area coverage measurement is the main source of error in volume estimation. Therefore observers should take particular care during this part of the volume estimation process.

6.2 Estimating or measuring the oiled area can bedone either by:

- Visual estimation
- Measurement of sensor images

6.3 Estimations of oiled slick area based on visual observations are likely to be less accurate than estimates based on measurements made of remote sensing images.

6.4 If possible, the whole slick should be visible in one image for ease of area measurement. Area calculations using accurate measurements of SLAR images will be more appropriate for large oil slicks, while measurements of UV images will be more suitable for smaller slicks.

6.5 Most modern SLAR systems incorporate electronic measuring devices; areas can be measured by drawing a polygon around the detected slick. It is recommended that these devices be used where at all possible as they will provide the most accurate measurement within the confines of the aircraft during flight. Alternatively the overall length and width can be measured electronically and the oiled coverage estimated visually.

6.6 It should be remembered that because of the resolution of the SLAR (generally 20 metres) small areas of less than 20 metres NOT covered with oil but within the overall area would not show on the SLAR. However, oil patches of less than 20 metres will show up as patches of 20metres.

6.7 The recommended procedure for visual observation is to estimate the length and width of the slick by making time and speed calculations. This forms an imaginary rectangle that encloses the slick. The coverage of the oil slick (expressed as a percentage or proportion) within this imaginary rectangle is then used to calculate the oiled area of the slick. Inevitable inaccuracies in dimension estimates and estimated coverage within these dimensions can give rise to high levels of error in area estimation.

6.8 When determining the oiled area coverage it is essential to remember that the main body of an oil slick may have 'areas' of clear water, especially near the trailing edge of the slick. For compact slicks, there may be only a few ‘clear water’ areas but for more diffused oil slicks there could be several which would lower the overall coverage percentage significantly. More accurate assessments of the oiled area can be made by a thorough analysis of the SLAR or UVimages.

7 Volume Estimation - Specific Appearance Area Coverage Measurement

7.1 The ‘oiled’ area should be sub-divided into areas that relate to a specific oil appearance (see BAOAC). This can be achieved using the recorded data from the vertical sensors and the noted visualobservations.

7.2 This part of the volume estimation is mainly subjective, so great care should be taken in the allocation of coverage to appearance, particularly the appearances that relate to higher thicknesses (**discontinuous true colour and truecolour**).

7.3 The vertical camera data (if available in flight) and the visual observations should be compared with the IR data, which will give an indication of the thickest part of the slick.

7.4 Thermal IR images give an indication of the relative thickness of oil layers within a slick. Relatively thin oil layers appear to be cooler than the sea and relatively thick oil layers appear to be warmer than the sea in an IR image. There is no absolute correlation between oil layer thickness and IR image because of the variable heating and cooling effects caused by sun, clouds and airtemperature.

7.5 The presence of any area within the slick shown as warm in an IR image indicates that relatively thick oil (Code 4 or 5 in the BAOAC) is present. Since these areas may only be small, but will contain a very high proportion of oil volume compared to the much thinner areas, their presence should be correlated with visual appearance in the BAOAC assessment.

7.6 The Volume Estimation Procedure is illustrated at AnnexB.

7.7 It is generally considered that 90% of the oil will be contained within 10% of the overall slick (normally the leading edge (up wind side) of the slick), within a few hours after the release.

9 Oil Volume Estimate Usage

9.1 Using the BAOAC to estimate oil volume gives a maximum and minimum quantity. It is suggested that in general terms the maximum quantity should be used together with other essential information such as location to determine any required response action.

BONN CP agreed that the minimum volume estimate should be used for legal purposes. Reference is made to Bonn Agreement Contracting Parties Meeting Summary Record 2003 Page 5, Para. 2.4 (f) which states “When the BAOAC is used to estimate the quantity of oil released at sea, the lower limit of the range in the code for each coded appearance should be used for estimating the amount of oil present in the slick for enforcement purposes and for statistical reporting”. However, it is emphasised that each national authority will determine how to use the BAOAC volume data within its own area.

9.2 It is emphasised that extra caution should be used when applying the BAOAC during major incidents involving large quantities of thick oil and / or heavy oils or when emulsion is present. Aircrews should use all the available information or intelligence; such as oil thickness measurements taken by surface vessels, to estimate the volume.

11 The Bonn Agreement Oil Appearance Code

11.1 The Theory of Oil Slick Appearances

1. The visible spectrum ranges from 400 to 750 nm (0.40 – 0.75 µm). Any visible colour is a mixture of wavelengths within the visible spectrum. White is a mixture of all wavelengths; black is absence of all light.
2. The colour of an oil film depends on the way the light waves of different lengths are reflected off the oil surface, transmitted through the oil (and reflected off the water surface below the oil) and absorbed by the oil. The observed colour is the result ofa combination of these factors; it is also dependant on the type of oil spilled.
3. An important parameter is optical density: the ability to block light. Distillate fuels and lubricant oils consist of the lighter fractions of crude oil and will form very thin layers that are almost transparent. Crude oils vary in their optical density; black oils block all the wavelengths to the same degree but even then there are different ‘kinds of black’, residual fuels can block all light passing through, even in thin layers.

11.2 The Bonn Agreement Oil Appearance Code

4. Since the colour of the oil itself as well as the optic effects are influenced by meteorological conditions, altitude, angle of observation and colour of the sea water, an appearance cannot be characterised purely in terms of apparent colour and therefore an ‘appearance’ code, using terms independent of

specific colour names, hasbeen developed.

5. The Bonn Agreement Oil Appearance Code has been developed as follows:

- In accordance with scientific literature and previously published scientific papers,
- Its theoretical basis is supported by small scale laboratory experiments,
- It is supported by mesoscale outdoor experiments,
- It is supported by controlled sea trials.

6. Due to slow changes in the continuum of light, overlaps in the different categories were found. However, for operational reasons, the code has been designed without these overlaps.
7. Using thickness intervals provides a biased estimation of oil volumes that can be used both for legal procedures and for response.
8. Again for operational reasons grey and silver have been combined into the generic term 'sheen'.
9. Five levels of oil appearances are distinguished in the code detailed in the following table:

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

10. The appearances described cannot be related to one thickness; they are optic effects (codes 1 - 3) or true colours (codes 4 - 5) that appear over a range of layer thickness. There is no sharp delineation between the different codes; one effect becomes more diffuse as the other strengthens. A certain degree of subjective interpretation is necessary when using the code *and any choice for a specific thickness within the layer interval MUST be explained on the Standard Reporting Log*.

11.3 Description of the Appearances

10.3.1 Code 1 – Sheen (0.04 µm – 0.3 µm)

11. The very thin films of oil reflect the incoming white light slightly more effectively than the surrounding water (Figure 1) and will therefore be observed as a silvery or grey sheen. The oil film is too thin for any actual colour to be observed. All oils will appear the same if they are present in these extremely thin layers.

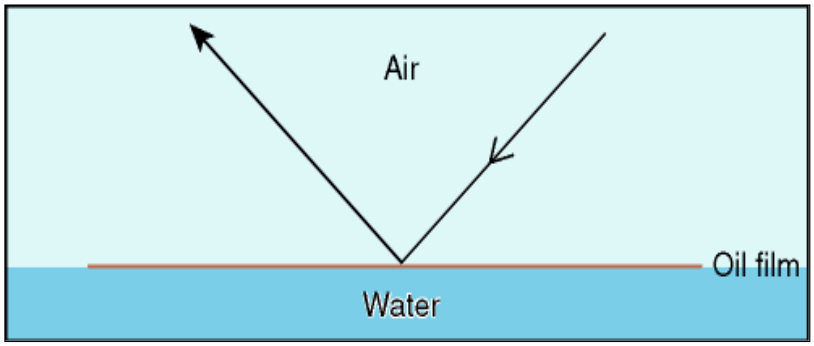


Figure 1. Light Reflecting From Very Thin Oil Films

12. Oil films below approximately 0.04-µm thickness are invisible. In poor viewing conditions even thicker films may not be observed.
13. Above a certain height or angle of view the observed film may disappear.

11.3.2 Code 2 – Rainbow (0.3 µm – 5.0 µm)

14. Rainbow oil appearance represents a range of colours: yellow, pink, purple, green, blue, red, copper and orange; this is caused by constructive and destructive interference between different wavelengths (colours) that make upwhite light. When white light illuminates a thin film of oil, it is reflected from both the surfaces of the oil and of the water (Figure 2).

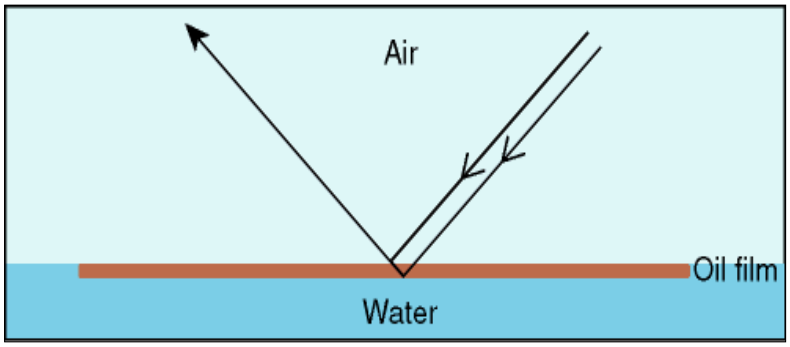


Figure 2. The Rainbow Region

15. Constructive interference occurs when the light that is reflected from the lower (oil / water) surface combines with the light that is reflected from the upper (oil / air) surface. If the light waves reinforce each other the colours will be present and brighter (Figure 3).

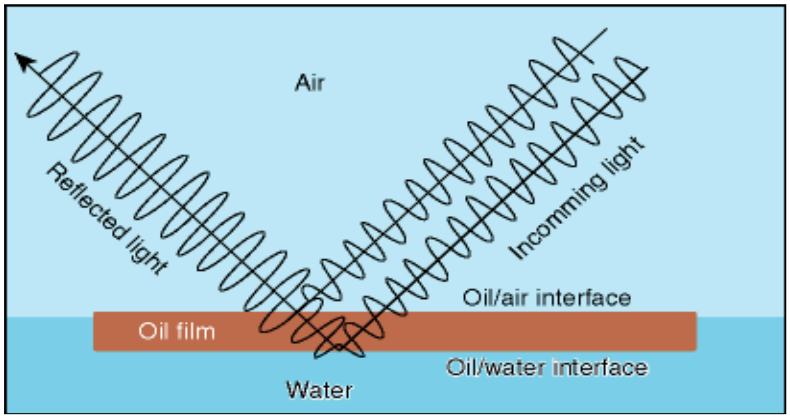


Figure 3. Constructive Interference

16. During destructive interference the light waves cancel each other out and the colour is reduced in the reflected light and appears darker (Figure 4).

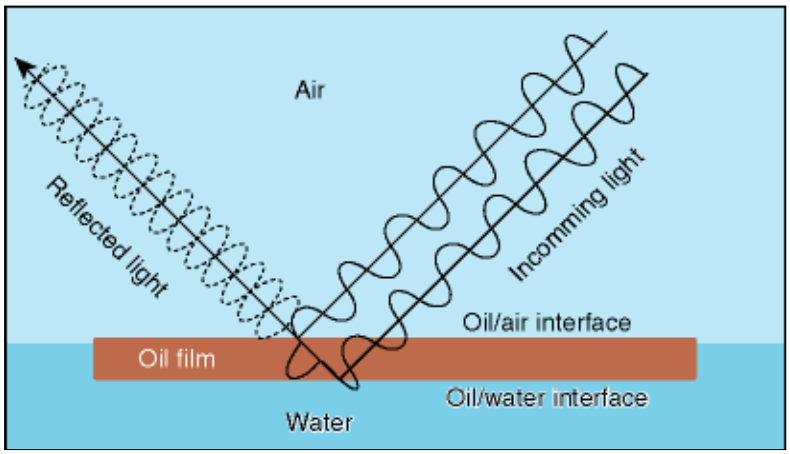


Figure 4. Destructive Interference

17. Oil films with thicknesses near the wavelength of different coloured light, 0.2 µm – 1.5 µm (blue, 400nm or 0.4 µm, through to red, 700nm or 0.7 µm) exhibit the most distinct rainbow effect. This effect will occur up to a layer thickness of 5.0 µm.
18. All oils in films of this thickness range will show a similar tendency to produce the 'rainbow' effect.
19. A level layer of oil in the rainbow region will show different colours through the slick because of the change in angle of view. Therefore if rainbow is present, a range of colours will be visible.

11.3.3 Code 3 – Metallic (5.0µm – 50 µm)

20. The appearance of the oil in this region cannot be described as a general colour. The true colour of the oil will not be present because the oil does not have sufficient optical density to block out all the light. Some of the light will pass through the oil and be reflected off the water surface. The oil will therefore act as a filter to the light (Figure 5).

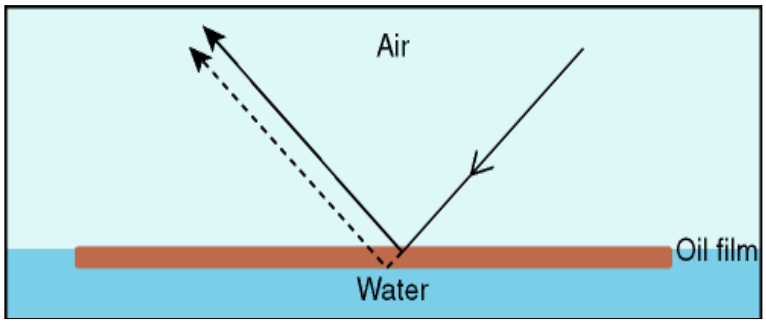
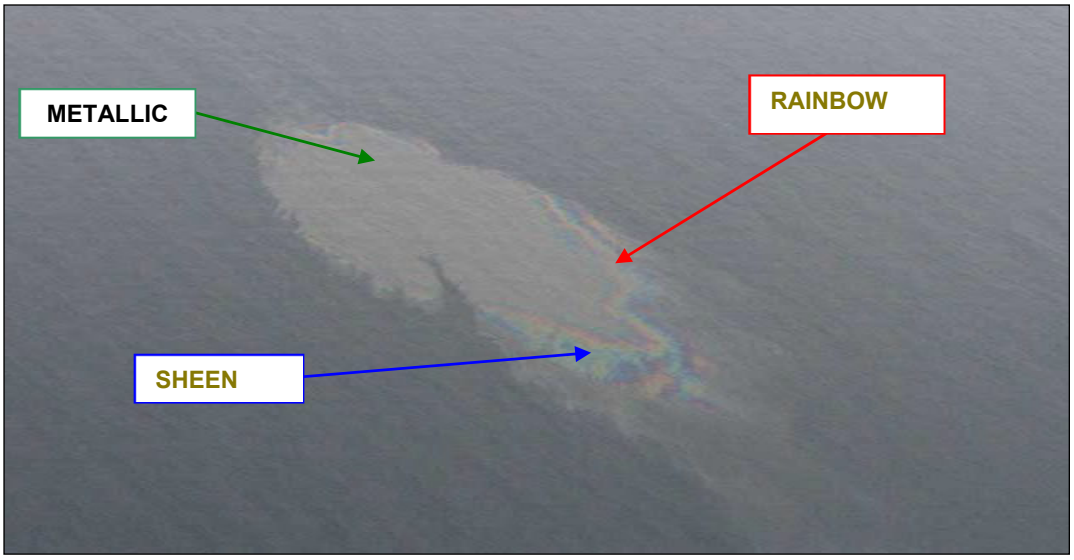


Figure 5. The Metallic Region

21. The extent of filtering will depend on the optical density of the oil and the thickness of the oil film.
22. The oil appearance in this region will depend on oil colour as well as optical density and oil film thickness. Where a range of colours can be observed within a rainbow area, metallic will appear as a quite homogeneous colour that can be blue, brown, purple or another colour. The 'metallic' appearance is the common factor and has been identified as a mirror effect, dependent on light and sky conditions. For example blue can be observed in blue-sky.



11.3.4 Code 4 – Discontinuous True Colours (50 µm – 200 µm)

23. For oil films thicker than 50 µm the light is being reflected from the oil surface rather than the sea surface (Figure 6).

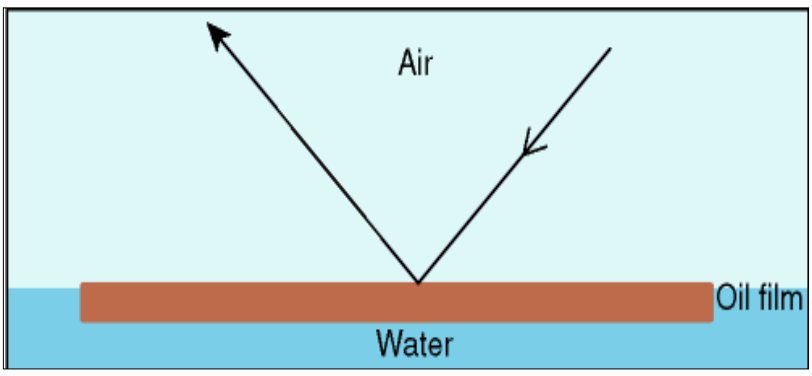
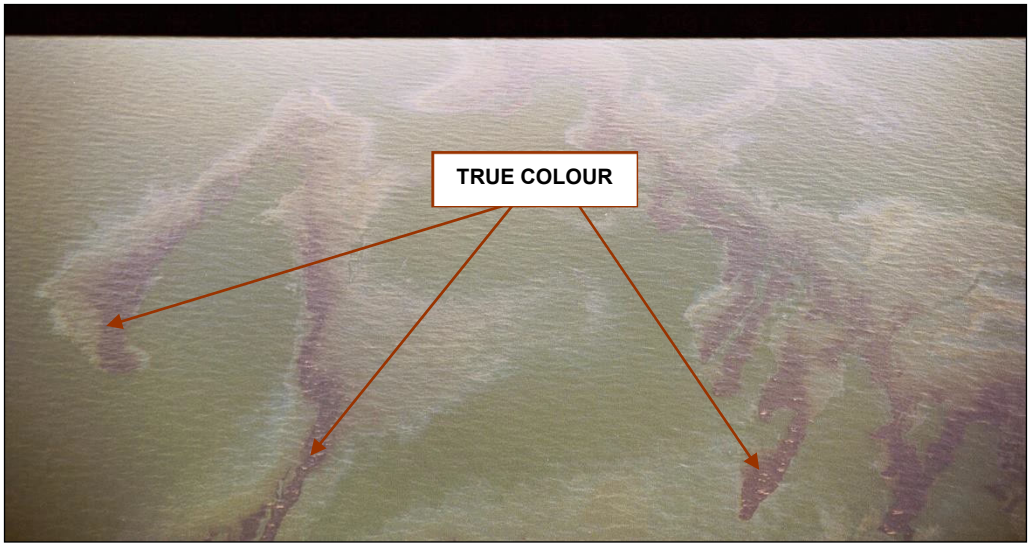


Figure 6. Thick Oil Films

24. The true colour of the oil will gradually dominate the colour that is observed. Brown oils will appear brown, black oils will appear black.
25. In this appearance category the broken nature of the colour, due to thinner areas within the slick, is described as discontinuous. This is caused by the spreading behaviour under the effects of wind and current.
26. 'Discontinuous' should not be mistaken for 'coverage'. Discontinuous implies colour variations and not non-polluted areas.
27. 'Discontinuous true colour' appeared to be a difficult appearance to describe and through imagery it may be possible to get a clearer picture of what is meant. For now the best result of the elaborations is: "**true oil colour against a background of metallic**".
28. When oil is moved by waves, the oil layer obviously is thicker in the wave-trough than on the wave-top. This variation of the "oil appearance" may be understood by indicating "discontinuous".

11.3.5 Code 5 – True Colours (>200 µm)

27. The true colour of the specific oil is the dominant effect in this category.
28. A more homogenous colour can be observed with no discontinuity as described in Code 4.
29. This category is strongly oil type dependent and colours may be more diffuse in overcast conditions.



Note: all documentation on the study can be downloaded from the Bonn Agreement web-site under publications, at: www.bonnagreement.org

ANNEX A

THE VOLUME ESTIMATION PROCEDURE

1. Oiled Area Measurement

Area from SLAR Data	12 km^2
Length and Width (SLAR Image or Time and Distance) Length – 12 km x Width – 2 km (Imaginary Rectangle) Area Covered with oil (Coverage) – 50%	
Oiled Area 12 x 2 x 50%	12 km^2

2. Appearance Coverage Allocation

Appearance Code 1 (Sheen)	50%
Appearance 2 (Rainbow)	30%
Appearance 3 (Metallic)	15%
Appearance 5 (True Colour)	5%

3. Thickness Band for Allocated Appearance

Sheen	0.04 µm – 0.3 µm
Rainbow	0.3 µm – 5.0µm
Metallic	5.0 µm – 50 µm
True Colour	More than 200µm

4. Minimum Volume Calculation

Oiled Area x Area Covered with Specific Appearance x Minimum Thickness Appearance 1 (Sheen)

12 km^2 x 50% x 0.04 µm = 0.24 m^3

Appearance 2 (Rainbow)

12 km^2 x 30% x 0.3 µm = 1.08 m^3

Appearance 3 (Metallic)

12 km^2 x 15% x 5.0 µm = 9 m^3

Appearance 5 (True Colour)

12 km^2 x 5% x 200 µm = 120.0 m^3

Minimum Volume = 0.24 + 1.08 + 9 + 120 = 130.32 m^3

6. *Maximum Volume Calculation*

Oiled Area x Area Covered with Specific Appearance x Maximum Thickness Appearance 1

(Sheen)

12 km^2 x 50% x 0.3 µm = 1.8 m^3

Appearance 2 (Rainbow)

12 km^2 x 30% x 5 µm = 18 m^3

Appearance 3 (Metallic)

12 km^2 x 15% x 50 µm = 90.0 m^3

Appearance 5 (True Colour)

12 km^2 x 5% x (more than) > 200 µm = > 120.0 m^3

Maximum Volume = 1.8 + 18+ 90.0 + > 120 = > 229.8m^3

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A3. Diesel properties

DIESEL FUEL	Fresh	Weathering		
		1-3 hours	1 day	1 week
Physical Characteristics:				
API gravity (classification)	33.2 (mid distillate)			
Density (g/mL) @ 20° C	0.855	ND	0.856	0.860
Viscosity (cP) @ 20° C	3.62	ND	4.0	5.4
Interfacial Tension (mN/m)	34.5	ND	32.6	31.4
Flash Point (°C)	78.9	ND	91.1	118.3
Pour Point (°C)	6	ND	18	12
Boiling Point (°C)				
Chemical Characteristics:				
Saturates (% by weight)	63.1	ND	64.2	63.6
Aromatics (% by weight)	34.9	ND	33.4	33.7
Resins (% by weight)	1.7	ND	1.7	1.5
Asphaltenes (% by weight)	0.2	ND	0.7	1.2
Waxes (% by weight)	ND	ND	ND	4.2
Weathering:				
% loss after laboratory weathering	-	0	3	23
Persistent in the environment	moderate			
Forms oil in water emulsions	no	no	no	no
Demulsifier effective?	yes	yes	yes	yes
Toxicity (laboratory tested):				
tropical clownfish (*Amphiprion clarkii*)	low	ND	low	low
inland silverside fish (*Menidia beryllina*)	mod.	ND	low-mod.	low-mod.
tropical prawn (*Penaeus vannamei*)	mod.-high	ND	mod.-high	mod.-high
mysid shrimp (*Mysidopsis bahia*)	mod.-high	ND	mod.-high	mod.-high
sea urchin larvae (*Arbacia punctulata*)	low	ND	low	low
sand dollar/sea urchin larvae (*Dendraster excentricus/Strongylocentrotus purpuratus)*	mod.-high	ND	low	low
Amenable to Dispersant:	yes	yes	no	no

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A4. Stag Crude Assay

STAG CPF EXPORT
CRUDE OIL ASSAY

conducted by

Petroleum Testing Laboratory
Refinery Road, Lonsdale SA 5160

for

Apache Energy

JADESTONE ENERGY

PROPERTIES OF CUTS

Test	Method	Unit	LPG	IBP - 230C	230 - 360C	360 - 540C	360C+	540C+
Fractional Distillation	D2892	%mass	Ni	4.9	48.2	36.4	47.0	10.6
Volume Yield	D5236	%volume	Ni	5.2	49.4	35.4	45.4	10.0
Density @15°C	D4052	kg/L		0.8788	0.9175	0.9670	0.9754	0.9937
Specific Gravity @60/60°F	D4052	-		0.8793	0.9180	0.9676	0.9760	0.9943
API Gravity	D4052	API		29.4	22.6	14.7	13.5	10.8
Aniline Point	D611	°C		51.9	54.5	62.3	68.8	
Aniline Gravity Product	Calc	-		3685	2940	2119	2103	
Ash	D482	%mass					0.0070	
Asphaltenes	IP143	%mass					0.40	
Carbon Residue - Micro	D4530	%mass					2.48	
Cetane Index - Procedure A	D4737	-			33.2			
Cetane Index - Procedure B	D4737	-			33.0			
Characterization Factor,calc	UOP 375	-					11.5	
Cloud Point	D2500	°C			<-45.0			
Colour ASTM	D1500	-			L0.5			
Copper Corrosion (3hrs @ 50C)	D130	-			1A			
FIA - Aromatic	D1319	%volume		1.8				
Freeze Point	D5972	°C		<-70.0				
Heat of Combustion - Gross,calc	D4868	MJ/kg					43.5	
Heat of Combustion - Nett,calc	D4868	MJ/kg					41.1	
Hydrocarbon - Mono-Aromatics	IP391	%mass			23.4			
Hydrocarbon - Di-Aromatics	IP391	%mass			4.8			
Hydrocarbon - Polycyclic-Aromatics	IP391	%mass			5.0			
Kinematic Viscosity @-20	D445	cSt		11.32				
Kinematic Viscosity @20°C	D445	cSt		3.476				
Kinematic Viscosity @40°C	D445	cSt		2.282	7.342			
Kinematic Viscosity @50°C	D445	cSt				200.2	675.2	
Kinematic Viscosity @100°C	D445	cSt				14.69	33.54	
Metal - Nickel	ICP-OES	wt ppm					7.2	31.4
Metal - Vanadium	ICP-OES	wt ppm					<1	<1
Nitrogen - Basic	UOP269	wt ppm					158	
Nitrogen - Total	D4629	wt ppm				830	1284	3421
PIONA (Benzene)	D6730	%volume		NA				
Pour Point	D5950	°C			<-39.0	-3.0	0.0	48.0
Smoke Point	D1322	mm		16.5				
Sulphur - Total	IP336	%mass		<0.030	0.057	0.20	0.22	0.31
Total Acid Number	D664	mg KOH/g			0.08	0.80	0.9	

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A5. Shoreline Assessment Form

Department of Transport

Shoreline Assessment Form

This form should be submitted to the Shoreline Division Coordinator (SC). A summary of the information will be forwarded by the SC to the Operations Officer, Planning Officer and Management Support Unit.

Purpose

This form is for shoreline responders who are required to complete a shoreline assessment.

It is recommended that such responders have completed oiled shoreline training as a minimum. This form is not intended to be used in isolation.

Purpose

Human health and safety is **always** the number one priority in any incident.

Priorities

Protection priorities under Australia's National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances (The National Plan) are:

- Human health and safety
- Habitat and cultural resources
- Rare and/or endangered flora and fauna
- Commercial resources
- Recreational and amenity areas

Complete

- Take Five and
- Job Safety Analysis (JSA)

Prior to and as part of your operations

What is a shoreline assessment?

A shoreline assessment:

- Is a simple and comprehensive survey of a shoreline
- Provides data to enable decision making for shoreline protection, clean-up and monitoring and
- Employs a systematic approach using standardised terminology

What information needs to be gathered?

Purpose

- Shoreline description
  - Shoreline type, substrate and energy
  - Biological character of shoreline
- Oil description
- Oil location, character and behaviour

Additional information that may be required:

- Access
- Site hazards and constraints
- Sensitive areas
- Features/landmarks
- Potential sites for
  - Decontamination/waste
  - Helicopter landing

Dividing the shoreline

Sectors

Where there is a geographical barrier and restricted access between two areas, they will be split into separate sectors. Different sectors may have separate field command centres, catering, ablutions, decontamination, etc. Sectors will be further spilt into segments.

Segments

A segment is a piece of shoreline that's a workable size for a team and could be defined based on:

- Shoreline type
- Substrate type
- Access points
- Features e.g. breakwater
- Jurisdiction e.g. shire boundaries
- Presence of particular flora and/or fauna
- Distance e.g. every 50m

Item Category	Item	Check
Recording	Camera	☐
Navigation	Maps and charts	☐
	GPS	☐
	Compass	☐
Communication	Mobile phone	☐
	Radio	☐
	Confirm phone/radio coverage	☐
Personal	First aid kit	☐
	Hat	☐
	Sun-cream	☐
	Drinking water	☐
	Rubber boots (non-slip)	☐
	Wet weather gear	☐
Documentation	Field booklet	☐
	Shoreline assessment forms	☐
	JSA forms	☐
	Log	☐
Other	Tape measure	☐
	Shovel	☐
	Sampling kit	☐

Ensure you advise command of your planned operation and establish reporting expectations for while you are in the field.

Shoreline descriptors:

Shoreline Type	Abbr.		Note
Cliff	Cl		Height and slope
Platform	Pl		Height relative to tide
Reef	Re		Reef is an intertidal platform
Beach	Be		
Dune	Du		
Flats	Fl		
Artificial	A		e.g. wharf, sea wall
Shoreline substrate	**Abbr.**	**Size**	**Note**
Bedrock or rock	R		
Boulder	B	Larger than head	
Cobble	C	Fist to head size	
Pebble	P	Pen diameter to fist size	
Gravel	G	2-4mm diameter	
Mud/silt/clay	M	Less than 0.6mm	Mix with water, if it goes cloudy = mud, if it sinks = sand
Earth	E		Usually cliffs only
Shellgrit	Sh		Usually with sand (i.e. Sh/S)
Coral	Co		Dead coral, i.e. coral rubble *(if corals are live, record as coral in both substrate type and biological character)*
Artificial	A		e.g. rip-rap

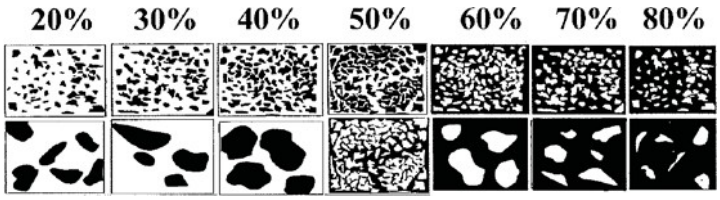
Note: S/B would indicate boulders and sand in equal amounts. S(B) would indicate sand was the dominant substrate.

Biological character
This is flora and fauna living on the shoreline. Document this and indicate location on sketch map.

Oil description/character

- **Colour**
- **Viscosity: Solid** *(doesn't flow)*, **Viscous** *(flow slowly)*, **Fluid** *(flows easily)*
- **Stickiness: Very sticky** *(can't be wiped/washed off)*, **Sticky** *(partly removed by wiping/washing)*, **Non sticky** *(wipes of easily)*

Percentage oil cover

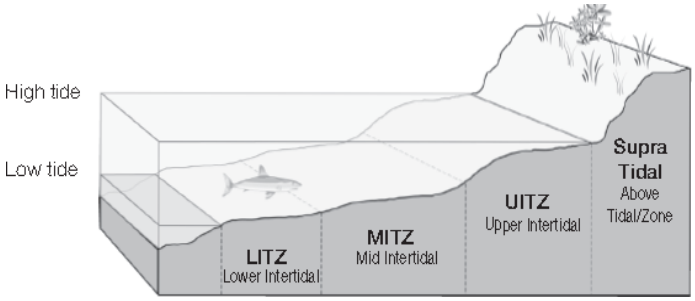


Oil thickness

Name	Abbr.	Thickness	Description
Pooled	Po	Can be measured in mm or cms	Pooled fresh or emulsified oil
Cover	Co	Over 1mm	Coverage of oil of measurable thickness but not pooled
Coat	Ct	Less than 1mm	This coach of oil that masks colour of substrate and can be scratched off with fingernail.
Stain	St	Less than 1mm	Very thin stain of oil which cannot be scratched off substrate with fingernail
Film or sheen	Fi or Shn	Extremely thin film or sheen	Substrate can usually be seen through oil. Can be described as brown, rainbow or silver.
Tar balls	Tb	Variety of sizes	Ball or clumps of weathered oil.

- To describe thickness of subsurface oil:
  - Depth = distance from substrate surface to top of buried layer
  - Thickness of lens = distance between top and bottom of buried layer

Shoreline tidal zones



Incident		**Ref No.**	
REPORTING DETAILS			
Assessment Team Leader		**Position/ Organisation**	
Team Members (name/org)			
Date Completed		**Time Completed**	
Reporting to		**Position/ Organisation**	
Date Received		**Time Received**	
LOCATION DETAILS			
Sector		**Segment**	
Name of Beach/Location		**Description (e.g. slope)**	
Topography/ Other Map		**Map Reference**	
Access Via	☐ Foot Only ☐ Road ☐ 4WD ☐ Boat ☐ Helicopter ☐ Gator/OUV		
Hazards			
TIMING			
First Assessment	☐ Yes ☐ No	**Last Assessment**	☐ Yes ☐ No
Timing	☐ Pre Impact ☐ Post Impact Before Clean-Up ☐ Post Impact After Clean-Up		
Time Since	Impact (days/hrs.):	Last Clean-up (days/hrs.):	

ASSESSMENT

Parameter	LITZ	MITZ	UITZ	Supratidal
Shoreline Description				
Shoreline type				
Substrate type				
Length of shoreline				
Width of shoreline				
Biological character				
Oil Distribution and Character				
Oil band length				
Oil band width				
% cover in band				
Surface oil thickness				
Oil appearance/character				
Depth of buried oil (from surface)				
Description of buried oil				
Other				
Un oiled debris				
Oiled debris				

Sketch Map

Please include North point and scale

Notes

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A6. Regulatory Notifications

The Jadestone IMT Phone Contact List (SharePoint) is to be used to assist with completing these regulatory notifications.

Table 0-1 – Regulatory Notifications

Agency / Authority	Notification Type & Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
NOPSEMA Reportable Incidents					
NOPSEMA (Incident Notification Office)	Verbal notification within **2 hours** Written report as soon as practicable, but no later than 3 days	*Petroleum & Greenhouse Gas Storage Act 2006* Offshore Petroleum Greenhouse Gas Storage (Environment) Regulations 2009 (as amended 2014)	A spill associated with the activity that has the potential to cause moderate to significant environmental damage[1]	Jadestone IMT Planning Lead	Incident reporting requirements: https://www.nopsema.gov.au/environmental-management/notification-and-reporting/
National Offshore Petroleum Titles Administrator (NOPTA) (Titles Administrator)	Written report to NOPTA within 7 days of the initial report being submitted to NOPSEMA	Guidance Note (N-03000-GN0926) Notification and Reporting of Environmental Incidents	Spill in Commonwealth waters that is reportable to NOPSEMA	Jadestone IMT Planning Lead	Provide same written report as provided to NOPSEMA
TIER 1-3 Spills					
AMSA (Rescue Coordination Centre (RCC))	Verbal notification without delay to include: • name of ship/s involved • time, type and location of incident • quantity and type of harmful substance • assistance and salvage measures	National Plan for Maritime Environmental Emergencies	All slicks trailing from a vessel All spills to the marine environment All spills where National Plan equipment is used in a response	Vessel Master	Incident reporting requirements: https://www.amsa.gov.au/marine-environment/marine-pollution/mandatory-marpol-pollution-reporting Online POLREP - https://amsa-forms.nogginoca.com/public/

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

Agency / Authority	Notification Type & Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
	• any other relevant information Written POLREP form, within 24 hours of request from AMSA				
Commonwealth Department of Agriculture, Water and Environment (Director of Monitoring & Audit)	Email notification as soon as practicable	*Environment Protection and Biodiversity Conservation Act 1999*	If Matters of National Environmental Significance (MNES) are considered at risk from a spill or response strategy, or where there is death or injury to a protected species	Jadestone IMT Planning Lead	N/A
Parks Australia (Director of National Parks)	Verbal notification as soon as practicable	*Environment Protection and Biodiversity Conservation Act 1999*	All actual or impending spills which occur within a marine park or are likely to impact on an Australian marine park	Jadestone IMT Planning Lead	Not applicable, however the following information should be provided: • Titleholder's details • Time and location of the incident (including name of marine park likely to be affected) • Proposed OPEP response arrangements • Details of the relevant IMT contact person.
Australian Fisheries Management Authority (AFMA)	Verbal phone call notification within 8 hours		Fisheries within the environment that may be affected (EMBA) Consider a courtesy call if not in exposure zone	Jadestone IMT Planning Lead	N/A
Northern Territory Waters					
NT Regional Harbourmaster	• Immediate verbal notification Follow up with POLREP as soon as practicable after verbal notification and email POLREP.	Northern Territory Oil Spill Contingency Plan. As per State legislation (i.e. *Marine Pollution Act 1999*)	All actual or impending spills in NT waters, regardless of source or quantity Notify if spill has the potential to impact wildlife in Territory waters (to	Notification by Jadestone IMT Planning Team	Marine Pollution Reports (POLREPs) are to be emailed to rhm@nt.gov.au (Regional Harbourmaster)

Agency / Authority	Notification Type & Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
			activate the Oiled Wildlife Coordinator)		Instructions for submitting POLREPs (including a POLREP Template) are provided on the NT Government webpage https://nt.gov.au/marine/marine-safety/report-marine-pollution
NT Department of Environment and Natural Resources (DENR) (Pollution Response Hotline; Environmental Operations)	• Verbal notification as soon as practicable Written report to be provided as soon as practicable after the incident, unless otherwise specified by the Minister	Northern Territory Oil Spill Contingency Plan. As per State legislation (i.e. *Marine Pollution Act 1999*)	All actual or impending spills in NT waters	Jadestone IMT Planning Lead	Marine Pollution Reports (POLREPs) are to be emailed to pollution@nt.gov.au (Environmental Operations) Instructions for submitting POLREPs (including a POLREP Template) are provided on the NT Government webpage https://nt.gov.au/marine/marine-safety/report-marine-pollution
NT Department of Primary Industry and Resources	Verbal phone call notification within 8 hours		Fisheries within the EMBA Consider a courtesy call if not in exposure zone	Jadestone IMT Planning Lead	N/A
Western Australia Waters					
WA Department of Transport (WA DoT) (Maritime Environmental Emergency Response (MEER) Duty Officer)	• Verbal notification within 2 hours • Follow up with POLREP as soon as practicable after verbal notification If requested, submit SITREP within 24 hours of request	Emergency Management Regulations 2006 State Hazard Plan: Maritime Environmental Emergencies Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and	Notify of actual or impending Marine Pollution Incidents (MOP) that are in, or may impact, State waters. Emergency Management Regulations 2006 define MOP as an actual or impending spillage, release or escape of oil or an oily mixture that is capable of causing loss of life, injury to a person or damage to the health	Jadestone IMT Planning Lead	WA DoT POLREP: https://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-PollutionReport.pdf WA DoT SITREP: https://www.transport.wa.gov.au/mediaFiles/marine/MAC-F-SituationReport.pdf

Agency / Authority	Notification Type & Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
		Consultation Arrangements	of a person, property or the environment.		
Department of Biodiversity Conservation and Attractions (State Duty Officer)	Verbal notification within 2 hours	Western Australian Oiled Wildlife Response Plan	Notify if spill has the potential to impact or has impacted wildlife in State waters (to activate the Oiled Wildlife Advisor)	Jadestone IMT Planning Lead	N/A
Department of Fisheries (Western Australia)	Verbal phone call notification within 8 hours		Fisheries within the EMBA Consider a courtesy call if not in exposure zone	Jadestone IMT Planning Lead	N/A
Department of Water and Environmental Regulation (DEWR) Environmental Hazard Branch Pollution Watch	Next working day		Courtesy call to advise of pollution incident	Jadestone IMT Planning Lead	N/A
International Waters					
Department of Foreign Affairs and Trade (DFAT) (24-hour consular emergency centre)	Verbal phone call notification within 8 hours, if the spill is likely to extend into international waters		Notify DFAT that a spill has occurred and is likely to extend into international waters Inform DFAT of the measures being undertaken to manage the spill, e.g. implementation of any operational and scientific monitoring plans that have been triggered, e.g. modelling studies, aerial surveillance to predict	Jadestone IMT Planning Lead	N/A

Agency / Authority	Notification Type & Timing	Legislation / Guidance	Reporting Requirements	Responsibility	Forms
			and monitor the spill extent and potential impact fishing activities		
Autoridade Nacional do Petróleo e Minerais (ANPM) Spill has potential impact on Timor Leste.	Verbal notification, as soon as practicable Follow up with written report (e.g. POLREP) within 48 hours of incident.	Interim Regulations issued under Article 37 of the Interim Petroleum Mining Code	All actual or impending spills in Timor-Leste offshore waters, regardless of source or quantity	Jadestone IMT Planning Lead	Report must contain a pollutant description (including estimated volume and distribution), spill tier, proposed response; and the pollution cause.

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A7. Incident Management Guidance

Appendix 7 - Incident Management Guidance

The purpose of this section is to provide guidance on the implementation and management of emergency response at Jadestone Energy with with respect to the Stag facility. This section summaries the key aspects of the Incident Management Team Response Plan (IMTRP) (JS-70-PLN-F-00008). For further details of Jadestone incident management team, refer to the IMTRP.

1. Purpose

The purpose of the Incident Management Team Response Plan (IMTRP) is to provide the Jadestone Energy (Australia) Pty Ltd, (JSE) organisation with the necessary information to respond to incidents affecting operations or business interruptions.

2. Scope

The scope of the IMTRP covers incidents involving facilities, offices or sites operated by Jadestone and where Jadestone has responsibility for organising incident and/or emergency response. It outlines incident activation procedures, incident management structures, communication arrangements, emergency response roster arrangements, information management procedures during incidents and IMT training and competency requirements.

3. Principles

Jadestone aligns with Australian Inter-Service Incident Management System (AIIMS) arrangements and uses five fundamental principles to guide and test the organisations incident management systems against:

- **Flexibility** – ensuring that the system can be applied across the full spectrum of incidents and hazards associated with Jadestone operations and activities;
- **Management by objectives** – the clear determination and communication of desired outcomes (objectives) to ensure that all parts of the incident management system understand the direction being taken;
- **Functional management** – the ability to delegate defined tasks across to groups able to effectively undertake actions in support of achieving objectives;
- **Unity of command** – the principle of management where there is a single Incident Controller providing direction and coordinating all actions; and
- **Span of control** – management of the number of individuals/groups within the structure that can be effectively supervised by one person.

Risk Management, Crisis and Incident Management and Business Continuity Management are a seamless continuum. Within Jadestone a high level of planning, preparation and practice is maintained through:

- **procedures** and **guidance** to manage and coordinate incidents;
- implementation and use of **incident response systems**;
- **training** and **management of competencies** across all elements of incident response;
- **drills** and **exercises** to test procedures / systems and to maintain competency; and
- **audits** and **inspections** of systems and capabilities.

Continuous improvement is also a vital part of the organisations incident management system. All opportunities to identify, capture and effectively "learn" from lessons are recommended and there is a continual drive to improve our ability to prepare for, respond to and recover from any incident that is experienced.

4. Interface with External Plans

Jadestone's oil spill response arrangements have been developed to meet the relevant requirements of the OPGGS (E) Regulations. It is consistent with the national system for oil pollution preparedness and response; the National Plan for Maritime Environmental Emergencies (NatPlan) managed by the Australian Maritime Safety Authority (AMSA) and the WA Department of Transport (WA DoT) Industry Guidance Note (July 2020for offshore oil spill response and consultation.

Stag facilityTable A7-1 summarises regulatory involvement in spill scenarios from Jadestone Facilities.

Table A7- 1: Jurisdictional and Control Agencies for Hydrocarbon Spills for Commonwealth & International Waters[2]

Jurisdictional boundary	Spill source	Hazard Management Agency	Jurisdictional authority	Control agency		Relevant documentation
				Level 1	Level 2	
Commonwealth waters (three to 200 nautical miles from territorial/state sea baseline)	Vessel[3]	N/A	AMSA	AMSA		Vessel Ship Oil Pollution Emergency Plan National Plan
	Petroleum activities[4]	N/A	NOPSEMA	Jadestone		Activity OPEP

Information from the following external documents have been used or referred to within this document:

- AMOSPlan – Australian Industry Cooperative Spill Response Arrangements
- NatPlan – National Marine for Maritime Environmental Emergencies
- State Hazard Plan - – Western Australia State Hazard Plan for Maritime Environmental Emergencies
- WAOWRP – Western Australia Oiled Wildlife Response Plan

4.1 AMOSPlan

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

[3] Vessels are defined by Australian Government Coordination Arrangements for Maritime Environmental Emergencies (AMSA, 2017) as a seismic vessel, supply or support vessel, or offtake tanker.

[4] Includes a 'Facility', such as a fixed platform, FPSO/FSO, MODU, subsea infrastructure, or a construction, decommissioning and pipelaying vessel. As defined by Schedule 3, Part 1, Clause 4 of the OPGGSA 2006.

4.2 National Plan (NatPlan)

A Memorandum of Understanding (MOU) has been established between Jadestone and AMSA, outlining respective roles and responsibilities when responding to vessel-sourced marine pollution incidents and petroleum activity related marine pollution incidents.

AMSA manages the National Plan for Maritime Environmental Emergencies (National Plan), Australia's key maritime emergency contingency and response plan. All resources under the National Plan are available to Jadestone through request to AMSA under the arrangements of the MoU.

For any oil pollution event, Jadestone Energy agrees to notify AMSA immediately in the interests of facilitating the most efficient and effective response to the incident.

In the instance of vessel sourced marine oil pollution events, Jadestone Energy has agreed with AMSA that:

- AMSA is the designated Control Agency for oil spills from vessels within the Commonwealth jurisdiction. Upon notification of an incident involving a ship, AMSA will assume control of the incident and respond in accordance with the National Plan;
- The National Plan and its supporting documents provide direction for the operational management and response of ship-sourced incidents; and
- AMSA is to be notified immediately of all ship-sourced incidents through RCC Australia.

Jadestone acknowledges that in addition to marine pollution incidents, AMSA has specific national interest responsibilities regarding the management of maritime casualties (as defined within the National Plan for Maritime Environmental Emergencies and International Convention on the High Seas in Cases of Oil Pollution Casualties) and specifically regarding the application of the Protection of the Sea (Powers of Intervention) Act 1981. AMSA and Jadestone Energy agree to work cooperatively to manage maritime casualty incidents in accordance with the arrangements within the National Plan for Maritime Environmental Emergencies.

AMSA will coordinate the resources of the National Plan for Maritime Environmental Emergencies on the formal request of the IMT Leader. Jadestone agrees to provide all available support to AMSA in AMSA's performance of its Control Agency responsibilities.

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

4.3 WA DoT & State Hazard Plan (MME)

The State Emergency Management Plans (State Hazard Plan)) enable the Western Australian Government to prevent, prepare for, respond to and recover from all different types of emergencies in the State.

The State Emergency Management Committee (SEMC) is the body with overall responsibility for emergency planning. SEMC is responsible for the development and review of several emergency plans for the Department of Transport.

These include:

- *Maritime Environmental Emergency (State Hazard Plan).*

Other State Hazard Plans include:

- *MARSAR (Marine Search and Rescue).*
- *MOP (Marine Oil Pollution).*
- *HAZMAT (Hazardous Materials).*
- *NPW (Nuclear Powered Warships).*
- *Health.*

The State Hazard Plan - Maritime Environmental Emergencies (MEE) covers:

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

Copies of the respective WA Plans can be found at: https://www.transport.wa.gov.au/imarine/state-hazard-plan.asp

4.3.1 Western Australian DoT Response Requirements

Jurisdictional boundary	Spill source	Hazard Management Agency	Jurisdictional authority	Control agency	
				Tier 1	Tier 2/3
Western Australian	Vessel #	WA DoT	WA DoT	WA DoT	WA DoT
	Petroleum activities*	WA DoT	WA DoT	Jadestone	WA DoT

If a Level 2/3 spill arises within, or has potential to enter Western Australian State waters, the HMA (DoT Marine Safety General Manager or proxy) will take on the role as the State Maritime Environmental Coordinator (SMEEC) and DoT will take on the role as a Controlling Agency.

Jadestone Energy will notify the DoT Maritime Environmental Emergency Response (MEER) unit as soon as reasonably practicable (within 2 hours of spill occurring). On notification, the HMA will activate their Maritime Environmental Emergency Coordination Centre (MEECC) and the DoT Incident Management Team (IMT). Relevant State Response Team members would also be activated by DoT.

Jadestone is required to work in coordination with DoT during such instances, as outlined within the DoT's *Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (July 2020)*.

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

spill. Figure A7-1 shows the cross jurisdictional arrangements and Control Agency structure for a Facility spill entering State waters.

To facilitate effective coordination between the two Controlling Agencies and their respective IMT's during a cross-jurisdictional response, a Joint Strategic Coordination Committee (JSCC) will be established. The JSCC will be jointly chaired by the SMEEC and Jadestone's nominated senior representative and will comprise of individuals deemed necessary by the chairs to ensure an effective coordinated response across both jurisdictions. Additional detail on the JSCC's key functions are outlined in *Offshore Petroleum Industry Guidance Note – Marine Oil Pollution: Response and Consultation Arrangements (July 2020).*

At the request of the SMEEC, Jadestone Energy will be required to provide all necessary resources, including personnel and equipment, to assist the DoT's IMT in performing duties as the Controlling Agency for State waters response. This includes providing an initial 11 personnel to work within the DoT Incident Control Centre located at Marine House, Fremantle, no later than 8 am following the day of the request. It also includes providing personnel to serve in DoT's Forward Operating Base no later than 24 hours following formal request by the SMEEC. The roles and responsibilities of these positions are outlined in Table A7-8.

As a minimum, the Deputy Planning Officer and Deputy Logistics Officer supporting the WA DoT IMT will be filled by Jadestone IMT personnel familiar with relevant Jadestone systems and processes and trained as per role specific training and competency requirements outlined in Table A7-10.

Two DoT personnel will be provided from DoT's command structure into Jadestone's GCT/ IMT as GCT/ Media Liaison Officers. The roles and responsibilities of these roles are outlined in Table A7-9.

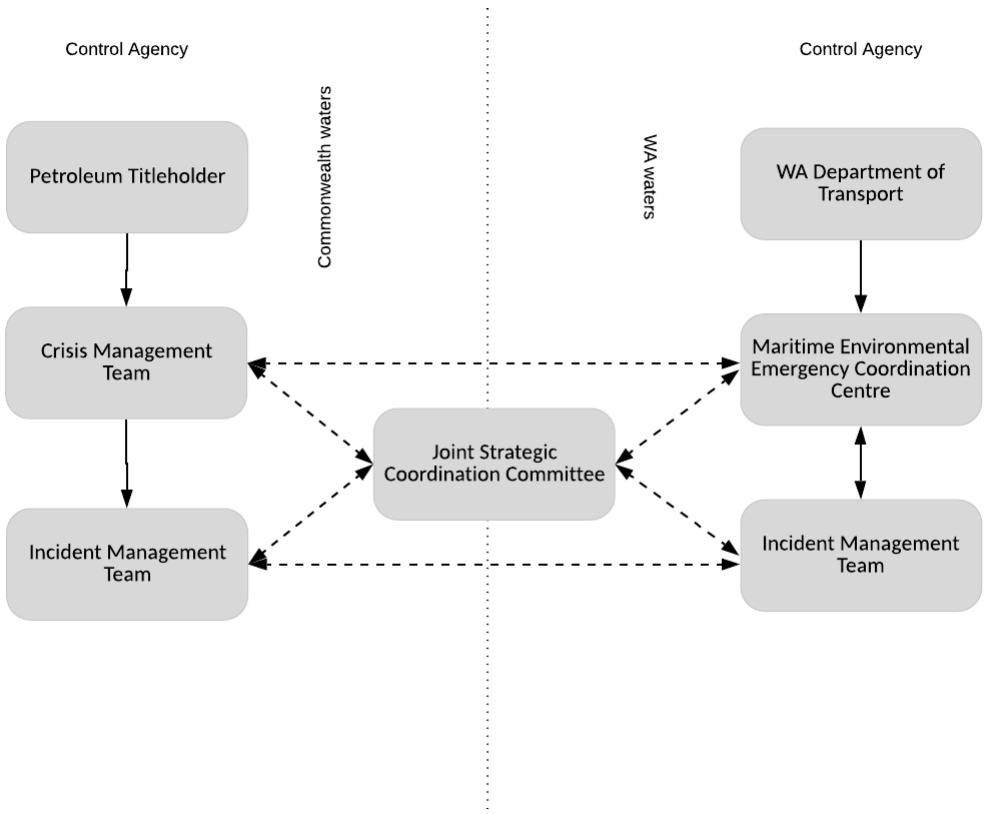


Figure A7- 1: Cross Jurisdictional Control Agency Arrangements (WA waters)

5. Risks

The Jadestone incident management process is based around the organisation being able to understand and respond to all hazards, natural and human-induced incidents, including those which may not have been experienced by the organisation. Hazards and safeguards are identified and recorded within respective risk registers. Potential causes and preventative measures are identified for each hazard; qualitative assessments of the consequences and likelihood are undertaken, and detection, protection, mitigation and recovery systems are defined.

In addition, the risk management process will also define and describe the following:

- Major Accident Events (MAE);
- Safety Critical Elements (SCE); and

Performance Standards (PS).

6. Incident Management Structure

Jadestone utilizes a tiered incident response structure to deal with and manage "incidents" associated with each of the organisation's risks. This structure is activated progressively, from business as usual, facility-based Incident Response Team (IRT), shore-based Incident Management Team (IMT), then if required to the corporate Group Crisis Team (CGT).

The incident management process and structure support all of Jadestone's activities and provides guidance to the IMT when activated. Figure A7-2 illustrates this structure and the primary areas of focus at each level.

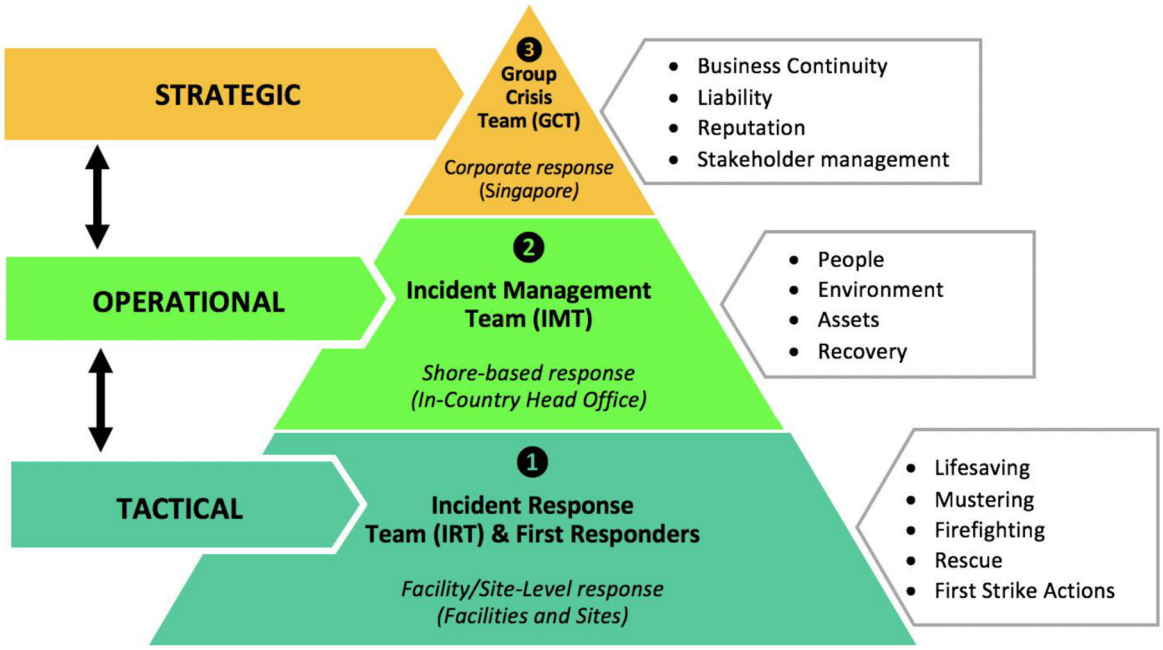


Figure A7-2 : Jadestone Incident Response Structure

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

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

6.1 Incident Response Teams – Tactical Level

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

Offshore Facility emergencies and incidents will be managed and coordinated by an On-Scene Commander (OSC); usually supported by an Incident Controller (IC) – *specific details relating to the Incident Response Team (IRT) is contained within respective facility response procedures or plans.*

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

6.2 Incident Management Team – Operational Level

An operational level response, and an IMT will generally be required for the following:

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

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

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

6.3 Group Crisis Team – Strategic Level

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

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

7. Incident Management

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

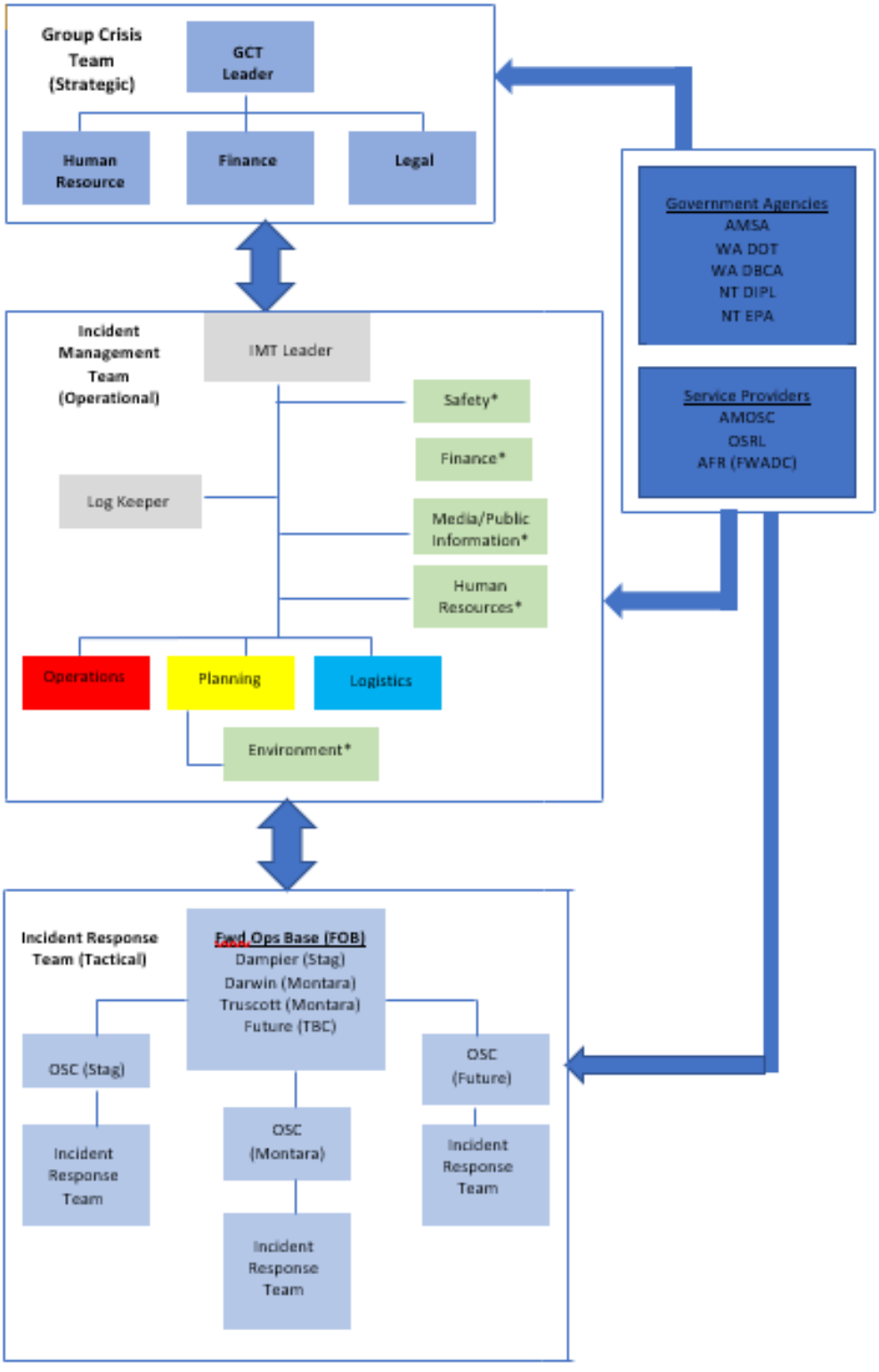
The Jadestone incident management system defines and standardises the organisational processes and structures to enable transition from reactive to proactive and ensure integration of the organisation and all other stakeholders while promoting successful incident management and coordination.

The IMT Leader will decide whether a full or partial mobilisation is required depending on the nature of the incident and the level of support required by the OSC during the initial period of the incident. The standard Jadestone incident management organisational structure is shown in Figure A7-3.

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

Jadestone will also consider the activation of regional operational centre or a Forward Operations Base (FOB) to assist with oil spill response. The local of a regional operational centre or FOB will depend upon the nature, direction and extent of any spill. The preferred locations would be Dampier (for Stag) as there is an excellent port, and ready access to airport and medical facilities, however Broome and potentially Truscott could be used.

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



*Note: Key support functions to the IMT (Environment, Safety, HR, Finance and Public Information) are activated if required and coordinated by a suitable qualified/competent lead or outsourced to a third-party provider

Figure A7-3: Jadestone Incident Management Structure

7.1 IMT Activation Process

The notification and activation of IMT members is by direct telephone call to the individual, following declaration by the IMT Leader. The IMT Leader will specify the location and the time at which the team is to convene. The activation process is illustrated in Figure A7-4.

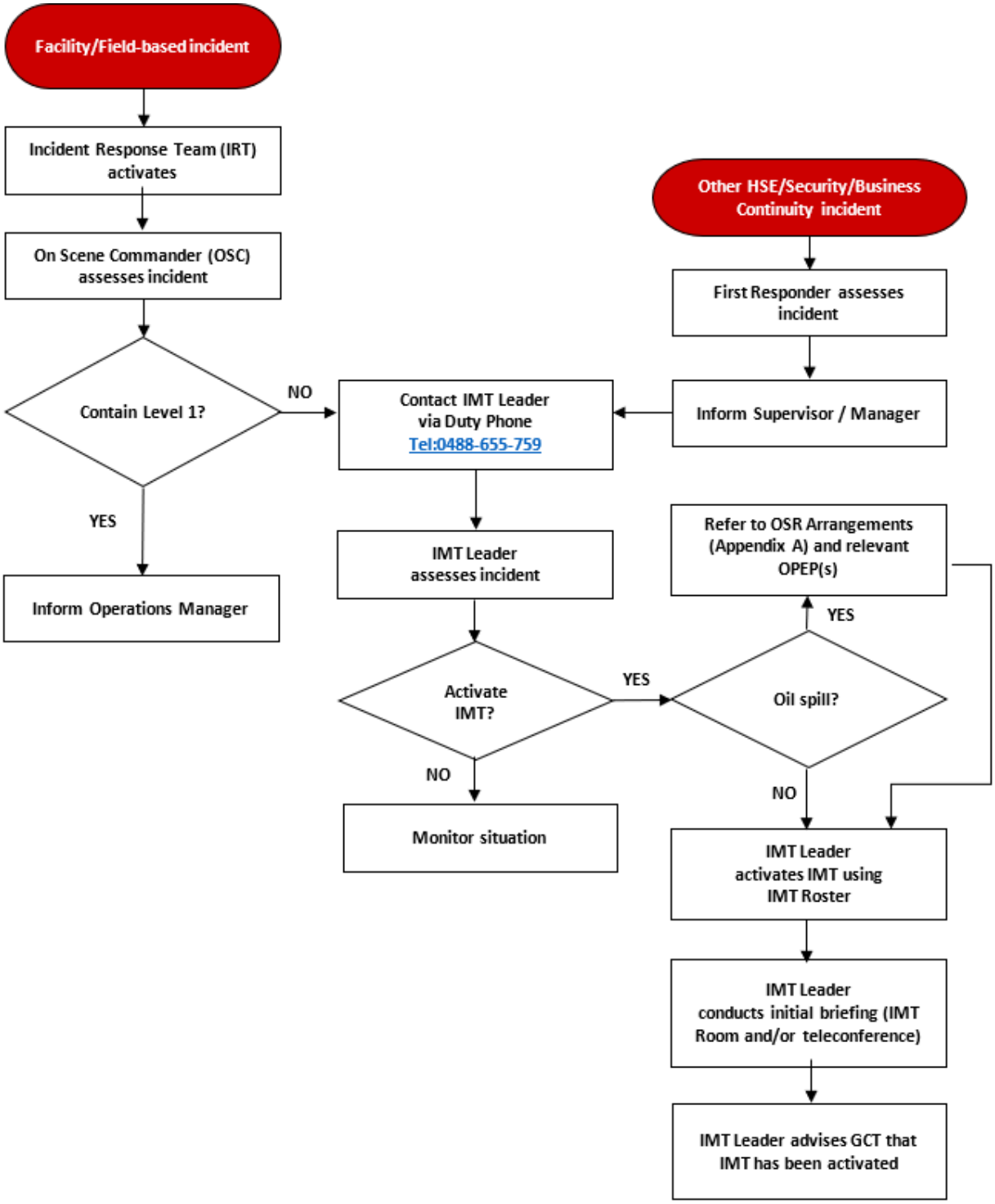


Figure A7-4: Incident activation process

7.2 Forward Operating Base (FOB)

In the event of a major incident, it is intended that facilities to support the Command & Control of response operations will be required in designated locations relevant to the respective Jadestone operation or location of the incident. Depending on the nature and scale of the incident, a Forward Operating Base (FOB) can be established in close proximity to the incident. The generic structure for the establishment of an FOB will be as shown in Figure A7-5.

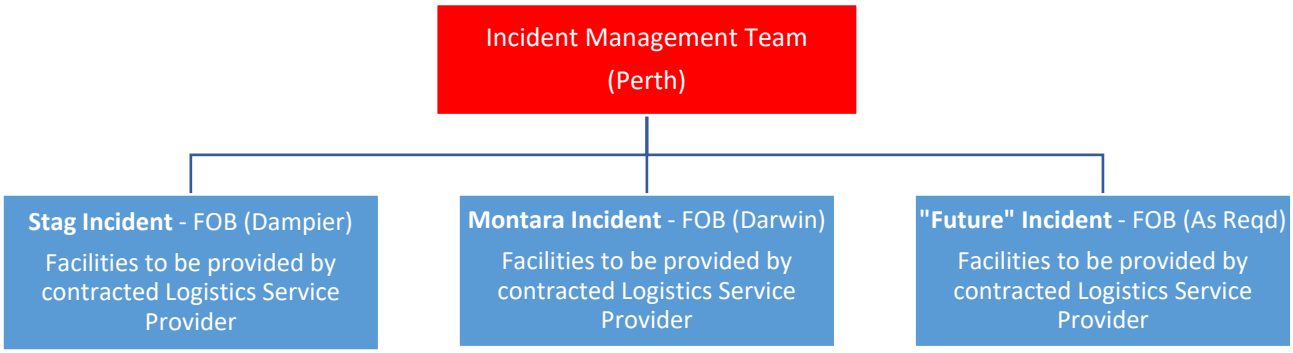


Figure A7-5: Guidance on the establishment of an FOB for an incident

The following facilities and services will be required to support the establishment of the FOB:

Forward Operating Base Supported by the Jadestone contracted logistic service provider (Dampier/Darwin)	- Conference room facilities for briefings/meetings - Telephone/Video conference capability - Communication facilities (radio/sat phone) - Break-out room facilities - Provision of internet/Wi-Fi access - Ability to access Jadestone IMS - Catering and domestic services - Access to logistical lay-down area - Access to marine/port service providers

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

A dedicated communication strategy in support of response operations will also be developed to support the functionality of the FOB.

FOB Integration with State/Territory - Depending on the nature of the incident, the FOB may be co-located with a State/Territory FOB activated in response to the incident. Information with respect to cross-jurisdictional arrangements are provided in the IMTRP Appendix A**.**

Personnel requirements to support the functionality of the FOB will be determined at the time and will be based around the nature of the incident, location and any requirements associated with State/Territory interaction.

7.3 IMT and FOB External Support Arrangements

The IMT Leader may activate external support if required, to assist with Jadestone incident response activities. Support to the IMT and/or FOB can be provided by the external agencies/organisations listed in Table A7-2.

Table A7-2 External support agencies/organisations for the IMT

Organisation	Types of services available	Arrangement
Australian Marine Oil Spill Centre (AMOSC)	Oil spill response resources (IMT/FOB staff, equipment, technical advice) – Australian based	Master Service Contract
Other Operators	Trained personnel in support of IMT/FOB (Mutual Aid)	AMOSPlan
Jacobs	Implementation of Scientific Monitoring Plan (oil spill response)	Contract
CHC Helicopters / Babcock	Provision and coordination of aviation support	Contract
Transport Service Provider	Provision of logistical support (road transport)	Contract
North West Alliance / Cleanaway	Provision of waste management support	Contract
Australian Maritime Safety Authority (AMSA)	Access to National Plan resources (personnel, equipment, technical advice) for oil spill response	MOU

8. IMT Roles and Responsibilities

The following tables (Tables A7-3 to Tables A7-7) describe the roles and responsibilities of IMT Lead roles. Specific information relating to the Group Crisis Team (GCT) and the Incident Response Team (IRT) roles and responsibilities are provided in respective crisis management and incident response plans.

Table A7-8 outlines the key roles and responsibilities of Jadestone personnel required to be positioned in the State Maritime Environmental Emergency Coordination Centre (MEECC)/ DoT IMT in the event of a Level 2/3 spill. Table A7-9 outlines the roles and responsibilities of DoT personnel to be positioned within Jadestone's IMT. Duty Cards for all roles are provided in the IMTRP Appendix B – IMT Duty Cards.

Table A7-3: IMT Leader Key Roles and Responsibilities

Incident Management Team (IMT) Leader
Role • Overall responsibility for the management of all activities and personnel deployed to resolve the incident • Establishment of systems and procedures for the safety, health, and welfare of all response personnel and members of the public who may be involved at an incident • Issuing of warnings and incident information to the public and affected stakeholders • Management of the relationship with agencies and people affected, or likely to be affected, by the incident • Liaison with the Marine Pollution Controller, when activated, to ensure the response is managed and coordinated effectively and appropriately within senior levels of supporting agencies and government. Responsibilities • Take charge and exercise leadership, including the establishment of the incident management structure • Set objectives for the incident response, considering the safety of all personnel as a priority • Develop and approve plans and strategies to control the incident • Implement the IAP and monitor its progress • Provide information and warnings to communities so that they can make informed decisions • Establish effective liaison and cooperation with all relevant agencies, affected communities and others external to the IMT • Obtain and maintain human and physical resources required for the resolution of the incident • Apply a risk management approach, and establish systems and procedure for the safety and welfare of all response personnel • Ensure effective communications with the GCT Leader, when activated • Ensure appropriate financial delegations are in place and these delegations are made known to the appropriate response personnel. • Ensure relief and recovery considerations are addressed • Ensure collaborations between all organisations supporting the response

Table A7-4: Operations Lead Key Roles and Responsibilities

Operations Lead
Role • Managing and supporting the Division or Sector Commanders or Functional Unit Coordinators • Providing advice and direction to the Division or Sector Commanders or Functional Unit Coordinators • Undertaking strategic planning • Briefing the IMT Leader and IMT • Maintaining effective communications within the Operations Section and with other sections • Issues resolution • Implementation of strategies to resolve the incident • Management of all activities that are undertaken directly (in the field) to resolve the incident • Management of all resources (people and equipment) assigned to the Operations Section Responsibilities • Obtain a briefing from the IMT Leader or the position that you report to • Establish the Operations Section appropriate to the size and complexity of the incident • Appoint unit coordinators as required and delegate tasks • Manage the personnel within the Operations Section • Adjust the structure of the Operations Section throughout the incident • Provide a safe working environment for personnel within the Operations Section • Establish and maintain a log of activities and decisions for the Operations Section • Communicate Section performance to the IMT Leader or the position you report to • Prepare shift handover and brief incoming Operations Officer • Manage the continuity of Operations activities across shift changes

Table A7-5: Logistics Lead Key Roles and Responsibilities

Logistics Lead

Role
• Providing support for control of the incident through the organisation and provision of:
  ○ Human and physical resources
  ○ Facilities, services and materials
• Providing support and control for the demobilisation of equipment and services
Responsibilities
• Obtain a briefing from the IMT Leader or the position that you report to
• Establish the Logistics Section appropriate to the size and complexity of the incident
• Appoint unit coordinators as required and delegate tasks
• Manage the personnel within the Logistics Section
• Adjust the structure of the Logistics Section throughout the incident
• Provide a safe working environment for personnel within the Logistics Section
• Establish and maintain a log of activities and decisions for the Logistics Section
• Communicate Section performance to the Incident
• Manage the continuity of Logistics activities across shift changes

Table A7-6: Planning Lead Key Roles and Responsibilities

Planning Lead
Role • Evaluation and analysis of intelligence on the current and forecast situation • Preparation of options analysis, and development of incident objectives and strategies • Undertake risk assessments • Preparation and distribution of the IAP, monitor and review the IAP implementation • Development of a Communications Plan for the incident (as part of the IAP) & other plans as required • Collection and maintenance of information on resources allocated to the incident • Provision of management support services Responsibilities • Obtain a briefing from the IMT Leader or the position that you report to • Establish the Planning Section appropriate to the size and complexity of the incident • Appoint unit coordinators as required and delegate tasks • Manage the personnel within the Planning Section • Adjust the structure of the Planning Section throughout the incident • Provide a safe working environment for personnel within the Planning Section • Establish and maintain a log of activities and decisions for the Planning Section • Communicate Section performance to the IMT Leader • Prepare shift handover and brief incoming Planning Officer • Manage the continuity of Planning activities across shift changes Checklist • Consider sources of local knowledge and information relevant to the incident. • Identify new and emerging risks for the incident and address these in the IAP • Monitor effectiveness of risk mitigation strategies • Provide strategic advice to the IMT based on information received • Complete the Net Environmental Benefit Analysis (NEBA) • Schedule and conduct meetings for the IMT and the Planning Section • Prepare the IAP for the next operational period and any longer-term planning required • Disseminate the IAP throughout the incident management structure • Develop changeover and demobilisation plans and manage their implementation • Develop and review the Communications Plan and its implementation • Develop and maintain an effective register of all resources, required, en route, allocated to and released from the incident • Regularly communicate progress of strategies and the IAP to the IMT Leader • Provide management support services (radio, telephone, computer operators, support in information transfer within the IMT and administrative support) • Collect, collate and store incident records • Maintain a personal log of activities and decisions made • Conduct handover briefing

Table A7-8: Roles and Responsibilities of Jadestone Personnel Positioned in State Maritime Environmental Emergency Coordination Centre (MEECC)/ DOT IMT

Key Roles	Responsibilities
CST Liaison Officer	Provide a direct liaison between the Jadestone and the State MEECC Facilitate effective communications and coordination between the Jadestone CMT Leader and the State Maritime Environmental Emergency Coordinator (SMEEC) Offer advice to SMEEC on matters pertaining to Jadestone crisis management policies and procedures
Deputy Incident Officer	Provide a direct liaison between the DoT IMT and the Jadestone IMT Facilitate effective communications and coordination between the Jadestone IMT (W) Leader and the DoT Incident Controller Offer advice to the DoT Incident Controller on matters pertaining to the Jadestone incident response policies and procedures Offer advice to the Safety Coordinator on matters pertaining to Jadestone safety policies and procedures particularly as they relate to Jadestone employees or contractors operating under the control of the DoT IMT
Intelligence Support Officer	As part of the Intelligence Team, assist the Intelligence Officer in the performance of their duties in relation to situation and awareness Facilitate the provision of relevant modelling and predications from the Jadestone IMT Assist in the interpretation of modelling and predictions originating from the Jadestone IMT Facilitate the provision of relevant situation and awareness information originating from the DoT IMT to the Jadestone IMT Facilitate the provision of relevant mapping from the Jadestone IMT Assist in the interpretation of mapping originating from the Jadestone IMT Facilitate the provision of relevant mapping originating from the Jadestone IMT
Deputy Planning Officer	As part of the Planning Team, assist the Planning Officer in the performance of their duties in relation to the interpretation of existing response plans and the development of incident action plans and related sub plans Facilitate the provision of relevant IAP and sub plans from the Jadestone IMT Assist in the interpretation of the Jadestone OPEP from Jadestone Assist in the interpretation of the Jadestone IAP and sub plans from the Jadestone IMT Facilitate the provision of relevant IAP and sub plans originating from the DoT IMT to the Jadestone IMT Assist in the interpretation of Jadestone's existing resource plans Facilitate the provision of relevant components of the resource sub plan originating from the DoT IMT to the Jadestone IMT

Key Roles	Responsibilities
	(Note this individual must have intimate knowledge of the relevant Jadestone OPEP and planning processes)
Environmental Support Officer	As part of the Planning Team, assist the Environmental Officer in the performance of their duties in relation to the provision of environmental support into the planning process Assist in the interpretation of the Jadestone OPEP and relevant TRP plans Facilitate in requesting, obtaining and interpreting environmental monitoring data originating from the Jadestone IMT Facilitate the provision of relevant environmental information and advice originating from the DoT IMT to the Jadestone IMT
Public Information Support & Media Liaison Officer	As part of the Public Information Team, provide a direct liaison between the Jadestone Media team and DoT IMT Media team Facilitate effective communications and coordination between Jadestone and DoT media teams Assist in the release of joint media statements and conduct of joint media briefings Assist in the release of joint information and warnings through the DoT Information & Warnings team Offer advice to the DoT Media Coordinator on matters pertaining to Jadestone media policies and procedures Facilitate effective communications and coordination between Jadestone and DoT Community Liaison teams Assist in the conduct of joint community briefings and events Offer advice to the DoT Community Liaison Coordinator on matters pertaining to Jadestone community liaison policies and procedures Facilitate the effective transfer of relevant information obtained from through the Contact Centre to the Jadestone IMT
Deputy Logistics Officer	As part of the Logistics Team, assist the Logistics Officer in the performance of their duties in relation to the provision of supplies to sustain the response effort Facilitate the acquisition of appropriate supplies through Jadestone's existing OSRL, AMOSC and private contract arrangements Collects Request Forms from DoT to action via the Jadestone IMT (Note this individual must have intimate knowledge of the relevant Jadestone logistics processes and contracts)
Deputy Operations Officer	As part of the Operations Team, assist the Operations Officer in the performance of their duties in relation to the implementation and management of operational activities undertaken to resolve an incident Facilitate effective communications and coordination between the Jadestone Operations Section and the DoT Operations Section Offer advice to the DoT Operations Officer on matters pertaining to Jadestone incident response procedures and requirements

Key Roles	Responsibilities
	Identify efficiencies and assist to resolve potential conflicts around resource allocation and simultaneous operations of Jadestone and DoT response efforts
Deputy Waste Management Coordinator	As part of the Operations Team, assist the Waste Management Coordinator in the performance of their duties in relation to the provision of the management and disposal of waste collected in State waters Facilitate the disposal of waste through Jadestone's existing private contract arrangements related to waste management and in line with legislative and regulatory requirements Collects Waste Collection Request Forms from DoT to action via the Jadestone IMT
Deputy Finance Officer	As part of the Finance Team, assist the Finance Officer in the performance of their duties in relation to the setting up and payment of accounts for those services acquired through Jadestone's existing OSRL, AMOSC and private contract arrangements Facilitate the communication of financial monitoring information to the Jadestone to allow them to track the overall cost of the response Assist the Finance Officer in the tracking of financial commitments through the response, including the supply contracts commissioned directly by DoT and to be charged back to Jadestone
Deputy On Scene Commander (FOB)	Provide a direct liaison between Jadestone's Forward Operations Base/s (FOB/s) and the DoT FOB Facilitate effective communications and coordination between Jadestone On Scene Commander and the DoT On Scene Commander Offer advice to the DoT On Scene Commander on matters pertaining to Jadestone incident response policies and procedures Assist the Safety Coordinator deployed in the FOB in the performance of their duties, particularly as they relate to Jadestone employees or contractors Offer advice to the Safety Coordinator deployed in the FOB on matters pertaining to Jadestone safety policies and procedures

Table A7-9: Roles and Responsibilities of DoT Personnel to be Positioned in Jadestone's IMT/CMT

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

9. Incident Assessment & Orientation

The IMT Leader is to lead and manage the IMT in responding to all incidents, with their priority being to provide support and/or assistance to the facility or associated Jadestone activity.

9.1 Understand & Assess the Situation

The IMT Leader is to coordinate personnel in understanding and assessing the situation with consideration given to the following:

- Size, scope, effect, or potential effect of the incident on:

  People, Environment, Assets, Reputation, Livelihood (PEARL)

  Consultation with the GCT with respect to Recovery/Business Continuity;

- Capture information relating to:

  Incident history and responses already taken

  Current response actions

  Confirmation of spill level

  Other response organisations that are activated

9.2 Initial Briefing

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

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

- Outline of incident;
- need to confirm spill level;
- Actions taken at the tactical level prior to activation;
- Overarching intention with respect to IMT actions; and
- Provision of initial actions to be taken by the IMT.

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

9.3 Notifications

Depending on the type and nature of the incident various internal and external notifications will be required. It is therefore vitally important to ensure that accurate and timely information is captured and that situational awareness is achieved quickly. The IMT Leader must ensure that notifications (where required) are completed and managed as part of an ongoing incident.

IMT Leader should notify the Country Manager of the event within one hour of receiving initial call. As situational awareness id gained, the incident/spill level is reassessed by the IMT Leader. Specific guidance relating to the regulatory notifications required during an oil spill incident are provided at:

- Appendix A of the IMTRP (Oil Spill Response Arrangements); and
- Oil Pollution Emergency Plans (OPEP) (this document).

10. Oil Spill Response Cycle

It is the function of the On-Scene Commander (OIM or Vessel Master for Level 1 incidents) or the IMT Leader (Levels 2) to assess the incident and respond as per the procedures outlined in the Jadestone IMTRP (JS-70-PLN-F-00008). The following sections describe the methods to assess oil spill response priorities.

10.1 Gaining Situational Awareness

The IMT needs to review the applicability of the response strategies contained within OPEPs to the actual incident characteristics. This is achieved using operational monitoring to gain situational awareness and obtain answers to the following:

- What type of hydrocarbon has been spilt?
- What is the expected behaviour of the hydrocarbon that has been spilt?
- How much has been spilt?
- Is the source under control?
- Where is the hydrocarbon going?
- Is there anything in the path of the predicted hydrocarbon travel zones?
- Can the hydrocarbon be approached or are there safety concerns?
- Can the hydrocarbon be contained?
- Can the hydrocarbon be dispersed?
- Will shoreline impact occur and clean-up be required?
- Will wildlife be affected and require response?

10.2 Assess Appropriate Strategies

Identify and assess known response strategy activities against the criteria detailed below using NEBA:

- Applicability of the response strategy to the range of credible spills (as detailed in the OPEP), including the potential effectiveness of the response in managing the environmental risks associated with each spill.
- Acceptability of the response strategy in relation to the potential environmental impact caused by the implementation of the response.

10.3 OPEP Actions Tables

The Action Tables detailed in the facility specific OPEPs have been developed to assist the IMT in commencing an oil spill response. They have been developed 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.

Models 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 described in the facility specific OPEPs are assessed using a NEBA process so the most effective response strategies with the lowest environmental consequences can be identified, documented and prepared for.

Jadestone uses a planning process based on risk-based scenario planning which required the team to:

- Understand the hazard profile;
- Identify parameters to assess applicable response strategies and scale of the event & suitable response strategies;

- Understand the impacts associated with response strategies; and
- Ensure capability supports management of risks to ALARP.

The outcome of this approach is that oil spill hazards associated with Jadestone's activities are addressed and risks are managed to ALARP; and that response strategies and resources are based on the nature and scale of the incident.

Spill response planning to identify a suitable combination of response strategies involves estimating required resources based on potential effectiveness. Capability to support the minimum resources required has been planned for and is presented in each facility specific OPEP**.**

10.4 Incident Action Plan

The Incident Action Plan (IAP) formally documents and communicates the:

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

It is the responsibility of the IMT to evaluate the response strategies provided in the OPEP based on real time information. The actual response may not always adopt all response options; this is outcome based depending on the circumstances that will produce impacts that are ALARP. The process implemented throughout the response by the IMT to assess the appropriate response strategies and implement these in a controlled manner to ensure the health and safety of operational personnel and effectiveness in response is the Incident Action Planning (IAP) process.

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

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

10.5 Monitoring Performance of IAP

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

The performance objectives and standards for response strategies and tactics are documented in the IAP. Performance against the objectives and standards are assessed through field observations and response monitoring and recorded in the IAP in the next operational period. Through this method, the performance measurement results (gathered from scientific reports and verbal communication/ logs/ photos/ reports provided by response Team Leaders) are fed back into the IMT to provide the IMT with greater situational awareness to enable the effective formulation of following IAPs i.e. the response strategies that are effective in obtaining the IAP objectives are continued or increased, while ineffective strategies are scaled back or ceased.

8.4 Net Environmental Benefit Analysis (NEBA)

The IMT use NEBA to inform the development and refinement of IAPs, so the most effective response strategies with the least detrimental environmental impacts can be identified, documented and executed. The Planning Lead is responsible for reviewing the priority receptors identified within the EP and OPEP and

application of the NEBA to identify which response options are preferred for the situation, oil type and behaviour, environmental conditions, direction of plume and priorities for protection. The EP describes the Strategic NEBA which has directed the selection of response strategies in this OPEP to the sensitivities of the priority receptors.

When a spill occurs, NEBA is applied to the current situation, or operationalised, using the Operational NEBA'S provided in the IMTRP Appendix D – Operational NEBA Form.

- All ecological and socioeconomic sensitivities identified within the spill trajectory area are inserted; and
- Potential effects of response strategies on each sensitivity are assessed and assigned a positive, negative or no change rating.

The Operational NEBA Form documents the decisions behind the recommendation to the IMT Leader on which resources at risk to prioritise, and the positives and negatives of response strategies to deploy.

To maintain flexibility, response information is used by the IMT to redefine and revalidate the operational NEBA on a daily basis and is fed into the IAP process. Sources of data for the NEBA include:

- Vessel & aerial surveillance;
- Ongoing operational oil and oil in water monitoring (visual);
- Trajectory modelling;
- Tracking Buoy location updates;
- Satellite imagery (if required);
- UAV imagery (if required);
- Fluorometer readings (Entrained oil monitoring);
- Weather and ocean conditions;
- Source Control reports;
- Megafauna Reports;
- Containment and recovery boom effectiveness (m^3/day);
- Skimmer effectiveness (m^3/day and water cut);
- Nearshore ocean currents and tides (direction & strength);

Shoreline Assessment reports;

Oiled wildlife response reports; and

- Scientific monitoring reports.

The NEBA matrix table prioritises environmental sensitivities and assesses the individual net effect that each response option may have on it. This process enables the trade-off effect to be achieved and provides the ability for an informed decision to be made. NEBA is an integral part of the decision-making process and will ultimately result in a trade-off between priorities and response strategies. The outcome of the response however will result in an overall net environment benefit.

10.5 Further IMT Management Guidance

Further guidance on Jadestone IMT and response strategies are detailed in the IMTRP and supporting documentation. This is a controlled document and restricted to Jadestone. Refer to Jadestone Energy management information system for further details.

11. IMT Training and Competency

Jadestone IMT leads will undertake training in their respective roles and responsibilities as provided by an Australian Registered Training Organisations (RTO) or internationally accredited training provider. In addition, internal drills/exercises to demonstrate competency are undertaken as per the Incident Management Exercise and Testing Program (JS-70-PR-F-00001) and are outlined in the IMTRP.

Competencies for IMT members will be maintained and managed by the HSE (ERL). Training requirements and core competencies for Jadestone key IMT response staff are outlined in Table A7-10.

Table A7-10: IMT Roles – Training and Competency Requirements

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

Priority Levels - (1) Pre-join; (2) 0-3 months; (3) 0-12 months
Key: M – mandatory R – recommended
***** - to participate **or** be an observer in a minimum of one drill per year
****** - to attend a minimum of one within the 3 year IMO certification period
******* to attend a minimum of three per year pro rata from starting time

11.1 IMT Exercise and Testing Program

As described in the IMTRP, over the course of a 3-year period it is intended that all major incident events including key MAEs and oil spills will be exercised using a stand-alone IMT drill or as part of an annual functional exercise. The annual oil spill exercise will alternate between offshore facilities.

Additionally, the cycle will serve to test the incident management system arrangements that support

Australian operations.

Specific work instructions supporting each activity can be found in the Appendices as listed in Table A7-11.

All IMT personnel shall make themselves available to participate in exercises, training, competency reviews and workshops wherever practical.

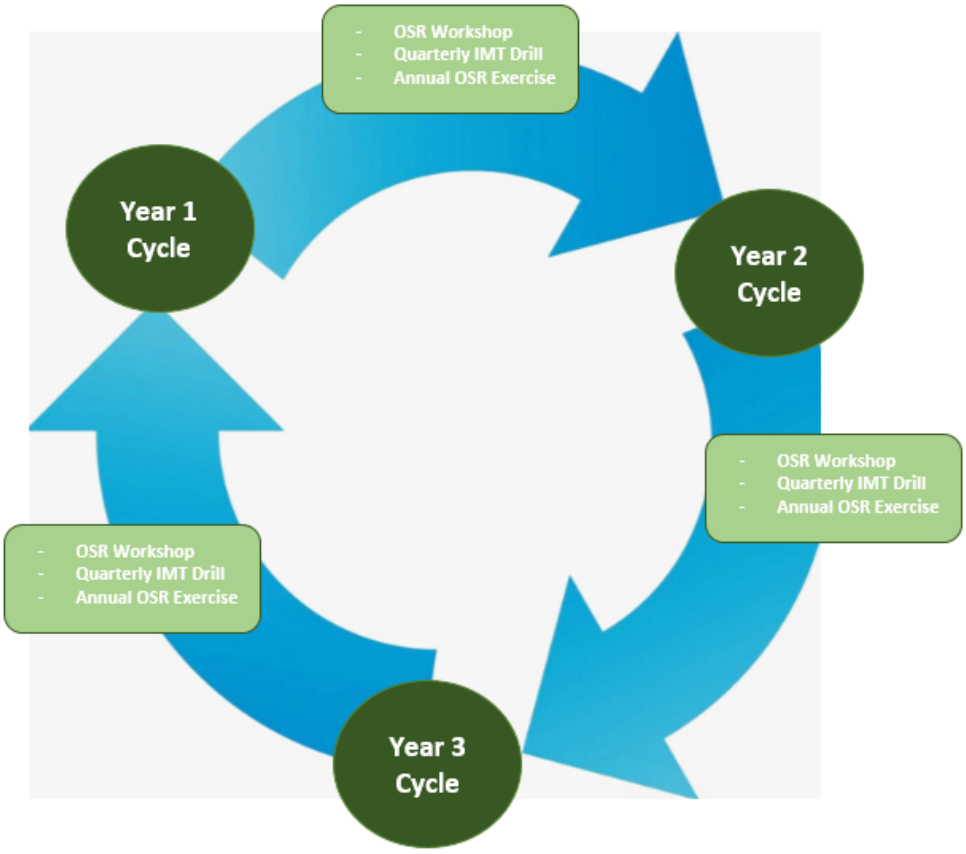


Table A7-11: Jadestone Emergency Management Exercise and Testing Program

Exercise/Test	Aim	Key Testing Objectives	Schedule	Testing Mechanism	Appendix
Jadestone Incident Management Team Introduction	Introduce the Jadestone incident management system	Familiarisation with Jadestone's: - risks and hazards - Incident management team structure/process - Oil spill response arrangements - Oil spill response strategies - Information management system	As part of IMT onboarding process.	All attendees to complete online assessment questionnaire Completion captured in Training Management System	B
IMT Duty Roster Orientation	Introduce the IMT Duty rostering expectations	Participants demonstrate knowledge and understanding of systems and processes relevant to being on the IMT Duty Roster including: - Key Jadestone Documents - ICC room contents and set up - Duty Card awareness - IMT Duty Handover meetings - OneNote - IMT Duty Roster scheduling and responsibilities - IMT Exercise requirements	As part of IMT onboarding process.	Knowledge demonstrated through feedback in orientation and satisfactory responses from verbal questioning	C
IMT Oil Spill Response Workshop (Annual)	Familiarise attendees with Jadestone's OPEP's, roles and responsibilities of the IMT functional teams and oil spill response planning requirements.	Understand Jadestone's OPEPs: - Risks / Credible scenarios - Response strategies and arrangements - IMT roles and responsibilities - Incident Action Plan (IAP) - NEBA	Annually; or When response arrangements are introduced/significantly amended; or After a significant change to the OPEP profile	Scenario based questionnaire specific to OPEP Completion recorded in BASSnet Facilitator/Assessor – Emergency Response Lead	D

Exercise/Test	Aim	Key Testing Objectives	Schedule	Testing Mechanism	Appendix
IMT MAE Drill (Quarterly)	Test IMT ability to respond to an incident (MAE) in support of an operational facility.	Test initial actions by the IMT in response to activation by ERT Test communications between ERT/IMT/GCT Test notifications (scenario dependant) Test IMT planning ability in response to MAE	To be conducted on a quarterly basis covering MAE and OSR events on a three-year exercise cycle, alternating between offshore facilities. Conducted with interaction between ERT (Facility), IMT (Perth) & GCT (Singapore)	Facilitator – Emergency Response Lead + external support (as required) Completion recorded in BASSNet Assessment – Emergency Response Lead + external support (as required)	E
Oil Spill Refresher (Quarterly)	Provide guidance on bespoke oil spill actions / tasks	Participants demonstrate knowledge and understanding of systems and processes relevant to bespoke IMT oil spill response actions including: - Understanding and preparation of a NEBA - Development and Implementation of IAP - Understanding and value of OSTM - Consistency for keeping logs	Four per year to be conducted	Knowledge demonstrated through feedback in orientation and satisfactory responses from verbal questioning	F
Oil Spill Response Functional Exercise (Annual)	Test Jadestone's ability to manage and coordinate oil spill response operations	Test the chain of command, communications, notifications, processes and procedures in accordance with relevant OPEP Test mobilisation and activation of resources in support of response arrangements Test Jadestone ability to respond to credible level 2/3 oil spill	Annually – to be based on Loss of Hydrocarbon event in accordance with a three-year exercise cycle, alternating between offshore facilities.	AMOSC and/or other suitable service provider to develop and facilitate exercise, and provide detailed report outlining success against objectives. Recommendations for improvements to be provided. Completion recorded in BASSnet.	G

13. Scientific Monitoring

Scientific monitoring activities are the principle tool for monitoring environmental impacts from hydrocarbon exposure and allows operators to determine when their termination goals have been met during a response. Jadestone has prepared the Framework for Scientific Monitoring GF-70-PR-I-00035 (the Framework) to guide scientific monitoring activities in an oil spill response.

13.1 Objectives

The objective of the Framework is to describe scientific monitoring studies to quantify impacts to the environment and their subsequent recovery.

13.2 Industry Guidelines

The NOPSEMA *Information Paper N-04750-IP1349: Operational and Scientific Monitoring Programs (OSMPs)* sets out general principles and practical advice to assist operators in their planning for, and application of, fit-for-purpose SMPs.

Features of these documents have provided the basis for which the Framework has been developed, with specific guidance utilised in the development of the monitoring program designs and application considerations.

13.3 Monitoring Background

Scientific monitoring activities have very different objectives to operational monitoring which significantly influence the monitoring methods likely to be used, the degree of scientific rigour required to meet the monitoring objectives, and the scope of studies.

Operational monitoring is monitoring undertaken in OPEPs to obtain information which will assist in the planning and execution of the oil spill response. Scientific monitoring is undertaken to provide indicative or quantitative data for short term and longer-term environmental effects assessment. Table A7-12provides the characteristics of each of the monitoring types.

Table A7-12: Characterisation Summary of Spill Monitoring Types

Monitoring Classification	Character / Criteria
Operational	• Results required short term; • Lower requirement for statistical strength; • Lower requirement for the identification of control sites or to demonstrate baseline conditions; • Concentration on key habitats or species that are indicators of biological community health, are of particular value or have slow recovery times; and • Includes monitoring to help predict environmental effects or define the sensitivity of resources to guide spill response actions.
Scientific	• May be longer-term studies and monitoring may extend beyond the time and location of the clean-up response; • Need for high statistical strength (e.g. potentially large number of samples or sample sites); and Need for high quality ‘control’ areas.

13.4 Revision of Monitoring Programs

Following a hydrocarbon spill, subsequent impacts to sensitive receptors will be apparent (e.g. oiling of habitats/fauna visible; surveillance activities confirm contact over time at receptor locations). Therefore, the requirement for long-term monitoring will be based on the nature of the spill and monitoring data collected for the short-term phase on the impact and recovery of sensitivities impacted.

Scientific monitoring activities will be assessed for their applicability and organised by the Environmental Team Lead. Using surveillance and spill fate modelling information collected as part of the operational monitoring, the IMT will assess and decide on the final suite of scientific response monitoring programs. **Table A7-13** describes the linkages between the OMPs and the SMPs.

Table A7-13: Matrix of SMPs Triggered by OMPs

Operational Monitoring Strategy	SMP1	SMP2	SMP3	SMP4	SMP5	SMP6	SMP7	SMP8
Satellite tracking buoy	X	X	X	X	X	X	X	X
Aerial surveillance	X	X	X	X	X	X	X	X
Vessel surveillance		X	X	X	X	X	X	X
OSTM	X	X	X	X	X	X	X	X
Fluorometry	X						X	X
Shoreline habitat assessment		X	X	X	X	X	X	

SMP1 – Water Quality

SMP2 – Sediment Quality

SMP3 – Intertidal Mudflats, Sandy Beaches and Rocky Shores

SMP4 – Mangroves

SMP5 – Benthic Habitats

SMP6 – Marine Fauna

SMP7 – Seafood Quality, Fisheries and Aquaculture

SMP8 – Fish, Invertebrates (Crustaceans and Cephalopods)

13.5 Scientific Response Monitoring Service Providers

During and post a spill requiring scientific response, monitoring activities require resources external to Jadestone which include specialist technical capabilities. Jacobs is Jadestone's primary support agency for scientific response monitoring activities. Jacobs has an Operational and Scientific Monitoring Program – Implementation Plan which outlines how Jacobs will coordinate its response arrangements for Jadestone including procedures, logistics and coordination, resourcing and preliminary study specifications.

Jacobs can increase resourcing for SMPs through the hiring of personnel and equipment through sub-contracted companies, as may be required to provide for the varied disciplines and fields of expertise for each of the SMPs, and to accommodate the scaling up of monitoring that may be required as the spatial extent of a spill increases. This is considered normal practice for environmental monitoring providers given the limited ability of any single provider to provide all expertise and equipment across the multitude of marine and coastal scientific disciplines. In support of this requirement Jacob's provide three monthly reporting of available personnel to support Jadestone.

Vessels to mobilise field teams to monitoring sites or for on-water sampling activities will be mobilised through Jadestone existing MSAs through multiple vessel providers. Given that sampling locations for the SMPs would in many instances be coincident to sites targeted for operational monitoring and spill response strategies, there exists opportunities for shared vessel usage during a spill.