Tiered Response Oil Spill Contingency Plan

Azinam

Final. REV 01

Date: 30/09/2022

Well Operator	Azinam (Eco Atlantic)	Prospect	Oil
Latitude	30° 39’ 55.1510” S	Nearest Installation(s)	N/A
Longitude	17° 10’ 40.6033” E	Tier 1 Response Primacy	Island Drilling
MODU/RIG Name	Island Innovator	Tier 2 Response Primacy	Azinam
Partners	Azinam South Africa Limited 50% Africa Energy Corporation 27.5%. Panoro Energy 12.5% Crown Energy 10%	Tier 3 Response Primacy	DoT - SAMSA (offshore) DFFE (Shoreline)
ITOPF Oil Type(s)	Group 2, 36 API	Spill Notification Point	Maritime Rescue Coordination Centre (MRCC) +27 (0)21 938 3300
Worst Case Well Flow Rate	195 BOPD		

Plan Reference: PRJ02728, Rev 01

Prepared By: [redacted] OSRL

Revision 01: [redacted] OSRL

DOCUMENT MANAGEMENT & CONTROL

OSCP Updates

Azinam will review, revise, and update this Tiered Response Oil Spill Contingency Plan (OSCP), for the following reasons:

- If there are any significant changes to any relevant legal requirements.
- When significant changes occur in Azinam business operations, for example:
    - High level organisational restructuring.
    - Significant changes to the risk identified.
    - New operations, move to production.
    - New joint venture partners.
- Significant changes to the exploration drilling programme.
- Significant changes to the risks identified.
- Significant changes in the availability of oil spill response resources.
- Significant changes in the logistical support available.
- Significant changes in environmental and/or socio-economic sensitivities.
- Following oil spill exercises and/or incidents.
- If the document has not been reviewed in 5 years.

NOTE: The DFFE is to be notified of any changes or updates to the plan, which may require further consultation subject to the extent of the changes made.

Document Control

Document Property	Information
Document's Name	Tiered Response Oil Spill Contingency Plan
Client's Company Name	Azinam
Document Status/Version	FINAL / Rev 01
Date of Publication	28/06/2022 (Revision Completed 30/09/2022)
Client's Name Abbreviation	Azinam

Controlled copy holders of this Oil Spill Contingency Plan (OSCP) are detailed below.

CONTROLLED COPY HOLDERS			
Copy Number	**Name/Position of Copy Holder**	**Hard Copy**	**PDF e-copy**
Internal			
1	Offshore Installation Manager (OIM) – Offshore Installation	☐	☐
2	Asset Duty Manager – Onshore Response Centre	☐	☐
3	Standby/Support Vessel Master	☐	☐
4	HSE Manager – Operational Unit	☐	☐
5	Operations Manager – COO or Operations Manager	☐	☐
External			
6	Island Drilling	☐	☐
7	NRG	☐	☐
8	IMOrg	☐	☐
9	DFFE	☐	☐
10	SAMSA	☐	☐
11	PASA	☐	☐
12	Tier 3 Oil Spill Response Service Provider – OSRL Duty Manager	☐	☐

Note: *Hard copies are not controlled, and reference should always be made to the electronic copies for the up-to-date version.*

ABBREVIATION LIST

AMSOL	African Marine Solutions (pty) Ltd
BAOAC	Bon Agreement Oil Appearance Code
BOP	Blowout Preventer
COC	Chain of custody
COO	Chief Operating Officer
CR	Control Room (offshore)
DFFE	Department of Forestry, Fisheries and Environment
DMR	Department of Mineral Resources
DoT	Department of Transport
ERP	Emergency Response Plan
ERR	Emergency Response Room
ERRV	Emergency Response & Rescue Vessel
ESI	Environmental Sensitivity Index
GiWACAF	The Global Initiative for West and Central Africa
GDS	Global Dispersant Stockpile
GOWRS	Global Oiled Wildlife Response System
GRN	Global Response Network
HAZID/ENVID	Hazard identification/Environmental identification
HSSE	Health, Safety, Security and Environment
IAP	Incident Action Plan
ICS	Incident Command Structure
IMO	International Maritime Organisation
IMOrg	Incident Management Organisation
IMT	Incident Management Team
IOGP	International Oil and Gas Producers (the global oil and gas industry trade association)
IOPC	International Oil Pollution Compensation
IPIECA	The global oil and gas industry association for advancing environmental and social performance
ISO	International Organisation for Standardisation
ITOPF	International Tanker Owners Pollution Federation
MDA	International space mission partner and a robotics
MODU	Mobile Offshore Drilling Unit
MRCC	South African Maritime Rescue Coordination Centre
NDMC	National Disaster Management Centre
NEBA	Net Environmental Benefit Analysis
NRG	Well Management Group
OEM	Original Equipment Manufacturers
OIM	Offshore Installation Manager
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation
OSC	On Scene Commander
OSCP	Oil Spill Contingency Plan
OSRA	Oil Spill Risk Assessment
OSRL	Oil Spill Response Limited
PASA	Petroleum Agency South Africa
PDMC	Provincial Disaster Management Centres
PPE	Personal Protective Equipment
PSV	Platform Supply Vessel
PTFE	Polytetrafluoroethylene
RAM	Risk Assessment Matrix
ROV	Remotely Operated Vehicle
RTC	Risk Tolerance Criteria

SA	South Africa
SAF	Sea Alarm Foundation
SANNCOB	The South African Foundation for the Conservation of Coastal Birds
SANParks	South Africa National Parks
SAPS	South African Police Service
SAPIA	South African Petroleum Industry Association
SAMSA	South African Safety Agency
SCAT	Shoreline Clean-up Assessment Technique
SG	Specific Gravity
SIMA	Spill Impact Mitigation Assessment
SLA	Service Level Agreement (with OSRL)
SOPEP	Shipboard Oil Pollution Emergency Plan
SRT	Strategic Response Team
TA	Technical Advisor
TNPA	Transnet National Ports Authority
TPR	Tiered Preparedness and response
TRT	Tactical Response Team
UAV	Unmanned Aerial Vehicles
VOCs	Volatile Organic Compounds

OSRL has produced this OSCP, using the information provided by Azinam.

This OSCP is for guidance purposes and must be tested, exercised and updated by Azinam to ensure its validity during a real incident. OSRL makes no warranties and will not accept any liability in relation to the advice or other information contained in this OSCP or to the merchantability or fitness for a particular purpose. The variables that cause an oil spill and the consequences on the environment can only be addressed on an individual basis.

The OSRL Duty Manager and Technical Advisor are available 24 hours a day, seven days a week, for such advice during the initial and ongoing stages of an incident.

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SCOPE OF THE OSCP

This Tiered Response Oil Spill Contingency Plan (OSCP) provides direction during a potential large oil spill from Azinam operations or facilities. It follows international good practice[1] and the South Africa National OSCP, ISO 15544:2000[2] and the IMO Manual on Assessment of Oil Spill Risk and Preparedness[3]. The tiered preparedness and response framework in this OSCP is consistent with the OPRC Convention[4]. It also follows the guidelines set out by the Petroleum Authority of South Africa (PASA) in their Regulatory Requirements Prior to Commencement of Drilling document. Azinam must have in place an approved OSCP to gain their *Pollution Safety Certificate* issued by SAMSA.

The OSCP provides guidance to spill response personnel related to Azinam exploration drilling operations.

Specifically, this OSCP:

- Provides guidance to the Azinam Tactical Response Team (TRT) and Strategic Response Team (SRT) for the response to, and control of, a hydrocarbon spill associated with operations in South Africa.
- Defines internal and external alerting and notification requirements.
- Sets out roles and responsibilities of key personnel following an oil spill incident.
- Provides guidance in spill assessment and response strategy selection for Azinam TRT and SRT, to protect sensitive areas and to mitigate negative effects.
- Identifies internal and external resources available to implement a spill response and how they should be mobilised.

This OSCP covers the following Azinam exploratory drilling operations in South Africa:

- Drilling: Oil spills arising from exploration drilling activities.
- Ports and Harbours: Oil spills arising from activities associated with ports and harbours.
- Field Support: Oil spills arising from activities involving field support vessels

Refer to: Operational Overview, Section 8 (pg 83) for further operational details.

Use of the OSCP

This OSCP consists of:

- Part 1, Action Plan (Sections 1 to 8) should be used in an emergency.
- Part 2, Reference Information (Sections 9 to 14) is primarily for regulatory approval and justification.
- Azinam OSCP Supporting Documents (Forms and justification)

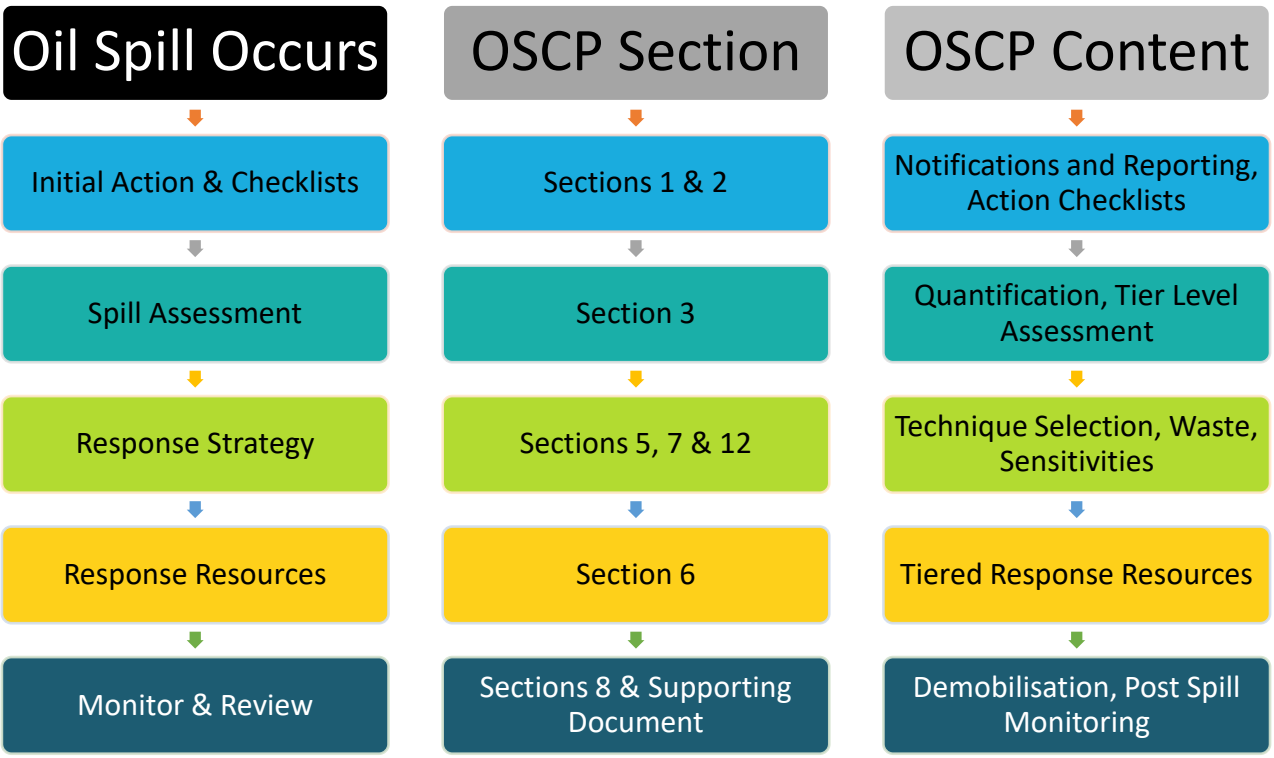
Use the OSCP roadmap below to navigate the plan effectively:

[1] IPIECA, ITOPF and IOGP.

[2] International Standard (ISO) 15544, First Edition 2000-09-15, Petroleum and natural gas industries — Offshore production installations — Requirements and guidelines for emergency response

[3] International Maritime Organization; 2010 Edition

[4] International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC '90)



Integration With Other Plans

This OSCP interfaces with:

- Azinam and Island Drilling Emergency Response Plan (ERP) (L4-MODU-INN-E-MA-101), 2021
- Island Drilling Shipboard Oil Pollution Emergency Plan (SOPEP) (L4-MODU-INN-E-MA-201), 2021
- Thombo Petroleum: Final Environmental Impact Report (TP02WD/FEIR/Rev.0), 2016
- South Africa's National Oil Spill Contingency Plan (NOSCP) Maritime 2019-2024 (Accessed through GiWACAF website)
- Coastal Oil Spill Contingency Plan West Coast Zone (May 2012)

The Island Drilling Shipboard Oil Pollution Emergency Plan (SOPEP) is the first document to refer to in an oil spill. If the spill has potential to escalate beyond the scope of SOPEP, activate this OSCP.

PART 1: ACTION PLAN

1. INITIAL ACTION

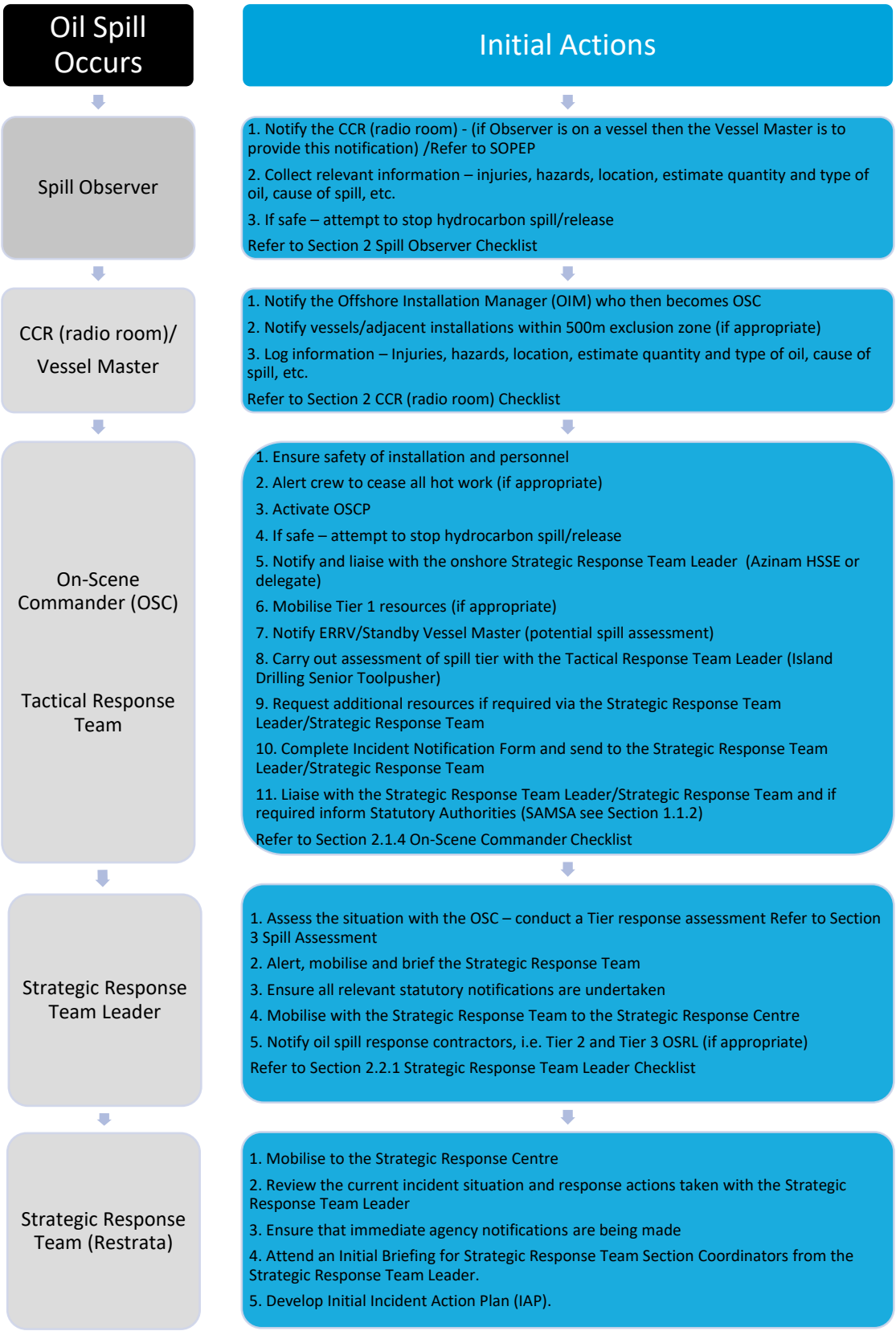


Figure 1-1 Initial actions flowchart

1.1. OIL SPILL REPORTING

1.1.1. Internal Notifications

The following internal notifications are to be undertaken from offshore (responsibility of the OSC), or via the onshore Strategic Response Team (SRT) if required.

Table 1-1 Internal notifications

Notification From	Notification To	Notification Type	Timeframe
OSC (OIM)	**SRT Leader**	Verbal and written	Immediate
SRT Leader	**Restrata**	Verbal and written	Immediate

1.1.2. External Notifications

The following external notifications are to be undertaken by the onshore Strategic Response Team (SRT). The SRT Leader (Azinam HSSE) will notify external bodies as detailed in Table 1-2. Notification forms are available in Appendix A, Forms. A Contact Directory is available in Appendix B.

Table 1-2 External notifications

Refer to the Marine Notice 55 2020 on the SAMSA website for the full list of contacts and their contact details.

Organisation/Regulatory Body	Notification Type	Timeframe
SAMSA Maritime Rescue Coordination Centre (MRCC) Duty Operator or Principal Officer **T:** [redacted]	Verbal and written	Immediate
Oil Spill Response Limited, Oil Spill Response Limited, Lower William Street, Southampton, United Kingdom, SO14 5QE **T:** [redacted]	Verbal and written	Immediate/as deemed necessary
PASA, Petroleum Agency South Africa [redacted] [redacted] **Tygerpoort Building, 7 Mispel Street, Bellville 7530, PO Box 5111, Tygervalley 7536** **T:** [redacted] **F:** [redacted]	Verbal	If no contact with MRCC
DFFE, Department of Forestry. Fisheries Department of Environment	Verbal	If no contact with MRCC

1.1.3. Nearest Installations

There are a number of operators and installations off the West coast of South Africa. These could be notified during an event, including Petro SA, Total Energies, Shell, Sungu Sungu and Qatar. They may be able to offer support, assistance or as a courtesy call. Liaise with PASA and SAMSA as required.

2. ACTION CHECKLISTS

2.1. INCIDENT MANAGEMENT STRUCTURE

Figure 2-1 illustrates the organisational structure for a tiered response to a spill from the Gazania-1 well, off the west coast of South Africa. The level of emergency management activated by Azinam to respond to an oil spill will depend on the response requirements.

The Tactical Response Team (TRT), Strategic Response Team (SRT), and the Crisis Management Team (CMT) form the Company response organization (refer to Gazania-1 Integrated Project Manual). The IMT will be run by an external company called Restrata who will fill the roles of the IMT as required.

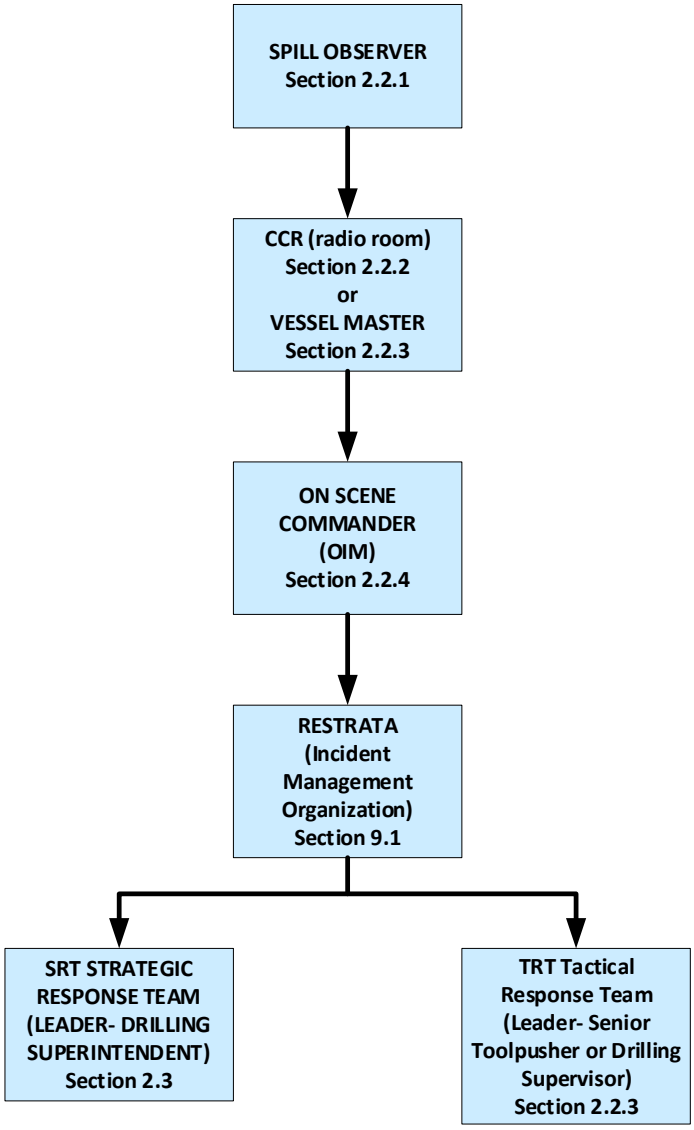


Figure 2-1 Island Drilling/Azinam/NRG Emergency Response Organisation

2.2. TACTICAL RESPONSE TEAM

2.2.1. Spill Observer

SPILL OBSERVER		
Person who first sees the hydrocarbon spill and takes instant action.		✓
SAFETY	Make safety your first priority.	
	If area is unsafe, leave and contact all personnel near the source of the spill and warn of any hazards.	
	If safe, assess any hazards and check for fire/explosion risks.	
	If safe to do so: • Cease hot work/isolate ignition sources and any live equipment, if applicable. • Shut down or move machinery, if necessary. • Take immediate action to stop the source of the spill. • Muster/evacuate personnel as required.	
	Approach the oil spill from upwind, heading downwind. If gas alarm sounds safely evacuate the area.	
ALERT	Contact all personnel near the source of the spill and warn of any hazards.	
	Immediately notify the CCR/Offshore Installation Manager (OIM) or Vessel Master.	
RESPONSE ACTIONS	Inform the CCR and/or the Vessel Master of the following: • Potential hazards and/or injuries • Safety and status of personnel • Source of the spill • Cause of the spill • Time and duration of incident/observation • Location of spill/incident • Hydrocarbon type (e.g. crude oil, diesel) • Appearance of the oil • Estimation of quantity of hydrocarbon spilled • Spill contained or release ongoing • Any other relevant information	
	If needed, help the On-Scene Commander (OSC) with the completion of the Incident Notification Form.	
	Direct the Tactical Response Team (TRT) to the spill.	
	Act as instructed by the On-Scene Commander (OSC).	
	Start a Personal Log and record time and details of own actions. Refer to: Appendix A, Forms	
	If trained, required and safe to do so, assist the TRT in their response.	
	Initiate the oil spill tier assessment if requested to do so.	
FINAL ACTIONS	Attend and take part in the debrief.	
	Offer support to the incident investigation.	
	Restart normal operations as advised by the OSC.	

2.2.2. CCR (radio room)

CONTROL ROOM OPERATOR		
Informs the OSC and runs operations until the OSC takes control. Gives further assistance as needed.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Ensure safety of personnel (muster/evacuate personnel as required).	
	Assess any potential hazards and/or injuries/casualties.	
	Assess any safety issues that require to be resolved.	
	If area is unsafe, leave and tell others as well.	
ALERT	Immediately notify the OSC and Azinam of the incident.	
COMMUNICATIONS	Set up on site communications and make sure communication channels are kept clear in case of emergency.	
RESPONSE ACTIONS	Obtain and record information from the Spill Observer including: • Potential hazards and/or injuries • Safety and status of personnel • Source of the spill • Cause of the spill • Time and duration of incident/observation • Location of spill/incident • Hydrocarbon type (e.g. crude oil, diesel) • Appearance of the oil • Estimation of quantity of hydrocarbon spilled • Spill contained or release ongoing • Any other relevant information	
	Pass all information provided by the Spill Observer to the OSC.	
	Start a Personal Log and record time and details of own actions.	
	Act on instructions received from the OSC. • Assist them in completing the Incident Notification Form	
	Maintain communication between the Spill Observer, OSC and Azinam HSSE Coordinator	
	Support the TRT in responding to the spill.	
FINAL ACTIONS	Give Personal Log to OSC.	
	Attend and take part in the incident debrief.	
	Offer support to the incident investigation.	
	Restart normal operations as advised by the OSC.	

2.2.3. TRT Leader (Island Drilling Senior Toolpusher)/Vessel Master

TRT LEADER/VESSEL MASTER		
Responsible for leading the TRT under direction and advice from the OSC.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Make safety the first priority.	
	Approach the oil spill from upwind, heading downwind if gas alarm sounds safely evacuate the area.	
	Ensure that all TRT members are aware of all potential hazards in designated field of operations. • Nominate a Site Safety Officer	
	Ensure the appropriate Safety Data Sheet's (SDS's) for the hydrocarbon spilled are available.	
	Ensure correct PPE is worn and all safety procedures are followed.	
	If safe to do so: • Cease hot work/isolate ignition sources and any live equipment, if applicable. • Shut down or move machinery, if necessary. • Take immediate action to stop the source of the spill.	
ALERT	Mobilise the TRT and brief them on the response to be mobilised.	
ASSESS THE SPILL	Provide the OSC with further assessment of the spill, as required **Refer to:** Spill Assessment Section 3.3 and Response Technique Selection, Section 5	
COMMUNICATIONS	Receive brief from the OSC.	
	Give incident briefings with the OSC at suitable time, include: • Changes to the spill and/or incident situation. • Effectiveness of the response techniques. • Support needs. • Site safety concerns.	
	Request additional resources (i.e., people, vessels, vehicles, equipment) from the OSC if required.	
RESPONSE ACTIONS	Lead the offshore TRT.	
	Act on instructions from the OSC.	
	Ensure that a basic site risk assessment has been completed prior to the start of the response operation.	
	Coordinate activity for all members of the offshore ERT in line with the OSC objectives and priorities.	
	If safe to do so, mobilise Tier 1 response resources. **Refer to:** Tiered Response Resources Section 6 and Response Technique Selection, Section 5	

TRT LEADER/VESSEL MASTER		
	Coordinate the arrival of Tier 2/3 resources and personnel.	
	Identify equipment lay down areas and logistics requirements to support Tier 2/3 resources and personnel.	
	If additional personnel have arrived on site ensure they are fully briefed, placing emphasis on health and safety.	
	Ensure that the site safety and emergency procedures are being implemented.	
	Be aware of danger/exclusion zones and the areas where entry is forbidden for people/boats/helicopters.	
	Ensure work is undertaken within the designated site safety zones to prevent the spread of oil into 'clean' areas.	
	Be aware of inaccessible areas.	
	Monitor the general welfare and safety of the offshore TRT throughout the incident.	
	Co-ordinate offshore oil spill response waste management.	
	Collect and maintain relevant documents for response operations.	
FINAL ACTIONS	Submit Personal Log to OSC.	
	Provide support for the incident investigation and analysis as required.	
	Ensure Tier 1 resources are returned to standby.	
	Attend and participate in incident debrief.	
	When safe, restart normal operations as advised by the OSC.	

2.2.4. On Scene Commander (OSC) (OIM)

ON SCENE COMMANDER		
For all incidents at the MODU (or within the 500m exclusion zone), the Offshore Installation Manager (OIM) would assume the role of the On Scene Commander (OSC) Alerts SRT Leader. Sets overall direction and tactical management of the incident, allocates sufficient resources and personnel.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	From initial alarm, assume role of OSC.	
	Make safety the first priority.	
	Ensure and maintain the safety of: • All personnel. • The rig/installation (muster/evacuate personnel as required). • Any vessel within 500 metres of the installation.	
	Assess any potential hazards and/or injuries/casualties.	
	Assess any safety issues that require to be resolved and request the TRT Leader to assign a Site Safety Officer.	
	Be aware of danger/exclusion zones.	
	Consider safety implications of gas plumes and VOCs and ensure gas monitoring is undertaken.	
	Approach the oil spill from upwind, heading downwind. If gas alarm sounds safely evacuate the area.	
	Make sure action has been taken to stop operational activities and if safe, stop spill.	
ALERT	Ensure any Vessel Master engaged in activity is aware of the incident and provide updates throughout the incident.	
	Establish contact with Azinam and determine roles and responsibilities.	
	Ensure that the CCR/Vessel Master has notified all site personnel of the incident.	
	If necessary, mobilise the offshore TRT and liaise with the offshore TRT Leader.	
	In liaison with onshore SRT, ensure that all relevant regulatory bodies/statutory authorities have been notified and that ongoing reporting mechanisms are in place. • DFFE • SAMSA • DoT	
	Reports the spill to Restrata who become the onshore SRT Reports the spill to NRG management using the NRG Incident Reporting System.	
	Complete and send the Incident Notification Form to the SRT Leader. **Refer to:** Appendix A, Forms Provide information on: • Potential hazards and/or injuries	

ON SCENE COMMANDER		
	• Safety and status of personnel • Source of the spill • Cause of the spill • Time and duration of incident/observation • Location of spill/incident • Hydrocarbon type (e.g. crude oil, diesel) • Appearance of the oil • Estimation of quantity of hydrocarbon spilled • Spill contained or release ongoing • Any other relevant information	
	Report the spill to Island Drilling as per the reporting requirements detailed within the Island Innovator SOPEP.	
	Ensure all other installations and vessels in the vicinity have been informed of the spill.	
	Ensure that the CCR/Vessel Master has notified all site personnel of the incident.	
ASSESS THE SPILL	Complete oil spill tier assessment. Identify suitable response strategies. **Refer to:** Spill Assessment Section 3.3 and Response Technique Selection, Section 5	
	If the release source/quantity is unknown, request the Infield Vessel to estimate release size from appearance if safe to do so.	
	In conjunction with the TRT Leader and Azinam, assess whether the spill can be handled utilising Tier 1 response resources.	
	If safe to do so, request the TRT Leader to mobilise Tier 1 response equipment.	
	If Tier 1 resources are inadequate for dealing with the incident or the spill escalates, inform the SRT Leader via Azinam of the requirement for mobilisation of the SRT and Tier 2/3 spill response resources.	
	If observation from the MODU/Vessel is not sufficient, request via the Onshore SRT if an aerial surveillance aircraft/helicopter can be sourced, with trained observers also mobilised.	
	Identify suitable response options in conjunction with the Azinam.	
	If spill is a crude oil, and containment and recovery will not be sufficient to stop oil reaching sensitive/shoreline areas, discuss potential for initial dispersant test spray(s) with Azinam and SRT Leader and if successful the options for ongoing dispersant operations. • Spray dispersant. If using onboard Slickgone NS, do not need approval. Inform DFFE of its use but do not wait for any approvals. • DFFE must be consulted prior to any additional dispersant use, and approval must be obtained prior to any dispersant application. **Refer to:** Response Technique Selection, Section 5	
	If an accurate measurement is not available estimate oil spill size. **Refer to:** Spill Assessment Section 3	

ON SCENE COMMANDER		
COMMUNICATIONS	Receive incident status reports from the TRT Leader/Vessel Master	
	Conduct incident briefings with the SRT at suitable times, outline: • Changes to the incident situation • The effectiveness of the response strategies being employed • Support requirements • Site safety concerns	
	Request additional resources from SRT as soon as possible.	
RESPONSE ACTIONS	Coordinate activity for all TRT members in line with SRT objectives and priorities.	
	Request that any active support vessel obtain a sample of the hydrocarbon. • Sampling of a slick will only be carried out if confirmed as safe to undertake. **Refer to:** Appendix D • Ensure suspected 3rd party spills in the vicinity are also sampled if it is confirmed as safe to undertake.	
	Coordinate the arrival of Tier 2/3 resources and personnel. Identify equipment lay down areas and logistics requirements to support Tier 2/3 resources and personnel. **Refer to:** Tiered Response Resources Section 6	
	If additional personnel have arrived on site ensure they are fully briefed, placing emphasis on health and safety associated with that site and particularly related to the incident.	
FINAL ACTIONS	Collect Personal Logs for all members of the TRT.	
	Liaise with the Azinam, SRT, SAMSA and DFFE to determine cessation of incident.	
	Lead the incident sites debrief and relay findings to the SRT.	
	Provide support for the incident investigation and analysis as required.	
	Ensure Tier 1 resources are returned to standby.	
	When safe, restart normal operations.	

2.3. STRATEGIC RESPONSE TEAM

2.3.1. SRT Leader (Azinam HSSE or delegate)

SRT Leader		
In charge of mobilising the SRT as required. Leads the SRT and defines strategic objectives of the response. Communicates with the Crisis Management Team (CMT).		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Make safety the first priority.	
ALERT	Receive Incident Notification Form and/or other communication from the OSC. Mobilise to the ERR or remain remote (Restrata)	
	Determine if the spill has originated from the operation or from contracted 3rd party operations (if applicable). • Initiate procedures to determine exact source of leak (if unknown). • Confirm response primacy for 3rd party contracted operations (i.e., Vessel owners)	
	Contact Restrata.	
	Mobilise the SRT as required, establish an appropriate organisation. **Refer to:** Oil Spill Reporting, Section 4.1	
	Notify the relevant statutory/regulatory authorities. **Refer to:** Oil Spill Reporting, Section 1.1.2	
	Notify the CMT Leader and request the CMT be mobilised if required.	
	Request the CMT Leader informs the CEO and Directors and agree frequency of ongoing communications.	
	Request the CMT Leader ensure that any Partners and Stakeholders are informed of the incident.	
	Notify any other potentially affected 3rd parties.	
	In conjunction with the CMT, assess which other government, contractors, industry contacts require to be notified, updated, and liaised with.	
ASSESS THE SPILL	Set the SRT objectives and priorities.	
	Assess whether the incident is under control or is ongoing and has potential to escalate.	
	Confirm in conjunction with the Operations Team Leader the oil spill tier level and applicable response techniques based on the spill information received from the OSC. • **Refer to:** Spill Assessment Section 3.3 and Response Strategy Selection, Section 5 • Consider the worst-case scenario if volumes have still to be clarified/confirmed (**Refer to:** Section 11). • Assess the overall effectiveness of the spill response so far. • Assess the need for further oil spill response resources. • Determine any Azinam/NRG approvals and financial support	
	Assess whether there maybe any cross-boundary impacts because of the incident, to co-operate with other companies and or authorities from neighbouring countries.	

SRT Leader		
	In conjunction with the Planning Team Leader/Environmental Advisor, review and monitor any potential environmental and socio-economic sensitivities at risk. **Refer to**: Environmental and Socioeconomic Sensitivities Section 11	
	If required, notify, and mobilise OSRL (**Refer to:** Appendix B) and request: • Real time oil spill modelling to be undertaken (based on either known or worst-case volumes) via the OSRL Notification Form (**Refer to:** Appendix B) • Requirement for OSRL Technical Advisor(s) to be mobilised (as appropriate). • Recommended spill response resources, equipment, and personnel, including response timings.	
	Ensure that the OSRL Notification and Mobilisation Forms have been completed by the SRT, signed (by a Nominated Callout Authority) and sent to the OSRL Duty Manager.	
	If required, authorise an initial aerial surveillance flight with trained observer(s) to monitor the slick, determine position of spill, progress of natural dispersion and potential requirement for dispersant spraying.	
	In conjunction with the CMT, consider suspension of all operations to concentrate on safe recovery of personnel and reduce the potential impact to the environment and the asset.	
COMMUNICATIONS	Assume overall command of the incident and inform all relevant parties that the SRT has been mobilised.	
	Give initial briefing to SRT Members.	
	Assess the situation with regards to priorities and allocate relevant tasks to the SRT.	
	Ensure clear lines of communications are maintained between the TRT and SRT via the OSC and/or Azinam/NRG.	
	Ensure clear lines of communications are maintained between the SRT and CMT via the CMT Leader	
	Get incident status reports from the SRT at regular intervals.	
	Liaise with the CMT (if mobilised) as to the level of support required and actions to be taken.	
	Liaise with the Operations Team Leader and Technical Support i.e., Well's Team or specialist support in developing solutions to address any source control related issues (i.e., Relief Well Drilling or Capping Strategy).	
	Give incident briefings with the SRT at suitable times, outline: • Status of objectives • Limitations and constraints • Future tasks for SRT • Next meeting time	
	Give incident briefings to the CMT as appropriate.	
	Ensure communications with the South Africa relevant authorities is regularly undertaken (as appropriate) throughout the incident.	
	Request the SRT to continue to liaise with all potentially affected 3rd parties.	

SRT Leader		
RESPONSE ACTIONS	Coordinate, lead and brief the SRT.	
	Establish expenditure and cost tracking requirements.	
	If the DoT have mobilised, you may be requested to form a Unified Command. You may need to send a representative to the Command post.	
	If the government have indicated that you need to respond in Unified Command, then either [redacted] or [redacted] will need to become joint Incident Commanders with the DoT.	
	Approve the Incident Action Plan/Response Plan **Note:** The Incident Action Plan details the planned strategy of response, objectives set and how these objectives should be met. It should be regularly maintained and updated. **Refer to:** Appendix A, Forms	
	Initiate incident review sessions as appropriate. During this time: • Pass on concise information • Obtain information from the TRT and SRT. • Ensure information is understood • Assess what is required • Agree how the objectives are to be achieved	
	If safe to do so, ensure appropriate action has been taken offshore to monitor and evaluate the spill (i.e., via the Infield Vessel).	
	Assess real-time oil spill modelling from OSRL. • Request that the oil spill modelling be updated as the situation changes/evolves.	
	In conjunction with the SRT, CMT, OSC, OSRL and relevant Statutory/Regulatory Authorities, assess the incident and agree priorities and an effective response strategy for combating the spill. • Consider potential changes regarding the incident, weather, fate of the oil and environmental/socio-economic sensitivities.	
	If chemical dispersant is to be considered as a suitable response technique, follow the instructions in OSCP Supporting Documents. **Refer to:** Section 5.3.5	
	If safe to do so, request the Support Vessel to track the spill, provided it is operating within the designated safety zone. The primary functions of the vessel must not be prejudiced. Consider manual tracking of the spill as back up. **Refer to:** Section 3.2	
	In conjunction with the SRT and CMT, determine the impact of the incident upon business, in particular with reference to any shutdown operations, considering consequences to the following: • Potential legal actions resulting from the incident and incident response. • Regulatory actions that may arise from the incident and response operations • Cross-business impacts, both locally and nationally • Development of a Claims Policy for the incident	

SRT Leader		
	• Community and public relations reactions to the incident and the incident response. • Relations with contractors employed at the site. • Operational and business interruptions. • Financial costs of the incident and the incident response.	
	Request the IMT to continue to act as the liaison between the relevant Statutory/Regulatory Authorities and the SRT.	
	Request the IMT to notify the relevant Statutory/Regulatory Authorities if a hydrocarbon release is either approaching or predicted to cross international transboundary lines.	
	If possible and safe to do so, request offshore to take oil samples and photographs. **Refer to:** Section 3.2.3	
	Identify and obtain authorisation for unusual expenditure.	
	Contact the CMT Leader to assess need to prepare a Media Holding Statement.	
	Ensure a Azinam/NRG media spokesperson is identified via the Onshore SRT and that any press releases are developed and receive the appropriate authorisation.	
	Ensure contact has been made with any Governmental and/or Statutory/Regulatory Authorities media teams.	
	Ensure that the focus of support is aimed at protecting people, environment and the asset.	
	Confirm that all HR issues and corporate decisions are being supported by the CMT.	
	Ensure that the CMT are kept up to date on all matters relating to the incident, potential impacts and the response strategy.	
	In conjunction with the SRT, OSRL and the relevant Statutory/Regulatory Authorities, continue to assess the incident and response strategy and amend accordingly.	
	Review all incoming information concerning any significant changes in incident status that could affect the response.	
	Request OSRL to advise of any environmental implications of the response techniques (if applicable).	
	Approve requests for additional resources or for the release of resources.	
	Establish clean up objectives and end point criteria ready for scaling down and demobilisation (section 8)	
	Ensure the Finance Team Leader is continually updated with costs and expenditure incurred throughout the incident.	
FINAL ACTIONS	Once response operations are no longer necessary and the threat to the environment has been reduced to as low as possible, stand down the incident in discussion with the relevant Statutory/Regulatory Authorities, the SRT, CMT, offshore TRT, Drilling Contractor and OSRL.	
	Confirm incident closure with the relevant Statutory/Regulatory Authorities.	
	Implement demobilisation when appropriate.	

SRT Leader		
	• Ensure that the Endpoints of the response have been agreed, and that the relevant Statutory/Regulatory Authorities, CMT and Drilling Contractor all agree on the formal demobilisation of the incident.	
	Complete demobilisation procedures.	
	Collect Personal Logs for all members of the SRT.	
	Lead the response debrief and pass on findings to the CMT. Give support to the incident investigation.	
	Ensure a final report to the Azinam/NRG Head Office is submitted containing a description of all actions carried out, results of internal investigation of the incident and the recovery level of the environmental conditions.	
	Give feedback to those involved in the response, of any changes and/or developments.	
	When safe, restart normal operations.	

2.3.2. Operations Team Leader

Operations Team Leader		
Leads the Operations Team. Ensures the most appropriate spill response strategy and corresponding resources are selected and implemented. Responsible for strategic management, supports all operations and personnel, making sure they follow approved safety practices.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Make safety the first priority.	
ALERT	Receive mobilisation notification of the Operations Team from the SRT Leader. Mobilise to the ERR or remain remote, as per the instructions from the SRT Leader (Restrata)	
	In the event of a Tier 2/3 incident, mobilise to the ERR. (Restrata)	
	Plan the organisation of the Operations Team.	
ASSESS THE SPILL	Carry out technical assessment of the incident. This will include causes, escalation potential and possible consequences of response strategy.	
	Assist the SRT Leader in evaluation of the incident's potential based on all information available. Determine the oil spill tier level and applicable response strategies. **Refer to:** Spill Assessment [Section 3 and Response Strategy Selection, Section 5	
	Assess the overall effectiveness of the spill response so far.	
	Assess the potential requirement for further oil spill response resources.	
COMMUNICATIONS	Receive initial incident brief from the SRT Leader.	
	Receive incident status reports from the OSC at regular intervals.	
	Assign work locations and preliminary work tasks to Operations personnel.	
	Establish a dedicated communications link with the SRT Leader and OSC/Client Representative- Restrata	
	Request additional technical staff with suitable experience/training to fulfil roles within the Operations Team and delegate team objectives to them.	
	Attend incident briefings with the SRT as required: • Provide an update on current operations • Determine the effectiveness of the response strategies being employed • Support and resource requirements • Highlight site safety concerns	
	Coordinate and consult with the Planning Team Leader on selection of the appropriate response techniques and tactics to accomplish objectives.	
	Liaise with Logistics Team with regards to resource requirements.	
RESPONSE ACTIONS	Coordinate, lead and brief the Operations Team.	
	Assume responsibility for tasks assigned by the SRT Leader.	
	Supervise Operations personnel to ensure response objective are being met.	

Operations Team Leader		
	Subdivide work areas into manageable units and ensure nominated personnel have responsibility for each task.	
	Mobilise specialist technical support /advisors as required.	
	Evaluate the requirements for specialist or technical support at the site.	
	Make operational documents, infrastructure diagrams, plans available to the SRT and CMT.	
	Advise the SRT and CMT on the operational and technical aspects and impacts of the incident.	
	Develop solutions to address any source control related issues (i.e., Relief Well Drilling or Capping Strategy).	
	Keep the SRT advised on support actions being provided and timescales.	
	In conjunction with the Planning Team, organise on location reconnaissance and/or surveillance for confirmation of the extent of the impact.	
	Ensure adequate resources and logistical, technical and management support is provided, as needed, to field operations.	
	Participate in the development of an Incident Action Plan/Response Plan including coordination with the SRT on selection of the appropriate strategies and tactics.	
	Liaise with OSRL (if mobilised) on all appropriate operational aspects of the response.	
	Identify/utilise staging areas for current and future response equipment levels.	
	Ensure that Operations personnel execute work assignments following approved safety practices.	
	Assist with development of long range strategic, contingency and demobilisation plans.	
	Coordinate planned activities to ensure compliance with safety practices.	
	Provide the Planning Team Leader with the required information for inclusion in the Incident Action Plan/Response Plan.	
	Receive information from the Planning Team Leader on location and movement of spilled or emitted materials.	
	Work with the Planning Team to develop an overall shoreline response strategy (if deemed necessary).	
	Monitor and evaluate the effectiveness of response operations, re-assess response techniques as necessary.	
	Ensure updates are disseminated during incident briefings and meetings.	
	Provide required information for inclusion in the Incident Action Plan. **Refer to:** Appendix A, Forms	
	Implement the Incident Action Plan/Response Plan for the Operations Team.	

Operations Team Leader		
	In conjunction with the Planning Team, ensure a waste management plan is produced and followed.	
	Oversee the disposal of wastes generated by response actions.	
	Secure waste transport and treatment disposal /storage sites.	
	Determine recovered waste storage availability. Calculate available volume vs. recovery rate, and storage capability and relay information to the SRT.	
	Regularly update the Incident Action Plan/Response Plan based on information received. Ensure updates are disseminated during incident briefings.	
	Ensure all preparations are made to assist and support the arrival of additional resources and personnel.	
FINAL ACTIONS	Provide SRT Leader with completed Personal Log.	
	Assist with long range strategic contingency and demobilisation plans.	
	Develop recommended list of resources to be demobilised as appropriate.	
	Assist in the completion of demobilisation procedures.	
	Provide support for the incident investigation and analysis as required.	
	Give feedback to those involved in the response, of any changes and/or developments.	

2.3.3. Planning Team Leader

Planning Team Leader		
Leads the Planning Team. Responsible for the collection, evaluation, dissemination and use of the incident information and maintaining status of assigned resources.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Make safety the first priority.	
ALERT	Receive mobilisation of the Planning Team from the SRT Leader. Mobilise to the ERR or remain remote, as per the instructions from the SRT Leader (Restrata)	
ASSESS THE SPILL	Identify the support, service, and personnel requirements for ongoing and future response operations.	
	Assess and document all aspects of the incident including the location, type, circumstances, type and quantity of material releases (if applicable), injuries, hazard assessment, etc.	
	Assist in assessment the overall effectiveness of the spill response so far.	
	Draft SRT objectives and priorities and gain agreement from the SRT Leader.	
	Assist in the potential requirement for further oil spill response resources.	
COMMUNICATIONS	Receive initial incident brief from the SRT Leader.	
	Assign work locations and preliminary work tasks to Planning personnel.	
	Collect, process and display incident information for all other SRT personnel and ensure information is kept updated.	
	Request additional technical staff with suitable experience/ training to fulfil roles within the Planning Team and delegate team objectives to them.	
	Ensure communications with the relevant authorities is regularly undertaken (as appropriate) by relevant personnel i.e., Planning Team Leader, CMT Leader throughout the incident.	
	Attend incident briefings with the SRT as required: • Propose draft incident objectives • Present projections for operational status	
	Coordinate and consult with the Operations Team Leader on selection of the appropriate strategies and tactics to accomplish objectives.	
	Liaise with Logistics Team with regards to acquiring the resource requirements.	
	Keep the SRT appraised of any significant changes in incident status.	
RESPONSE ACTIONS	Coordinate, lead and brief the Planning Team.	
	Assemble the Incident Action Plan/Response Plan. **Refer to:** Appendix A, Forms	
	Provide completed Incident Action Plan/Response Plan to the SRT Leader for review and approval.	

Planning Team Leader		
	Liaise with relevant contractors i.e., OSRL on all appropriate planning aspects of the response.	
	Activate an initial aerial surveillance flight to monitor the slick, determine position of spill, progress of natural dispersion and potential requirement for dispersant spraying.	
	Liaise with the Operations Team and Logistics Team to obtain necessary resources to support surveillance operations, including aircraft, maps, communications equipment, cameras, video recorders and surveillance specialists.	
	Work with the Environmental Advisor to obtain dispersant approval (if applicable). • Ensure the Environmental Advisor has all required information.	
	Develop other incident supporting plans in conjunction with the Operations Team (e.g., transport, waste, security).	
	Determine the need for any specialised resources in support of the incident.	
	Establish special information collection activities as necessary (e.g., weather, environmental reports).	
	Incorporate plans (e.g., traffic, medical, communications and site safety) into the Incident Action Plan/Response Plan.	
	In conjunction with OSRL, identify resources requirements for all response operations.	
	Process and facilitate requests from the SRT for additional resources.	
	Oversee preparation and implementation of the Incident Demobilisation Plan.	
	Develop new/revise incident objectives and provide to the SRT Leader.	
	Develop other incident supporting plans (e.g., salvage, transition, security).	
	Assume responsibility for tasks assigned by the SRT Leader.	
	Regularly assist in the update of the Incident Action Plan/Response Plan based on information received. Identify resources requirements for all response operations.	
	Process and facilitate requests from the SRT for additional resources.	
FINAL ACTIONS	Provide the SRT Leader with completed Personal Log.	
	Assist with long range strategic contingency and demobilisation plans.	
	Oversee preparation and implementation of the Incident Demobilisation Plan.	
	Assist in the completion of demobilisation procedures.	
	Provide support for the incident investigation and analysis as required.	
	Give feedback to those involved in the response, of any changes and/or developments.	

2.3.4. Environmental Advisor

Environmental Advisor		
Reports to the Planning Team Leader and is responsible for advising Operations and the SRT Leader on measures to minimise potential environmental impacts of an incident. Is responsible for ensuring all applicable environmental laws/statues/decrees are met and development of environmental support plans and acquisition of environmental permits needed to facilitate the incident response.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Make safety the first priority.	
ALERT	Receive mobilisation of the Environmental Advisor from the SRT Leader. Mobilise to the ERR or remain remote, as per the instructions from the SRT Leader (Restrata)	
ASSESS THE SPILL	Assist in classifying the initial spill tier to confirm the severity of the spill, to determine the spill level and to assess the level of response and associated resources required to combat the spill. • **Refer to:** Spill Assessment Section 3 and Response Strategy Selection, Section 5 • Consider the worst-case scenario if volumes have still to be clarified/confirmed • Assess the overall effectiveness of the spill response so far. Assess the need for further oil spill response resources.	
	Review and monitor any potential environmental and socio-economic sensitivities at risk, referencing Section 12. Environmental and Socio-Economic Sensitivities. Advise the SRT accordingly.	
	Assist in assessment the overall effectiveness of the spill response so far.	
	Assist in the potential requirement for further oil spill response resources.	
INITIAL ACTIONS	Assist the Planning Team Leader in establishing strategic response objections and priorities.	
	Provide Planning Team Leader information on personnel, equipment, material, and supply needs.	
	Assist the SRT in establishing strategic response objections and priorities.	
RESPONSE ACTIONS	Participate in SRT meetings.	
	Assess whether there maybe any cross-boundary impacts because of the incident, to co-operate with other companies and or authorities from neighbouring countries.	
	Secure maps and charts of immediate area impacted by the incident.	
	Arrange for offshore oil samples to be collected and sent for analysis. Ensure that offshore Support Vessel follows the correct procedure per the Spill Sampling Checklist (Appendix D)	
	Obtain and monitor all relevant meteorological information (i.e., tides, currents and wind) and update the SRT accordingly.	
	Provide Planning Team Leader periodic status reports.	
	If requested by the SRT Leader, mobilise the Tier 2 oil spill response contractor. **Refer to:** Section 6.3	
	If requested by the SRT Leader, mobilise OSRL and: • Obtain signed authorisation from a Nominated Callout Authority to mobilise OSRL via the Mobilisation Form. • Request real time oil spill modelling to be undertaken (based on either known or worst-case volumes) via the OSRL Notification Form. • Request requirement for OSRL Technical Advisor(s) to be mobilised to the RCC.	

Environmental Advisor		
	• Azinam/NRG have access to real time oil spill modelling through OSRL, therefore, ensure that OSRL are sent all relevant information relating to the spill and request that OSRL undertake oil spill modelling.	
	Once received, assess real-time oil spill modelling from OSRL: • Request that the oil spill modelling be updated as the situation changes/evolves. • Request OSRL to undertake sub-surface modelling if required. • Ensure that the SRT are updated with all modelling results and potential spill impact locations.	
	Ensure that the SRT are updated with all modelling results and potential spill impact locations	
	Ensure the implementation of a programme to protect and rehabilitate oiled wildlife: • Assess need for and feasibility of wildlife rehabilitation centres, including all financial aspects, procurement of staff and equipment, training, and centre management. • Work with the Logistics Team to obtain necessary resources to construct and operate facilities for wildlife rehabilitation, as appropriate. • Coordinate wildlife and habitat protection and rehabilitation operations with appropriate resource agencies. • Identify experts to assess wildlife impacts and rescue and rehabilitation, as appropriate. • Ensure procedures are in place for the safety of personnel engaged in wildlife protection and rehabilitation operations. **Refer to:** Section 6.4.6	
	Secure all appropriate permits and approvals from the appropriate authorities.	
	In conjunction with the SRT, CMT, OSC, OSRL and relevant Statutory/Regulatory Authorities, assess the incident and agree priorities and an effective response strategy for combating the spill. • Consider potential changes regarding the incident, weather, fate of the oil and environmental/socio-economic sensitivities.	
	Request OSRL to advise of any environmental implications of the response techniques (if applicable).	
	Ensure the establishment of an Environmental Surveillance Programme (to assist with endpoints).	
	Provide the Planning Team Leader and Operations Team Leader with information on potential environmental impacts of any response technique that could adversely affect the environment	
	Provide the Planning Team Leader and Operations Team Leader with current and predicted weather and oceanographic data.	
	Compile and maintain relevant paperwork and documentation for response operations.	
	Develop, as appropriate, supporting plans for the Incident Action Plan/Response Plan (i.e., waste management, wildlife protection, SCAT, environmental assessment).	
	Attend regular SRT meetings, updating team on any changes to the situation, risk assessment, environmental matters relevant to the response and safety concerns.	
	Evaluate potential impacts to shoreline/land areas.	
	Carry out assessment operations to determine degree of oiling and to identify most appropriate clean-up technique	
	Provide clean-up technique recommendations to the Planning Team Leader and Operations Team Leader.	

Environmental Advisor		
	Recommend disposal techniques for disposal of all generated wastes.	
	Work with the authorities to establish final clean-up standards for contaminated soil, water, equipment and other debris.	
	Establish an endpoint/certification programme for termination of clean-up activities.	
FINAL ACTIONS	Provide the SRT Leader with completed Personal Log.	
	Complete demobilisation procedures.	
	Attend incident debrief.	
	Provide support for the incident investigation and analysis as required.	

2.3.5. Logistics Team Leader

Logistics Team Leader		
Leads the Logistics Team. Manages logistical support of the incident, e.g., facilities, materials and services.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Make safety the first priority.	
ALERT	Receive mobilisation of the Logistics Team from the SRT Leader. Mobilise to the ERR or remain remote, as per the instructions from the SRT Leader (Restrata)	
ASSESS THE SPILL	Identify the support, service, and personnel requirements for ongoing and future response operations.	
COMMUNICATIONS	Receive initial incident brief from the SRT Leader.	
	Request additional technical staff with suitable experience/ training to fulfil roles within the Logistics Team and delegate team objectives to them.	
	Advise the SRT Leader on resource availability to support incident needs.	
	Attend incident briefings with the SRT as required: • Provide an update on logistical status • Provide logistical information as necessary	
	Coordinate and consult with the Planning and Operations Team Leaders on logistical requirements.	
RESPONSE ACTIONS	Coordinate, lead and brief the Logistics Team.	
	Assign work locations and preliminary work tasks to Logistics personnel.	
	Determine and supply immediate incident resource and facility needs.	
	Identify resources requirements for all response operations (i.e., Aircraft, Vessels of Opportunity, cranes, forklifts,).	
	Assume responsibility for tasks assigned by the SRT Leader.	
	Record key events, actions, messages and decisions on Incident Event Log.	
	Manage the Logistics personnel and activities.	
	Ensure the general welfare and safety of Logistics personnel.	
	Liaise with the Operations Team Leader to ensure that all logistical requirements are covered.	
	Liaise with OSRL (if mobilised) on the logistical aspects of the response (i.e., mobilising personnel and equipment appropriately, customs, visas/immigration, accommodation, in-country transportation).	
	Develop and advise the SRT of resource approval and requesting process.	
	Assist in the production of the Incident Action Plan/Response Action Plan. In particular focus on service and support areas of the action plan. **Refer to:** Appendix A, Forms	

Logistics Team Leader		
	Ensure food water and sanitation, Restrata facilities, communications networks, medical and security services are provided where required.	
	Compile information on personnel, equipment, materials and supply needs.	
	Mobilise support services and agencies/organizations as appropriate.	
	Obtain current staff lists for facilities.	
	Forecast and procure immediate incident resource and facility needs.	
	Identify food, accommodation, facility, security, communication and transport requirements in consultation with the Operations Team Leader.	
	Monitor/Track resource utilisation and effectiveness of support services and make necessary adjustments.	
	Advise the Operations and Planning Team Leaders on resource availability to inform the development of response strategy and selection of techniques.	
	Advise the Finance Team Leader of the type and quantity of all resources procured for the response along with their purchase, rental and/or labour costs.	
	Identify long term service and support requirements for planned and expected operations.	
	Ensure documentation is maintained on equipment, materials and services provided.	
	Determine and supply immediate incident resource and facility needs.	
	Assess on-going requirements for equipment and personnel throughout the incident.	
	Request and/or set up expanded ordering processes as appropriate to support the incident.	
	Advise the SRT on personnel replacement and allocation.	
	Regularly assist in the update of the Incident Action Plan/Response Action Plan based on information received. Identify resources requirements for all response operations.	
	Process and facilitate requests from the SRT for additional resources and liaise with Finance regarding all required expenditure during the response.	
	Ensure a tracking system for equipment and supplies to ensure the location and status of all resources is in place (including information regarding maintenance).	
	Ensure the Finance Team are kept informed of purchases as required.	
	Evaluate logistical support effectiveness and make organisational and procedural adjustments as necessary.	
	Make all preparations to assist and support the arrival of additional resources and personnel.	
FINAL ACTIONS	Provide SRT Leader with completed Personal Log.	
	Assist with long range strategic contingency and demobilisation plans.	
	Develop recommended list of logistics resources to be demobilised as appropriate and initiate recommendation for their release.	

Logistics Team Leader		
	Assist in the completion of demobilisation procedures (Section 8)	
	Provide support for the incident investigation and analysis as required.	
	Give feedback to those involved in the response, of any changes and/or developments.	

2.3.6. Finance Team Leader

Finance Team Leader		
Leads the Finance Team. Responsible for all financial, administrative and cost analysis aspects of the incident.		✓
DOCUMENT	Begin Personal Log. **Refer to:** Appendix A, Forms	
SAFETY	Make safety the first priority.	
ALERT	Receive mobilisation of the Finance Team from the SRT Leader. Mobilise to the ERR or remain remote, as per the instructions from the SRT Leader (Restrata)	
ASSESS THE SPILL	Identify the financial requirements for ongoing and future response operations.	
COMMUNICATIONS	Receive initial incident brief from the SRT Leader.	
	Delegate tasks to the Finance Team.	
	Attend incident briefings with the SRT as required: • Verify financial and administrative requirements • Brief on administrative and financial status projections	
RESPONSE ACTIONS	Coordinate, lead and brief the Finance Team.	
	Assume responsibility for tasks assigned by the SRT Leader.	
	Review operational plans and provide alternatives where financially appropriate.	
	Manage all financial aspects of the incident.	
	Provide financial and cost analysis information as required.	
	Gather pertinent information from briefings with responsible authorities.	
	Maintain contact with Authorities and Governmental Representatives administrative headquarters on finance and administration matters.	
	Receive, process and track all incident related claims.	
	Liaise with the Operations Team Leader and Logistics Team Leader to ensure that all financial requirements are covered and recorded.	
	Monitor ongoing operations to ensure accurate and timely administrative and financial support.	
FINAL ACTIONS	Provide the SRT Leader with completed Personal Log.	
	Provide financial input to demobilisation planning.	
	Develop recommended list of financial resources to be demobbed and initial recommendation for release when appropriate.	
	Continue to process all claims, loss adjustments and cost recovery where required.	
	Provide support for the incident investigation and analysis as required.	
	Give feedback to those involved in the response, of any changes and/or developments.	

3. SPILL ASSESSMENT

3.1. SPILL ASSESSMENT CHECKLIST

OIL SPILL ASSESSMENT CHECKLIST		
Use this checklist to assess the oil spill. Designed for: • Offshore Installation Manager (OIM) • Vessel master (if spill incident was not at the MODU location)		
STEP	**GUIDANCE**	**RESPONSE INFORMATION**
Determine essential details	Location of pollution incident	
	Source of spill	
	Oil type	
	Extent of oil spill	
	Date/Time of incident	
	Potential hazardous circumstances: • PPE requirements • Gas monitoring • remove non-essential personnel	
	Any other relevant information? Ss spill contained or ongoing?	
Assess safety hazards	Until otherwise established, assume oil spill is giving off potentially dangerous Volatile Organic Compounds (VOCs) (i.e., gas or hydrocarbon vapours). ELIMINATE IGNITION SOURCES Approach oil spill from downwind, if gas alarm sounds safely evacuate the area. APPROACH ONLY IF SAFE TO DO SO!	
Determine oil spill source	If source unknown, investigate with care. Instigate actions to stop spillage at source - IF SAFE TO DO SO!	
Estimate quantity of oil released if exact amount unknown	Refer to 3.2.1 Bonn Agreement Oil Appearance Code (BAOAC) Spill Size Estimation to estimate oil slick volume if quantity spilt in unknown.	
Predict oil fate; determine direction and speed of oil movement in addition to weathering characteristics	Refer to 3.2.2 Manual Release Tracking Where could the oil impact if uncontrolled and uncontained?	
Assess prevailing and if possible future weather conditions:	Wind speed and direction;	
	State of tide and current speed	
	Sea state	
Mobilise response equipment	Is there need for additional assistance?	
Follow notification procedures	Internal	External

3.2. QUANTIFICATION, TRACKING AND SAMPLING

3.2.1. Bonn Agreement Oil Appearance Code (BAOAC) Spill Size Estimation

Table 3-1 Worksheet for estimating oil slick volume using the BAOAC

Worksheet for estimating oil slick volume in accordance with the BAOAC						
If the source/quantity is unknown, then a visual estimation can be made based on the relationship between observed oil colour and its thickness using the Bonn Agreement Oil Appearance Code (BAOAC) (Table 3-2). This can be achieved by taking observations directly from the drilling unit, crew change helicopter, standby vessel or dedicated aerial surveillance aircraft.						
STEP 1. Total area: Estimate total size of the impacted area as a square or rectangle (in km²). *(i.e., 10 x 2 km = 20 km²).* **STEP 2. Oil Spill Area:** Assess the area affected by the slick in km² calculated as a % of the total area *(i.e., 90% of 20 km² = 18 km²).* **STEP 3. Calculate area by colour:** Estimate the percentage of the oil spill area that is each of the colour appearance codes *(e.g., 60% silvery= 10.8 m², 0% Rainbow, 40% metallic = 7.2 km², 0% Discontinuous True, 0% Continuous True).* **STEP 4. Calculate quantity by colour:** Multiply the area covered by each colour appearance of oil by the thickness (Min and Max) *(e.g., Silvery Sheen Min = 10.8 km² x 0.04 and Silvery Sheen Max = 10.4 km² x 0.3 and Metallic Min =7.2 km² x 5 and Metallic Max = 7.2 km² x 50).* **STEP 5. Total quantity:** Add all the minimum volumes together (total minimum quantity of oil (m³)). Add all the maximum volumes together (total maximum quantity of oil (m³)). **STEP 6. Conversion:** If necessary, you can convert m³ to tonnes by multiplying total quantity in m³ by the Specific Gravity of the spilt oil. *Refer to 8.1.2 Hydrocarbon Storage Inventories (p.84) for a full list of product oil properties.*						
Step 1	Total Area (Width x Length) km²					km²
Step 2	Oil Spill Area (Estimated) km²					km²
Colour Appearance		Code	Minimum thickness (m³/km²)	Maximum thickness (m³/km²)	**(Step 3) % of Area Affected**	**(Step 3) Area Covered km²**
Silvery Sheen		1	0.04	0.3		
Rainbow Sheen		2	0.3	5.0		
Metallic		3	5.0	50		
Discontinuous True		4	50	200		
Continuous True		5	200	>200		
Calculation for Area Covered: km² = Area/100 x % of Area Covered. Calculate for each code to give area covered by colour.						
Colour		**(Step 3) Area Covered km²**		**(Step 4) Min Volume (m³)**		**(Step 4) Max Volume (m³)**
Silvery Sheen						
Rainbow Sheen						
Metallic						
Discontinuous True						
Continuous True						
Step 5	Total Volume (m³)					
Step 6	Total Volume in Tonnes (m³ x SG)					

Table 3-2 Bonn Agreement Oil Appearance Colour Code

Code	Description/Appearance	Layer Thickness Interval (Microns)	Litres per km^2	Key features
1	Sheen (silver/grey) 	(< 0.3 µm)	40-300	The very thin films of oil reflect the incoming light better than the surrounding water and be a silvery or grey sheen. Above a certain height or angle of view the observed film may disappear.
2	Rainbow 	(0.3 µm – 5.0 µm)	300-5000	Rainbow oil appearance is caused by an optical effect and independent of oil type. Depending on angle of view and layer thickness, the distinctive colours will be diffuse or very bright. Bad light conditions may cause the colours to appear duller. 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.
3	Metallic 	(5.0 µm – 50 µm)	5000-50,000	Although a range of colours can be observed (e.g., blue, purple, red and greenish) the colours will not be like 'rainbow'. 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 conditions.
4	Discontinuous True Oil Colour 	(50 µm – 200 µm)	50,000-200,000	For oil slicks thicker than 50 µm the true colour will gradually dominate the colour that is observed. Brown oils will appear brown, black oils will appear black. The broken nature of the colour, due to thinner areas within the slick, is described as discontinuous. Discontinuous' should not be mistaken for 'coverage'. Discontinuous implies true colour variations and not non-polluted areas.
5	Continuous True Oil Colour 	(>200 µm)	>200,000	The true colour of the specific oil is the dominant effect in this category. A more homogenous colour can be observed with no discontinuity as described in Code 4. This category is strongly oil type dependent, and colours may be more diffuse in overcast conditions.

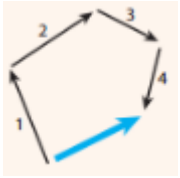
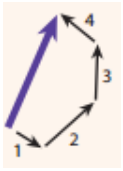
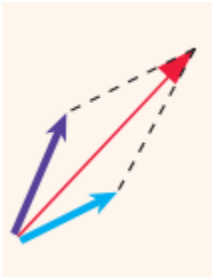
3.2.2. Manual Release Tracking

Manual release tracking allows a vessel observer to estimate the movement of the oil infield.

Table 3-3 Manual release tracking calculations

Manual Calculation of Surface Release Trajectory

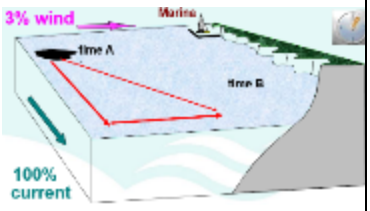
Oil spills drift on the water at 3-4% of the wind speed and 100% of the speed of the current. The actual route covered by a slick can be determined geographically by vectoral addition of the speed of the current and 3-4% of the wind speed, established on an hourly basis. An example is shown below[5]:

Time	Current (flowing to)	Wind (blowing from)	Overall Drift
First hour	1.5 knots @ 340º	12 knots x 3/100 = 0.36 knots at 300º	
Second hour	1.5 knots @ 60º	30 knots x 3/100 = 0.9 knots at 230º	
Third hour	1 knot @ 110º	25 knots x 3/100 = 0.75 knots at 185º	
Forth hour	1 knot @ 190º	20 knots x 3/100 = 0.6 knots at 130º	
Overall drift over 4 hours:			

The black arrows show the successive effects of the current (100%) and the wind (3%) on the slick each hour. The blue/purple arrows show the resultant drift after 4 hours. The red arrow shows the overall resultant drift trajectory.

Estimating slick movement may be done manually by 'vector' addition using an estimate of current and wind effect. Use the below table to plot the track of the hydrocarbon on an hourly basis.

Latitude:	Enter the latitude of the release when first observed and updated following subsequent observations.
Longitude:	Enter the longitude of the release when first Observed and updated following subsequent observations.
Wind:	Enter the wind bearing and speed at position.
Tide:	Enter the tide bearing and speed at position.
Hours Elapsed:	Calculate 3% wind speed over 8-hour elapsed period, tidal bearing and speed.
Plot:	After calculating wind and tidal bearings for each hour to a maximum of 8 hours, calculate new latitude and longitude position of slick to a maximum of 8 hours.



Over time the spill moves from point A to B under the influences of the wind (3%) and surface current (100%).

Slick Position at 0 Hours							
Latitude	N/S		º		‘		“
Longitude	E/		º		‘		“

Hours Elapsed	Current Speed (knots)	Current Bearing (º)	Wind Speed (knots)	3% of Wind Speed (knots)	Wind Bearing (º)
0					
1					

Observed Position 1	Lat:		Long:	

[5] https://www.ipieca.org/resources/good-practice/aerial-observation-of-oil-spills-at-sea/

Manual Calculation of Surface Release Trajectory					
1					
Observed Position 2	Lat:		Long:		
2					
Observed Position 3	Lat:		Long:		
3					
Observed Position 4	Lat:		Long:		
4					

3.3. TIERED RESPONSE LEVEL ASSESSMENT

The OSC should use Table 3-4 to assign a response capability level to the spill. The SRT Leader should then confirm the capability level based on the information received.

The three response capability levels, define the spill response resources (such as response personnel, equipment and additional support) that may need to be mobilised.

Table 3-4 Spill assessment capability level

Capability Level	Definition
1	Tier 1 capabilities are locally held resources used to mitigate spills that are typically operational in nature occurring on or near an operator's own facility. The resources also provide an initial response to spills that may potentially escalate beyond the scope of Tier 1 capabilities. NOTE: Volume 2 (Response Strategies) of South Africa's 2019 National Oil Spill Contingency Plan (NOSCP) Maritime, details that it is expected that, at a Tier 1 level, Local authorities, Operators, Ports and Oil Facilities shall ensure they have suitable Tier 1 response resources commensurate with the risk of environmental or economic impact of their activities and sufficiently extend for a period until either Tier 2 or Tier 3 resources and support can be mobilised.
2	Tier 2 capabilities refer to additional, often shared, national or regional resources necessary to supplement a Tier 1 response or support an escalating response. Tier 2 capability includes a wider selection of equipment and expertise suited to a range of strategic response options. NOTE: Volume 2 (Response Strategies) of South Africa's 2019 National Oil Spill Contingency Plan (NOSCP) Maritime, provides links to the available Tier 2 response equipment that can be found on the Inventory of Assets and the National Oil Spill Response Dashboard.
3	Tier 3 capabilities are globally available resources that further supplement Tiers 1 and 2. They comprise the international resources necessary for spills that require a substantial external response due to incident scale, complexity and/or impact potential. NOTE: Volume 2 (Response Strategies) of South Africa's 2019 National Oil Spill Contingency Plan (NOSCP) Maritime, expects that Operators engaged in oil exploration and production activities shall demonstrate access to a Tier 3 provider in terms of their specific oil spill contingency plan.

By identifying the capability level, the OSC, TRT Leader and SRT Leader can mobilise the appropriate response resources to combat the spill, based on the oil type spilled (i.e., crude oil, diesel), location and the available resources (Section 5).

4. RESPONSE TECHNIQUE SELECTION

4.1. RESPONSE STRATEGY

The worst-case scenario is a loss of well control and blow out from the Gazania-1 well. The preparedness modelling indicates that during summer months a diesel spill is unlikely to reach the shoreline, whereas a crude spill is likely to reach the shoreline within two days. Using the SIMA that has been conducted for the WCS (see Section 12.6), the overall response strategy focuses on minimising the oil reaching the shoreline, and shoreline protection. The application of the individual techniques for a response are detailed in Section 4.3.

4.2. RESPONSE SCENARIO SPILL IMPACT MITIGATION ASSESSMENT (SIMA)

The selection of the most appropriate response options typically involves the consideration of various factors and trade-offs. Therefore, a structured process has been developed to help facilitate response option selection and support strategy development. This process is known as Net Environmental Benefit Analysis (NEBA)[6]. NEBA[7] is a process which can assist Azinam and relevant stakeholders to make informed decisions about the most appropriate response options required to minimise impacts of oil spills on people and the environment.

To assist in undertaking this process, a qualitative method to undertake the NEBA process has been developed, known as Spill Impact Mitigation Assessment (SIMA). Based on the known or anticipated characteristics of the spill scenario, conduct a SIMA, using the four stages:

1. Compile and evaluate data to understand the potential impacts of the spill and to identify potential response options.
2. Predict the outcomes/impacts to determine if a 'monitor and evaluate' approach would be an effective option as well as considering all other techniques.
3. Balance trade-offs by weighing a range of benefits and drawbacks resulting from each feasible response option.
4. Select the best response option(s) to plan the approach for the incident based on which combination of tools and techniques will minimise impacts and promote recovery.

The outcome of the SIMA process will determine the most appropriate response strategy for the spill scenario. OSRL Technical Advisors are available to support the SIMA process during an incident. An example SIMA Matrix is available in Appendix A, Forms.

The worst-case planning scenario SIMA has been completed and is available in Section 12.6.

[6] https://www.ipieca.org/resources/good-practice/response-strategy-development-using-net-environmental-benefit-analysis-neba/

[7] The Oil and Gas Industry are in a transitional phase to potentially move from Net Environmental Benefit Analysis to a more appropriate term to better reflect the process, its objectives and the suite of shared values which shape the decision-making framework, including ecological, socio-economic and cultural aspects. The term Spill Impact Mitigation Assessment (SIMA) may replace NEBA over time. However, at this time it is only being used as a qualitative method to undertake the NEBA process.

4.3. RESPONSE TECHNIQUES

By identifying the capability level, the OIM and SRT can mobilise the appropriate response resources to combat the spill, based on the oil type spilled (i.e., crude oil, diesel), location and the available resources. Use Figure 4-1 to help response decision making.

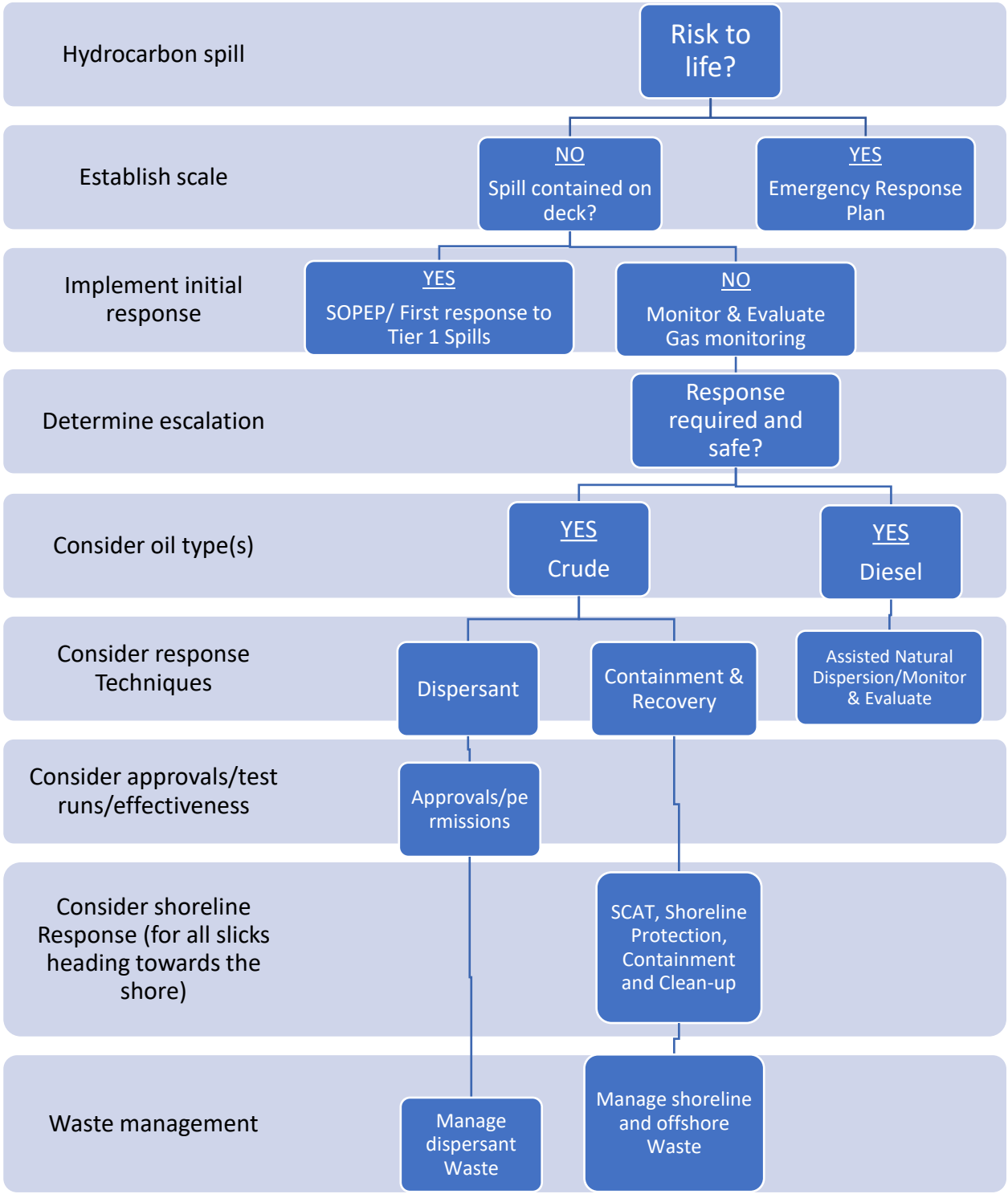


Figure 4-1 Response technique selection process

4.3.1. Assess the Spill

An initial response to small spills is to allow biological and physical processes to disperse oil naturally. The physical appearance of the slick should be monitored closely and if there are changes in the oil or conditions which may influence the perceived impact, alternative response resources should be considered and prepared for mobilisation.

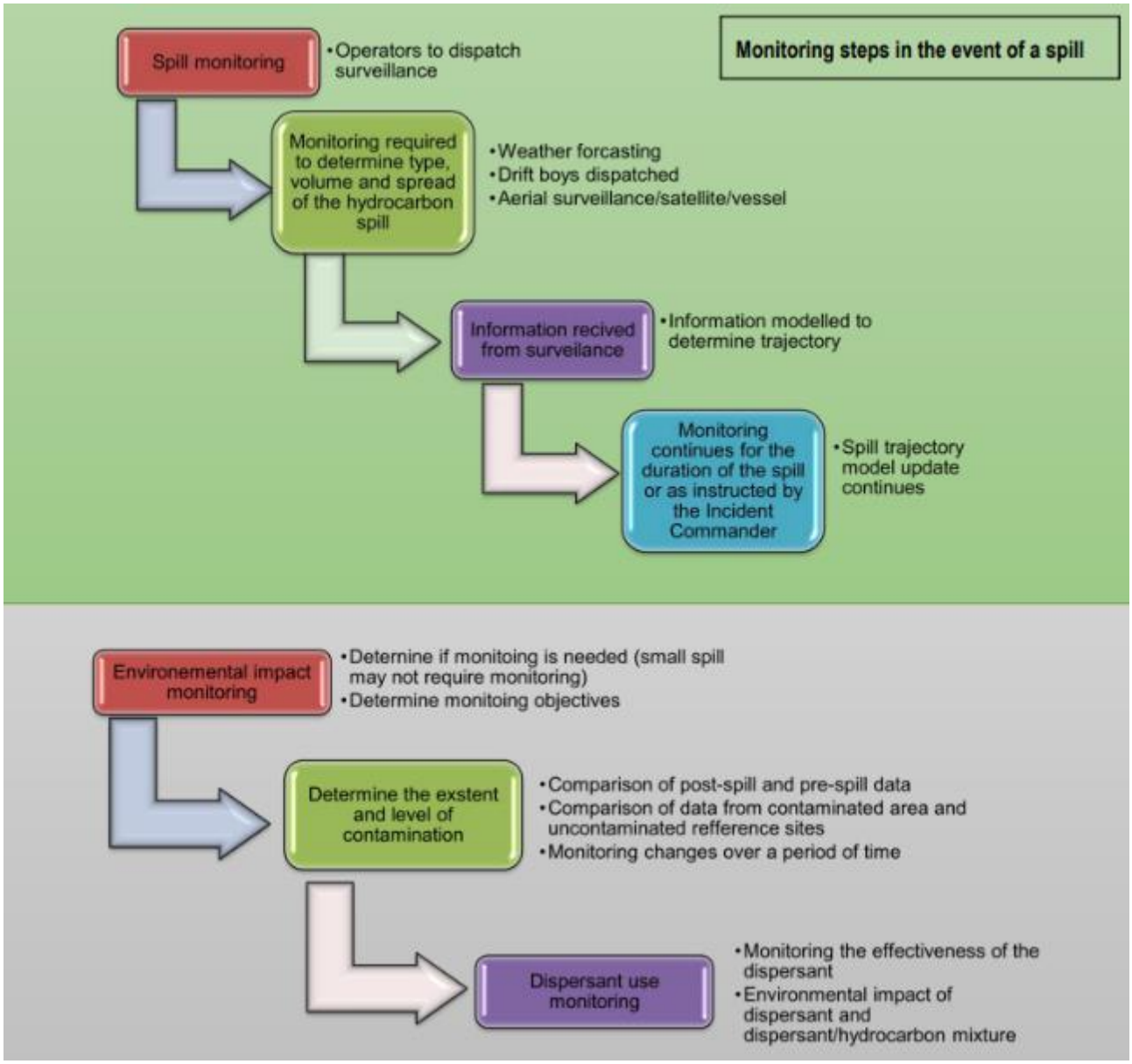


Figure 4-2 Monitoring steps in an oil spill incident (source: SA NOSCP, 2019, volume 2)

Surveillance can be carried out by mobilising the M/V Umkhuseli ERRV or Vessels of Opportunity (VOOs) and potentially mobilising an aerial surveillance aircraft (of opportunity) with trained crew. Trained surveillance personnel can be mobilised via OSRL.

Crew change helicopters with trained crew, could also be used in the tracking and surveillance of oil spills.

Modelling

An on-call modelling team can provide surface and/or subsurface oil spill modelling on request using the OILMAP Oil Spill Modelling via OSRL, using forecast weather conditions with modelled current data. The requirement for oil spill modelling would be managed by the SRT.

Visualisation

The Azinam SRT will display all relevant response information in the Restrata control room. This will include surveillance and modelling results, any mapping and known positions of resources.

4.3.2. Assisted Natural Dispersion for Diesel Spills

Assisted natural dispersion incorporates several weathering processes: spreading, emulsification, evaporation, oxidation, dissolution, dispersion, or biodegradation. The effectiveness of these processes varies depending on the oil properties and the environment.

If safe to do so, natural dispersion processes may be assisted using propeller assisted agitation, whereby the vessel “prop wash” can be implemented to mechanically assist break up and spread of oil. The vessel should be directed through the spill focusing on the thicker leading edge. This is generally recommended for sheens/rainbow not continuous oil. This technique would be appropriate for small diesel spills and not large crude spills.

4.3.3. Offshore Containment and Recovery

Offshore containment and recovery is a response technique based on the restriction of oil movement using booms and its subsequent removal using skimmers and other mechanical means. Containment and recovery operations may be required for spills which may impact environmentally sensitive areas. It will be used or continue to be used if the oil is:

- no longer amenable to dispersants
- threatens environmental sensitivities; and/or
- oil is unlikely to be removed by natural processes

The feasibility of a containment and recovery response will depend upon the presence of surface pollution that is capable of being contained and then recovered from the sea surface and having conditions suitable for equipment deployment.

The advantages of this response option are that it removes the oil from the water surface without dispersal into the water column. However, large quantities of oiled waste can be recovered, which requires storage and onward processing.

At sea containment and recovery can be conducted with large offshore booms operated by one or two vessels in conjunction with a skimmer operation. Single systems may be utilized if available, which can offer some advantages although there are also some potential downsides (such as smaller encounter rates). It should also be noted that a secondary vessel or means to remove the recovered oil will still be required. All at sea containment and recovery operations also require a method for transport and storage of the recovered oil/ oil emulsion. Solid and liquid waste will be generated, which will require appropriate onboard vessel storage (i.e., IBCs, drums, and tanks). A separate tanker/vessel may be required to store large volumes of recovered oil.

The effectiveness of containment and recovery systems is usually limited to between 5% and 20% of the initial spilled volume. Limitations can include a combination of operational, environmental, and logistical constraints. Oceanographic conditions off the South African coastline are not generally conducive to containment and recovery of oil at sea. However, this strategy can be attempted close to the shoreline, in bays and ports and harbours.

Azinam have the M/V Umkhuseli to assist with any containment and recovery operations. It has capacity for 1086m^3 of recovered oil in its deck tanks. It will also have the tier 1 containment and recovery equipment package on board.

The second support vessel will have the second containment and recovery package on board. Both packages will contain 200m of offshore boom and an offshore skimmer.

The technique for containment involves using a boom to contain and concentrate surface oil, whilst recovery is conducted using a skimmer device to physically recover oil from the sea surface, transferring it into temporary inflatable storage barge.

200m of 1500mm offshore boom is located on a hydraulic reel, which is powered by a diesel driven power pack. The offshore boom comes as standard with ASTM connectors and 4.5 metre air inflatable. The individual buoyancy chambers have separate air valves, which mean that in the unlikely case of puncture only one chamber will lose air, and not impair the integrity of the boom at the sea water interface.

The offshore skimmer system includes an adaptable weir skimmer unit with an oleophilic polymer removable brush attachment, allowing recovery of an expansive range of oil types. This is diesel driven by the same power pack as the boom reel, but not simultaneously. These power packs are fitted with safety devices in the form of spark arrestors and Chalwyn auto shutdown valves.

The technique can be deployed in a formation at up to one knot, more suitable for an initial release where there is a high percentage of surface oil coverage. Deployment requires two vessels; one vessel to deploy the equipment, a second vessel to lead the boom formation during deployment. Therefore, if Azinam wish to use both packages, they will need two VOO to support each operation.

4.3.4. Harbour Protection and Containment

To ensure the disruption of port activities are minimised, clean-up operations need to be appropriately managed. Once bulk oil floating within a port or harbour has been recovered, the solid faces of wharves are relatively easy to clean. Wharves or docks suspended on piles may present a more difficult clean-up task once oil has drifted underneath them. It may be possible to position vessels and use propeller wash to flush out free oil from underneath wharves, so that it can be recovered from the water surface. Remaining residues may require physical intervention.

Issues such as adequate ventilation and tidal rise/fall should be carefully evaluated. Hot-water, high-pressure washing can be used to clean residual oil from berths and wharves in conjunction with light inshore booms and skimmers or sorbents to contain and recover the oil released.

4.3.5. Dispersant Application

Surface Dispersant

Dispersant promotes the formation of numerous tiny oil droplets and inhibits re-coalescence of droplets into a slick. This promotes rapid dilution by water movement and increases the surface area making the oil more amenable to natural biodegradation. If any spilled oil does not disperse naturally, dispersants can be considered.

If the NEBA/SIMA has determined that a dispersant response for spilled oil at sea is appropriate, then the likely behaviour of the spilled oil will be known, there is a suitable 'window of opportunity' to apply dispersant efficiently and effectively, and the likely environmental impacts (i.e., to seabirds, fish) are proportionate to the spill itself. Where there is a risk of environmental harm, the use of dispersant is an effective method to accelerate dispersion of oil in an open water environment.

As oil weathers, it usually becomes more viscous and may emulsify. Dispersants will be less effective on emulsified and highly viscous oils. A test spray and dispersant effectiveness test is recommended to be conducted to determine the dispersants likely effectiveness prior to full scale spraying. A shaky bottle test is a basic field dispersant effectiveness test conducted by mixing seawater, dispersant and a matching oil type in a small container and comparing the results with a separate container containing only the oil and water. Refer to the instructions in your test kit.

Dispersant use is generally inappropriate in shallow sheltered waters or on spills of refined products such as diesel.

Surface dispersion consists of applying dispersants to the oil slick on the surface of the spill either from vessels or aircraft. However, whilst it is currently assumed that the oil is amenable to dispersion this will need to be verified at the time of an actual incident by conducting some test spraying. Samples of collected oil can also be tested onboard the M/V Umkhuseli as they are equipped with an oil testing kit. This information will confirm to what extent the oil is dispersible and the likely window of opportunity over which dispersant spraying may be effective.

Dispersant can be deployed from the Supply Vessel and OSRL's aerial dispersant aircraft (Tier 2/3 response contractor). The vessel dispersant application package is suitable for use on fresh/amenable oil. The package includes four 1000ltr intermediate bulk containers (IBCs) of dispersant each for two vessels.

The dispersant pump unit is supplied complete with two AFEDO spray nozzles and hoses sets. The system is designed for the application of either concentrated or diluted dispersant.

South Africa's national oil spill dispersant policy sets out the criteria necessary for making rational decisions on the non-use of dispersants. The policy can be found on the SAMSA website in Marine Notice No. 14 of 1997 under the title: "Policy on the use of oil spill dispersants in South African waters". This document also contains the list of approved dispersants. However, any dispersant approved under the MCA agreements would also be used.

The policy on dispersant usage requires and prohibits their use in water depths of less than 30 metres and within five (5) nautical miles of the coast unless a net environmental benefit analysis suggests otherwise.

The patrol vessels of DFFE are dedicated to carrying dispersant. Additional dispersant stocks are located in the ports of Cape Town and Durban (including 20 tons of Type III concentrate dispersant in Cape Town, formulated to disperse heavy emulsified oils). However, the quality is unknown, and the stockpiles may have been disposed of.

A dedicated aerial dispersant spraying resource is not available in South Africa. Aerial dispersing could be provided through the use of crop spraying aircraft which are available locally, and through OSRL Tier 3 provider.

4.3.6. Scenarios where dispersant can be used without preapproval

NOTE: The DFFE is providing pre-approval of the dispersant "Slickgone NS dispersant" through the endorsement of the OSCP and subjected to the conditions of use as per the plan. Further use of dispersants on a major oil spill (tier 2 or 3) must be approved by the DFFE. The use of oil spill dispersant in South African waters must be used in accordance with the DFFE National Oil Spill Dispersant Policy and considering the following additional requirements:

- DFFE will need to be notified in writing once the dispersant has been applied (volume used, location, and any environmental assessments conducted).
- DFFE would need to approve any additional use of dispersants that are not included in the OSCP.
- The use of dispersant will be subjected to a net environmental benefit analysis (NOSCP).
- The DFFE may request the operator to cease the use of dispersant application if there are legitimate concerns to the environment or economic resources.

The stockpile of Slickgone NS held on board the rig and vessel can be used immediately if the oil spill is in line with certain circumstances given in the table below. The DFFE have given approval (through approval of this plan) that Azinam can spray the 4 IBC's of Slickgone NS dispersant without needing to advise DFFE beforehand, if needed, to maximise the window of opportunity. For any additional dispersant spraying operations, the decision to use dispersants should only be taken by the DFFE and their approval given (government authority responsible for the co-ordination of oil spill combating). If this stockpile of Slickgone dispersant is used, the DFFE will need to be notified of its use in writing once the dispersant has been applied.

Scenario:	**Maximum:**	**Controlling factors:**
Blowout Light to Medium crude (ITOPF Group 2)	Loss of well control and failure of blow out preventer resulting in release of crude oil to the marine environment maximum volume 10,000 bbl/day	The encounter rate at which floating oil can be removed (BAOAC code) Sensitivities immediately at risk (is there time to mount C&R instead?) Prevailing conditions for feasibility and effectiveness (Wind speed <35knots, Wave height <5 m) Oil properties (amenable? Viscosity up to 5000cSt) ➢ This needs to be assessed by the incident commander (OIM)
	Minimum: Loss of well control and failure of blow out preventer resulting in release of crude oil to the marine environment minimum volume ~10 tonnes	

Refer to the IPIECA Good Practice Guide on Surface Dispersants for further information on decision making.

4.3.7. Shoreline Response

4.3.7.1. Shoreline Clean-up Assessment Technique (SCAT)

Shoreline Clean-up Assessment Technique (SCAT) is the recognised method of documenting oiled shorelines and can be used to assess the shorelines detailed within Section 12.1.

SCAT is a simple but comprehensive process to document conditions on a shoreline. It is a systematic approach which utilises standard terminology, supports decision making and can assist with the post spill analysis. Aerial surveillance aircraft can be used to assist the SCAT process by surveying large sections of coastline and identifying any potential oiled shoreline or making a general assessment of the shoreline type.

SCAT surveys can be used for:

- Pre-spill shoreline site assessments.
- Development of shoreline treatment recommendations.
- Development of clean-up standards or criteria.
- Net Environmental Benefit Analysis (NEBA) or Spill Mitigation Assessment (SIMA).
- Post-treatment inspection and evaluation.
- Provision of long-term monitoring.
- Establishing endpoints.

4.3.7.2. Shoreline Protection

Monitoring an oil spill offshore is important when planning shoreline protection operations. Prevailing wind and sea conditions may make a large or ongoing spill difficult to prevent from reaching the shoreline. Practical shoreline protection options are to:

- Direct oil that has the potential to reach shore to less sensitive (environmental and socio-economic) locations.
- Redirect oil away from an area by the deployment of booms or barriers.
- Exclude the oil from a location by deployment of booms or the construction of dams or berms.
- Prevent contact between oil and shoreline by using deluge or flushing techniques to create a water barrier or by installing a physical or textile barrier such as plastic sheeting or sorbent material.
- Contain and collect oil for recovery from the water surface, using conventional mechanical booming and skimming techniques.

4.3.7.3. Shoreline Clean-up

Oil may be allowed or encouraged to strand on a specific shoreline. Shoreline booms can prevent oil migrating down the coastline and impacting a more sensitive area. Whatever type of shoreline the oil impacts on, the method of clean-up is usually labour intensive. Once oil is stranded ashore, a response to an oil spill normally changes from an *emergency phase* to a *project phase* and will need to be managed as such. It is important to

note that the use of inappropriate techniques and inadequate organisation can aggravate rather than mitigate the extent of the damage caused by the pollution. There are three stages of shoreline clean-up:

- Stage 1: Removal of floating oil at the water's edge and thick concentrations on the shore.
- Stage 2: Clean-up of moderate contamination (stranded oil and oiled beach materials).
- Stage 3: Clean-up of lightly contaminated shorelines and final polishing (i.e., removal of oil stains).

The purpose of shoreline clean-up should be to reduce environmental impacts. However, on some occasions it may not be necessary to clean-up at all and oil on the shoreline may best be left to weather and degrade naturally. Therefore, before attempting any shoreline clean-up operation it is most important to take guidance from SAMSA and PASA on environmental considerations as to the most sensible approach to adopt. There are *local oil spill contingency plans* which have been created for the shorelines which need to be followed. The local governmental authorities under the auspices of the DFFE would lead a shoreline clean-up.

4.3.8. Oiled Wildlife Response

A large spill can have wildlife casualties, even if the oil slick remains offshore. Birds and other groups of animals, including and marine mammals, can be affected. Effects of oil on wildlife vary depending on many factors including species distribution and vulnerability, oil characteristics and weathering.

In South Africa, there is access to Southern African Foundation for the Conservation of Coastal Birds (SANCCOB). This organisation has a 24-hour seabird rescue number and two centres (Cape Town and Gqeberha). They have several rescue units they can mobilise to site or offer support.

5. TIERED RESPONSE RESOURCES

5.1. TIERED RESPONSE CAPABILITY

Tiered response is the basis of a robust oil spill preparedness and response framework, consistent with the OPRC'90 convention. The tiered capability principle outlines the measures needed to mitigate against potential environmental consequences associated with oil spills.

In line with the IOGP IPIECA 'Tiered Preparedness and Response' good practice guidelines[8] the evolved response capability model for Azinam is outlined in Figure 5-1. The evolved model uses a segmented circle to represent Azinam's broad range of response capabilities.

Each segment of the circle represents one of 15 elements of response capability. When combined graphically, these represent the full response toolbox for Azinam's operation. The segments are of equal size and provide a qualitative illustration only. They do not represent any degree of importance or hierarchy of use. Underpinning the model is the recognition that, to be able to effectively use these capabilities, a robust management structure is required.

[8] IPIECA-IOGP (2015) Tiered preparedness and response. Good practice guidelines for using the tiered preparedness and response framework.

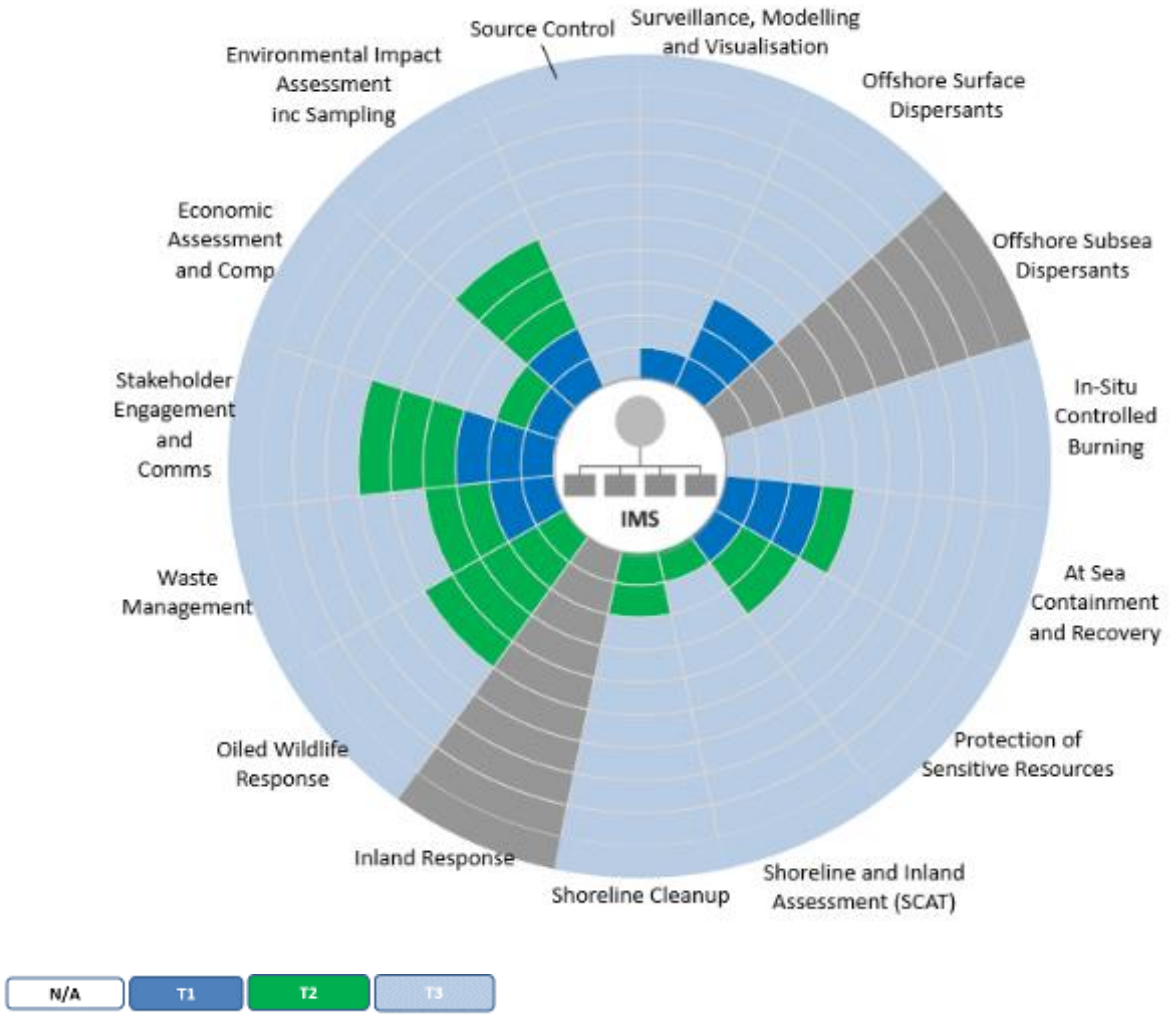


Figure 5-1 Azinam response capability

An overview of the resources available to Azinam are summarised in Table 5-1. These resources make up Azinam's capability to effectively respond to an oil spill incident.

Table 5-1 Tiered resources overview

Tier	Resource	#	Location	Response/Flight Time[9]	Mobilised by
Offshore Surface Dispersants, Section 4.3.5 (p.49)					
1	Vessel dispersant application package	2	Supply vessel	Package 1 immediate. Package two is onshore (5 hrs)	Azinam
1	Oil spill sampling kit	2	Supply vessel	Package 1 immediate. Package	Azinam

[9] Response flight times are indicative and do not include:

- Time required for crew rest
- Time used chartering aircraft.
- Time spent obtaining approvals.
- Time for adverse weather conditions.
- Time required to obtain flight clearances.
- Time incurred for payload considerations.
- Time required to obtain visas or clear customs.

Tier	Resource	#	Location	Response/Flight Time[9]	Mobilised by
				two is onshore (5 hrs)	
2	Titan helicopter group/suitable light aircraft for support operations		Springbok	As available	Azinam
3	OSRL Stockpile: Vessel dispersant spraying		Refer to Table 5-7 OSRL Service Level Agreement summary Table 5-7	6 hours mobilisation. 29 hours transfer.	Azinam
3	OSRL Aerial dispersant spraying:	1	Refer to Table 5-7 OSRL Service Level Agreement summary Table 5-7	6 hours mobilisation plus 29 hours flight time	Azinam
	Boeing 727	1	UK	4 hours mobilisation 29 hours flight time	Azinam
At Sea Containment and Recovery, Section 4.3.3(p.48)					
1	Containment and recovery response package	2	Infield	Package 1 immediate. Package two is onshore (5 hrs)	Azinam
2	Vessels		Simons Town	As required	Navy
2	Vessels		Paarden Eiland, Cape Town	As required	DFFE
3	OSRL SLA Stockpile		Refer to Table 5-7 OSRL Service Level Agreement summary Table 5-7	4 hours mobilisation/loading 29 hours flight time	Azinam
In Situ Controlled Burning					
3	OSRL SLA Stockpile		Refer to Table 5-7 OSRL Service Level Agreement summary Table 5-7	6 hours mobilisation/loading 29 hours flight time	OSRL
Oiled Wildlife Response, Section 4.3.8 (p.53)					
2	SANCCOB		Cape Town	24-hour response line	Azinam
2	National oiled wildlife response contingency plan		South Africa	As required	DFFE
3	Sea Alarm		Global	Through OSRL contracts	OSRL
Protection of Sensitive Resources, Section 4.3.7.2 (p.52)					
2	Sensitivity mapping		South Africa	Through IMOrg and IPIECA website	IMOrg
2	NEBA		South Africa	NOSCP	SAMSA
3	OSRL SLA Stockpile		Refer to Table 5-7 OSRL Service Level Agreement summary Table 5-7	4 hours mobilisation 29 hours flight time	Azinam

Tier	Resource	#	Location	Response/Flight Time[9]	Mobilised by
Shoreline and Inland Assessment (SCAT), Section 4.3.7.1 (p.52)					
2	SCAT strategy		South Africa	NOSCP	SAMSA
3	OSRL SLA personnel		Refer to Table 5-7 OSRL Service Level Agreement summary Table 5-7	6 hours mobilisation 29 hours flight time	OSRL
Shoreline Clean-up, Section 4.3.7.3 (p.52)					
2	Local authorities hand tools and equipment		Ports	As required	DFFE
3	OSRL SLA personnel		Refer to Table 5-7 OSRL Service Level Agreement summary Table 5-7	6 hours mobilisation 29 hours flight time	Azinam
Surveillance, Monitoring and Visualisation, Section 4.3.1 (p.47)					
1	Field Supply Vessel	2	Infield	Immediate	Azinam
1/2/3	OSRL Oil Spill Modelling		Refer to Table 8	Max 2 hrs (OOOH)	Azinam
3	OSRL Satellite surveillance		Southampton, UK	+ 24 hours after activation (case by case)	Azinam
Waste Management, Section 6 (p.70)					
1	Waste management plan		Azinam	Immediate	Azinam
2	Waste management plan		South Africa	NOSCP	National task team
3	OSRL SLA Stockpile	50 %	Refer to Table 8		OSRL
Stakeholder Engagement and Communication, Section 12.6 (p.119)					
1	Azinam	/	South Africa	Immediate	Azinam
2	DoT	/	South Africa	Immediate	Azinam
3	OSRL	/	International	Immediate	Azinam
Economic Assessment and Compensation					
1	Azinam		South Africa	As required	Restrata
Environmental Impact Assessment (including Sampling), Section 4.3.1 (p.47)					
1	Sampling package	2	In field	Immediate	OIM

5.2. TIER 1 RESOURCES

Table 5-2 details the equipment located on the Umkhuseli support vessel and the second set stored at on the second PSV when contracts are confirmed. For further specifications, refer to Appendix C.

Table 5-2 Azinam on site equipment

Equipment package	Includes
Containment and recovery	• 200m offshore boom • Hydraulic reel • Diesel power pack • Offshore oil skimmer device

	• Storage barge • PPE • 2 x 10ft DNV 2.7-1 offshore containers
Offshore dispersant	• 1 x Boat spray systems • 1 x AFEDO spray nozzles • 4x IBCs Dispersant of Slickgone NS • PPE
Offshore inflatable storage	• 2 x 10m^3 inflatable storage barge • Air inflator • 1 x 10ft DNV container

5.3. TIER 2 ARRANGEMENTS

5.3.1. DoT, DFFE and SAMSA

South Africa's National Oil Spill Contingency Plan (NOSCP) Maritime (adopted on October 31, 2018 and updated in 2019)

The NOSCP aims to promote the planned and nationally co-ordinated response to any marine oil spill to:

a. protect human health and safety.

b. minimise detrimental environmental impacts; and

c. provide for the restoration of the environment, as nearly as is practicable, to pre-spill conditions.

The NOSCP sets out the roles and responsibilities of most parties likely to be involved in a national response to a marine oil spill in South Africa.

Under the Marine Pollution (Control and Civil Liability) Act 6 of 1981, the **DoT is responsible for responding to a national marine oil spill incident**.

Azinam must be in the incident command and respond following IMS in Joint Command.

The priorities for response identified in the NOSCP are:

a. human health and safety.

b. natural environment.

c. commercial resources.

d. amenities; and

e. reputation.

The NOSCP states that a Net Environmental Benefit Analysis (NEBA) will be used to decide which response techniques to use.

If an oil spill occurs the incident owner should activate their own Oil Spill Contingency Plan (OSCP) and **notify SAMSA MRCC**. If the incident owner cannot deal with the incident, it would then be handed over to the national maritime incident management (IM) structure. Should the national maritime IM structure not be able to cope with an incident, they would then approach the National Disaster Management Centre (NDMC) to assist.

The NDMC is established as an institution within the public service and forms part of, and functions within a department of state where the Minister is responsible. Their objective is to promote an integrated and co-ordinated system of disaster management, with special emphasis on prevention and mitigation by national, provincial and municipal organs of state, statutory functionaries, other role players involved in disaster management and communities.

The NOSCP is written to follow the guidelines of Incident Management Systems (IMS) and the SA authorities have updated the NOSCP in line with IMS. They have also received training to conduct an emergency response following the principles of IMS. Restrata and Azinam will need to follow the principles of IMS when they respond to an incident that involves the authorities.

The Joint Response Committee should ensure that a media office is in place to arrange and coordinate with the press and locals.

5.3.2. OSRL Technical Advisor Service

OSRL provide a Technical Advisory service to assist in making response decisions for Tier 2 size incidents:

Step 1: Call the Duty Manager on:

[redacted]

Step 2: Agree requirements. An initial telephone conversation with the Duty Manager is essential to build an understanding of the incident so that recommendations can be made in terms of required skills and numbers of technical personnel, up-to the allotted five. An email confirmation will be sent from the Duty Manager to the mobilising party for good order.

Note: No mobilisation form is required since this service is free of charge for the first five days. The duty manager will ensure that the agreed support is mobilised as soon as possible.

Step 3: Arrange meet and greet. In-country team will provide meet and greet so that we can hit the ground running on arrival.

Step 4: Integrate the expertise. Integration of the spill response specialists into the response effort is an essential ingredient.

Step 5: Extend or stand-down. If the incident requires a sustained presence beyond the first five days a standard mobilisation form will be required, and normal day-rate charges will commence. Any additional personnel will be integrated into the response of up to 18 personnel as per SLA. If OSRL staff are no longer required, OSRL will stand down from the incident.

Note: Upon receipt of the first Technical Advisor, the five-day term commences. A total of five staff can be requested within five consecutive days.

5.3.3. South Africa's Government Arrangements

Table 5-3 Resource availability summary table

Response Technique	Response ready in country capability?

Surveillance, modelling and visualisation	X	No on call designated resource. Helicopters are available from TNPA, Titan Helicopter group or private charterers at several locations.
Offshore surface dispersants	X	Vessels are available that could be used as vessels of opportunity for dispersant spraying, including around 19 on the Western Cape. No dispersant stocks.
At sea containment and recovery	X	The only vessel towable boom is held by OPSCA in Saldanha. Vessels are available that could be used as vessels of opportunity for dispersant spraying, including around 19 on the Western Cape. 4 specifically for pollution response.
Protection of sensitive resources	√	Nearshore boom suitable for sensitive resource protection are available from several operators. (<1000m)
Port clean-up	√	Fence boom and boom suitable for ports is held by a number of suppliers in SA, along the Western Cape. Skimmers also held by DFFE.
Shoreline clean-up	√	Several stockpiles of hand tools and near shore equipment exists.
Oiled wildlife response	√	Oiled wildlife organisations exist with facilities and in country expertise.
Waste management	√	Hazardous landfill sites and land based temporary storage exists.
Protection of sensitive resources	√	Nearshore boom suitable for sensitive resource protection are available from several operators. (<1000m)

5.3.4. DFFE

The DFFE OSR equipment stockpile is located in Paarden Eiland, Cape Town and could be mobilised nationally.

The stockpile is made up of a large amount of port, nearshore and shoreline containment and recovery equipment including inflation chamber boom, weir skimmers, vacuum systems, rope mops, disk skimmers and some associate ancillaries (including some hoses and pumps). There is also a large amount of sorbent boom sections. Temporary storage of waste oil is achieved with two Fastank 2000s.

The status of the equipment is potentially not response ready. There is a small amount of new equipment that is yet to be commissioned. Two RIB work boats within the stockpile are also not response ready. DFFE used to have a stockpile of dispersant. It was disposed of as testing showed it had degraded therefore was no longer effective.

Patrol boats

DFFE have four patrol boats which have a dual role – they patrol the fishing grounds around South African waters and are to be used for pollution control. They are fitted with spray arms and dispersant tanks. The four vessels comprise of:

- 1 x offshore patrol boat – this is the largest patrol boat, classed an ocean patrol boat: and
- 3 x inshore patrol boats – these are small, fast patrol boats.

5.3.5. Navy

The navy have an oil spill warehouse at Simons Town near Cape Town. The stockpile is listed by the Navy to consist of near shore air inflation chamber boom, solid floatation fence boom, rope and weir skimmers, bubble screen system, a decontamination unit, temporary storage tanks and granular and pad sorbents.

5.3.6. SAMSA/AMSOL

Neither SAMSA nor AMSOL hold oil spill clean-up equipment.

SAMSA, on behalf of the Department of Transport, have an emergency towing and salvage vessel contract which is held by AMSOL. Under this contract, AMSOL provide a salvage and towing tug the SA Amandla.

AMSOL hold a variety of vessels, with appropriate trained masters and crew, for work around the South African coastline. None are designated for oil spill response activities but would be suitable as vessels of opportunity if available during an oil spill. The Umkhuseli is a vessel which Azinam have contracted from AMSOL to provide AHTS/PSV support during their operations.

5.3.7. Oil Pollution Control South Africa (OPSCA)

OPSCA have a warehouse in Saldanha. They are government owned and are contracted to provide preventative booming for offloading crude tankers but if instructed to by government, they could respond to an oil spill. They hold response ready offshore boom – capable of being towed to collect free floating oil. They have a range of oil skimmers including brush skimmers, disk skimmers, weir skimmers and a mechanical skimmer. They also have a shallow water landing craft and a boom towing vessel.

5.3.8. Private Tier 1 service providers

There are a variety of Tier 1 service providers who were visited as part of this review. Some (most commonly Spilltech) hold contracts with South African Petroleum Industry Association (Sapia) stakeholders to provide onsite or on call equipment and personnel. All Tier 1 providers would make their resources available in spill (where there are conflicting priorities this would be on a best effort basis).

5.3.9. Wildlife response providers

SANCCOB have facilities in Cape Town and Port Elizabeth. In Cape Town SANCCOB have a recently upgraded, purpose-built facility. It has a hospital building with two intensive care units, a surgery, laboratory, medication room and x-ray room. There is a three-part wash bay area for oiled birds and a walk-in freezer to store fish to feed birds in care. In Port Elizabeth, SANCCOB have an oiled wildlife rehabilitation centre with adjoining visitor centre. The centre has the capacity to rehabilitate over one hundred birds at a time and assess their health prior to release back into the wild.

There is one pool area for resident birds and three further pools to allow birds different levels of access to water to build up swimming strength as part of their pre-release rehabilitation.

SANCCOB have 40 staff including support functions. Approximately half the staff are trained in rehabilitation. These staff are trained to a level whereby they could train volunteers or other non-skilled staff to carry out wildlife response roles in a large spill. SANCCOB have staff vets. They train approximately 150 volunteers a year in wildlife response.

Other wildlife organisations are listed in the draft National Oiled Marine Wildlife Preparedness and Response Contingency Plan. These include uShaka who rehabilitate stranded marine animals and would be willing to help rehabilitate marine mammals in a spill. They have veterinarian staff and rehabilitation facilities.

5.3.10. Vessels of Opportunity (VOO)

Vessels of Opportunity (VOO's) are any vessel that can be used to assist in an oil spill response. For an offshore response, motorised vessels will be required as they have the capacity to tow and deploy boom. It can often be the case that fishing vessels are used as they are often available and tend to be stable vessels that are used to towing or trailing fishing gear. The use of fishing vessels also provides short term economic relief to the local community.

Generally, two vessels are required for an offshore boom deployment, a deployment vessel, and a boom towing vessel. It is essential that the equipment is secured to the deck during the entire operation to prevent the boom from being pulled into the water. The deployment of the boom takes place over the stern of the vessel, with the skimmer being deployed over the side of the vessel using the vessels onboard crane.

The towing vessel should have at least one starboard or port side bollard (minimum of 1 ton pull), be able to maintain steerage at low speeds and have a minimum of a 100-horsepower engine. Smaller craft will not be able to tow or deploy boom but could be used to transport both response equipment and personnel from different locations.

Offshore vessel specifications for at vessel dispersant application are detailed within Table 5-4.

Table 5-4 Offshore logistic requirements for vessel dispersant application

Offshore Vessel Dispersant Application
Vessel Design
Good manoeuvrability of vessel.
Sufficient storage capability to store dispersant in IBC's on deck – with sufficient anchoring points.
Accessibility on vessel side towards the bow of the vessel to fit AFEDO nozzles.
Low vessel freeboard to allow dispersant to efficiently be sprayed on oil surface and not dissipated by wind.
Crane for loading dispersant IBCs. Most cranes lift 1000 kg. Heaviest IBC is 62pprox.. 1000kg.
Accommodation to support vessel crew and support staff for extended periods (at least 7 days).
Air band radios (i.e., vessels to aircraft) and Marine band radios (i.e., vessel to command, vessels to vessels).
Storage space for sufficient PPE.
Operator workspace to write reports.

Offshore vessel specifications for at sea containment and recovery are detailed within Table 5-5.

Table 5-5 Offshore logistic requirements for at sea containment and recovery

Boom Deployment and Skimming Vessel
Vessel design
Good manoeuvrability of vessel.
Ability to tow 200m to 400m of boom at low speeds (<0.5 knot) without losing safe navigation (8 tonne of weight in apex of boom).
Vessel freeboard – no more than 1 metre freeboard otherwise boom hangs on a 'cutting' point.
Clear stern for boom deployment – boom reel to sit at least 2 metres back from the stern of the vessel – allowing 1m to operate in and 1m for safety.
Ability to have boom reel welded or chained to deck or welded and chained in a container (container locked in place).
Hydraulic supply – OSRL provide their own power packs.
Crane for deploying skimmers. Most cranes lift 1000 kg. Heaviest skimmer is 62pprox.. 400kg.
Accommodation to support vessel crew and support staff for extended periods (at least 7 days).
Air band radios i.e., vessels to aircraft and Marine band radios i.e., vessel to command, vessels to vessels.
Storage space for sufficient PPE.
Operator workspace to write reports.
Adequate Deck Space:
Minimum 60 square metres (10mx6m) for boom reel, power pack, skimmer and ancillaries (hoses, hydraulic lines) (use 2 reels = 400 metres boom – requires extra space for boom reel).
Accessibility on vessel side to deploy skimmer.

Sufficient storage capability to store recovered oil preferably in vessels tanks or in IBC's/ISO tanks on deck – with sufficient anchoring points. Vessel tanks – go in through manifold or hatch – OSRL connections are mainly 5 inches (alternatively use 25 or 50 tonne lancer barges).
Decontamination zone.

In addition, offshore vessel specifications for boom towing vessels are detailed within Table 5-6.

Table 5-6 Offshore logistic requirements for boom towing vessel

Boom Towing Vessel
Vessel design;
Good manoeuvrability of vessel.
Ability to tow 200m to 400m of boom at low speeds (<0.5 knot) without losing safe navigation (8 tonne of weight in apex of boom).
Air band radios i.e., vessels to aircraft and Marine band radios i.e., vessel to command, vessels to vessels.

5.4. TIER 3 ARRANGEMENTS

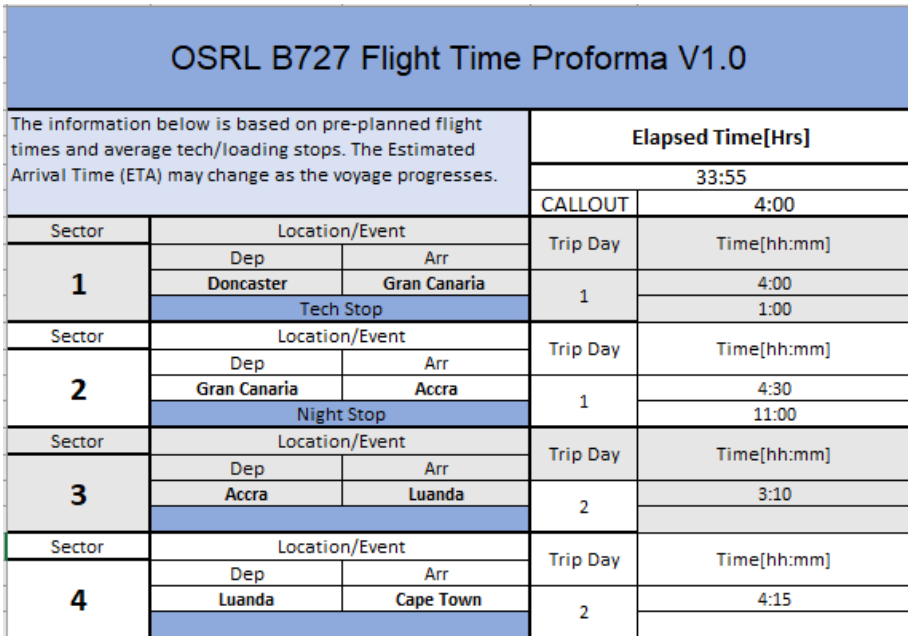
5.4.1. OSRL

Azinam is an associate member with OSRL which guarantees access to Tier 3 technical advice, resources and expertise 365 days a year on a 24-hours a day.

Table 5-7 summarises the OSRL's SLA available to Azinam. Further details can be found in the Oil Spill Response Service Level Agreement on OSRL's website.

Table 5-7 OSRL Service Level Agreement summary

Service	OSRL Service Information				
Response notification, mobilisation, service and advice	In oil spill call (24-hour numbers):				
	Region	EMEA (Europe Africa Middle East)			
	OSRL base location	Southampton, UK			
	Telephone	[redacted]			
	Fax	[redacted]			
	Email	[redacted]			
	Forms	**Refer to Appendix A Forms**			
	The duty manager will attempt to contact the caller within 10 minutes. Once contact has been made, further details will be collected to agree a response strategy.				
Nominated Contact	OSRL must receive an official mobilisation authorisation from one of Azinam's nominated call-out authorities (anyone can notify OSRL) to mobilise resources.	Azinam Nominated Authorities are [redacted], [redacted], [redacted] or [redacted]. Nominated call-out Authorities are updated annually. Contact the OSRL duty manager for the list.			
Spill response equipment	SLA response equipment is housed in secure facilities in Singapore, UK, Bahrain and USA, customs cleared where required, and ready for deployment. Azinam is responsible for ensuring the clearance of equipment into the country and the payment of all associated duties, imposts, etc. A complete list of equipment can be downloaded from OSRL's website at https://www.oilspillresponse.com/services/member-response-services/equipment-list/.				
	As per the SLA, Azinam can mobilise up to 50% of the global stockpile by type available at the time of request. If there is another incident running concurrently Azinam can mobilise 50% of what remains. Equipment will be mobilised from the most appropriate location to provide the most timely and effective response. For equipment form the UK, it would take approximately a 12-hour flight plus 2-3 days for repositioning, permits, flight crew and set up.				
SLA dispersant stockpile	If there was an incident, Azinam is entitled to 50% of the SLA dispersant stockpile located in Southampton, Singapore, Fort Lauderdale and Bahrain. OSRL may be able to obtain further dispersant through the Global Response Network (GRN) and other organisations, if required.				
Global aerial dispersant	**Aircraft Type**	**Location**	**Dispersant Capacity**	**Mobilisation time**	**Range**
	C-130A Hercules	Singapore	13,000 litres	6 hours	2000 nm in 8 hours
	Boeing 727	UK, Doncaster	15,000 litres	4 hours	970 nm in 6 hours
	Aerial Dispersant Response Times for South Africa				

Service	OSRL Service Information
	For aerial dispersant operations, response times are expected as follows:  OSRL B727 Flight Time Proforma V1.0 The information below is based on pre-planned flight times and average tech/loading stops. The Estimated Arrival Time (ETA) may change as the voyage progresses. Elapsed Time[Hrs] 33:55 CALLOUT 4:00 Sector 1: Dep Doncaster – Arr Gran Canaria; Tech Stop; Trip Day 1; Time[hh:mm] 4:00 / 1:00 Sector 2: Dep Gran Canaria – Arr Accra; Night Stop; Trip Day 1; Time[hh:mm] 4:30 / 11:00 Sector 3: Dep Accra – Arr Luanda; Trip Day 2; Time[hh:mm] 3:10 Sector 4: Dep Luanda – Arr Cape Town; Trip Day 2; Time[hh:mm] 4:15 **The flight times detailed above for the B727 are for guidance purposes only and are subject to obtaining flight clearances, landing permits, ground handling time, local security situation, adverse weather conditions or any other unforeseen circumstance which could delay the flight. As with any response there will be factors outside of our control which could affect the response times and every endeavour will be taken to ensure a timely mobilisation.*
World-wide transportation of equipment	Logistics support through OSRL includes: • Access to global cargo network via contracted broker for aircraft of opportunity, vessels, and road transport. • Access to aircraft of opportunity for passenger charter services through a contracted broker
Oil spill trajectory and tracking	3D and 2D modelling available on request providing trajectory and backtrack modelling.
	Access to global satellite imagery through an agreement with our dedicated satellite provider MDA.
	Access to unmanned aerial vehicles (UAV's) through strategic partnerships.
Oiled Wildlife Advice	Access to expert oiled wildlife advice via our contracted provider Sea Alarm Foundation (SAF).
Response Personnel	Technical Advisors (Tas) can be deployed to support Azinam during an actual or potential oil spill incident. The first 5 response personnel (Technical Advisors) are free of charge for the first five days. If these personnel are retained after the free (5 day) period, a signed Mobilisation form will be required, and these personnel will form part of the 18 person SLA entitlement and the normal OSRL daily charges will apply.
	As per the SLA, Azinam is guaranteed access to a team of 18 oil spill response personnel. This team of 18 is chosen with the most appropriate competence and experience as determined by Azinam requirements. Personnel are on standby and available 24 hours a day, 365 days a year. The skill set of the team will be determined by the specifics of the incident and requirements. Typical initial roles of the team include: • Technical advice and incident management coaching within the command centre

Service	OSRL Service Information
	• Development of an Incident Management Plan • Tier 1/2 equipment readiness and training of contractors • In-country logistics planning and support for inbound equipment • Impact assessment and advice on response strategy selection • SCAT and aerial surveillance/quantification surveys • Tactical response planning In a prolonged incident, if Azinam determines that more support from OSRL is required, this may be approved on a case-by-case basis. If additional staff are provided, it is on the condition that they may be recalled by OSRL in needed for a further incident response.

Refer to Appendix A Forms – OSRL Mobilisation Form

COVID-19

As a result of the COVID-19 pandemic, many governments and companies have imposed restrictions limiting the movement of people. All remote technical advice from the Duty Manager will be as normal. This includes providing real-time oil spill modelling, satellite imagery, spill impact mitigation assessments, response strategy recommendations, tactical response planning, incident action planning and inputs to response visualisation.

Mobilisation of OSRL response teams to South Africa will happen, if it can be done safely and legally, with appropriate precautions in place to safeguard the health and safety of staff, contractors, and customers. OSRL understands that an exemption may be granted for entry into South Africa in the event of an oil spill and would seek to liaise with DFFE at the earliest opportunity if required to mobilise to South Africa. Azinam, should help OSRL expediate these discussions.

For further information, please refer to the South Africa Response Plan on OSRL's webpage https://www.oilspillresponse.com/globalassets/external-links/covid-19-updates.

Logistical Support

Azinam is responsible for the logistics of any resources from OSRL from airside/dockside in South Africa. OSRL will handle the equipment transfer up to the point of handover (i.e., at departure airport/port) when there is a transfer of responsibility (Figure 5-2). Further details can be found in the Logistics Planning Guide Service Level Agreement on OSRL's website.

Azinam should establish contact and plans with existing service providers in South Africa to deliver the necessary logistical support and clearances.

Azinam is expected to provide assistance for OSRL personnel and equipment both at the airport and any final destinations in South Africa.

Figure 5-2 below shows the tasks involved in moving equipment from OSRL's base to the scene of the incident and where the responsibilities lie.

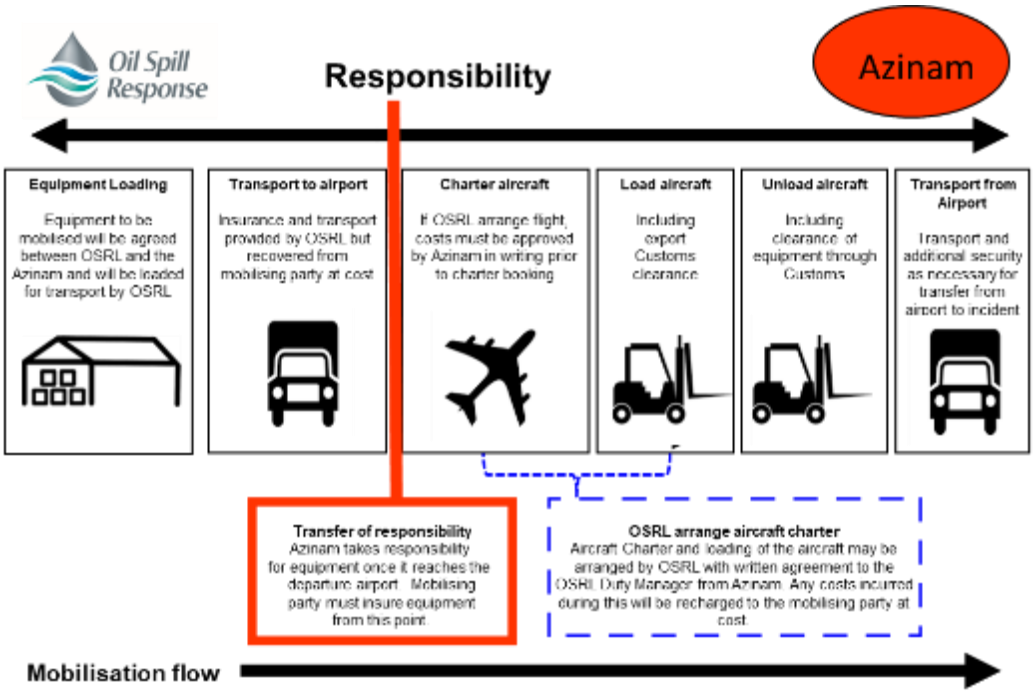


Figure 5-2 Mobilising equipment key logistics responsibilities

Azinam will be required to assist with airport clearance/customs and immigrations to mobilise equipment and related response personnel. Expedient arrangement of these will aid the response time and thus the efficiency of response.

Support by Sea

Azinam plans to set up a primary supply base at Cape Town port, which is approximately 300 km to Block 2B by a typical supply vessel. For berth 501, the dock is 187 m long, and draught is 10.7 m. the quayside width is 5m. warehousing will be offsite. Bunkering facilities are serviced by fixed and mobile solutions.

Support by Air

Suitable light aircraft should be used as a spotter aircraft for aerial dispersant spraying operations to direct the spray aircraft to the areas of oil to be dispersed and advise on the effectiveness of the dispersant application operations. OSRL would utilise its own aircraft (Boeing 727) for dispersant spraying.

Azinam plans to use helicopter support from Titan Helicopter Group and may subject to immigration control restrictions.

From Cape Town International airport, the distance to Kleinzee or Springbok airports is 271 and 265 nm respectively. From there, it is another 60 or 72 nm offshore to the Island Drilling location, respectively.

Cape Town International Airport is Azinam's primary airport for receiving OSRL resources. The distance from airport and the base location to the offshore drilling location is approximately 300 km.

Road Logistics

From Cape Town International Airport the road logistics to the Springbok and Kleinzee minor airports and towns are as follows. To Springbok by road, it is 564km and 5.5 hrs. There is a 1500m runway and a hospital,

accommodation and services. To Kleinzee the distance is 616kms and around 6.5 hrs. the runway is only suitable for helicopter flights and there are minimal facilities at the mining town.

5.4.2. Global Response Network

OSRL can facilitate the mobilisation of further resources through the Global Response Network (GRN). The GRN is a collaboration of major oil industry funded spill response organisations whose mission is to harness cooperation and maximise the effectiveness of oil spill response services worldwide. It includes:

- Alaska Clean Seas (ACS).
- Australia Marine Oil Spill Centre (AMOSC).
- Clean Gulf Association (CGA).
- Eastern Canada Response Corporation (ECRC).
- Marine Spill Response Corporation (MSRC).
- Norwegian Clean Sea Association for Operating Companies (NOFO).
- Oil Spill Response Limited (OSRL).
- Western Canada Marine Response Corporation (WCMRC).

5.4.3. Oiled Wildlife Response

Members of OSRL have access to expert oiled wildlife advice via the Sea Alarm Foundation (SAF).

SAF is a small non-governmental organisation that works to improve global preparedness for, and response to, oiled wildlife incidents. SAF experts do not handle animals.

Under the OSRL/SAF agreement, the availability of two persons is guaranteed as follows:

- Full time availability of one SAF expert for advice and potential mobilisation to the affected site.
- Full time availability of one SAF expert for advice and response support. This expert will not be mobilised but provide advice and support from SAF office in Brussels or OSRL Premises.

If Azinam request the mobilisation of SAF, they will:

- Provide specialist advice to the SRT via the Wildlife Branch Director and Wildlife Planning Coordinator (if mobilised). SAF personnel will act in a technical advisory role rather than a decision-making role within the SRT.
- Work closely with Azinam to determine the appropriate level of wildlife response and resource needs.
- Pre-assess capabilities and preparedness levels with local government and local responders, maximizing their involvement.
- Assist Azinam to integrate these local resources into the management structure.
- Notify the Global Oiled Wildlife Response System (GOWRS) Coordinator who will check availability for potential mobilisation of resources and will directly liaise with Azinam and OSRL pending further decision making on levels of mobilisation required.
- Assist mobilisation of GOWRS personnel and support to maximise GOWRS effectiveness.

- Co-ordinate mobilisation of oiled wildlife response equipment from OSRL bases.

5.4.3.1. Equipment

Azinam has access to specialised wildlife response equipment which is pre-packaged, aviation secure and stockpiled at OSRL. The equipment packages are 'start-up' kits designed to last for the first few days of an oiled wildlife response.

Additional Wildlife Response Organisations -SANCCOB

SANCCOB is an organisation within South Africa that conserve, protect and look out for the welfare of animals.

Refer to https://www.sea-alarm.org/publications/country-wildlife-response-profiles/ for further information.

6. WASTE MANAGEMENT

Oil spill response operations have the potential to generate significant amount of both hazardous and non-hazardous wastes if there is an offshore or shoreline impact. During a spill, the waste streams will be generated from various sources, including water, wildlife, sediments, oil spill treatment products and PPE. The response techniques used during the response will also generate waste that will also need to be treated with all waste materials having to be temporarily stored and transported to their final disposal sites. The objectives of waste management are addressed below:

- Provide safe working conditions and necessary personal protection.
- Comply with all applicable laws and regulations.
- Co-operate with local and government agencies to minimise the impact on local waste disposal facilities.
- Handle, store, and transport oily waste in appropriate containers or tanks.
- Minimise the amount of waste generated.
- Segregate oily and non-oily waste to allow optimum recovery and minimise disposal of each waste stream.

6.1.1. Hazardous Waste Regulations

Waste from an oil spill is categorised as hazardous waste. Hazardous waste is managed either by recycling, export or incineration. South Africa has the following hazardous waste regulations which are as follows:

Table 6-1 Waste regulations

Directive, Regulations and Legislation	Key Points
National Environmental Management: Waste Act, 2008 Aka DFFE Waste Management Act.	The National Environmental Management: Waste Act, 2008 (No. 59 of 2008) (NEM:WA) regulates all aspects of waste management and has an emphasis on waste avoidance and minimisation. NEM:WA creates a system for listing and licensing waste management activities. Listed waste management activities above certain thresholds are subject to a process of impact assessment and licensing. Activities listed in Category A require a Basic Assessment, while activities listed in Category B require an EIA. As there has been uncertainty as to the applicability of NEM:WA with regards to operations offshore this issue was raised with DFFE. They subsequently responded that NEM:WA is not applicable to offshore oil and gas operations. The proposed onshore activities would not trigger the need for a Waste Management Licence
Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (1989);	International marine pollution convention.
MARPOL	MARPOL national legislation in place

6.1.2. Key Stakeholders

Considering the “polluter pays” and the “extended producer responsibility” principles, small and medium size enterprises usually choose to give the hazardous waste produced by their production processes to officially licensed companies for their further treatment and/or disposal.

Temporary storage, transportation and final disposal methods shall be arranged to comply with the Department of Forestry, Fisheries and Environment (DFFE). There is not a fully developed national waste management plan. The responsible working group or committee would be the national task force assigned by DFFE, who would usually be facilitated by the responsible local authority. Any coastal OSCP will contain further details.

6.1.3. Sources of Waste

There are many possible sources of waste during an oil spill response, and they can be categorised to help with the segregation, transportation, storage, treatment, and disposal (Cedre, 2011).

Table 6-2 Waste sources

Waste Category		% Oil Content	Associated Waste Types
1	Oily Liquid	>10 %	Recovered oil (fresh or weathered) Oily water Water-in-oil emulsion
2	Oily Pastes and Solids	>10 %	Oiled beach material-sand, mud Tarballs
3	Oiled Pebbles and Stones	>10 %	Oiled beach material-cobbles stones
4	Oiled Sorbent Material	>5 %	Oiled sorbents – mops, pillows, natural materials, booms etc
5	Oiled Organic Matter	>5 %	Oiled flotsam/jetsam Oiled seaweed and terrestrial vegetation
6	Oiled Solid Waste	>5 %	Oiled equipment, sorbents, vessels Oiled PPE Oiled debris – wood, plastics, metal
7	Oiled Fauna	>5 %	Oiled animal carcasses (birds, fish, mammals)

Response activities generate waste, both offshore and on the shoreline (IPIECA-IOGP, 2014):

Table 6-3 Types of waste for each response technique

	Response Activity	Waste Types									
		Recovered Oil (fresh, weathered or emulsified)	Oily Water Mixture	Oiled Beach Substrate: Sand, mud	Oiled Debris/Vegetation	Tar balls	Oiled PPE	Oiled Equipment	Oiled Sorbent	Oiled Animal Carcass	Empty Dispersant Container
Offshore	Containment and Skimming	✓	✓		✓		✓	✓	✓	✓	
	Dispersant application										✓
	Decontamination operations		✓	✓	✓				✓		

Shoreline	Flushing and Skimming	✓	✓		✓	✓		✓			
	Manual recovery	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Mechanical recovery	✓		✓	✓	✓		✓			
	Beach substrate washing		✓			✓					
	Decontamination operations		✓			✓	✓		✓		

Refer to the POSOW Oil Spill Waste Management Manual (2016) for establishing a waste management response.

6.1.4. Waste Management Procedures

Facilities for waste storage should be identified during the preparation stage of a response due to the critical factor that waste storage plays in each stage of a response. Temporary storage sites will often be required within a response, and therefore good practice would be to pre identify these sites within the preparation stage to manage the total amount of waste generated during a response, the waste hierarchy displays the initial thought process within the preparation stage.

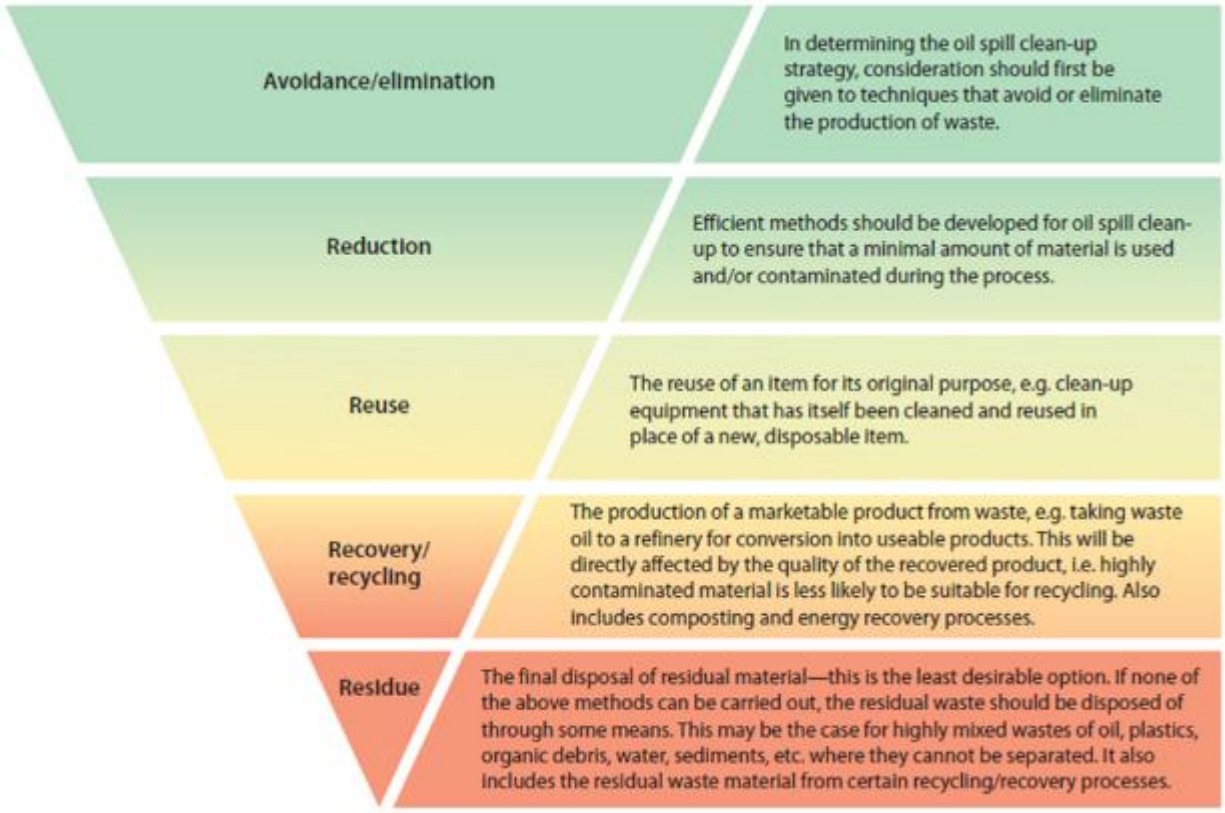


Figure 6-1 Waste hierarchy

Avoidance/Elimination

With careful planning and assessment of the possible response scenarios a number of methods of avoiding waste measures can be identified, including:

- Preventing secondary contamination of clean-up and storage sites and transport routes.
- Pre-identification of potential impact sites and, where possible, clear any pre-existing debris and rubbish to reduce the amount of oily debris that would need to be dealt with should the oil reach that area.
- Recovery equipment should be cleaned and reused rather than discarded.
- Reusable Personal Protective Equipment (PPE) should be selected where appropriate and procured for use. For example, products such as rubber boots may be cleaned and reused.

Reduction

A critical factor to consider during spill response is to minimise the amount of waste generated. Waste should be segregated as much as possible to maintain flexibility in the choice of disposal options. When handling and temporarily storing waste, care should be taken to minimise additional contamination. Waste should be stored and transferred in secure containers and secondary containment such as bunds or synthetic liners should be used at any storage locations. Covers should be provided for open storage containers and piles of waste material, in order to prevent rainwater accumulation unnecessarily adding to the overall waste volume and to prevent run-off causing any secondary contamination.

Reuse

It is important to set up a 'decontamination zone' during a response to enable the reuse of equipment and PPE. Personnel and equipment can be cleaned within this zone. The decontamination zone will sit within the warm zone of the response site, acting as a buffer between the hot and code zones, preventing secondary contamination.

Failing to segregate waste correctly can rapidly increase the waste volume and financial implications. Waste should be classified, segregated and then labelled.

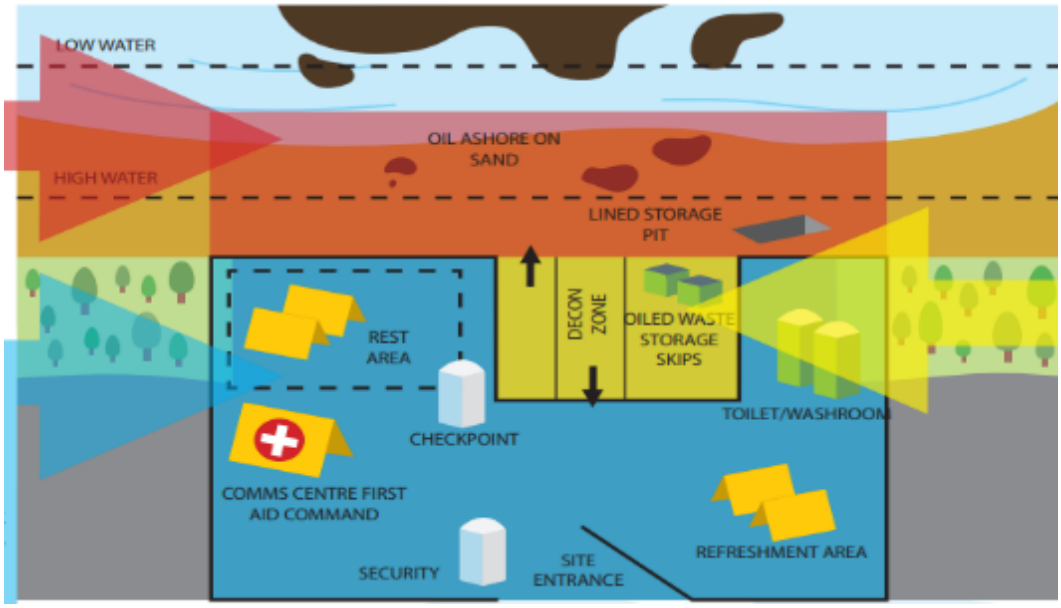


Figure 6-2 Zoning and spill site layout

Disposal

When transporting waste, approved waste contractors must take precautions to ensure no oil is leaching out of trucks. This includes covering and sealing open tops, decontaminating before leaving site and ensuring that the transportation of contaminated wastes meets requirement/regulations. Transportation to final disposal sites should be served by tankers for liquid waste and sealed trucks for solid waste.

Table 6-4 Components of waste

Wastes Components	
Recovered liquid Waste	Oil can be sent for reprocessing assuming low water and debris content otherwise separated into various components of oil, water and sediment before doing so.
Oiled Sediment	Cleaning oiled sediment should occur close to the oiled source. This may generate new types of waste when oil is remobilised and should be managed correctly.
Oiled PPE	If possible, clean and reuse PPE to minimise waste. Non re-usable PPE should be disposed of appropriately.
Oiled Debris	Due to limited methods of treating oiled debris, pre cleaning beaches and ensuring appropriate waste segregation will minimise quantity of oiled debris.

7. DEMOBILISATION

7.1. DEMOBILISATION PROCEDURES

When the oil spill is under control, the Strategic Response Team will assess when a response is no longer needed. This decision will be communicated to all concerned, including external agencies (SAMSA and DFFE). The response will need to be scaled down before it is terminated, as decided by the Strategic Response Team. The demobilisation procedures in Table 7-1should be followed by the SRT Leader and referred to by the relevant authorities and stakeholders involved in demobilisation.

Table 7-1 Demobilisation procedures

Demobilisation procedure steps	Explanation
Establish clean-up objectives	Endpoints are based on clean-up objectives set early in the spill, which may include: • Minimise exposure hazards for human health. • Speed recovery of impacted areas. • Reduce the threat of additional or prolonged natural resource impact.
Establish end point criteria	Shoreline treatment, shoreline clean-up or response termination endpoints are criteria assigned to a segment or unit of oiled shoreline that stipulate when sufficient treatment effort has been completed for that specified area. The endpoints are the practical definition of 'clean' for that specified area or shoreline. The endpoints are a standard against which the clean-up operations carried out can be evaluated. 'Clean' has been achieved when the pre-defined endpoints have been attained and the specified treatment of that area or shoreline has reached the agreed objective or goal. The practical reasons for employing end point criteria are to: • Assist the Strategic Response Team in selecting treatment objectives and techniques for a specified area before the response operation commences. • Provide operations supervisors with clear objectives so they can tailor work efforts towards a known endpoint. • Provide an inspection team with clear description of the pre-defined standards and goals for different areas/shoreline types. • Measuring whether these end points have been obtained can be through quantitative measurements or qualitative field observations. A selection on the state of end points with their criteria for use is available at Table 7-2.
Review the response operations through NEBA	For a Tier 1 and 2 response capability, it is likely to be only the Strategic Response Team who determine the end point criteria and response termination For a Tier 3 response capability it is likely to involve many stakeholders, including SAMSA and DFFE. These stakeholders may have some criteria or ideas for deeming how a shoreline or clean-up operation is closed. To achieve this effectively, Net Environmental Benefit Analysis (NEBA) may help, involving all stakeholders. This will facilitate response technique selection for the level of clean-up required, relative to the 'do nothing' strategy.
Termination of response	The response is to be terminated if it has satisfied end point criteria set by regulation or by SAMSA during the incident. It is based on several factors, including: • Source of spill has been stopped thus likelihood to cause further pollution is negligible. • Risk of greater environmental damage if further clean-up is

Demobilisation procedure steps	Explanation
	implemented. • Residual impacts can be cleaned-up naturally e.g., through wave energy and weather, biodegradation. • Clean-up is assessed acceptable and meets expectations of stakeholders involved. • Response techniques deemed to be ineffective or cause more net damage to the environment (than no response) must be terminated immediately. Strong pressure can be placed on those managing the response in the SRT to adopt non-technical criteria and to retain resources that are excessive or not required. The endpoints and the involvement of external agencies developing the initial surveys should facilitate the demobilisation procedure and bring the operation to a successful close.
Demobilisation notification and debrief	If external resources were used, notification must be sent to stand-down the response. Forms may need to be sent to notify stakeholders of the demob. A debriefing will be held immediately afterwards with all members of the Strategic Response Team led by the SRT Leader. The SRT Leader will debrief within 24 hours for all parties involved in the Strategic Response Team. Separate debriefings will be held for other parties involved in the oil spill incident depending upon the location and the role assumed. Every team member is responsible to close outstanding actions and submit their personal log to the SRT Leader. Two reports will be made by the SRT Leader: • Management of the oil spill incident (Strategic Response Team functioning, site functioning) • The oil spill incident These reports will be prepared as per Azinam. Each Strategic Response Team member is required to submit their contribution by role. The purpose of a timely and orderly demobilisation is to ensure that all resources are effectively terminated. This will save resources, time and money for all stakeholders involved. Demobilisation should be done in a phased approach, reducing resources, equipment and personnel in accordance with the demands of the shoreline or area of operation. All clean-up operations should be continually monitored and evaluated using information from aerial surveillance and personnel on site. Strategic decisions can be re-assessed whether the scale of the response is appropriate for the size and severity of the spill incident. As the response progresses, different resources will be required. The DFFE will be responsible for compiling a situation report. Termination arrangements are outlined in the *Local Oil Spill Contingency Plans.*

Table 7-2 Shoreline clean-up end points

#	Endpoint	Criteria for use
1	No visible oil	Often used for sand beaches where oil removal can be effective without delaying resource recovery.
2	No more than background oil	Often applied where there is significant background rate of tarball deposition on the shoreline.
3	No longer releases sheen that will affect sensitive areas, wildlife or human health	Used where sheening persists after clean-up efforts become ineffective or on sensitive habitats where further clean-up efforts will cause more harm than natural removal. Residual sheening should persist over a relatively short time period.
4	No longer rubs off on contact	Defined as removal to a stain or coat or weathering to a point where it is no longer sticky. This is appropriate for hard substrates.
5	Oil removal to allow recovery without causing more harm than natural removal of oil residues	Used where further oil removal will result in excessive habitat disruption or high biota mortality.

Once oil spill response has ended, clean-up of the environment and rehabilitation and maintenance to any response equipment should continue as required. These measures will be directed by Azinam's normal chain of command and not under the emergency response structure.

Documentation Archives

All documentation and data produced as a result of the spill should be collected, stored and filed for future reference. This includes personnel, contractors, supply services, financial payments, etc. Any documents produced become potential evidence for when the incident is investigated, either internally by Strategic Response Team and/or by external authorities. A record of lessons learnt should be recorded. All oil spill documentation, including this OSCP must be updated and reflect the revised Risk Assessment and required resources.

Documents should be methodically ordered by date and category for ease of reference. Ideally, Strategic Response Team should employ a full-time member of the Strategic Response Team to assume the role of Documentation Unit Leader and/or a Demobilisation Unit Leader to collate all information from personnel as they are demobilised. All persons involved in the spill must be requested to retain any documents they may have regarding the spill, and hand them over when they demobilise. This is typically the most appropriate time to capture the persons and the documents they have.

APPENDIX A. FORMS

Reporting, Notification & Mobilisation:

- SAMSA Alert report.
- NEMA Control of Incident report.
- OSRL Mobilisation Authorisation.
- OSRL Notification Forms

Response Techniques:

- Aerial Surveillance Observer Log.
- Visual Dispersant Monitoring Observer Log.
- Dispersant Effectiveness Monitoring Report (Tier I)
- Dispersant Effectiveness Monitoring Report (Tier II and III)
- Vessel Dispersant Application Log.

Other:

- Site Safety and Health Plan.
- Media Statements
- Personal Log.

Sampling:

- Oil Pollution Sample – standard label.
- Oil Spill Sample Record.
- Water Sample Data Record.

APPENDIX B. CONTACT DIRECTORY

Organisation	Contact Position or location	Telephone Number	Email/website
[redacted]	[redacted]	[redacted]	[redacted]
DFFE *Shoreline oil spills:*	Pretoria Cape Town	+27 12399 9000 +27 86 111 2468 [redacted]	www.dffe.gov.za [redacted]
DoT *Oil spills at sea:*	Pretoria [redacted]	+27 12 309 3033 +27 12 309 3310 [redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]			
[redacted]	[redacted]	Tel: [redacted] Cell: [redacted] / [redacted]	[redacted]
[redacted]	[redacted]	Tel: [redacted] Cell: [redacted]	[redacted]
[redacted]	[redacted]	Tel: [redacted]	

APPENDIX C. EQUIPMENT LIST

Table 7-3 Oil Spill Response Equipment located on the Umkhuseli supply vessel

Equipment	Quantity	Total	Details	Image
200 m offshore boom system	1 per vessel	2	200 m of Ro-boom in 50 m section lengths with ASTM connectors to be stored on a hydraulically operated winder	 ©
Offshore weir skimmer with brush adaptor	1 per vessel	2	Complete with diesel power pack, hose set, floats and ancillaries Recovery capability of 30 m³/hr	 ©
Floating temporary storage tank	1 per vessel	2	25 m³ capacity	 ©
Dispersant Boatspray 50 set	1 per vessel	2	Complete with diesel pump unit, a de-mountable spray arm set and ancillaries Pump rate of 50 ltr/min	 ©
Dispersant, Slickgone NS 1 m³ in IBC tanks	4 per vessel	8 m³ (8,000 litres)	4 m³ of dispersant onboard	 ©
Sorbents, various	3 per vessel	6		 ©

PART 2: REFERENCE MATERIALS

8. OPERATIONAL OVERVIEW

8.1. SUMMARY OF OPERATIONS

8.1.1. Drilling Operations

Azinam holds hydrocarbon exploration rights over the Gazania-1 well, Block 2B, Orange Basin, offshore South Africa. Azinam intends to drill 1 exploratory well in Block 2B. Drilling is due to commence in early September 2022, for approximately 29 days with an option for a geological sidetrack which would add a further 12 days to the drilling. Drilling will be undertaken using the Island Innovator moored semi-submersible rig in a water depth of 152m.

Table 8-1 presents an operational summary of the Gazania-1 well as covered by this OSCP.

Table 8-1 Operational summary

Operational Summary	
Operator Details	
Well Operator	*Azinam SA Limited (ECO Atlantic)*
Partners	*Africa Energy, Panoro Energy and Crown Energy*
Well management company	*NRG*
Drilling Contractor	Island Drilling
Drilling Unit	Island Innovator
Emergency Response T2/T3 liaison and control room	Restrata
Drilling Unit Specification	6th generation semi-submersible drilling, intervention and completion unit.
Field Information	
Contract Area	Block 2B
Operational Classification	Exploration drilling
Drilling Period (Days)	29 days plus optional additional 12
Water depth	150 m
Sea floor temperature	5°C
Nearest Median Line	Namibia
Nearest Point of Land	Hondeklipbaai
Nearest Protected Area	McDougal's Bay
Nearest well	AJ-1 8 km north
Operational Information	
Hydrocarbon Types	Crude Oil (ITOPF Group II) Marine Diesel (drill ship and standby vessels)
Gas to Oil Ratio (GOR)	No gas expected
Worst-Case Well Flow Rates	10,000 bopd
Expected Well Temperature	70°C
Expected Well Pressure at Total Depth (TD)	4700psi
Well direction	Vertical plus possible sidetrack.

Operational Summary	
Maximum Hydrocarbon Inventory	300mmbbls
Drilling Muds	Water based muds
Total well depth	*2991m below the seafloor*
High Pressure High Temperature (HPHT)	Normal pressure and normal temperature, capable of natural flow
Testing	No coring or well testing is planned
Logistics Supply Base	Cape Town (300km)
Tier 1 Response Primacy	Azinam
Tier 2/3 Response Primacy	Restrata, DoT (for oil spills at sea) DFFE (for shoreline spills) SAMSA (delegated authority)
Pollution Response Contractors	Oil Spill Response Limited (OSRL)

Drilling operations will be supported by 2 supply vessels. The supply vessels will be used to bring drilling equipment, water, fuel and subsistence from the onshore logistics supply base at Cape Town to the Island innovator. The supply vessels will also return waste and surplus equipment to shore. Each offshore trip between the logistics supply base and the drillship will take approximately 12 hours (one way). The supply vessels will also be equipped to respond to oil spill incidents.

Loadouts and bunkering/fuelling will be conducted in location.

Waste will be transferred from the drillship to the supply base at Cape Town prior to its final disposal at an approved waste management facility.

Personnel transportation will be conducted by rotary wing aircraft from Springbok airport. There will be approximately one helicopter flight per day, approximately 72 miles each way. The Kleinzee airfield is also close to the operations however the runway surface is dilapidated. It is possible for a helicopter to perform a hover landing. The runway length is 1580m.

8.1.2. Hydrocarbon Storage Inventories & Well Data

The following tables summarise the hydrocarbon storage inventories for the Gazania-1 drilling operations.

Table 8-2 Island Innovator hydrocarbon storage inventories

Hydrocarbon Storage Inventory	
Fluid Type	Maximum Storage Volume/Capacity (m^3)
Marine Diesel/Fuel Oil	3227m^3
Base Oil	980m^3
Water Based Mud	726m^3
Lubricating Oil	
Hydraulic Oil	

Table 8-3 Umkhuseli supply vessel hydrocarbon storage inventory

Umkhuseli Supply Vessel Hydrocarbon Storage Inventory	
Fluid Type	Maximum Volume/Capacity (m^3)
Marine Diesel/Fuel Oil	1210m^3
Base Oil	196m^3
Recovered Oil	1086m^3

8.1.3. Well Data

Table 8-4 outlines key well data associated with the Gazania-1 drilling operations.

Table 8-4 Well information

Well Data					
Well Name	Well Type	HPHT	Latitude	Longitude	Worst Case Well Flow Rate
Gazania-1	Exploration	No	30° 39’ 55.1510”S	17° 10’ 40.6033”E	10,000 bopd

8.1.4. Operational Location Map

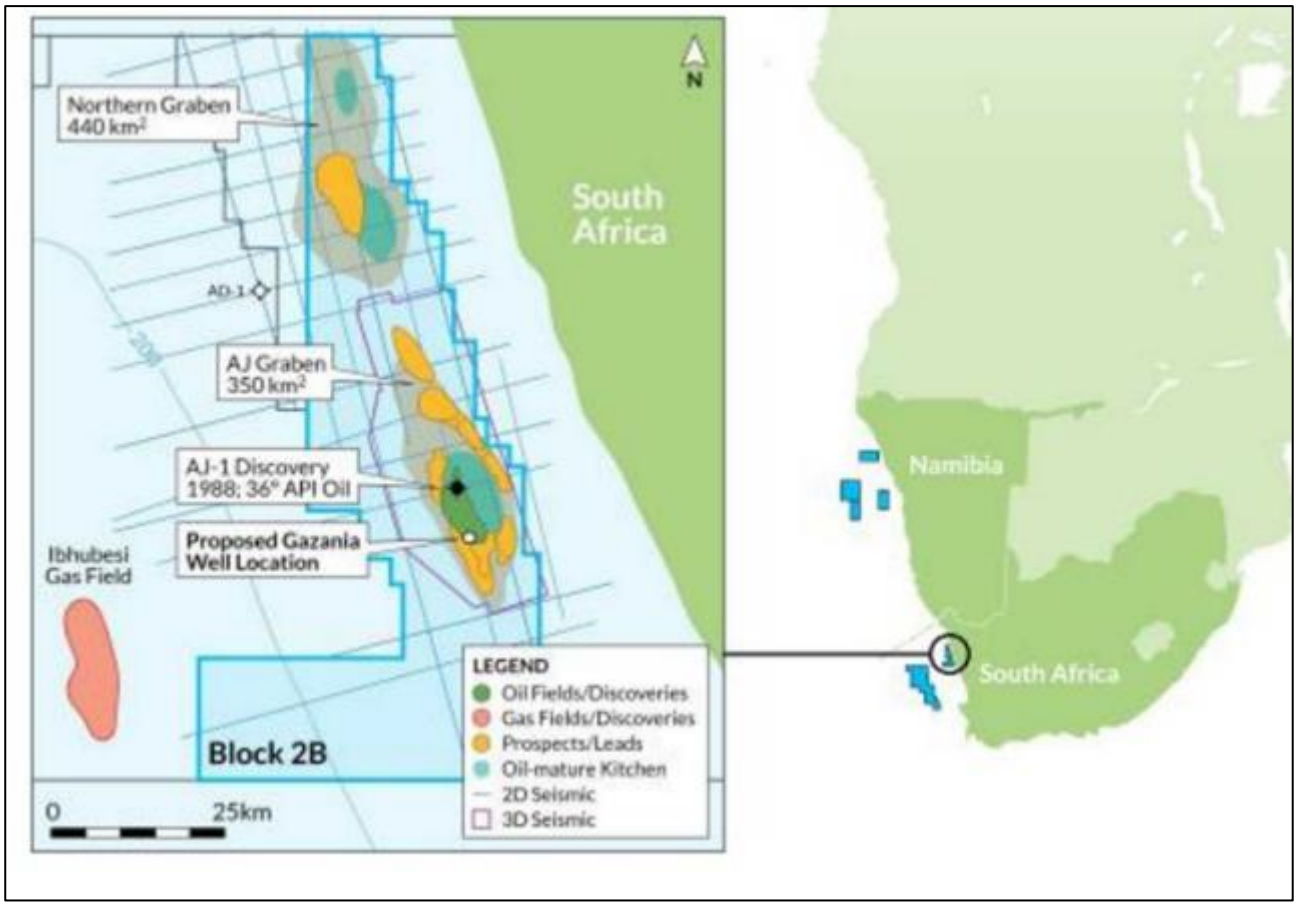


Figure 8-1 Location of Gazania-1 within Block 2B

8.1.5. Hydrocarbon Properties

Table 8-5 and Table 8-6 provide detail of the hydrocarbons' properties associated with the Gazania-1 drilling operation and corresponding ITOPF[10] categorisation.

Table 8-5 Hydrocarbon characteristics of expected oils

Hydrocarbon Characteristics			
Type	Properties		Spill Characteristics
Expected oil	Density @ 15°C (SG)	0.8-0.85	• Group 2 oils are light oils which spread rapidly with wind and current when spilled on water. • Light ends evaporate quickly (up to 40% by volume), but the heavier components (up to one-third of spill volume) persist long enough to warrant a response[11]. • Group 2 oils don't tend to form viscous emulsions
	ITOPF Group	II	
	Pour Point (°C)		
	Viscosity @ 15°C (cP)		
	Wax Content (%) >16%: high wax		
	Asphaltene Content (%) 0.06: unlikely to emulsify 0.5: may emulsify >0.55: stable emulsion likely		

Table 8-6 Hydrocarbon characteristics for other operational oils

Generic Hydrocarbon Characteristics			
Type	Properties		Spill Characteristics
Aviation Fuel	Density @ 15°C (SG)	0.78 - 0.84	• Low viscosity distillate fuel that spreads very rapidly to form a thin sheen • High proportion of light ends which evaporate quickly • Rapidly disperse/evaporate if released into the marine environment
	ITOPF Group	I/II	
	Pour Point (°C)	-5 to -31	
	Viscosity @ 15°C (cP)	4	
	Wax Content (%) >16%: high wax	Refined product - not applicable	
	Asphaltene Content (%) 0.06: unlikely to emulsify 0.5: may emulsify >0.55: stable emulsion likely	Refined product - not applicable	
Diesel	Density @ 15°C (SG)	0.82	• Low viscosity distillate fuel that spreads very rapidly to form a thin sheen • High proportion of light ends which evaporate quickly • Rapidly disperse/evaporate if released into the marine environment
	ITOPF Group	II	
	Pour Point (°C)	-5 to -31	
	Viscosity @ 15°C (cP)	4	
	Wax Content (%) >16%: high wax	Refined product - not applicable	
	Asphaltene Content (%) 0.06: unlikely to emulsify 0.5: may emulsify	Refined product - not applicable	

[10] The International Tanker Owners Pollution Federation (ITOPF) classifies oil into four main groups based roughly on their specific gravity (SG).

[11] NOAA. 1992. Introduction to Coastal Habitats and Biological Resources for Spill Response. Oil Behaviour and Toxicity.

	>0.55: stable emulsion likely		
Hydraulic/lube oil	Density @ 15°C (SG)	0.856 (lubricant) to 0.88 (hydraulic)	• Medium density, low volatility refined oil • Pour Point indicates oil is likely to be liquid in the North Sea during all seasons • Very high additive content, likely to be highly persistent on the sea surface
	ITOPF Group	II/III	
	Pour Point (°C)	-10	
	Viscosity @ 15°C (cP)	25 to 36	
	Wax Content (%) >16%: high wax	Refined product - not applicable	
	Asphaltene Content (%) 0.06: unlikely to emulsify 0.5: may emulsify >0.55: stable emulsion likely	Refined product - not applicable	

8.2. FATE AND BEHAVIOUR OF OIL SPILLED IN MARINE ENVIRONMENTS

The fate and behaviour of oil spilled at sea depends largely on the physical and chemical properties of the oil. It is the oil's chemical composition, in combination with meteorological conditions, which affect the way in which the oil breaks up and dissipates into the marine environment or persists. This interaction between the spilled oil and its new environment is a process known as weathering, and it can only be predicted if the oil's properties are known.

8.2.1. The Weathering Process

The weathering process is illustrated in Figure 8-2 and described in Table 8-7. Tiered resource capability and response techniques for operations can be planned based on the oils' predicted weathering in the marine environment.

If oil is spilled, additional oil spill modelling can predict the fate and behaviour of the spilled oil based on the current and forecast meteorological conditions.

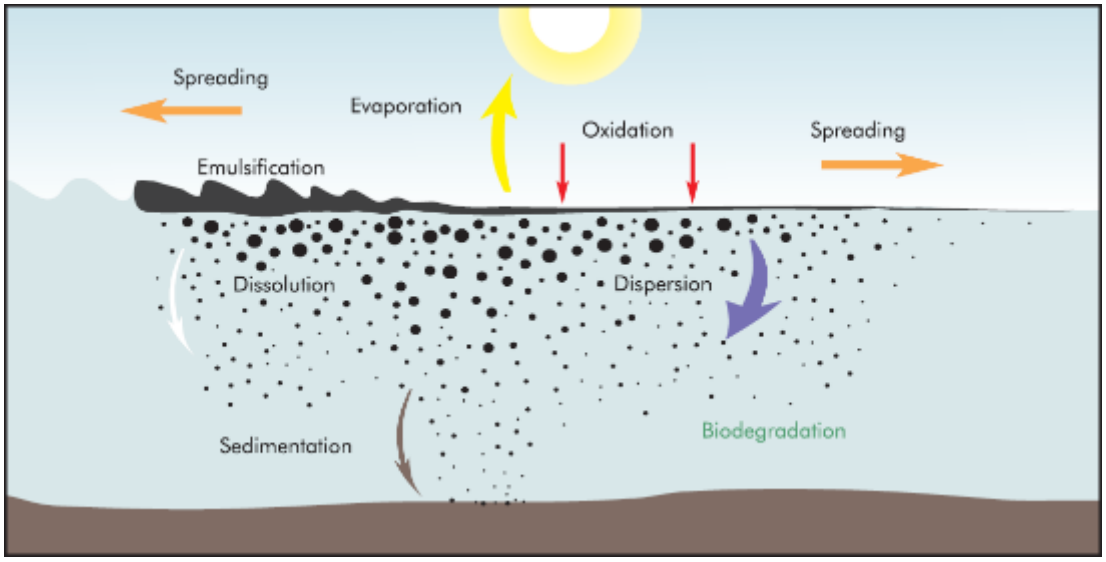


Figure 8-2 Weathering processes acting on spilled in the marine environment.

Each weathering process affects oil spill response and the extent of environmental damage caused by spilled oil.

Spreading, evaporation and emulsification begin as soon as the oil is spilled into the water. These processes affect the window of opportunity for oil spill response techniques such as in-situ burning and dispersant application. The window of opportunity varies between oil types and meteorological conditions.

Table 8-7 Summary of weathering processes acting on oil spilled in the marine environment and the corresponding effects on oil spill response efforts

Weathering Process	Action	Advantages	Disadvantages
Spreading	• Oil spreads over the sea, becoming thinner with distance from source. • Rate is dependent on oil viscosity, wave action, wind speed, and air and sea temperature.	• Provides sufficient area for multiple clean-up efforts.	• Increases surface area of slick so oil affects a larger area and is more difficult to encounter in booms. • Decreases slick thickness, limiting mechanical recovery and dispersant efficacy.
Evaporation	• Light ends evaporate quickly, which could potentially produce an explosive atmosphere. • Rate is dependent on volatile content of oil, wind speed, air and sea temperature.	• Reduces volume of oil to be recovered. • Removes pollution from marine environment. • Evaporating light ends can help ignition of slick (i.e., in-situ burning) • Can potentially reduce likelihood or extent of oil reaching shorelines.	• Can create explosive environment whereby safety takes primacy and response efforts can be delayed. • Increases oil viscosity making it less amenable to dispersant application.
Emulsification	• Seawater mixes with oil to form a viscous and persistent emulsion, potentially increasing the total volume by up to 3-4 times. • Difficult to recover, cannot be burnt or dispersed. • Extent depends on oil composition and sea state.	• No advantages can be applied.	• Increases volume of oil, resulting in increased waste management. • Cannot be dispersed or burned. • Reduces recovery efficiency.
Dispersion	• Oil breaks down into droplets which mix into the water column. • Small droplets may remain dispersed in the water, large droplets may resurface. • Rate depends on oil viscosity and sea state.	• Reduces volume of oil to be recovered. • Encourages natural biodegradation of oil components.	• Can harm marine organisms. • Human health can be affected by eating contaminated seafood.
Sedimentation	• Oil adheres to suspended particles which are heavy enough to sink the oil to the seabed. • Rate depends on suspended sediment concentration. High concentrations occur at river mouths and in coastal waters.	• Reduces volume of oil to be recovered. • Can potentially reduce likelihood or extent of oil reaching shorelines.	• Can harm marine organisms, especially on the seafloor. • Human health can be affected by eating contaminated seafood.
Biodegradation	• Oil is consumed by bacteria that break it down into smaller compounds until it becomes carbon dioxide and water.	• Potential to return environment to pre-spill conditions (as per defined endpoints). • Can reduce waste.	• Slow process (begins after ~1 week). • Heavy compounds can degrade slowly. • Cannot degrade largest and most complex oil

Weathering Process	Action	Advantages	Disadvantages
	• Rate depends on oil type, availability of nutrients (nitrogen and phosphorus), oxygen concentration and water temperature.	• Free (unless fertilisers used). • Energy from oil is distributed through the food web.	components. • Intermediate products may be harmful to marine organisms (however, potentially not as harmful as the original spill product).
Dissolution	• Water soluble components, such as benzene and toluene dissolve into the water column and can affect marine organisms. • Extent depends on oil composition; most oils contain small soluble fractions.	• Reduces spill volume at surface. • Soluble compounds are generally readily biodegradable.	• Soluble compounds are generally harmful to marine organisms.
Photo-oxidation	• Breaks down oil components into smaller, soluble compounds. • Can form persistent compounds called tars. • Extent depends on oil type and the form in which it is exposed to sunlight.	• Can break down large aromatic compounds that are resistant to biodegradation.	• Oxidised compounds can be more harmful to marine organisms. • Increases the oils persistence.

8.3. HYDROCARBON FATES AND BEHAVIOURS

8.3.1. ITOPF Group 1 Oils

Marine Diesel Oil is classified as a Group 1 oil by the ITOPF classification of oil[12] due to its very low specific gravity (<0.8).

- Group 1 oils spread rapidly with wind and current when spilled on water and tend to dissipate completely through evaporation and physical dispersion within 1-2 days, so it doesn't have time to form emulsions.
- Small globules of semi-solid oil may persist for some time if the oil contains wax or other persistent components.

Group 1 oils pose significant health and safety concerns:

- High concentration of toxic (soluble) compounds can cause localised and severe impacts to water column and intertidal resources.
- Extremely low flash point means high risk of fire or explosion (all sources of ignition should be ceased immediately).

8.3.2. ITOPF Group 2 Oils

The expected crude at the Gazania-1 well is a Group 2 oil by the ITOPF classification of oil[12] due to its low specific gravity (0.8-0.85).

- Group 2 oils are light oils which spread rapidly with wind and current when spilled on water.
- Light ends evaporate quickly (up to 40% by volume), but the heavier components (up to one-third of spill volume) persist long enough to warrant a response[13].
- Group 2 oils don't tend to form viscous emulsions, but there are exceptions.

9. OIL SPILL RESPONSE MANAGEMENT

9.1. RESTRATA

Restrata are an incident management organisation used by Azinam to help run an incident. Azinam will assume primacy for any incident where a Tier 2 or 3 oil spill has occurred but will remain responsible for all affected Azinam staff, or staff of direct contractors.

The Restrata Control Room is manned 24-7 and is the Azinam point of contact in event of an incident. The Restrata Control Room Operator (CRO) responsibilities include:

- Passing on information to the Azinam and Restrata Duty Managers.
- At the request of the Azinam Duty Manager, initiate a full or partial IMT mobilisation.
- Continuing as the point of contact for Azinam until the IMT is established.

[12] ITOPF. 2014. Technical Information Paper (TIP 02). Fate of Marine Oil Spills.

[13] NOAA. 1992. Introduction to Coastal Habitats and Biological Resources for Spill Response. Oil Behaviour and Toxicity.

Restrata are contracted to provide core Incident Management Centre (IMC) facilities, comprising of an online Command & Control platform and an Incident Management Team (IMT) as follows:

- Team Leader (Restrata)
- Duty Manager (Azinam)
- Site Contact (Restrata)
- Log Keeper (Restrata)
- Logistics Coordinator (Restrata)
- HSEQ Coordinator (Restrata)
- HR Coordinators x 2 (Restrata)
- Media Advisor
- Relative Response (Supervisor + appropriate number)
- Media Response Team

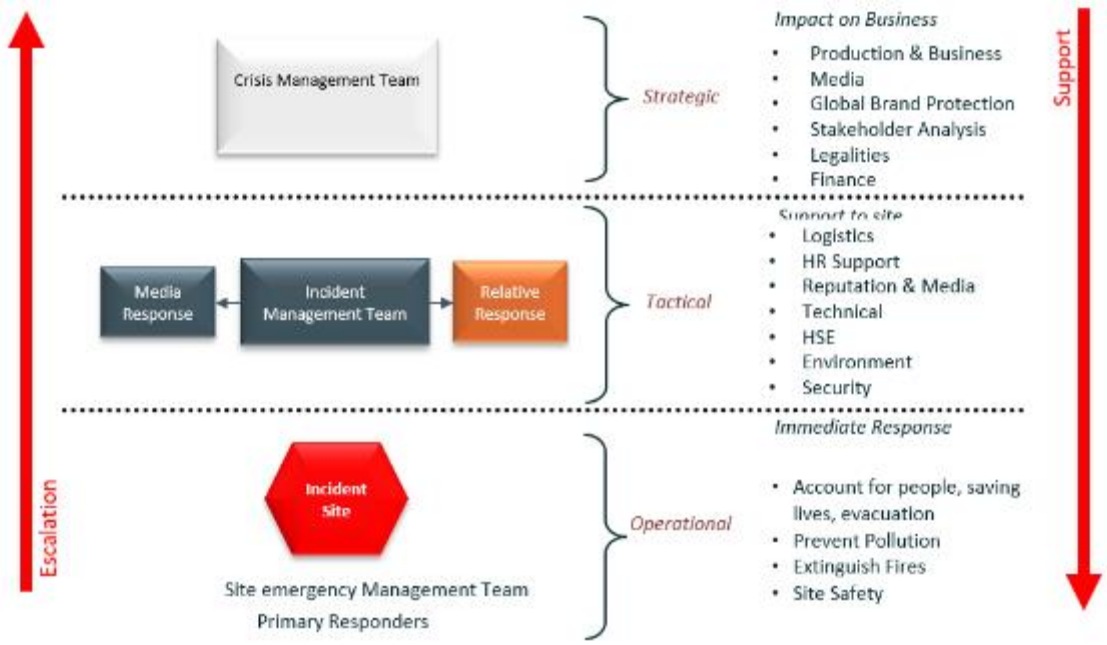


Figure 3 Restrata assisstance to Azinam

9.2. TACTICAL RESPONSE TEAM (TRT)

The responsibility for managing the operational (primary) response to any incident or emergency rests with the operator of the rig and/or vessel.

The Tactical Response Team (TRT) are the first responders to an emergency occurring at the worksite and undertake all tasks under the direction of the On-Scene Commander (OSC). The TRT's main objective is to ensure the safety of all workers in the area of the spill. The TRT will take appropriate action to mitigate the negative impacts to people, environment and relevant assets in a safe manner.

Upon discovery of an incident, it is the responsibility of personnel (at the incident site) to notify the radio room and/or the OIM. Once the Tactical Response Team (TRT) is activated, it is the responsibility of the on-site team to ensure notification is made to the Strategic Response Team (SRT). Once the SRT is activated (if required) subsequent communications between the TRT and SRT will be done via the OSC.

9.2.1. TRT Structure

The TRT will consist of:

- Spill Observer
- CCR Radio Room
- TRT Team Leader (Island Drilling Senior Toolpusher)/Vessel Master
- On Scene Commander (OSC) (OIM)
- Senior day Drilling Supervisor (Azinam)

Refer to: Action Checklists, Section 2, for roles and responsibilities of each key member of the TRT.

9.3. SUPPORT/SUPPLY VESSEL MASTER

If there is a spill from a support/supply vessel, the vessel master is responsible for internal reporting and notification of the incident as detailed in their Shipboard Oil Pollution Emergency Plan (SOPEP). The SOPEP includes a description of actions to be taken to reduce or control the oil spill, as well as procedures and point of contact for co-ordinating spill response actions with local and national authorities. The initial actions will be taken in accordance with the approved SOPEP. Under Regulation 26, Annex 1 of International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), any support or supply vessel must have a SOPEP approved by a classification society or flag state. If the spill originates from a vessel, the Vessel Master will take on the role of the On-Scene Commander (OSC). The OSC may call upon other support vessels to assist in various oil spill response techniques. The OSC of the vessel will need to notify and liaise with the OIM if the incident has occurred within the 500m exclusion zone. This will be done through the agreed radio channels. The vessel OSC may seek additional first responder support from the OIM on the rig depending on the incident needs.

9.4. STRATEGIC RESPONSE TEAM (SRT)

The SRT provides strategic direction to emergency response operations, supports tactical responders, addresses tactical issues and concerns best handled at the SRT level, and interfaces with the CMT. The SRT will be based within the Restrata Emergency Response Room in Aberdeen, Scotland. Notification to contractors and local responders is also under the SRT responsibility. In case of SRT activation, it is the responsibility of the SRT Leader to ensure notification and ongoing communication is made to the CMT.

9.4.1. SRT Structure

The SRT is led by the SRT Leader who is responsible for directing and coordinating the response to the incident. The SRT Leader is responsible for activating the SRT and building the initial organization. The SRT Leader and Operations Team Leader will activate only the functions required to address the situation, and then deactivate the functions as soon as they are no longer needed. The SRT Leader should have clear financial authorities and will refer to the CMT for decisions exceeding their stated authority threshold.

If the DoT want to respond to an oil spill incident in Unified Command, then [redacted] or [redacted] will need to attend their command post and represent Azinam in joint command.

The SRT is comprised of the following core functions:

- SRT Leader (Azinam HSSE or delegate)
- Operations Team Leader
- Planning Team Leader
- Environmental Advisor
- Logistics Team Leader
- Finance Team Leader

The SRT structure allows:

- Clear definition of roles and responsibilities amongst response personnel.
- Communication with relevant agencies, authorities and governments involved.
- Procedures from managing personnel, facilities, equipment and communications.
- Manageable span of control and lines of authority during a response.

Refer to: Action Checklists, Section 2, for roles and responsibilities of each key member of the SRT.

9.5. CRISIS MANAGEMENT TEAM (CMT)

The Crisis Management Team (CMT) is based with Restrata in Aberdeen, which has direct responsibility for managing issues arising from the incident that could have implications to Azinam.

The CMT is responsible for providing strategic support and advice to the SRT and affected business areas. In an incident, the CMT is responsible for:

- Corporate level strategic handling of the incident.
- Facilitation of required resource allocation.
- Notification and collaboration with the COO, Directors, Partners and Stakeholders.
- Expert technical advice regarding insurance, reputation and external relations.
- Corporate communication with relevant agencies, authorities and governments involved.
- Ensuring that company reputation issues are evaluated and addressed.
- Handling the media and central political authorities in cooperation with the SRT through the Azinam Corporate Communications Team.
- Support and provide authorisations to enable the SRT to take specific actions.
- Ensuring business continuity measures are in place.

The CMT generally comprises the senior executives from Azinam's businesses and functions. The CMT Leader will act as a focal point between the SRT and CMT.

Refer to: Azinams Emergency Response Plan/Crisis Management Plan for details regarding the CMT structure and Restrata

9.6. UNIFIED COMMAND

If requested by DFFE, Azinam will assume a Unified Command structure with DFFE. The roles may be run by Restrata and therefore not an Azinam representative.

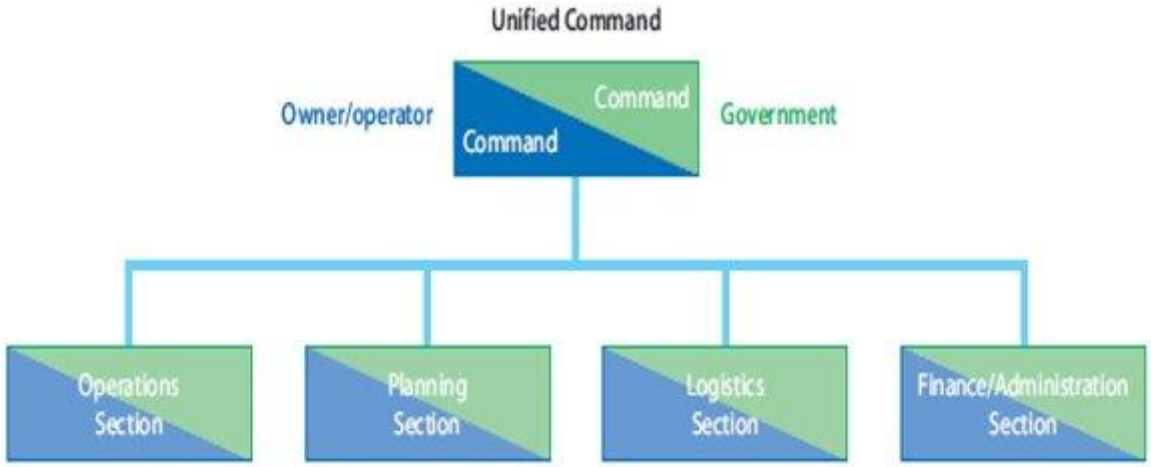


Figure 4 Unified Command within ICS

10.OIL SPILL GOVERNANCE (REGULATORY FRAMEWORK)

Azinam complies with the following international, regional and national legislation and statutory requirements applicable to petroleum activities and oil spills in South Africa.

Table 10-1 Relevant legislation

Name	Key Points
International Conventions	
UNCLOS United Nations Convention on Law of the Sea	The United Nations Convention on the Law of the Sea, often referred to by the English acronym UNCLOS, is a multilateral treaty concluded under the auspices of the United Nations and resulted from the third United Nations Conference on the Law of the Sea (UNCLOS III), which took place between 1973 and 1982
The London Convention on the Prevention on Marine Pollution by Dumping of Wastes and other Matter, 1972	The "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972", the "London Convention" for short, is one of the first global conventions to protect the marine environment from human activities and has been in force since 1975. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. Currently, 87 States are Parties to this Convention.
OPRC 1990	International framework for cooperation in combating and responding to major incidents or threats of oil pollution. The convention strives to: • Prevent marine pollution by oil, in accordance with the precautionary principle • Advance the adoption of adequate response measures if oil pollution does occur • Provide for mutual assistance and co-operation between States for these aims Parties adhering to the convention are required to establish: • Parties undertake, individually or jointly, all appropriate measures to prepare and respond to an oil pollution incident. • Stockpiles of oil spill response equipment for oil spill response exercise and the development of detailed pollution incident response plans. • Oil pollution emergency plans for ships, offshore units and seaports under their jurisdiction.
MARPOL 73/78 And applicable Annexes (III and V for South Africa)	Prohibits the discharge of oil or oily mixtures from ships into the sea, except where '*the oil content of the effluent without dilution does not exceed 15 parts per million*'. Allowance for oil spill operations for '*the discharge into the sea of substances containing oil, approved by the Administration, when being used for the purpose of combating specific pollution incidents in order to minimize the damage from pollution. Any such discharge shall be subject to the approval of any Government in whose jurisdiction it is contemplated the discharge will occur*.' Local regulation and guidance should always be sought prior to carrying out any decanting operations. Requires ships to have a Shipboard Oil Pollution Emergency Plan (SOPEP), in accordance with IMO guidelines and approved by the government of the state under whose authority the ship is operating. The SOPEP must include: • Procedures for reporting oil pollution incidents • List of authorities and persons to be contacted in an incident

Name	Key Points
	• Detailed description of immediate action to be taken to reduce or control discharge of oil • Procedures and point of contact for co-ordinating spill response actions with national and local authorities
CLC 69, 1992 and Fund 1992	Convention on Civil Liability for Oil Pollution Damage • Ensures adequate compensation is available to persons who suffer oil pollution damage resulting from oil-carrying ships. • Does not cover oil spills from offshore installations, drilling facilities or inland spills.
HNS 2010	The HNS Convention was adopted in 1996 to ensure adequate and efficient compensation to victims of accidents involving HNS, such as chemicals. The Convention is based on the two-tier system established under the CLC and Fund Conventions.
Regional Frameworks	
Abidjan Convention	West African coastal countries from Mauritania to South Africa. Mutual assistance for marine pollution incidents. Helps coastal states prevent marine pollution incidents by: • Developing legislation and contingency plans • Information exchange • Incident reporting Refer to: http://abidjanconvention.org/
Benguela Current Convention	The Benguela Current Commission (BCC) is a multi-sectoral inter-governmental, initiative of Angola, Namibia and South Africa. It promotes the vision of the Benguela Current Large Marine Ecosystem (BCLME) sustaining human and ecosystem well-being for generation after generation.
Nairobi Convention 1985	Protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region. Ensure sound environmental management of natural resources. Prevent/mitigate marine pollution using industry best practice and provision of training. Forbids intentional discharge of oil, oily mixtures and waste at sea. Refer to: http://www.unep.org/nairobiconvention/
National Legislation, Policy and Plans	
National Oil Spill Contingency Plan (NOSCP)	The NOSCP aims to promote the planned and nationally co-ordinated response to any marine oil spill to: a. protect human health and safety. a. minimise detrimental environmental impacts; and a. provide for the restoration of the environment, as nearly as is practicable, to pre-spill conditions. The NOSCP sets out the roles and responsibilities of most parties likely to be involved in a national response to a marine oil spill in South Africa. Under the Marine Pollution (Control and Civil Liability) Act 6 of 1981, the DoT is responsible for responding to a national marine oil spill incident. Under the Maritime Safety Authority Act 5 of 1998, SAMSA administers these responsibilities. The priorities for response identified in the NOSCP are: a. human health and safety. a. natural environment.

Name	Key Points
	a. commercial resources. a. amenities; and a. reputation. The NOSCP states that a Net Environmental Benefit Analysis (NEBA) will be used to decide which response techniques to use. If an oil spill occurs the incident owner should activate their own Oil Spill Contingency Plan (OSCP) and notify SAMSA. If the incident owner cannot deal with the incident it would then be handed over to the national maritime incident management (IM) structure. Should the national maritime IM structure not be able to cope with an incident, they would then approach the National Disaster Management Centre (NDMC) to assist. The NDMC is established as an institution within the public service and forms part of, and functions within a department of state where the Minister is responsible. Their objective is to promote an integrated and co-ordinated system of disaster management, with special emphasis on prevention and mitigation by national, provincial and municipal organs of state, statutory functionaries, other role players involved in disaster management and communities.
The Constitution of the Republic of South Africa Act no.108, 1996	Section 24 of the Constitution states that everyone has a right to an environment that is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that; (i) prevent pollution and ecological degradation;(ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The argument may be made that in order to give effect to this right, especially as it relates to preventing pollution of the marine environment, reasonable measures must be taken to combat oil spills as well as measures to remedy the effects of spills.
Marine Pollution (Control and Civil Liability) Act, 1986 (Act 2)	The Minister of Transport is assigned with a responsibility to provide for the protection of sea from pollution by oil and other harmful substances discharged from ships and for that purpose to give effect to the International Convention for the Prevention of Pollution from Ships, 1973 as amended by the Protocol of 1978 (MARPOL 73/78) and to provide for matters incidental thereto. This Act is administered by SAMSA. The Act empowers the Minister of Transport to develop regulations.
Marine Pollution (Control and Civil Liability) Act, 1981 (Act 6)	To provide for the protection of the marine environment from pollution by oil and other marine harmful substances, and for that purpose to provide for the prevention and combating of pollution of the sea by oil and other harmful substances; to determine liability in certain respects for loss or damage caused by the discharge of oil from ships, tankers and offshore installations. The Act is administered by SAMSA. Regulations relating to the prevention and combating of pollution of the sea by oil have been made and the Act grants SAMSA extensive powers to take a variety of steps to prevent pollution of the sea where a harmful substance is likely to or is being discharged. Moreover, there are regulations regarding criminal as well as civil liability after a “discharge” causing pollution of the sea has occurred, and to provide for matters related to it. The Act empowers the Minister of Transport to develop regulations.
Marine Pollution	This Act gives domestic effect to both the Intervention Convention Relating to the

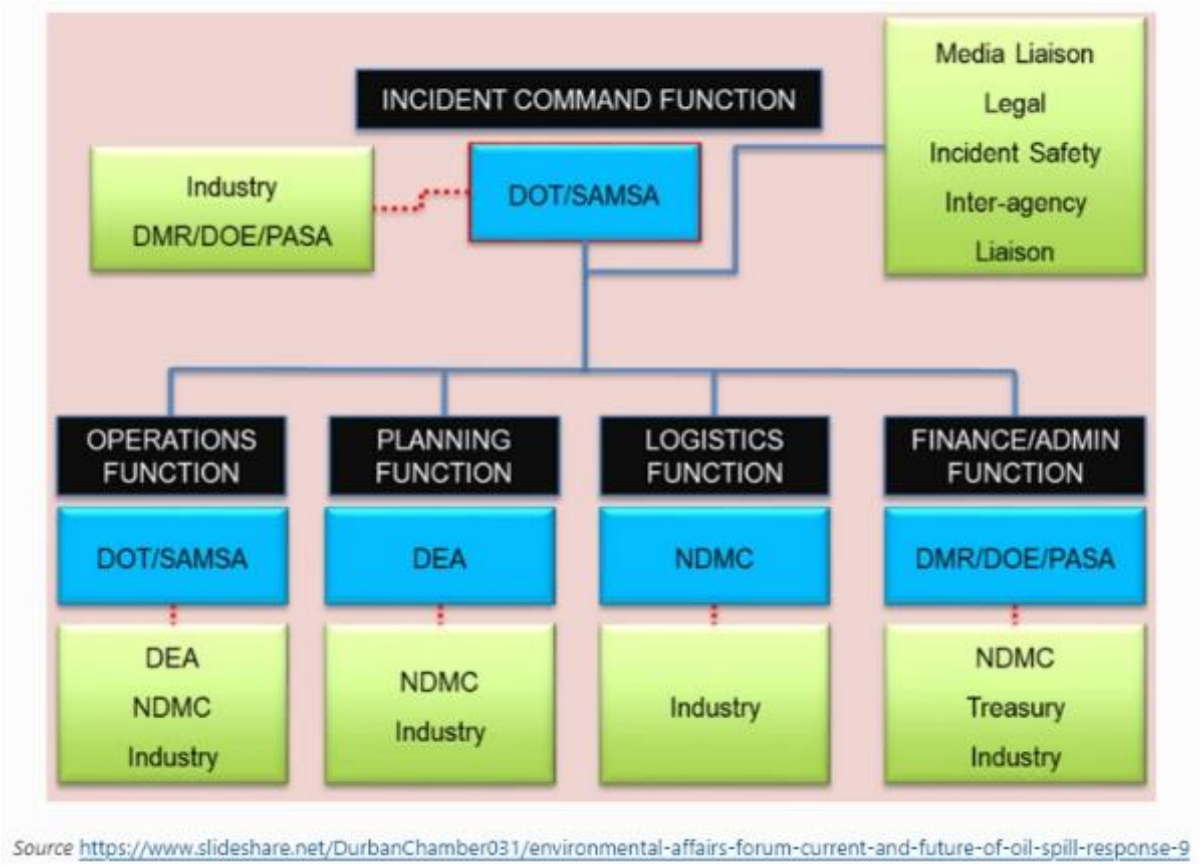
Name	Key Points
Intervention Act 1987 (Act 64)	Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 as well as the Protocol Relating to Intervention on the High Seas in Cases of Marine Pollution by Substances other than Oil, 1973.
National Ports Act, 2005 (Act 12)	This Act relates to the establishment of the National Ports Authority and the Ports Regulator; to provide for the administration of certain ports by the National Ports Authority; and to provide formatters connected therewith.
The Public Finance Management Act, 1999 (Act 1)	This Act regulates financial management in the national government and provincial governments and ensures that all revenue, expenditure, assets and liabilities of these governments are managed efficiently and effectively.
Disaster Management Act, 2002 (Act 57)	This Act provides for, among others, an integrated and co-ordinated disaster management policy that focuses on preventing or reducing the risks of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disasters and post-disaster recovery.
Dumping at sea Control Act, 1980 (Act 73)	This Act brings into force domestically the provisions of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, 1972 (the London Convention). It provides for the control of dumping at sea of various substances and structures, including vessels, platforms or other man-made structures.
Merchant Shipping Act, 1951 (Act 7)	SAMSA is responsible for the administration of this Act. The Act imposes an obligation on an owner of a ship to secure the sea worthiness of a ship. Unseaworthy ships may be detained and where any ship is detained, it may be inspected by a surveyor who shall report on any supposed defects or deficiencies.
The Sea-Shore Act, 1935 (Act 21)	The Sea-Shore Act makes specific provision for the protection of public health. The competent authority to whom the administration of the Health Act has been assigned, may declare that any local authority may exercise, in respect of the seashore and the sea situated within its area of jurisdiction or adjoining such area, any of the powers which are conferred by the Health Act on a local authority. This could therefore be extended to include the taking of measures to remedy an oil spill in cases where it could be harmful.
South African Maritime Safety Authority Act, 1998 (Act 5)	This Act provides for the establishment of SAMSA whose objectives are to ensure the safety of life and property at sea, to prevent and combat pollution of the marine environment by ships and to promote the Republic's maritime interests.
National Environmental Management: Integrated Coastal management Act, 2008 (Act 24)	Included among the aims of the Act is the control of dumping at sea and pollution in the coastal zone. The Act provides that in fulfilling the rights contained in section 24 of the Constitution, the state through its functionaries and institutions implementing the Act, must act as a trustee of the coastal zone and must in implementing the Act take reasonable measures to achieve the progressive realization of those rights in the interest of every person.
National Environmental Management Act, 1998 (Act 107) (NEMA)	NEMA is administered by the Department of Environmental Affairs and provides for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment.

10.1. ROLES AND RESPONSIBILITIES OF KEY STAKEHOLDERS

The following authorities and organisations hold key roles in oil spill response incident management in South Africa. Their jurisdiction is discussed below.

Table 10-2 Roles and responsibilities of key stakeholders

Stakeholder	Stakeholder	Stakeholders
SAMSA (South African Maritime Safety Authority) Legally designated party responsible for preventing and combatting pollution and shall be the lead agency. SAMSA will have overall responsibility for responding to casualties and implementation of the South Africa Incident Response Plan. • Developing the NOSCP • Control of the tugs • Administration of the Pollution Acts. • In charge of some clean up equipment	DFFE • Coordination and implementation of environmental protection and clean up measures • Clean up measures during a spill • Pollution combatting • Control of any dispersant spraying operations • Maintenance and storage of any dedicated equipment and dispersant • Maintenance of Local Coastal Spill Contingency Plans	Local Authorities • Guided by DFFE coastal plans and instructions. Cooperation and assistance National Port Authority • Assistance • Additional equipment SAPIA • Clean up activities



Source https://www.slideshare.net/DurbanChamber031/environmental-affairs-forum-current-and-future-of-oil-spill-response-9

Figure 5 Incident Command for National Organisations

In summary, for the maritime and coastal areas outside harbours the organisations responsible are as follows:

The Competent authority

Oil pollution prevention and response is divided between the Department for Forestry and Environment (DFFE) and the National Department of Transport (NDOT). Within the NDOT, the South African Maritime Safety Authority (SAMSA) is responsible for the supervision of salvage, oil trans-shipments and lightering operations while the oil is still aboard the vessel, together with any negotiations with owners and insurers. The DFFE is responsible for measures undertaken once oil has been released to sea, namely shoreline protection and clean-up, and at-sea response, including the operation of dedicated oil response vessels and aircraft and dispersant spraying operations.

The national contingency plan is currently under revision and extension to include spills of chemicals. 25 Local Coastal Oil Spill Contingency Plans, compiled by DFFE, detail appropriate actions to be taken upon threatened or actual impact. These are supported by a comprehensive Coastal Sensitivity Atlas. Individual plans for oil handling facilities are in place, drawn up by the oil industry, represented by the Oil Industry Environment Committee (OIEC). The clean-up of oil spills in port has been delegated to PORTNET, the ports administration. Plans are established for each port.

Control functions are performed by personnel drawn from the major agencies with the On Scene Coordinator drawn from the DFFE. In a major incident a Marine Control Centre will be established by DFFE at the nearest port facilities and in the event of a threat or actual impact of pollution of the shoreline, a Shore Control Centre will be established by DFFE. When alerted, local authorities must nominate officers to become Area Controllers. In the event of lesser spills, where more localised areas have been impacted or threatened, operations may be coordinated from Local Civil Defence Control Centres in contact with the main Shore Control Centre.

Response at Naval facilities would be managed by the South African Navy using equipment and personnel at its disposal. In the event of large spills assistance would have to be called for from other sources.

- Response

Dispersants have historically been relied on for spill combat at sea. However, present day policy reflects a more cautious approach with spraying determined by the OSC and dependent upon the type and state of the oil and the size of the slick. In general, dispersants may only be used more than 9.2km offshore and in water with a depth of more than 30 metres. In certain cases, where the advantages of spraying outweigh those of abstinence (e.g., where the slick threatens important ecological or socio-economic resources), this policy may be overridden. A list of approved oil spill dispersants has been established. Only dispersants bearing the South African Bureau of Standards mark of approval may be used.

Booms and skimmers are utilised in sheltered port and coastal areas in an attempt to protect sensitive areas and to recover spilt oil. Considerable effort has also been directed to advising local authorities on the use of 'self-help' techniques for the protection of the numerous sensitive areas along the coastline, using locally available equipment and materials.

SAMSA is responsible for overall co-ordination of the prevention and/or combating of an oil spill incident. Their powers include requiring the master or owner of a ship or tanker to unload the harmful substance from the ship or tanker, to dispose of any harmful substance unloaded or to move the ship or tanker to a place

specified by SAMSA (place of refuge). Other relevant responsibilities include administering the acts relating to oil pollution, taking control of the technical aspects of shipping casualties and controlling the use of the standby oil pollution prevention tug, contracted from African Marine Solutions (AMSOL).

DFFE has responsibility for combating pollution of the sea and shoreline by oil (as delegated under Section 52 of the SAMSA Act 5 of 1998) and is the overall coordinator of clean-up operations. DFFE is responsible for co-ordination and implementation of coastal environmental protection and clean-up, control of the use of pollution combating vessels, surveillance aircraft. DFFE has jurisdiction to approve the use of dispersants and dispersant spraying operations, maintenance and supply of dispersant stocks and other dedicated oil spill equipment. DFFE will liaise with different groups (including local environmental groups, SAMSA and salvors). DFFE have compiled 25 local coastal oil spill contingency plans that detail appropriate actions to be taken upon threatened or actual impact.

Local authorities are responsible for taking specified measures to prevent or remedy adverse effects of a spill on the coastal environment, provide assistance in the form of supervision, labour, transport and equipment for the protection and clean-up of their beaches and other areas under their jurisdiction, making arrangement with local Traffic and Police.

Harbour Masters

One of TNPA's functions is to regulate and control pollution and protect the environment within the port limits. They have jurisdiction over their individual port areas which typically stretch 3-5 miles from the main harbour port areas.

11. OIL SPILL RISK ASSESSMENT

11.1. RISK ASSESSMENT METHODOLOGY

The Oil Spill Risk Assessment (OSRA) methodology described below is adapted from the International Maritime Organisation (IMO) guidance[14] and IPIECA-OGP Report on Oil Spill Risk Assessment and Response Planning for Offshore Installations[15]. This OSRA has been undertaken for the exploration drilling phase of the project.

The Risk Register (Section 11.2) and Risk Assessment Matrix (RAM) (Section 11.3) show the outcomes of the risk assessment process.

Table 11-1 Oil spill risk assessment methodology

Steps	Description
Step 1 Establish Risk Assessment Context	• The scope and boundaries of OSRA are for the Gazania-1 well, Block 2B, off the West coast of South Africa. • The objectives of the OSRA are. for regulatory approval and for decision making. • The level of detail in the risk assessment is. qualitative due to the nature of the wellbeing an exploratory well.
Step 2 Oil Spill Hazards/ Scenarios Identification	All operation processes and actions were reviewed to identify potential sources, and events, that could lead to an oil spill including their potential preventive measures. • The resources used to complete the OSRA are Emergency Response Plan, the project description and the Island Drilling SOPEP and drill plan. • The scenarios identified from events and their sources and causes are listed. • The potential scenario, oil type and volume are recorded in the Risk Register. • The worst-case scenario is assumed in all cases
Step 3 Likelihood analysis	The hazardous events have been characterised based on historical data sources, volume of oil likely to be spilled, duration, location and other info to develop the event into a scenario. Oil spill mitigation measures shall be considered already in place. Based on characteristics (likelihood and volumes), scenarios have been aggregated to get representative scenarios for modelling.
Step 4 Consequence Analysis	The most sensitive of the environmental receptors (ecological and socio-economic) from available data; have been identified from the following categories: • Biological features • Shoreline type • Sensitive Socio-economic receptors The consequence of impact of the receptor has been noted, based on the impact oiling has on the receptor to provide the consequence category. Oil spill modelling was carried out in 2016 by CCA Environmental ltd for Block 2B in the proposed exploration area. Four realistic scenarios were chosen and have been linked to the risk assessment. Refer to: • Oil Characteristics, • Environmental and Socioeconomic Information, Section 12 which may be affected based on the oil spill modelling results • Oil spill modelling results Section 12.5

[14] as issued in the Manual on Oil Spill Risk Evaluation and Assessment of Response Preparedness (2010 Edition)

[15] Oil Spill Response Joint Industry Project (JIP) 6: Oil Spill Risk Assessment and Response Planning for Offshore Installations (2013)

Steps	Description
	The potential oil spill scenarios and assigned likelihood and consequence values are recorded in the Risk Register. Refer to: Risk Register, Section 11.2.
Step 5 Establishing and evaluating Risks	The risk can is calculated based on the predicted consequence from the modelling results and the likelihood determined previously. This is put on the Risk Assessment Matrix (RAM). The 'plot' in the Risk Assessment Matrix indicates the risk level of the operations (i.e., highlights the scenarios which are deemed low, medium or high risk) and therefore show what risks need to be reduced depending on the RTC, following the ALARP principle. If there are any scenarios deemed to be above RTC, the risk level may be further reduced by mitigating the consequence on the selected sensitivities. Refer to: RAM, Section 11.3

11.2. RISK REGISTER

Table 11-2 Definition of consequence categories

Severity	Environmental Definition
1	Slight impact
2	Minor local impact
3	Moderate regional impact
4	Major national impact
5	Extensive international impact

Table 11-3 Definition of likelihood categories

Likelihood	Definition
A	Never happened in the industry
B	Heard of in the industry
C	Has happened in the organisation or more than once per year in the industry
D	Has happened at the location or more than once per year in the organisation
E	Has happened more than once a year at the location

Table 11-4 Gazania-1 well, Block 2B Risk Assessment

SCENARIO						Initial Risk			Mitigation Measures	Residual Risk		
#	Source	Event	Oil Type	Spill Volume	Impact	Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
1	Blowout	Loss of well control and failure of blow out preventer resulting in release for 16 days when well is capped.	Light to Medium crude (ITOPF Group 2)	10,000 bbl/day per day	Coastline impacted. International media and government interest guaranteed	A	5	Medium	Control of density of the drilling fluid, equipment inspections, pressure and function testing. Testing of the BOP is conducted during drilling operations. Process Control System, Process Shutdown System, Emergency Shutdown System, Fire and Gas System, Diverse Path Shutdown System. OSRP in place and oil spill response contractors identified and oil spill response equipment and dispersant will be provisioned accordingly.	A	4	Low
2	Blowout	Loss of well control and failure of blow out preventer resulting in release for 8 days when well is capped.	Light to Medium crude (ITOPF Group 2)	10,000 bbl/day per day	Coastline impacted. International media and government interest guaranteed	B	4	Medium		B	3	Low
3	Vessel collision	Medium sized	Marine	629bbls	Possible	D	2	Me	Tank alarms, navigation	D	1	Low

SCENARIO						Initial Risk			Mitigation Measures	Residual Risk		
#	Source	Event	Oil Type	Spill Volume	Impact	Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	or grounding	operational spill of diesel	diesel oil		national media interest.			diu m	systems, AIS, bunded areas, spill kits, oil spill response resources provisioned appropriately, Tier 3 response contractor in place (OSRL), secondary containment area around storage tanks. Diesel transfer hoses equipped with breakaway couplings, bunkering as a planned activity in accordance with the SOPEP. Visual inspection of hoses. Bunkering operations will be supervised.			
4	Tank rupture/pumping error/tank overfill	Medium sized operational spill of diesel	Marine diesel oil	629bbls	Possible national media interest.	D	2	Me diu m		D	1	Low
5	Fuel transfer operations	Rupture of hose during transfer/loading	Marine diesel oil	100bbls	Possible national media interest.	D	2	Me diu m		D	1	Low
6	Crew transfer aircraft	Loss of fuel from the aircraft tanks only. No oil lost from the rig	Jet A-1 fuel	1 tonne	Release to the sea, possible contact with marine life and vessels.	B	3	Lo w	Contractor(s) appointed based on safety mitigations and specification of vessel/aircraft Trained crews to implement mitigation measures	B	2	Low

11.3. RISK ASSESSMENT MATRIX (RAM)

The risks have been recorded and plotted on the following RAM to identify risks of low, medium or high severity.

Table 11-5 Risk Assessment Matrix

Consequence		Increasing Likelihood				
Severity	Environment	A	B	C	D	E
		Rare – only in exceptional circumstances	Unlikely – could occur at some future time	Possible – might occur at some time, not common	Likely – probably occur in most circumstances	Almost certain – expected in most circumstances
1	Slight impact/insignificant				3, 4, 5	
2	Minor local impact		6			
3	Moderate regional impact		2			
4	Major national impact	1				
5	Extensive international impact					

Risk Severity Levels

Key:	Low	Medium	High
	Manage for continuous improvements by application of best practice	Incorporate risk reduction measures in balanced approach	Urgent remedy and resources required for immediate risk reduction

12. ENVIRONMENTAL AND SOCIOECONOMIC SENSITIVITIES

12.1. SHORELINE TYPE

Shoreline types are classified by the Environmental Sensitivity Index (ESI) and are numbered in order of their sensitivity to damage from spilled oil. Shorelines with a high ESI are more vulnerable than shorelines with a low ESI.

A review of the EIA has indicated that the shoreline types listed in Table 12-1 could potentially be affected by an oil spill from Azinam's operation in South Africa. Approximately 53% of the west coast of South Africa's shoreline is rocky shore. Over 80% of this rocky shoreline is exposed rocky headlands. Approximately 37% of the shoreline of the west coast of South Africa is sandy beaches interspaced with some larger bays. There are also significant kelp beds in the nearshore littoral zone which are habitat to a number of protected species such as the West Coast rock lobster.

Table 12-1 Shoreline types at risk from an oil spill from Azinam's operation

ESI Rank		Coastline/Location	Oil Holding Capacity	Oil Impact on Shoreline Type
1A	Exposed rocky shore		Low	• Oil usually held offshore by waves reflecting off the steep cliffs • Oil may impact less steep shores • Oil persistence is related to incoming wave energy • Oil persistence is limited to days during high-wave conditions • Oil trapped in rock pools will kill resident organisms • The damage to the intertidal community is expected to be relatively light with fairly rapid recovery • Diving birds using rocky sites may be killed if oiled • Aggressive clean-up methods (large volumes of dispersant, excessive mechanical scraping, or hot water/high pressure washing) damage rocky shore communities
1B	Exposed, solid man-made structures		Low	• High energy environments likely to prevent oil sticking to exposed structures • Oil may remain at or above the high tide line where less frequent wave action occurs. • Impacts to intertidal communities are expected to be short duration, except when the toxicity of the oil is high enough to impact quickly. • Light oil products have the greatest impact to birds at their nesting colonies or feeding in near-shore waters. • Ecological impacts are affected in rocky shores by aggressive clean-up methods (large volumes of dispersant application, excessive mechanical scraping, or hot water/ high pressure flushing).
3A	Fine- to medium-grained sand beaches		Low	• Oil is deposited as a band along the high-tide line • Organisms living in the sand may be killed • Birds may be oiled and killed, but may relocate • Oiled layers may be buried by clean sand

ESI Rank		Coastline/Location	Oil Holding Capacity	Oil Impact on Shoreline Type
4	Coarse-grained sand beaches		Low-medium	• Large accumulations cover entire beach face • Smaller accumulations are deposited primarily along high-tide line • Oil could be buried to 10-20 cm along upper beach face
5	Mixed sand and gravel beaches		Low-medium	• Oil is deposited primarily along the high-tide zone • Under very heavy accumulations, oil may spread across the entire beach face • Oil may percolate over 30 cm into the sand • Organisms may be killed by smothering or by lethal concentrations in the water column
7	Exposed tidal flats		Medium	• Most oil will be pushed across the flat as the tide rises • Oil may be deposited on a falling tide if oil concentrations are high • Biological damage may be severe and long term
8A	Sheltered scarps and sheltered rocky shores		Medium	• Oil persists for several years, particularly between rocks • Upper intertidal biota and algae are most severely affected • Algae in the lower intertidal zone are most resistant to damage
8B	Sheltered, solid man-made structures		Medium	• Oil persists for several years, particularly in crevices • Upper intertidal biota and algae are most severely affected • Algae in the lower intertidal zone are most resistant to damage
9A	Sheltered tidal flats		Medium-high	• Oil may persist for many years • Long-term oil incorporation into tidal-flat sediments is common • Oil deposition commonly occurs along the upper fringes of the flat • Very heavy oil accumulations will cover much of the surface of the flat • Biological damage may be severe and long term

12.2. SENSITIVITIES

The coastal sensitivity atlas of Southern Africa is a series of 34 maps at a scale of 1:250000 covering the entire coastline which is colour coded depending on the substrate and its sensitivity. There are resources coded onto the maps. The maps should be used during a response to form part of the NEBA process and are available on the DFFE website (https://mapservice.environment.gov.za/).

The west coast is characterised by very varied substrates with clear contrasts between rocky cliffs, long sandy beaches, extremely sheltered deep bays and highly exposed open coasts with long dissipative beaches.

The west coast is typically cool and temperate. Some 10,000 species of plants and animals have been recorded, representing 15% of the global marine species diversity.

In a National Biodiversity Assessment 2018 (http://hdl.handle.net/20.500.12143/6362), it was found that half of South Africa's marine ecosystem types are threatened, with bays, islands and rocky shelves most threatened on the IUCN red list. The ecosystem threat status of 150 marine and coastal habitat types were assessed.

The main sensitivities found across the western South African coastline are as follows:

- Important habitats for birdlife in particular, migrant waders and breeding sites for various endangered and threatened species including penguins, gannets, cormorants and other sea birds.
- Estuaries and lagoons and associated navigable rivers which are important for bait organisms, fish, water birds and recreational amenities.
- Marine reserves and sanctuaries (marine protected areas).
- Recreational fishing.
- Seawater intakes for fish factories, aquariums and city sanitation system and diamond diggings.
- Recreational amenities including tourist beaches, surfing and sailing areas.
- Breeding: Spawning areas for fish including species such as anchovy and sole, calving areas for the southern right whales, and otters are common along the coast.
- Commercial fishing such as oyster and seaweed collection, rock lobster catches, demersal and line fish landings.
- Offshore diamond recovery operations.
- Mangroves and associated birdlife.
- Port and harbours: commercial activities including cargo and bulk material loading/offloading and recreational activities such as yacht clubs and fishing boats.
- Deepwater offshore habitats which are critically endangered, included deep water coral communities, seamount communities associated with Childs Mount and Tripp Seamount, approximately 100 km W and 250 km NW respectively of the drilling location.

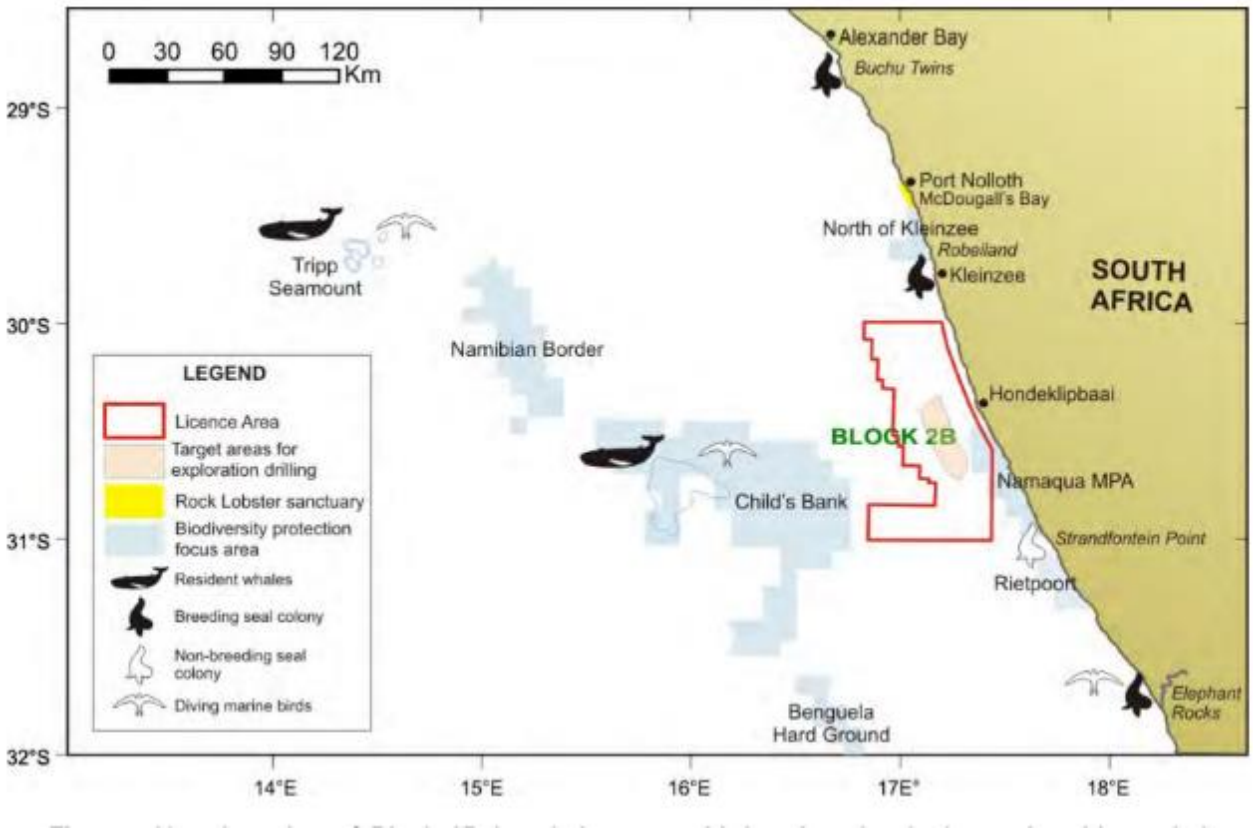


Figure 6 Sensitivities (Thomo EIA)

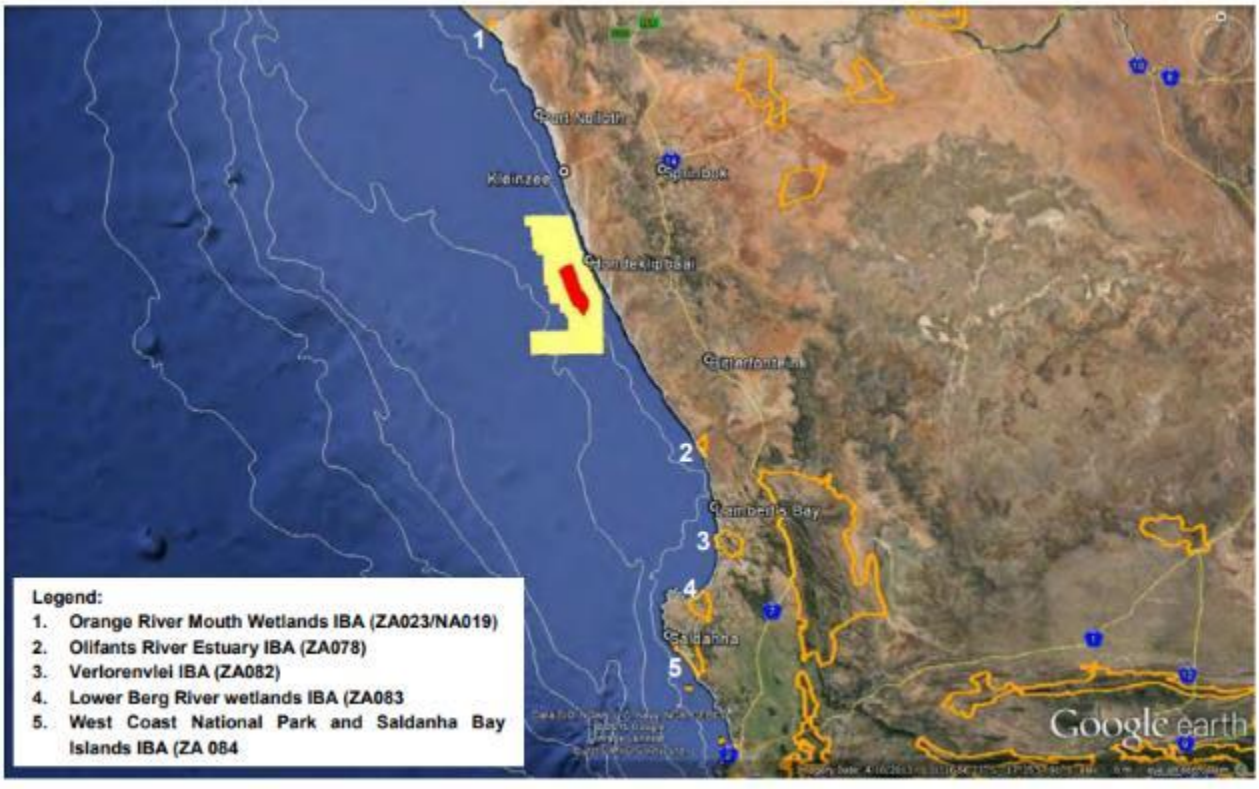


Figure 7 Important Bird Areas (Thombo EIA)

12.2.1. Marine Protected Areas

There are no marine protected areas within the vicinity of the drilling location. The closest is located to the north-east at McDougall's Bay. The remainder are due south of the drilling location. The Thombo EIA contains details regarding sensitive areas and species for transboundary spills into the waters of Namibia.

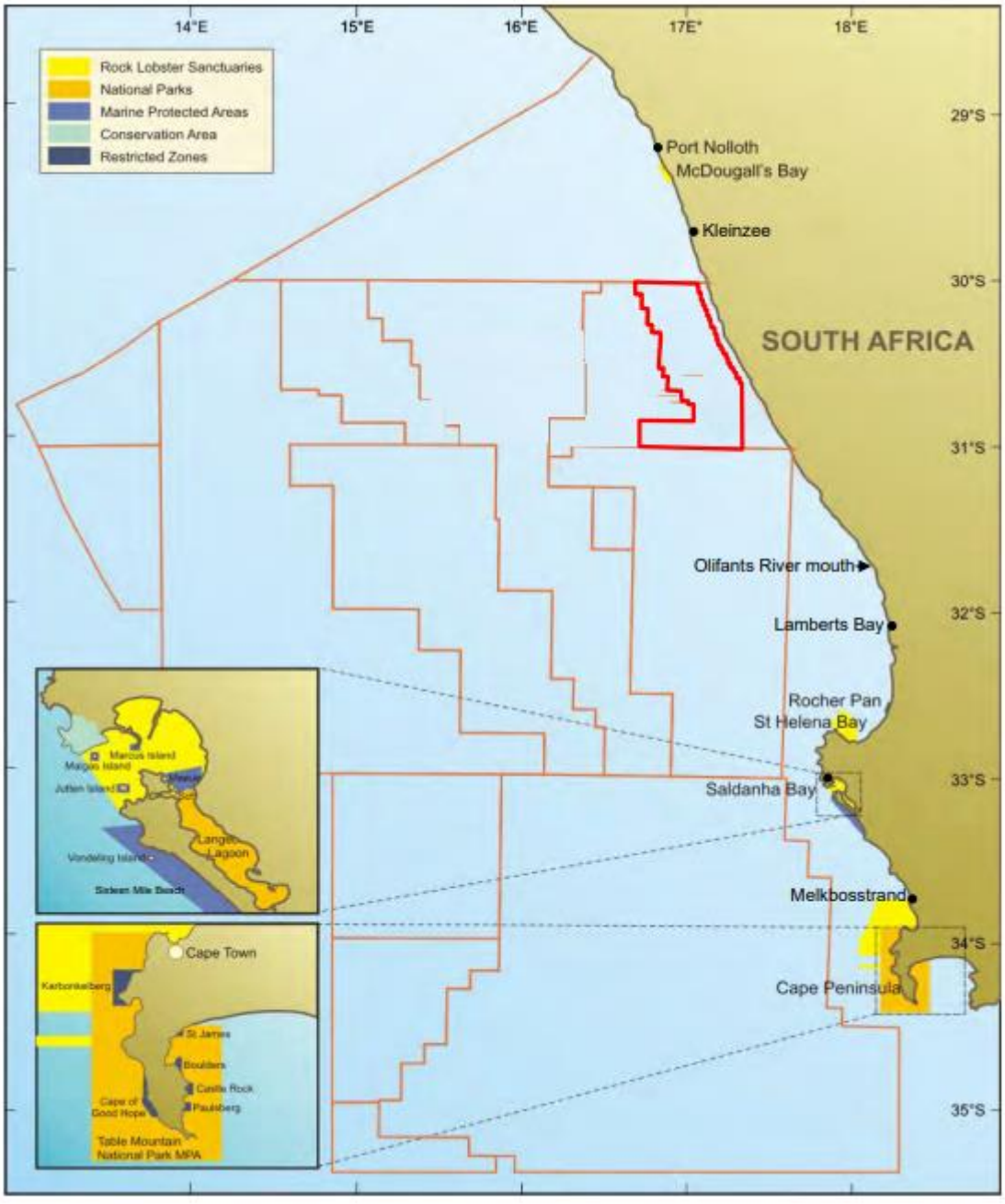


Figure 8 National parks close to Block 2B (Thombo EIA)

12.3. SOCIOECONOMIC FEATURES

This section identifies a range of socioeconomic markers that could be impacted in the unlikely event of an oil spill resulting from operations at the Gazania-1 well site.

The extent to which any sensitivity is impacted by an oil spill depends on many differing factors, such as the type and volume of oil spilled, and the season in which the incident occurs. For best practice and effective

preparedness planning purposes, Azinam has evaluated the most severe instances of possible impacts within Table 12-2 and identified the main socio-economic receptors at potential risk from an oil spill, how an oil spill can impact them, and indicates the seasons or months in which they are at their most sensitive.

Table 12-2 Socio-economic sensitivities that may be affected by an oil spill at Block 2B

Socio-economic Sensitivity	Location	Potential impacts	Sensitive Season/Month
Ports and harbours	Lamberts Bay Port Nolloth Alexander Bay	• Risk of fire - danger to public and vessels. • Temporary closure or restrictions stop hot work (e.g., welding). • Restriction of traffic by booming and gate closures - impacts local economy. • Contamination of vessels and port/harbour structure.	All year
Fishing (artisanal and commercial)	The south African fishing industry consists of 14 commercial sectors operating within the country's 200nm EEZ. Active fisheries of the west coast are Demersal trawl, small pelagic purse-seine, demersal long line, pelagic long line, tuna pole, traditional line and west coast rock lobster.	• Oil pollution is harmful to juvenile fish, may result in low future yields. • Indirect impact in nursing grounds • Spilled oil may cause migratory fish to change migration route. • Oil accumulation in flesh which can pose health hazard to consumers; 'tainting' makes fish unpalatable. • Contamination of fishing gear - fire & health hazard. • Adverse publicity reduces demand regardless of fish health	All year
Mariculture industries and kelp forests	Offshore and close to the shoreline along the coast including kelp farming, oyster farming, oysters, mussels and abalone, in the Bays of Helena, Saldhana and Jacobs.	• Oil pollution is harmful to juvenile shellfish, may result in low future yields. • Indirect impact in nursing grounds • Oil accumulation in flesh which can pose health hazard to consumers; 'tainting' makes fish unpalatable. • Contamination of fishing gear - fire & health hazard. • Adverse publicity reduces demand regardless of fish health	All year
Tourism/leisure /recreation	Includes recreational angling, divers, water sports, nature watching, and beach recreation. Most of which	• Evasion of oiled areas, or areas reportedly affected • Reputation can reduce	Spring-summer

Socio-economic Sensitivity	Location	Potential impacts	Sensitive Season/Month
	occurs nearshore.	tourists visiting for years • Loss of business & loss to local economy especially during peak season • Long term impacts if tourist attraction impacted	
Shipping	The majority of shipping traffic is towards the outer edge of the continental shelf (west of the drilling location). Inshore traffic comprises mainly fishing and mining vessels passing Block 2B.	• Risk of fire - danger to public and vessels • Restriction of ship traffic by booming and gate closures - impacts local economy • Contamination of vessels and ports	All year
Industry	Submarine cables lie to the west of the drilling location Mining for diamond, manganese, phosphate and glauconite prospecting areas also to the west offshore.	• Sand and gravel extraction: stopped until oil spill response operations end • Power stations & desalination plants: damage caused by oil entering water inlet • Shipyards: oil damage to unpainted vessels, hot works pose fire hazard • Shellfish farms: damage to stock if ventilated by local seawater • Power stations & desalination plants: damage caused by oil entering water inlet	All year
Indigenous communities		• Oil may impact sacred places or habitat which can results in various health and safety issues. It may also upset the communities and lead to protest or unrest. • Oil may impact the communities' source of livelihood (e.g., fishing) which can lead to negative psychological impacts and potentially loss of livelihood • Continuous litigation (for claims and compensation) that put persistent stress on the communities	All year

12.4. METEOROLOGICAL CONDITIONS

Winds

Winds are one of the main physical drivers of the nearshore Benguela region, both on an oceanic scale, generating the heavy and consistent south-westerly swells that impact this coast, and locally, contributing to the northward-flowing longshore currents.

The prevailing winds in the Benguela region are controlled by the South Atlantic subtropical anticyclone, the eastward moving mid-latitude cyclones south of southern Africa and the seasonal atmospheric pressure field over the subcontinent. The strongest winds occur during the summer (October to March). Virtually all winds in summer come from the south to south-east, (strongly dominated by south-south-easterlies which occur over 40% of the time, averaging 20 - 30 knots (kts) and reaching speeds in excess of 100 km/h (60 kts). Southerlies are almost as common, blowing about one-third of the time and averaging 20 - 30 kts. The combination of these southerly and south-easterly winds drive the massive offshore movement of surface water, resulting in strong upwelling of nutrient-rich bottom waters, which characterise this region in summer.

Winter remains dominated by southerly to south-easterly winds, but the closer proximity of the winter cold front systems results in a significant north-westerly component. This 'reversal' from the summer condition results in cessation of upwelling, movement of warmer mid-Atlantic water shorewards and breakdown of the strong thermoclines which typically develop in summer. There are also more calms in winter, occurring about 3% of the time, and wind speeds generally do not reach the maximum speeds of summer. However, the westerly winds blow in synchrony with the prevailing south-westerly swell direction, resulting in heavier swell conditions in winter.

Currents

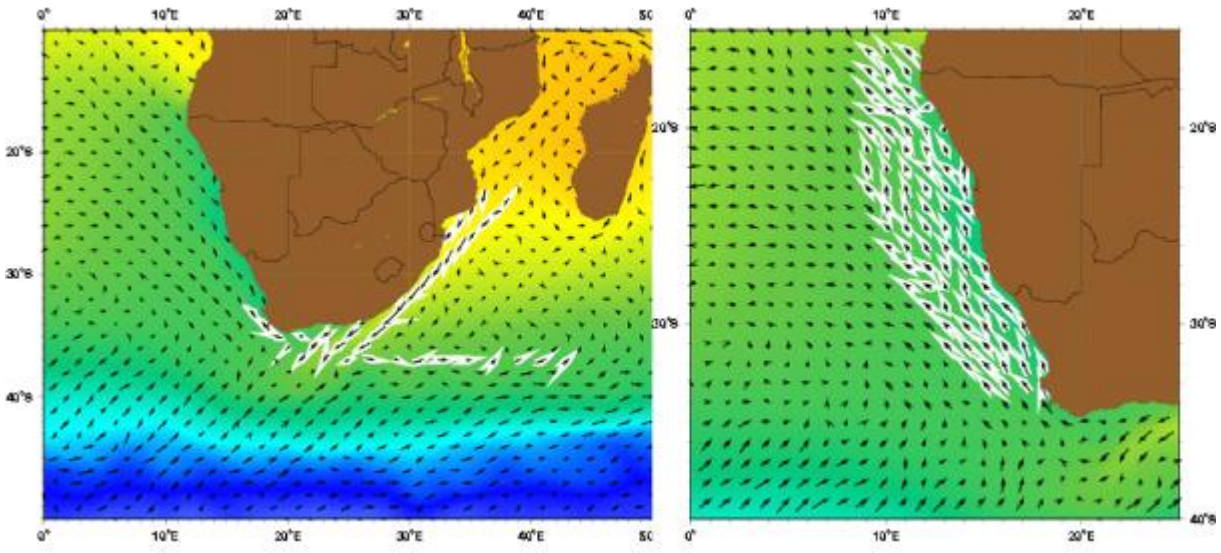


Figure 9 The Agulhas Current and the Benguela Current yearly average direction.

Source: www.oceancurrents.rsmas.miami.edu

The Benguela Current is the eastern boundary current of the South Atlantic subtropical gyre. It begins as a northward flow off the Cape of Good Hope, where it skirts the western African coast equatorward until around 24°S-30°S. The temperature regime in the Benguela Current region is strongly seasonal, with average surface temperatures ranging between 21°C and 15°C in summer and between 17°C and 13°C in winter.

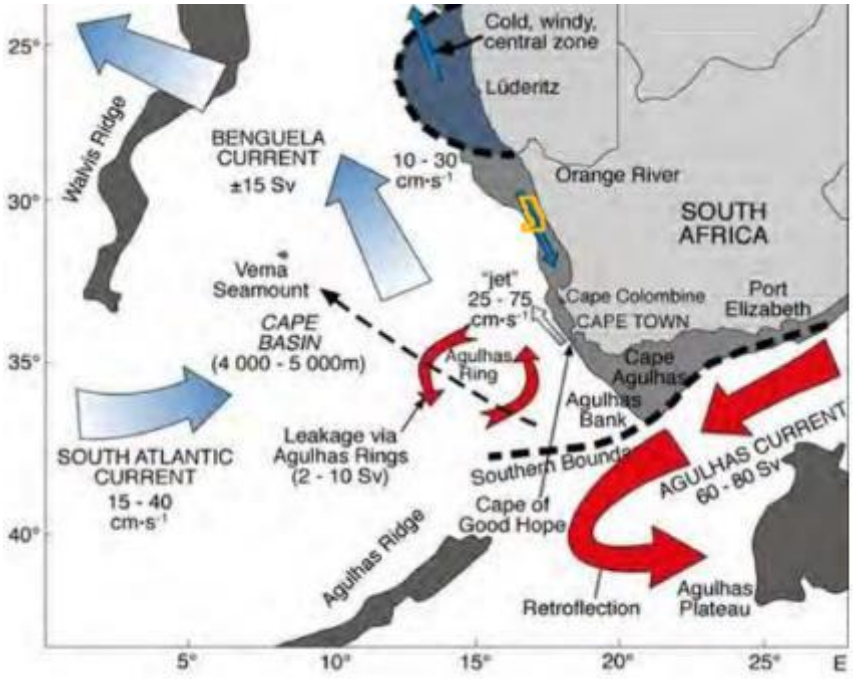


Figure 10 The Benguela system offshore South Africa

For both waves and tides along the West Coast, they are strongly influenced by the seasonal meteorology. There is only moderate seasonal variation, with a SSW dominance and wave height of around 2m.

12.5. OIL SPILL MODELLING RESULTS

Modelling Input

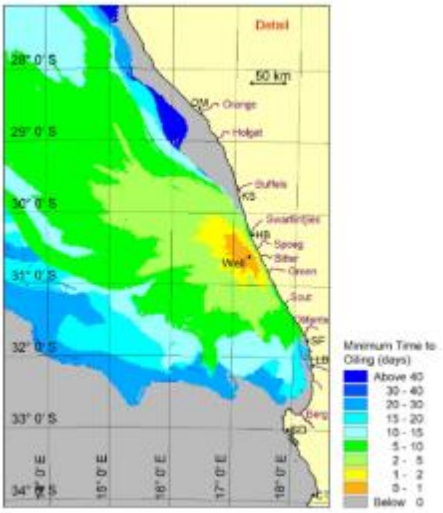
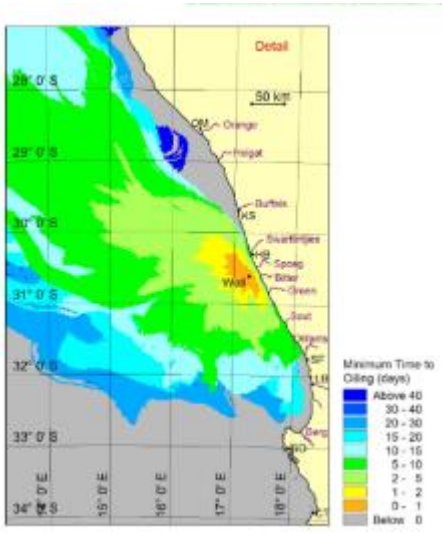
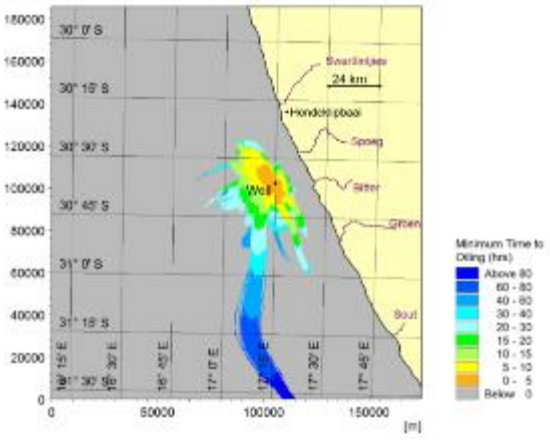
Oil spill modelling study was conducted by CCA Environmental using MIKE 21 software in 2016[16]. The modelling was conducted using an analogue marine diesel oil and bonny light crude. The scenarios selected are as follows:

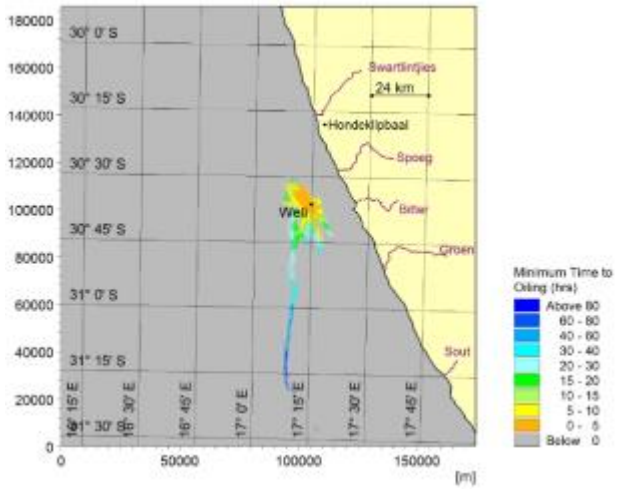
- Large blowout from Gazania-1 well with a light to medium crude and the wellhead with a release rate of /day.
    - Capped after 16 days (scenario 1)
    - Capped after 8 days (scenario 2)
- Complete loss of diesel inventory on the water's surface
    - 629 bbls (scenario 3)
    - 4 bbls (scenario 4)

The following section provides a summary of the modelling results. Refer to the Oil Spill Modelling Report for more details.

[16] Oil Spill and Drilling Discharge Modelling Specialist Study S2001-16-RP-CE-Thombo_Oil_and_Cuttings_Modelling-R2 2016-02-03.docx.

Table 12-3 Trajectory results assuming no response intervention

[Most Oil Ashore]	
33% likelihood of shoreline oiling Mass of oil ashore is 4500 tonnes in a minimum of 2 days during summer months. Minimum time for surface oiling during summer is illustrated on the right.	
Scenario 2	
20% likelihood of shoreline oiling Mass of oil ashore is 4100 tonnes in a minimum of 2 days during summer months. Minimum time for surface oiling during summer is illustrated on the right.	
Scenario 3	
Oil remains on the surface for a maximum of 4.6 days and travels 100km from the source. <1% likelihood of shoreline oiling Minimum time for surface oiling during summer is illustrated on the right.	
Scenario 4	

Oil remains on the surface for a maximum of 3.8 days and travels 80km from the source. <1% likelihood of shoreline oiling Minimum time for surface oiling during summer is illustrated on the right.	

12.6. SPILL IMPACT MITIGATION ASSESSMENT FOR PREPAREDNESS

SCENARIO

Location	Gazania-1 well offshore South Africa
Incident	Well blowout
Oil Type	ITOPF group 2 oil
Volume of Release	10,000 BOPD
Duration of Release	Declining release from day 1
Prevailing Conditions	Spring
Scenario Setting	The oil is likely to spread rapidly with the wind and current when spilled on water. Light ends will evaporate quickly but the heavier components will persist. Modelling shows there is likely to be shoreline oiling.

SIMA

			OFFSHORE								SHORELINE	
			No intervention	Containment and Recovery		In situ Burning		Dispersant – Vessel		Dispersant – Aerial	Shoreline Booming	
	Potential relative impact			Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score	Impact modification factor	Relative impact mitigation score
Resource compartments	N/L/M/H	A	B1	A x B1	B2	A x B2	B4	A x B4	B5	A x B5	B6	A x B6
Seabed	low	2	0	**0**	-1	**-2**	-1	**-2**	-1	**-2**	0	**0**
Lower water column (below 20m)	low	2	0	**0**	-1	**-2**	-2	**-4**	-2	**-4**	0	**0**
Upper water column (top 20m)	medium	3	+2	**6**	-3	**-9**	-3	**-9**	-3	**-9**	0	**0**
Water surface	medium	3	+2	**6**	+3	**9**	+3	**9**	+3	**9**	0	**0**
Air	medium	3	+1	**3**	+3	**9**	+3	**9**	+2	**6**	0	**0**
Shorelines	high	4		**4**	+3	**2**		**7**		**7**		**8**
1. exposed rocky shores	*low*	*2*	*0*	*0*	*0*	*0*	*+2*	*4*	*+2*	*4*	*+3*	*6*
3. fine-grained sand beaches	*low*	*2*	*+1*	*2*	*0*	*0*	*+2*	*4*	*+2*	*4*	*+3*	*6*
4. coarse-grained sand beaches	*low*	*2*	*+1*	*2*	*0*	*0*	*+2*	*4*	*+2*	*4*	*+3*	*6*
5. mixed sand and gravel beaches	*medium*	*3*	*+1*	*3*	*+1*	*3*	*+3*	*9*	*+3*	*9*	*+3*	*9*
7. exposed tidal flats	*medium*	*3*	*+2*	*6*	*+1*	*3*	*+3*	*9*	*+3*	*9*	*+3*	*9*
8a. sheltered rocky shores	*medium*	*3*	*+2*	*6*	*+1*	*3*	*+3*	*9*	*+3*	*9*	*+3*	*9*
8b. sheltered man-made structures	*medium*	*3*	*+2*	*6*	*+1*	*3*	*+3*	*9*	*+3*	*9*	*+3*	*9*
9. sheltered tidal flats	*high*	*4*	*+2*	*8*	*+1*	*4*	*+3*	*12*	*+3*	*12*	*+3*	*12*
High Value Resources				**7**		**3**		**-5**		**-5**		**6**
marine protected areas	*high*	*4*	*+2*	*8*	*+1*	*4*	*-2*	*-8*	*-2*	*-8*	*+2*	*8*
spawning areas	*medium*	*3*	*+2*	*6*	*+1*	*3*	*-1*	*-3*	*-1*	*-3*	*+1*	*3*
marine mammals	*medium*	*3*	*+2*	*6*	*+1*	*3*	*-1*	*-3*	*-1*	*-3*	*+2*	*6*
Socio-economic				**6**		**1**		**5**		**5**		**4**
tourism	*high*	*4*	*+2*	*8*	*+1*	*4*	*+3*	*12*	*+3*	*12*	*+1*	*4*
artisanal fishermen	*medium*	*3*	*+1*	*3*	*-1*	*-3*	*-1*	*-3*	*-1*	*-3*	*+1*	*3*
Cultural	low	2	0	**0**	+1	**2**	+3	**6**	+3	**6**	+2	**4**
		TOTAL		31		13		16		13		21
		RANKING		**1st**		**4th**		**3rd**		**4th**		**2nd**

Potential Relative Impact Scores:	
none	1
low	2
medium	3
high	4

	Description
+3	Major mitigation of impact
+2	Moderate mitigation of impact
+1	Minor mitigation of impact
0	No or insignificant alteration of impact
-1	Minor additional impact
-2	Moderate additional impact
-3	Major additional impact

Range of scores	Colour	Description
8 to 12		Major mitigation of impact
3 to <8		Moderate mitigation of impact
>0 to <3		Minor mitigation of impact
0		No or insignificant change
>-3 to <0		Minor increase in impact
>-8 to -3		Moderate increase in impact
-12 to -8		Major increase in impact

Disclaimer: OSRL has completed this SIMA with best information available at the time. It is advised that stakeholder engagement is carried out and scores updated where applicable to provide a more comprehensive assessment. This SIMA is for guidance purposes and must be reviewed and updated to ensure its validity. OSRL makes no warranties and will not accept any liability in relation to the advice or other information contained in this SIMA or to the merchantability or fitness for a particular purpose. The variables that cause an oil spill and the consequences on the environment can only be addressed on an individual basis. The OSRL Duty Manager and Technical Advisor are available 24 hours a day, seven days a week, for such advice during the initial and ongoing stages of an incident.

13.SUMMARY

This Tiered Response Oil Spill Contingency Plan (OSCP) provides direction during a potential large oil spill from Azinam operations or facilities. It follows international good practice[17] and the South Africa National OSCP, ISO 15544:2000[18] and the IMO Manual on Assessment of Oil Spill Risk and Preparedness[19]. The tiered preparedness and response framework in this OSCP is consistent with the OPRC Convention[20]. It also follows the guidelines set out by the Petroleum Authority of South Africa (PASA) in their Regulatory Requirements Prior to Commencement of Drilling document. Azinam must have in place an approved OSCP to gain their *Pollution Safety Certificate* issued by SAMSA.

The worse case scenario has been identified through the risk assessment and modelled to understand the sensitivities at risk. This has facilitated the identification of suitable equipment that Azinam now has available on site. A SIMA was created to ensure that the right response technique is deployed at the right time.

The OSCP Supporting Documents should be used in conjunction with this OSCP as it has information contained within it that supports and justifies some of the decisions and responses made in the OSCP. This includes a scenario where the Slickgone NS dispersant stockpile can be used without pre-approval from DFFE and where it should not be used, and what to do when the stockpile is insufficient and needs replacing.

[17] IPIECA, ITOPF and IOGP.

[18] International Standard (ISO) 15544, First Edition 2000-09-15, Petroleum and natural gas industries — Offshore production installations — Requirements and guidelines for emergency response

[19] International Maritime Organization; 2010 Edition

[20] International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC '90)

14. AWARDED DRILLING AUTHORIZATION, CERTIFICATION AND ENDORSEMENT

14.1. PETROLEUM AGENCY S.A. DRILLING AUTHORIZATION

Petroleum Agency SA

Tygerpoort Building · 7 Mispel Street · Bellville 7530 · P.O. Box 5111 Tygervalley 7536 · South Africa
Tel: +27 21 938 3500 · Fax: +27 21 938 3520
E-mail: info@petroleumagencysa.com

22 September 2022

Attention: [redacted] Email: [redacted]
Eco Atlantic Oil and Gas
Overland Park,
Kansas,
USA

De[redacted]

RE: PLANNED DRILLING IN BLOCK 2B, OFF THE WEST COAST OF SOUTH AFRICA

The above matter refers.

The Petroleum Agency South Africa has reviewed the documentation submitted in support of your drilling campaign, within Block 2B, off the West Coast of South Africa. We hereby confirm that the submitted documentation complies with the terms and conditions of the Exploration Right and the associated Environmental Authorisation (EA). Permission to commence with drilling operations is therefore granted, subject to the approval of the Oil Spill Contingency Plan by the respective Authorities.

Kindly note that you will be required to submit daily operations and environmental monitoring reports to reports@petroleumagencysa.com. All Environmental monitoring reports including records specified in the EA must be submitted within the prescribed timelines.

Please do not hesitate to contact us should you have any queries related to this matter.

Your Sincerely,

[redacted]
Chief Operating Officer

14.2. SOUTH AFRICAN MARITIME SAFETY AUTHORITY POLLUTION SAFETY CERTIFICATE

REPUBLIC OF SOUTH AFRICA
SOUTH AFRICAN MARITIME SAFETY AUTHORITY

Certificate No. **SB172/09/2022**

POLLUTION SAFETY CERTIFICATE

(Regulation 25 of the Regulation relating to the Prevention of and Combating of Pollution of the Sea by Oil)

Name of Offshore Installation	Port of Registry	Official No. or Registration No.
ISLAND INNOVATOR	**ALESUND**	**8769731**
Gross Tonnage	Type of Offshore Installation	Location
29929	**SEMI-SUBMERSIBLE**	**BLOCK 2B**

This is to certify that **AZINAM** is entitled to operate the **ISLAND INNOVATOR** Subject to the following conditions:

a) **The above-named offshore installation shall be used and operated in accordance with the provisions of Regulation 23 (c) and (d) of the said Regulations;**
b) **That at all times a valid certificate of inspection or classification as referred to in Regulation 22 (e) of the said regulations shall be kept on board thereof;**
c) **That at all times a valid certificate of insurance or similar evidence of financial security, in respect of liability for pollution damage in terms of Act 6 of 1981, is kept on the offshore installation;**
d) **That the offshore installation shall be inspected at intervals not exceeding 12 months from the date of issue of this certificate unless the contract between the aforementioned parties ceases prior to such period;**
e) **That in the event of an oil spill or any other form of pollution as detailed in terms of Act 6 of 1981 and its associated regulations, the undertakings, commitments and responsibilities and any other such details as specified within the Oil Spill Response Plan is is complied with and undertaken;**
f) **That in the event of any structural changes to the offshore installation or any other constructional changes affecting the operating procedures; be advised to the office issuing this certificate;**
g) **That any significant changes to standard operating procedures be advised to the office issuing this certificate;**

This certificate will remain in force until **31 December 2022**

Issued at **SALDANHA** this **30** day of **September 2022**

SOUTH AFRICAN MARITIME SAFETY AUTHORITY
P.O. BOX 33 SALDANHA 7395
2022 -09- 30
POSBUS 33 SALDANHA 7395
SOUTH AFRICAN MARITIME SAFETY AUTHORITY

Neville Noble

Principal Officer For Director General
(Seal or Stamp of the authority, as appropriate)

14.3. DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT (DFFE) ENDORSEMENT,

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

P. O. Box 52126, Victoria and Alfred, Waterfront, Cape Town, 8002

Ref: EDMS 222356
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Dear [redacted]

DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT (DFFE) RESPONSE TO AZINAM OIL SPILL RESPONSE CONTINGENCY PLAN

The DFFE is mandated with the responsibility of combating oil spills in the marine environment, in terms of Section 52 of the South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998) to ensure protection and clean-up measures to be taken once oil is released into the sea. In addition, the Prevention and Combating of Pollution of the Sea by Oil Act, 1981 (Act No. 6 of 1981) gives effect to the DFFE on the use of oil spill dispersants in South African waters.

In terms of section 58(1) of the National Environment Management: Integrated Coastal Management Act, read with section 28(1) of the National Environmental Management Act, every person who may cause significant pollution or degradation of the environment, including causing an adverse effect on the coastal environment, must take reasonable measures to prevent such pollution or degradation from occurring, or, in so far as such harm to the environment cannot be reasonably avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

AZINAM OIL SPILL CONTINGENCY PLAN

Reference is made to a request from AZINAM to review and endorse an oil spill contingency plan (OSCP) for the prevention and mitigation of a possible oil spill at sea. It is noted that the exploitation and exploration for natural gas and light fuel oil is proposed for October 2022 along the west coast of South Africa, and a DFFE endorsed OSCP is

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crucial for the activity to commence. The DFFE has reviewed the AZINAM OSCP and provided substantial comment to the structure and content of the plan (APPENDIX 1). Following the inclusion of the amendments of the draft plan (REF REV OO) dated 07/09/2022 (APPENDIX 2) was received and herewith has reference.

The DFFE hereby endorses the AZINAM OSCP with the following recommendations:

1. The DFFE is to be notified of any changes or updates to the plan, which may require further consultation subject to the extent of the changes made.
2. The plan is to be tested as soon as possible to ensure an effective response (noting the proposed commencement of drilling, testing of the plan is critical).
3. Oil spill drills would need to include cross boundary (South Africa and Namibia) implications.
4. The DFFE is to be notified in advance when testing of the plan is to occur.
5. It is recommended that the methodology for the tiering of an oil spill (section 3.3 of the plan) needs updating. The further reference to section 5 of the plan includes the revolving resource wheel which has not been incorporated in the tiering methodology. In subsequent updates to the plan the DFFE would require stronger alignment to the South African National Oil Spill Contingency Plan (NOSCP).
6. Strengthening of the AZINAM OSCP emergency contact list to include Namibian contacts is highly recommended.
7. It is recommended that the plan, as referenced as a tier 3 plan, be considered a plan for all levels of oil spill response.

DISPERSANT USE PRE-APPROVAL

The DFFE is providing pre-approval of the dispersant "Slickgone NS dispersant" through the endorsement of the OSCP and subjected to the conditions of use as per the plan. Further use of dispersants on a major oil spill (tier 2 or 3) must be approved by the DFFE. The use of oil spill dispersant in South African waters must be used in accordance with the DFFE National Oil Spill Dispersant Policy and considering the following additional requirements:

- DFFE will need to be notified in writing once the dispersant has been applied (volume used, location, and any environmental assessments conducted).
- DFFE would need to approve any additional use of dispersants that are not included in the OSCP.
- The use of dispersant will be subjected to a net environmental benefit analysis (NOSCP).
- The DFFE may request the operator to cease the use of dispersant application if there are legitimate concerns to the environment or economic resources.

The Department reserves the right to change its opinion if further information suggests the content of the AZINAM OSCP would not effectively mitigate an oil spill resulting from the exploration and exploitation of oil and gas. The content of this endorsement does not invalidate any other applicable legislation which may be triggered by the activity.

[redacted]

Director: Coastal Pollution Management
Date: 29 September 2022

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