ENVIRONMENTAL MANAGEMENT PLAN (EMP)
DRILLING ACTIVITY
PSC TL-OT-17-09

APPENDIX D - OIL SPILL CONTINGENCY PLAN

TR-HSE-PLN-004

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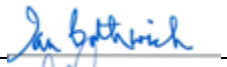
Prepared	04/06/21	HSE Adviser	
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ACRONYMS

BBL	Barrel
BOP	Blow Out Prevention
CMP	Crisis Management Plan
CMT	Crisis Management Team
DEM	Digital Elevation Model
DSM	Digital Surface Model
ED	Eastern Drilling
ESD	Emergency shutdown
FCP	Forward Command Post
GIS	Geographic Information System
HCA	High Consequence areas
HR	Human Resources
HSE	Health, Safety and Environment
IC	Incident Controller
IMP	Incident Management Plan
IMT	Incident Management Team
MCS	Maximum Credible Spill
MSDS	Material Safety Data Sheets
OSC	On Scene Commander
OSCP	Oil Spill Contingency Plan
OSCT	Oil Spill Combat Team
OSRT	Oil Spill Response Team
PIC	Person in Charge
PPE	Personal Protection Equipment
SERP	Site Emergency Response Plan
SERT	Site Emergency Response Team
TR	Timor Resources
WCS	Worst Case Spill

PREFACE

This Oil Spill Contingency Plan (OSCP) has been prepared to describe the oil spill contingency procedures that have been put in place by Timor Resources for the control and response to oil spillage arising from their operations.

The plan is divided into three parts:

Part A - Strategy Plan

Chapter 1 Introduction - Purpose of Plan; Document Control; Training and Policy; Legal Requirements; and Meteorological and Seasonal Characteristics.

Chapter 2 Spill Risk and Categories

Chapter 3 Response Strategy

Chapter 4 Response – Roles and Responsibilities

Part B - Action Plan

Chapter 5 Actions

Chapter 6 Communications and Emergency Contact Details

Part C Appendices

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PART A – STRATEGY PLAN

1 INTRODUCTION

1.1 PURPOSE OF THE PLAN

Timor Resources HSE Policy commits to implementing appropriate control and contingency measures to prevent pollution and minimise and manage these risks, threats, hazards and impacts to an acceptable level, in addition, to carry out monitoring and remediation of any impacted or affected areas as may be appropriate.

This Oil Spill Contingency Plan (OSCP) develops the strategy and the means of oil spill response to any instance of hydrocarbon spilt during Timor Resources drilling campaign in PSC TL-OT-17-09. The objective is to produce an "operational" document, known, understood and accepted by all users and response personnel. The OSCP forms part of the planning for crisis and emergency response as described in the Timor Resources Crisis and Emergency Management Standard (TR-HSE-STD-00-000-009) and is addressed as follows:

- Site Emergency Response Plan (SERP) - On site incident control.
- **Oil Spill Contingency Plan (OSCP)** - Oil pollution incident control - as a supplement to SERP.
- **Incident Management Plan (IMP)** - providing support to on site response.
- **Crisis Management Plan (CMP)** - executive and senior management control of crisis events and providing support to IMP.

1.2 SCOPE OF THE PLAN

This Plan is predicated on:

- The Primary control for Oil Spill is prevention: A Multi Barrier Well Control systems will be used at all times whilst conducting drilling operations.
- Secondary measures include onsite containment and removal of contaminated soil.
- If the spill volumes exceed the capacity to contain onsite a tertiary containment operation will be executed to prevent the spill reaching environmentally sensitive or urban areas (High Consequence areas “HCA”). The containment is designed to minimise the area of impact and facilitate removal of contamination.

The plan covers the Rusa-1 drilling rig site and the immediate environment outside the 1 hectare site with details provided in Section 12.

1.3 LEGAL REQUIREMENTS

1.3.1 Decree Law 18/2020 on Onshore Petroleum Operations in Timor Leste

Chapter XVII Environmental Affairs - Article 143 (3) Environmental Licenses for Petroleum Operations specifies that the Authorised Person shall ensure that an application for Environmental License for Petroleum Operations shall include amongst other things an Environmental Management Plan (see below) and an Oil Spill Contingency Plan.

Article 125 requires that an authorised person shall promptly notify the Ministry, other relevant authorities and potentially affected communities and persons of an emergency, major accident event or other health and safety incident as soon as possible, no later than 24 hours after the incident occurred.

Article 148: specifies that an Authorised Person shall provide an oral or written notice to the Ministry of any Reportable Spill[1] as soon as possible, but not later than two hours, and a Significant Spill[2] within twenty-four hours after occurrence. Oral notice shall be followed by prompt written notices to the Ministry, in any case not later than three days after the first occurrence.

Article 146 provides specific guidance on what the OSCP should include and obliges the Authorised Person to lodge the plan at least 30 days prior to commencement of petroleum operations. The plan shall include an analysis of the types and circumstances that might result in a spill and should be developed in accordance with Good Oil Field Practice (See for example: IMO/IPIECA (2012); IPIECA/IOGP (2014 and 2015); IPIECA (2004 and 2007).

Article 146 further requires that effective and timely measures are provided in the plan to eliminate and control, contain and clean up any resulting damage, and that tasks and responsibilities for the deployment of resources in combatting a spill are described, together with full details of the Command and Control organisation. The plan shall provide classification of potential spills together with an analysis of potential movement.

A summary of how this Plan addresses the various elements of Article 146 is presented in

[1] "*Reportable Spill*" means any authorised and observable discharge of Petroleum, brine, chemical or hazardous substances.

[2] "*Significant Spill*" means an unauthorised discharge of Petroleum exceeding 80 litres per incident that has been spilt, or is likely to spill, onto land, into rivers or into ground water, or, in the case of Natural Gas, a leakage.

Table 1-1 below.

1.3.2 Ministerial Diploma 46 2017 Annex VI Environmental Management Plan

Annex VI details the minimum requirement for the Environmental Management Plan (EMP) in support of an Environmental Impact Statement and addresses mitigation and management measures in the different phases of the proposed project and includes a requirement for an attachment dealing specifically with Leaks and Spills.

1.3.3 Good Oil Field Practice

The following documents provide examples of Good Oil Field Practice:

- IPIECA/IOGP (2014). Incident Management System.
- IPIECA (2007). Guide to tiered preparedness and response.
- OSRL (2013) Inland Operations Field Guide.

Table 1-1: How OSCP Addresses Law 18/2020 Article 146

LAW 18/2020 ARTICLE 146	
Reference Article 146	**OSCP Section**
1	Frontispiece: OSCP dated 4th May 2021 lodged more than 30 days prior to spud
2	Part A Strategy Plan Section 2: Spill Risk and Categories
3	Part A Strategy Plan Section 1.3.3: Good Oil Field Practice
4	Part A Strategy Plan Section 3: Response strategy illustrating effective and timely measures to be taken To eliminate and control the effects of an oil spill.
5	Part A Strategy Plan Section 4: assignment of roles and responsibilities Part B Action Plan Section 5: detail of actions required for deployment of resources
6	Part A Strategy Plan Section 2.4: sequential classes of magnitude, the Tiered Response Concept.
7	Part A Strategy Plan Section 2: classification of oil spills Part C Appendices Section 12: well specific trajectory analysis, maps and response layout.
8	Part A Strategy Plan Section 4: organisation of Timor Resources response organisation, including command and control system (4.2), communications (Part B Action Plan Section 6), and reporting (Part B Action Plan Section 5.2.2 and 5.4 (11), 5.6 (5), Part C Appendices Section 7: Forms. Part C Appendices Section 8: details of Tier 1 response kit on site and Third-Party support agencies.
9	Part C Appendices Section 10.2 Seepage and Pollution, Clean-up and Contamination Insurance cover.
10	N/A
11	Part A Strategy Plan Section 1.6: commitment that the plan will be reviewed annually or when any major changes are made
12	Part A Strategy Plan Section 1.6: commitment that any significant revisions will be notified to ANPM within 15 days.

1.4 METEOROLOGICAL AND SEASONAL CHARACTERISTICS

Climate

Timor-Leste is typical tropical country with all parts experiencing a monsoonal climate with distinct wet and dry seasons. The wet season in the project area typically runs from December to June with the dry season in August, September and October see Figure 1-2. July and November are transition months between the monsoons. The average minimum temperatures range from 21°C to 25°C with maximum around 30°C. The dry season tends to be cooler than the wet season.

Rain

The Rusa-1 area has high rainfall period in the month of January – February, May – June and December annually. The rainfall recorded during these months are usually between 150mm and 250mm per year. See Figure 1-1 below for the rainfall level and period in recorded

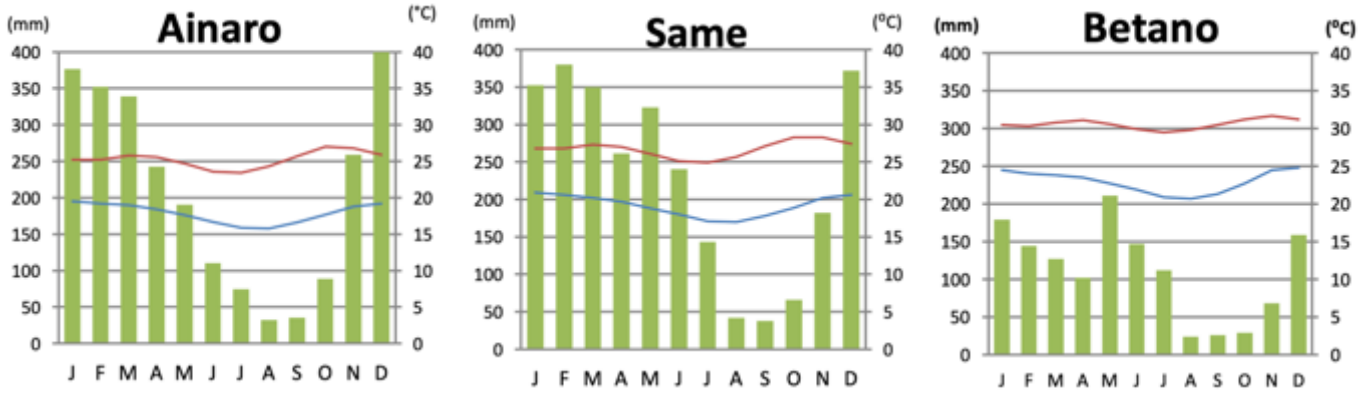


Figure 1-1: Annual rainfall level recorded in Ainaro, Same and Betano regions

Source: Seeds of Life. (2013)

Note: The red and blue lines are temperature measurement at the location.

Wind

A major factor that influences local wind speed and direction trends is the topography and land use of the region (Worley Parsons 2012). The Betano development area and the surrounding coastal region is low-lying and has reasonably flat terrain with elevations at approximately 20 m and local peaks located around Nova Betano up to 250 m above sea level. Inland, approximately 10 km, the foothills begin with elevations approximately 400 to 500 m above sea level.

The wind rose for the Betano area is presented in Figure 1-2 represents data collected from the monitoring period only (December 2011 to February 2012). Due to the failure of the meteorological station, only 6% of the monitoring period produced valid wind speed and wind direction data. The wind rose shows that for the recorded data, a majority of the winds blew from the northwest at reasonably low speeds (less than 3.0 m/s). Currently, there is insufficient data to be able to determine prevailing wind patterns.

Figure 1-3 presents wind roses for the Dili airport, Baucau and the south coast study area (Suai, Betano and Beaço) after Worley Parsons Betano Refinery and Beaço LNG Plant Strategic EIS (2012).

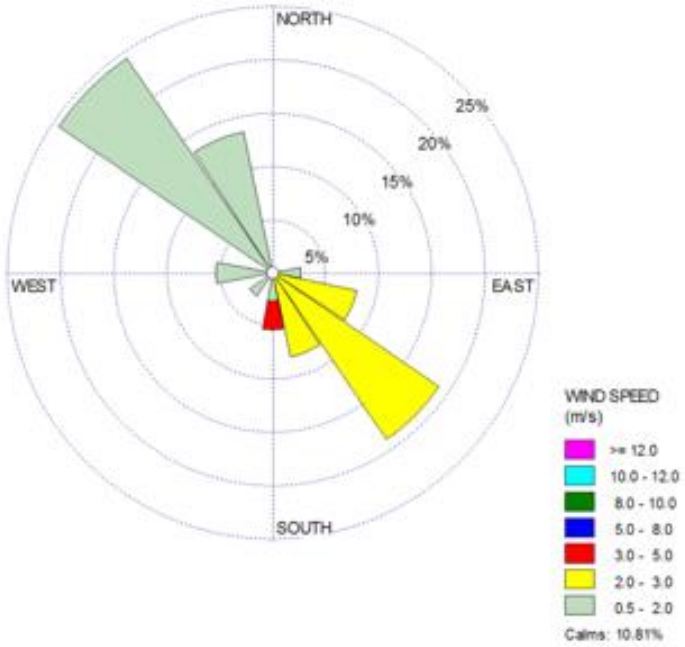


Figure 1-2: Wind speed and direction Betano region December 2011 to February 2012
Source: WorleyParsons, 2012

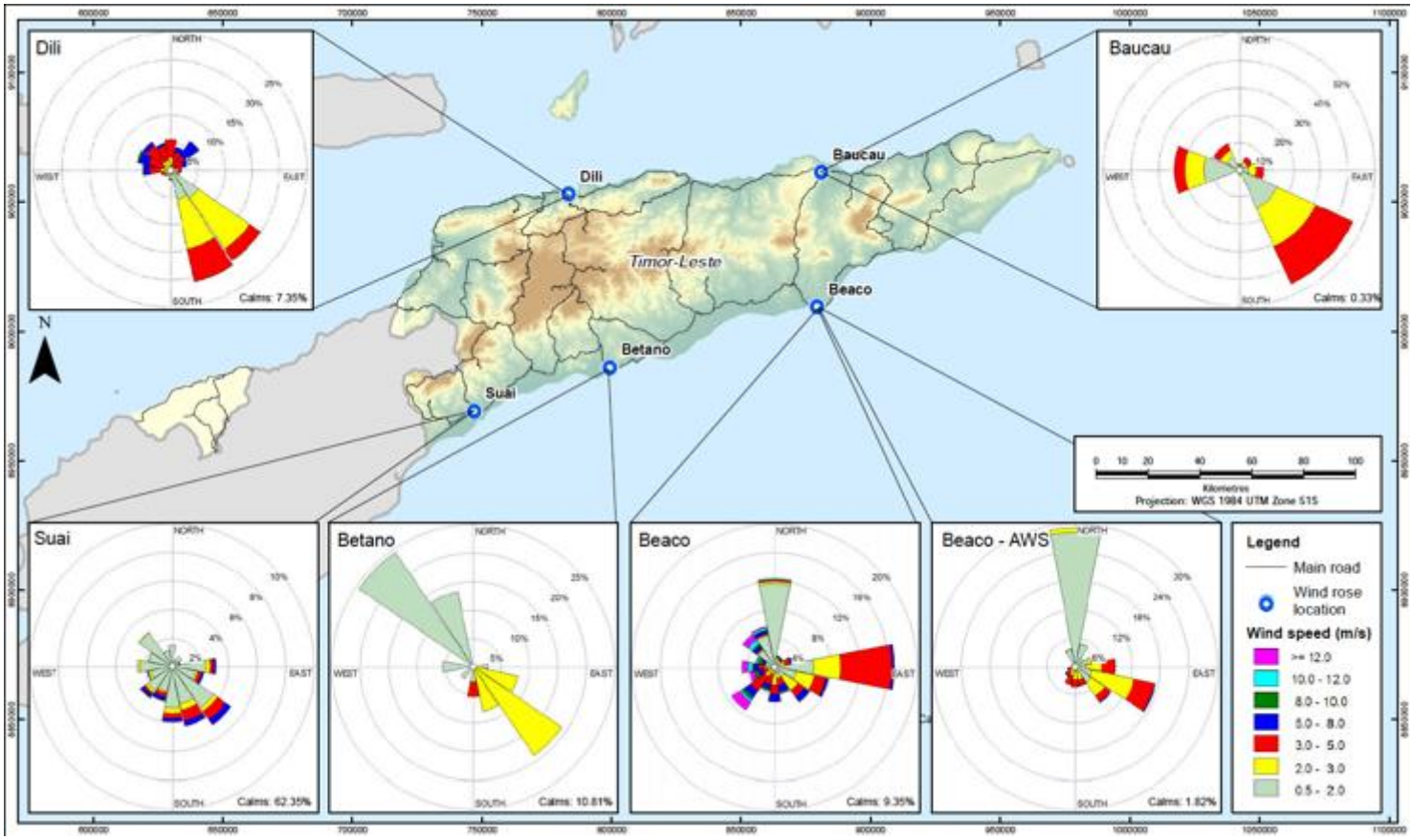


Figure 1-3: Wind speed and direction Timor Leste December 2011 to February 2012
Source: WorleyParsons 2012

1.5 TRAINING, EXERCISE AND REVIEW

The General Manager Exploration is responsible for ensuring that all personnel involved in emergency response are trained in Oil Spill Response Team (OSRT) roles and responsibilities and, where required, in the Timor Resources Incident Management Team (IMT). All IMT personnel and field supervisors will complete Introduction to IMS (IMS 100) and IMS Level 2 (IMS 200) level courses. All field-based personnel involved in OSRT will receive in house training from an internationally recognised emergency response and oil spill specialist, details of the training for different personnel are provided in Table 1-2 below.

Table 1-2: OSRT Training Matrix

Personnel	Course Title	Course Outline
On site responders	**First Responder**	To provide operator-level personnel, responsible for undertaking on-site clean-up operations, with a complete overview of the various methods available for recovering spilled oil and cleaning affected areas so that they can become effective members of the OSRT. Identify the hazards from spill operations and explain how to mitigate them, understand the need for oil spill site safety assessment process and the importance of site control.
On Scene Commander	**On Scene Commander**	To train personnel, having OSC responsibilities, to coordinate and supervise response operations, and be able to deliver a timely, organised and effective response. Provide the OSC with an understanding of site assessment requirements, environmental issues, response strategies, equipment and waste management. These are areas of responsibility that will need to be addressed and communicated between on-site responders and the OSRT.
OSRT Team Leaders	**OSRT Team Leaders** **Introduction to IMS**	Provides OSRT Team Leaders with an overview of oil spill response and the skills and knowledge to manage oil spill response operations. The course focuses upon managing tactical response operations under the OSRT. In addition, the Team Leaders will complete introductory IMS training as follows: **Introduction to IMS:** • **IMS Overview -** the benefits of using IMS and the five primary management functions. • **Basic Features of IMS** - Explain the basic features of IMS. • **Incident Commander and Command Staff Functions -** Describe the role and function of the Incident Commander and command staff functions. • **General Staff Functions** - Describe the roles and responsibilities of the General Staff and functional elements including Operations Section, Planning Section, Logistics Section and Finance/Administration Section.

		• **IMS Facilities** - Describe the basic ICS facilities. • **Common Responsibilities** - Describe common responsibilities at an incident and list individual accountability responsibilities.
Incident Commander	**Incident Commander** **IMS Level 2**	This course provides the technical knowledge required to initiate and terminate a response. A theoretical, class-based course designed for those in the leadership role of the OSRT. In addition, the IC will complete the Introduction to IMS described above and complete IMS Level 2 training as follows: **IMS Level 2:** • **Describe the IMS organization appropriate to the complexity of the incident or event** - To understand the Incident Management System (IMS) organisation appropriate to the complexity of the incident or event. • **Use IMS to manage an incident -** To enable personnel to operate efficiently during an incident or event within the Incident Management System. • **Leadership and Management** - To understand chain of command and formal communication relationships, identify common leadership and to understand Delegation of Authority. • **Delegation of Authority and Management by Objectives** - Explain Incidents are managed by objectives and objectives are communicated throughout entire ICS organization by the incident planning process. • **Functional Areas and Positions** - Describe the functions of organizational positions within the Incident Management System (IMS). • **Briefings** - Describe components of Transfer of Command, field, staff and section briefings/meetings. • **Organizational Flexibility** - Explain how the modular organization expands and contracts. • **Transfer of Command** - To describe the process of transfer of command and to list the essential elements of information involved in transfer of command
IMT Leader Dili	**Introduction to IMS and IMS Level 2**	As Above
IMT Dili	**Introduction to IMS**	AS above

Competency Assessment

An assessment of knowledge will be conducted using 10 multiple choice questions based on the course content. Participants must achieve a 70% average over the course to pass. An electronic certificate will be issued to participants with 70% attendance and for achieving the pass mark of the assessment.

The full efficiency and effectiveness of response can only be obtained through regular training and exercise programmes and routine testing of support functions, including periodic access to external support agencies.

All staff, contractors and other personnel assigned to the OSRT must undertake regular and appropriate training and take part in drills and exercises according to this Oil Spill Contingency Plan and be acquainted in the use of any response materials and equipment. Key personnel identified in a spill response role include:

- Drilling Contractor - rig management
- Timor Resources Drilling Supervisor/Company-man
- Timor Resources - Operations
- Timor Resources - Finance
- Timor Resources - Logistics
- Timor Resources - HSE (Planning)

A timetable for training and exercises shall be established and programmes must be directed to all levels of the emergency response organisation.

The following exercises will be completed before spud

- IMT tabletop scenario exercise Dili IMT (pre spud)
- OSCP rig based drill with responders and equipment (repeated each month)
- OSCP tabletop scenario exercise with escalation to Tier 2 and Tier 3 requirements (repeated quarterly)

1.6 DOCUMENT CONTROL

It is the responsibility of the General Manager Exploration, as Document Owner, to control and update the contents of this document. This document will be reviewed, revised and reissued annually or when any major changes are made to ensure that the plan reflects the current conditions and status of activities. Any changes or amendments noted by any party should be notified to the General Manager Exploration, who will advise ANPM, as appropriate, within 15 days.

2 SPILL RISK AND CATEGORIES

The following sections describe the types of spillages that may arise from operations at the well site and may be considered as:

- **Worst Case Spill (WCS)** - The largest volume that could be spilled as a result of any event or combination of events. The results of a catastrophic event or failure, such as an uncontrolled blow out.
- **Maximum Credible Spill (MCS)** - The largest spill that is considered possible given the spill prevention, control and other mitigation methods in place. Temporary loss of well control with a resulting short term discharge.
- **Most Likely Spill (MLS)** - The most likely spill to occur during the drilling programme.

Timor Resources has adopted best industry practices approach to well planning, implementation and well control requirements and follow Decree Law 18/2020 in regard to onshore petroleum operations. The emphasis is on preventing the occurrence of a situation where reactive measures such as surface or relief well intervention is required. The drilling programme is for a single well Rusa-1 as shown in Table 2-1.

Table 2-1: Well Location subject to final survey of actual hole centre

Well	Rusa-1
Seismic Line	Fafulu23
Easting (UTM 51S)	795324
Northing (UTM 51S)	8991662
Latitude	-9.11205
Longitude	125.68675
Drill Floor (mGL)	5.33
Ground Level (mSS)	-96
Total Depth (mMD)	2601m (base case) 3936m (deeper option only)

In order to address potential spill volumes data has been obtained from previous drilling campaigns in the region such as: Aliambata (1916), Matai-1 (1960), Tafara East-1 (1969) and Suai Loro-2 (1971). Whilst minor oil shows have been observed the maximum well flow rate was observed at Tafara East-1 which flowed water at some 2,400 barrels water per day that is approximately 400m^3 per day.

2.1 WORST CASE SPILL (WCS)

The estimate for the WCS is based on the flow rate of any well and the time taken to mobilise a rig and drill a relief well. Numerous land rigs are available in the region and based on Timor Resources experience in mobilising the current rig to Suai by barge, it is estimated that a period of 60 days would be necessary to source transport and commission a suitable rig and 30 days to drill a relief well. WCS spill estimate is presented in Table 12-1 for the Rusa-1 well.

2.2 MAXIMUM CREDIBLE SPILL (MCS)

The estimates for the MCS is based similarly on flow rate but assuming a partial loss of control say 50%, and assuming that Timor Resources specialist well control contractor Wild Well Control Inc. would mobilise resources directly to site from Singapore and regain control of the well in 30 days. The MCS spill estimate is presented in Table 12-1 for the Rusa-1 well.

2.3 MOST LIKELY SPILLS (MLS)

The most likely spill based on experience is from fuel storage tanks or drums and may be addressed as follows.

2.3.1 Storage Tanks

Diesel fuel is stored at the rig site in a 20,000L tank within a bund. The design intent of the bund is that it will have a volume equal to 110% of the largest tank within the bund. In assessing potential loss it has been assumed that tank and bund have both failed, thus 20m^3 loss to the environment.

2.3.2 Drums

Cargo unloading/loading may include various products in drums (e.g. diesel and lube drums, and some drilling materials shipped in drums). Drums are typically unloaded on pallets with 4x 0.25m^3 drums per pallet, loss of 2 may occur if cargo is dropped during operations, thus resulting in a spill of 0.5 m^3. Potential losses are summarised in Table 2-2.

Table 2-2: Potential Losses During Drilling Project

Source	Type	Volume (m^3)
Worst Case Spill Uncontrolled well blow out requiring a relief well 400m^3/day x 90 days	Crude	36,000
Maximum Credible Spill Partial loss of well control requiring intervention by Wild Well Control Inc well control specialists 200m^3/day x 30 days	Crude	6,000
Most Likely Spill Loss of diesel fuel storage tank on well site and failure of bund	Diesel	20
Most Likely Spill Loss of bulk materials 2x 0.25m^3 drums	Diesel Lube Oil Drilling chemicals	0.5

2.4 RESPONSE LEVELS

Pollution response is based on an escalating scale whereby the resources, both equipment and personnel, mobilised for a response will vary according to the incident scale and characteristics, the response shall follow the Three-Tier concept (see IPIECA 2007), with response levels defined according to:

- The type and quantity of oil spilt
- The potential impact on the environment
- Potential media and public interest in the incident
- The amount and source of resources deployed
- The levels of support and higher-level management activated

Response will depend upon the spill size, severity, location, type of product and whether the spill is on-going. In order to describe the most appropriate contingency arrangements for oil spillages, spillages have been grouped into three categories, on the basis of quantity of hydrocarbons spilt. These are as follows:

- Tier 1 Spills < 5 m^3
- Tier 2 Spills >5 - 100 m^3
- Tier 3 Spills >100 m^3

These values are indicative triggers for escalation of response level, from a Tier 1 response to a Tier 2 response, and Tier 2 to a Tier 3 response. On site containment volumes are presented in Table 12-1 , which illustrates that Tier 1 and Tier 2 spills are contained within the rig site bermed area.

If there is any doubt about the size of the spill and/or its duration, and therefore the appropriate spill category, then judgement must be used in deciding which are the most applicable procedures. In general, assume the worst case and be prepared to adjust response as the spill develops and additional information becomes available.

For the purposes of this Oil Spill Contingency Plan, the three Tiers can be further described as follows:

2.4.1 Tier 1

A small sized spill or minor event within the Timor Resources field operations capacity. This event would be able to be controlled and corrected within the immediate vicinity of the operation by the Site Emergency Response Team (SERT) at the Incident Command Post (ICP) with minimal or no impact outside the localised area. The SERT would supervise the response and report progress to the Incident Management Team (IMT) in Dili.

2.4.2 Tier 2

A medium spill having local implications, again lead by Site Emergency Response Team deploying all available Tier 1 Resources and local contractors. Resource support in terms of heavy equipment and qualified personnel will be required.

2.4.3 Tier 3

A large spill beyond the capabilities and control of the onsite resources, thereby requiring the full support of Timor Resources Incident Management Team (IMT), government and third-party assistance.

The Tier 3 response category can be divided into that which can be managed by local and national resources up to the Maximum Credible Spill size of 6,000 m^3. Any event in excess of the MCS will require external support such as related to an uncontrolled blowout with potential long-term local, national, international implications and/or that matches any of the following criteria:

- Major environmental damage
- Major social and socio-economic implications
- Major media coverage

2.4.4 Tier 2 and 3 Escalation and External Support

If the spillage is deemed beyond the capabilities of the onsite response for a Tier 1 event or requires rapid escalation to Tier 2 or Tier 3, then a tiered response is necessary. The following Tier 2 and Tier 3 support can be called upon.

Tier 2 A medium spill where local contractors are called in to provide heavy earth moving equipment and labour. Additional resources can be made available at the national level as required, and government agencies may be called on a mutual aid basis. If the situation warrants, then an immediate escalation to Tier 3 external support is recommended. For well control incident Wild Well Control Inc in Singapore may be mobilised.

Tier 3 A crisis situation where substantial further resources will be required from Wild Well Control Inc in Singapore together with the mobilisation of international drilling personnel and equipment.

Resources from international co-operative stockpiles such as OSCT Jakarta may be required.

It is important to note that considerable logistical support is necessary when Tier 3 support agencies are involved.

The following provides an indication of the requirements of supporting external resources:

- Support to international air and sea freight movements.
- Customs clearance.
- Adequate lifting equipment at airport/dock.
- Arrangements for transfer from airport to docks.
- Welding and heavy equipment support services.
- Adequate vessels and aircraft for transport and deployment of equipment and for response if necessary: recovery, storage and waste management operations.
- Accommodation and catering for personnel.
- Availability of locally available, trained personnel resources.
- Support from municipality and national government.
- Communications.
- Control centre and field control facilities.

2.4.5 Termination of Response

Guidelines concerning criteria or end points for termination of a response will be discussed and agreed with stakeholders and will be undertaken in conjunction with ANPM and the relevant authorities. Joint on-site surveys will be used to identify areas where a continued response is unlikely to be effective or fail to achieve a net benefit.

Agreed criteria for termination are:

- Demobilising protection measures when any realistic threat of oiling is gone.
- Establishing clean-up endpoints, based on land usage and environmental sensitivity.
- Establishing a longer-term monitoring and clean-up strategy in coordination with key stakeholders, where circumstances dictate.

NOTE:

Spills rarely fall into convenient categories.

The boundaries between categories of spill and response Tiers will inevitably be blurred.

It is, therefore, important to be prepared to escalate the response from the earliest moment.

It is better to over-react and downsize as required than to under-react and try to catch up later

2.5 CHARACTERISTICS OF THE EXPECTED OILS

The properties of oil from offset wells are summarised in Table 2-3 and the expected range is between 25-45°API. The heavy Cota-Taci 1 crude is considered likely to be degraded, the Matai wells and multiple Matai seeps exhibit APIs in the mid 30 region whilst the Suai Loro oil is a light oil with 45 °API. The most likely mid-case is considered to be in the region 35 °API, that is, a light oil with a specific gravity of 0.8498.

Table 2-3: Properties of Expected Hydrocarbons

	Cota Taci 1	Matai 1	Matai 3	Suai Loro	No. 2 Diesel Fuel	Lube Oil
Density @ 20°C g/cm²	0.9036	0.8398	0.8550	0.8017	0.820 to 0.845	0.881
°API	25.1	37	34	45	30 to 37	28
Viscosity mm²/s @ 80°C	-	-	-	-	1.9 to 4.1	12.5 to 22.0
Pour Point °C	-	-	-	-	-17 to -30	-24
Flash Point °C	-	-	-	-	52 to 96	220
ITOPF Group (1)	3	2	2	1	2	3

(1) See Table 2-4

It is further considered, for the purposes of this assessment, that any oil encountered will have a low pour point <6°C typical of an ITOPF Group 1 or 2 oil (see Figure 2.3) and given the prevailing temperatures in Timor Leste are consistently high, 21°C -32°C, well above the expected pour point, the oil will be liquid. Any oil discovered will be subject to assays to confirm its characteristics.

The relatively high API and prevailing temperature indicate that the expected oil as well as diesel will evaporate and dissipate rapidly and, for small spillages, will pose more of a fire and safety threat than an environmental one, thus may require no response other than to monitor and observe. The specific gravity of the oil and diesel indicate they will be mobile if spilt thus enhancing spreading and dispersion and both will float on water if they enter a water course. Spreading and dispersion are therefore likely to be important processes contributing to rapid removal of spilt oil from the surface of any water.

Table 2-4: Examples of Oils Classified According to °API Gravity (after ITOPF)

Group	Density	Examples
Group 1	<0.8	Condensate, Gasoline, Kerosene, Premium and No 2 Diesel
Group 2	0.8 - 0.85	Marine Gas Oil, Abu Dhabi Crude
Group 3	0.85-0.95	Intermediate Fuel Oil IFO 180, Arabian Light Crude, North Sea Crudes (e.g. Forties)
Group 4	>0.95	Intermediate Fuel Oil IFO 380, Heavy Fuel Oil, Venezuelan Crude Oils

Group 1 oils

A: °API > 45 (Specific gravity < 0.8)
B: Pour point °C
C: Viscosity @ 10–20°C: less than 3 CSt
D: % boiling below 200°C: greater than 50%
E: % boiling above 370°C: between 20 and 0%

	A	B	C	D	E
Asgard	49	-28	2 @ 10°C	58	14
Arabian Super Light	51	-39	2 @ 20°C		
Cossack	48	-18	2 @ 20°C	51	18
Curlew	47	-13	2 @ 20°C	57	17
F3 Condensate	54	<-63	1 @ 10°C	81	0
Gippsland	52	-13	1.5 @ 20°C	63	8
Hidra	52	-62	2.5 @ 10°C	60	11
Terengganu condensate	73	-36	0.5 @ 20°C	>95	0
Wollybutt	49	-53	2@ 20°C	55	4
Gasoline	58		0.5 @ 15°C	100	0
Kerosene	45	-55	2 @ 15°C	50	0
Naptha	55		0.5 @ 15°C	100	0

Group 2 oils

A: °API 35–45 (Specific gravity 0.8–0.85)
B: Pour point °C
C: Viscosity @ 10–20°C: between 4 Cst and semi-solid
D: % boiling below 200°C: between 20 and 50%
E: % boiling above 370°C: between 15 and 50%

Low pour point <6°C	A	B	C	D	E
Arabian Extra Light	38	-30	3 @ 15°C	26	39
Azeri	37	-3	8 @ 20°C	29	46
Brent	38	-3	7 @ 10°C	37	33
Draugen	40	-15	4 @ 20°C	37	32
Dukhan	41	-49	9 @ 15°C	36	33
Liverpool Bay	45	-21	4 @ 20°C	42	28
Sokol (Sakhalin)	37	-27	4 @ 20°C	45	21
Rio Negro	35	-5	23 @ 10°C	29	41
Umm Shaif	37	-24	10 @ 10°C	34	31
Zakum	40	-24	60 10°C	36	33
Marine Gas oil (MGO)	37	-3	5 @ 15°C		
High pour point >5°C					
Amna	36	19	Semi-solid	25	30
Beatrice	38	18	32 @ 15°C	25	35
Bintulu	37	19	Semi-solid	24	34
Escravos	34	10	9 @ 15°C	35	15
Sarir	38	24	Semi-solid	24	39
Statfjord	40	6	7 @ 10°C	38	32

Note: High pour point oils only behave as Group 2 at ambient temperatures above their pour point. Below this treat as Group 4 oils.

Group 3 oils

A: °API 17.5–35 (Specific gravity 0.85–0.95)
B: Pour point °C
C: Viscosity @ 10–20°C: between 8 CSt and semi solid
D: % boiling below 200°C: between 10 and 35%
E: % boiling above 370°C: between 30 and 65%

Low pour point <6°C	A	B	C	D	E
Alaska North Slope	28	-18	32 @ 15°C	32	41
Arabian Heavy	28	-40	55 @ 15°C	21	56
Arabian Medium	30	-21	25 @ 15°C	22	51
Arabian Light	33	-40	14 @ 15°C	25	45
Bonny Light	35	-11	25 @ 15°C	26	30
Iranian Heavy	31	-36	25 @ 15°C	24	48
Iranian Light	34	-32	15 @ 15°C	26	43
Khafji	28	-57	80 @ 15°C	21	55
Sirri	33	-12	18 @ 10°C	32	38
Thunder Horse	35	-27	10 @ 10°C	32	39
Tia Juana Light	32	-42	500 @ 15°C	24	45
Troll	33	-9	14 @ 10°C	24	35
IFO 180	18–20	10–30	1,500–3,000 @ 15°C		–
High pour point >5°C					
Cabinda	33	12	Semi-solid	18	56
Coco	32	21	Semi-solid	21	46
Gamba	31	23	Semi-solid	11	54
Mandji	30	9	70 @ 15°C	21	53
Minas	35	18	Semi-solid	15	58

Note: High pour point oils only behave as Group 3 at ambient temperatures above their pour point. Below this treat as Group 4 oils.

Group 4 oils

A: °API <17.5 (Specific gravity >0.95) or
B: Pour point >30°C
C: Viscosity @ 10–20°C: between 1500 CSt and semi-solid
D: % boiling below 200°C: less than 25%
E: % boiling above 370°C: greater than 30%

	A	B	C	D	E
Bachaquero 17	16	-29	5,000 @ 15°C	10	60
Boscan	10	15	Semi -solid	4	80
Cinta	33	43	Semi -solid	10	54
Handil	33	35	Semi -solid	23	33
Merey	17	-21	7,000 @ 15°C	7	70
Nile Blend	34	33	Semi-solid	13	59
Pilon	14	-3	Semi-solid	2	92
Shengli	24	21	Semi-solid	9	70
Taching	31	35	Semi-solid	12	49
Tia Juana Pesado	12	-1	Semi-solid	3	78
Widuri	33	46	Semi-solid	7	70
IFO 380	11–15	10–30	5,000–30,000 @ 15°C		

2.6 BEHAVIOUR OF SPILT OILS

A distinction is made between non-persistent oils that tend to disappear rapidly and persistent oils which, in contrast, dissipate more slowly and usually require a clean up response. Persistent oils embrace most crude oils and lube oil, non-persistent oils include distillates (e.g. gasoline and diesel) that are lighter and significantly less viscous. When oils are spilled, they undergo a number of physical changes, some of which lead to their removal from the surface, and some of which lead to their persistence. These changes are basic to determining the most appropriate response to a spillage.

Each oil spill incident must be evaluated independently, and the detailed strategy of response is primarily based on prevailing weather and water conditions i.e. wet versus dry season, as well as ecological sensitivity and the properties of the spilt oil. The following sections briefly discuss the key behaviours of oil when spilt.

2.6.1 Spreading and Penetration

Oil spilt on land or on water will spread horizontally with the main driving force being the oil's weight. The spread and penetration on land will depend on whether the surface is impermeable or permeable. On impermeable surfaces spilt oil will remain static until it is recovered, unless a gradient is present that may cause it to spread. The response should be to prevent the oil from spreading and potentially contaminating other surface areas, this will require containment such as the construction of berms around the spill. Once contained, the oil will then need to be recovered through either manual or mechanical methods.

Permeable ground poses challenges to the containment of oil as it flows in both a horizontal and vertical direction and will travel with the direction of groundwater flow once it is reached, however the freshwater aquifer in the project area is found at approximately 84m depth, with small pockets of perched water also found throughout the area between 5 and 10m depth.

Oil is unlikely to reach the main aquifer given its depth and the high retention capacity of the soils. However, groundwater movement is very slow, usually between 0.5m and 1.5m per day, hence if the aquifer is considered at threat there will be time to study the underlying hydrogeology and identify the most optimal location for the recovery of oil.

On permeable surfaces, the oil will penetrate into the soil due to its weight with each soil type allowing oil to permeate at different rates and to retain oil at varying capacities. See Table 2-5 . The pore spaces in coarser soils are larger, oil will flow through more readily (due to gravity) thus giving a lower retention capacity. However, finely packed sediments retain the oil in two ways, firstly the oil molecules cannot pass so easily between the particles due to their size and secondly because the forces associated with capillary action hold the oil in the pore spaces.

Surface area is also a factor in soil retention capacities with small grain sediments having a higher surface area and therefore will hold more oil on the surface of the grains than larger grained sediments.

Soil textures in the area are described in the EIA, the dominant feature in the Rusa-1 area being Bobonaro Scaly Clay, described as follows "*Bobonaro grey, and rarely red, clay, mostly muddy*" (Timor Resources 2021). Worley Parsons Betano Refinery and Beaço LNG Plant Strategic EIS (2012) the Nova Betano East soils are typically Clay and Sandy Clay. Clay will form an impermeable barrier to penetration.

Observations of the ponding water after rain on existing tracks in the Rusa #1 wellsite area indicate that the near surface clay and sandy clay soils would have a similar hydraulic conductivity (Ksat) range of $1.3x10^{-6}$ m/s to $2.9x10^{-5}$ m/s. These low permeabilities provide a good seal against infiltration, and indicate a higher surface run-off flow, thus any spilt oil is not likely to penetrate.

Table 2-5: Retention Capacities in Different Soil Types
(Source: OSRL 2013)

SURFACE TYPE	CAPACITY (ltrs/m³)
Stones / Coarse Gravel	5
Gravel / Coarse Sand	8
Coarse Sand / Medium Sand	15
Medium Sand / Fine Sand	25
Fine Sand / Silt	40

When responding to spills on permeable surfaces, it is important to minimise the amount of oil that can penetrate below the surface; this may require the oil to be spread over a large surface area in an attempt to reduce head pressure on the surface to prevent penetration. This may well be the preferable option compared to long-term operations of subsoil and groundwater clean-up.

Inland water bodies can either be static, such as ponds or lakes, or moving, such as a river. Oil is likely to spread on the surface and where subject to wind and current, can also drift moving down or across the water body. Whilst containment takes place, it is important to maintain any water flow. During the early stages oil spreads rapidly under gravity and the viscosity of the oil influences the rate. Diesel and the expected oil have a low viscosity and, with prevailing temperatures well above their pour point, will tend to spread rapidly.

2.6.2 Evaporation

The greater the proportion of light ends, the greater the evaporation of the spilt oil, so the relatively high API and prevailing temperature indicate that the expected oil as well as diesel will evaporate and dissipate rapidly. The evaporative process is primarily dependent upon the density and viscosity characteristics of the oil and its initial spreading rate. Evaporation rates are dependent on the season (wet or dry), wind speed, air and/or water temperature, the amount of water and the state of the water surface.

Quantification of evaporation rates is primarily a function of the physical and chemical characteristics of the oil, surface area and depth of free oil, depth of soil penetration linked to soil characteristics. The most likely oil to be recovered is low sulphur with a density of approximately 35° API, calculated from analysis of non-biodegraded recoveries of oils from seeps and previous wells. This oil is similar in properties to blended diesel fuel for which several published models are available. Evaporation rate for diesel at the oil/air interface can result in a reduction of 50% by evaporation in approximately 3 days (Fingas 2011), dependent on surface area and depth. The initial evaporation rate is rapid and then declines as more light carbon chains have evaporated and the oil becomes heavier. The modelled evaporation rate for 35o API oil expected in the current campaign is shown if Figure 2-1 below. Evaporation rates of oil that has penetrated the ground surface is generally slower and is also a function of the depth of penetration and type of soil, particularly porosity (Uzoije et al 2011).

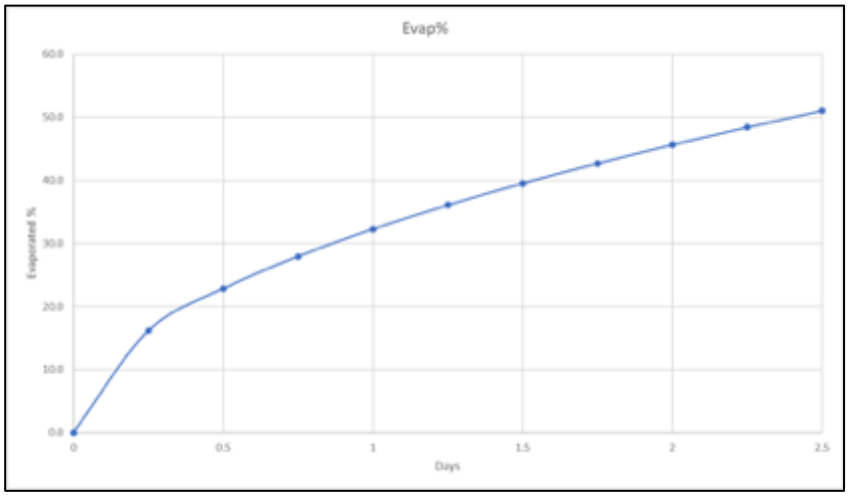


Figure 2-1: Evaporation rate for 35° API (no compositional change factored)

In assessing the evaporation rate, it is also pertinent to examine the volume of oil that will remain after evaporation that will need to be contained and managed. As can be seen in Figure 2-2 it is estimated that approximately 50% of the oil will remain after evaporation, thus a spill of 1200 m^3 would leave 600m^3 to be contained and managed.

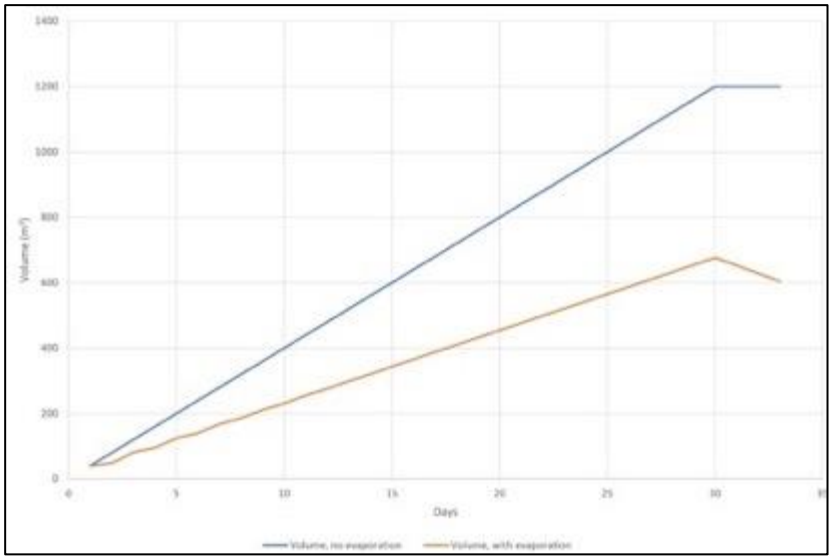


Figure 2-2: Evaporation volumes, assuming 2.5 days only

2.6.3 Dispersion in Water

Depending on the characteristics of the water body: stream, river, pond, lake, depth, flow rate; the rate of dispersion is largely dependent upon the characteristic of water surface and water depth, proceeding most quickly in deeper water in the presence of waves and eddies.

2.7 Spill Movement

The vast majority of purpose-built modelling software is applicable to offshore oil spills (e.g. GNOME, MEDSLIK II, ADIOS 2, OSCAR, SIMAP, SINTEF, TAMOC, CDOG, OSIS, OILTRANS, OILMAP and many more). A significant component of the software is dedicated to modelling trajectory forecasts for surface and subsurface spills in a complex interaction with ocean currents, tides, and winds. These platforms do not have the capability to model terrain data.

There are few modelling software packages available that apply specifically to onshore spills where trajectory models are almost wholly dictated by topography. **OILMAPLand** is a product developed by RPS, it incorporates ESRI ArcGIS Desktop to simulate spill migration over land and in surface water networks. It includes processes to estimate rate of evaporation and spreading on water bodies.

A literature review of case studies for onshore oil spill trajectory modelling shows that the majority use a combination of broader application GIS and 3D model building software packages, rather than a single software. For example, **TUFLOW** is a hydraulic modelling software designed predominantly for flood, urban drainage, and coastal assessments.

Whilst there is no specific interface for oil spill modelling, the 2D/3D mesh capability, in combination with several GIS plugins and a DEM dataset, can be used for drainage and watershed analysis. USGS has developed **Modflow 6** the latest release of a groundwater flow simulator which can be used to model potential contamination of aquifers. A vertical saturation model was developed by US EPA, named **HSSM** (Hydrocarbon Spill Screening Model) but the software was last updated in 1997 and does not run on modern operating systems, though the modelling work flow is still valid.

Timor Resources Oil Spill Trajectory Analysis has used a combination of:

- **Petrosys**, an oil industry standard for mapping, manipulation and visualisation of grid surfaces and volumes
- **Global Mapper**, a GIS platform incorporating the capacity to run watershed, sea level rise and flood models.
- **MOVE**, a 3D model building platform incorporating volumetric analysis, kinematic restoration, and validation, and geomechanical modelling.

The extent of onshore oil spills is determined from a number of primary factors principally spreading and evaporation discussed above, but elemental in the trajectory analysis is surface topography. The primary dataset used for the trajectory modelling is a 5x5m Digital Surface Model (DSM) generated from LiDAR. The data has been processed to produce a DSM which reflects not only the ground level but includes tree canopy and buildings etc. With LiDAR data it is possible to produce a Digital Elevation Model (DEM), depicting the true ground elevation, from the raw data automatically in areas less than ~90% canopy cover (subject to LiDAR point density), or manually for buildings or in areas of dense cover.

Data limitations for evaporation dispersion modelling are related to the resolution of the DSM, access to raw LiDAR data to reprocess the DEM particularly in flatter terrain, sparse regional soil profile data and uncertainty in relationship with:

- Depth of Soil Penetration. Soil type, permeability, depth of vadose zone etc
- Biodegradation, introduce soil from Weimarok or other perennial seeps that contain oil microbes to accelerate process.

See detailed drainage trajectory analysis and assessment for Rusa-1 well location in section 12.

3 RESPONSE STRATEGY

Oil and diesel spills should be dealt with as a hazardous material, and an exclusion zone established as soon as possible. Any product spilt on land or within the well site should be contained as quickly as possible to prevent spreading and recovered using absorbent material from the rig spill response kit, (see Section 9) to soak up residue material. Timor Resources are committed monitor and evaluate any spill incident and to clean-up and remediate as necessary.

Should spilt oil or diesel enter a water course "Monitor and Evaluate" response should be mounted immediately, and a reconnaissance survey of the immediate drainage courses conducted, see Section 12 for drainage map examples.

The expected oil and diesel are classified as a Group 2 "light oil" (see Section 2-5), and with a relatively low density has a half-life of a few hours under the temperature conditions in the drilling area, and given their low density, low viscosity and high volatility will dissipate rapidly by evaporation/natural dispersion.

Oil spilled on land will require a "Contain and Recover" response by the construction of berms, mounds around the spill site to stop oil entering drainage ditch around the site perimeter. To prevent oil leaving the site, the perimeter drain should be sealed.

Oil entering the natural drainage system outside the contained well site area will require a "Contain and Recover" response by the erection of berms/barriers across the waterway, see Section 12 for site specific response strategies.

Table 3-1: Response techniques for each oil type

Section	RESPONSE STRATEGY	Expected Crude Oil	No.2 Diesel Fuel	Lube Oil [1]
3.1	Exclusion Zone	☑	☑	☑
3.2	Monitor & Evaluate	☑	☑	☑
3.3	On land Containment & Recovery Excavation and construction of berms/barriers around spill area	☑	☑ Be aware of fire risk ☒	☑
3.4	Water Courses Containment & Recovery Construction of berms/barriers in water courses	☑	☑	☑
9	Waste Storage Waste Management	☑	☑	☑

[1] Lube oil spills are limited to 0.25m3 drums

☑ = Recommended ☒ = Not Recommended

Continuous monitoring and assessment are routinely conducted throughout the incident by the Planning Function under IMS, see Section 4.2, in the preparation of the response action plan and maintenance of the situation and resource status.

3.1 EXCLUSION ZONE STRATEGY

The spilt oil may pose a health and safety risk to personnel and the public due to release of flammable, toxic vapours and gases. There is an immediate need to evacuate non-essential personnel up wind and up slope from the spill. Evaluate the direction of spill movement to confirm spill areas. Section 12 provides for site specific details of spill trajectories, drainage maps, environmental sensitivity images and response strategies.

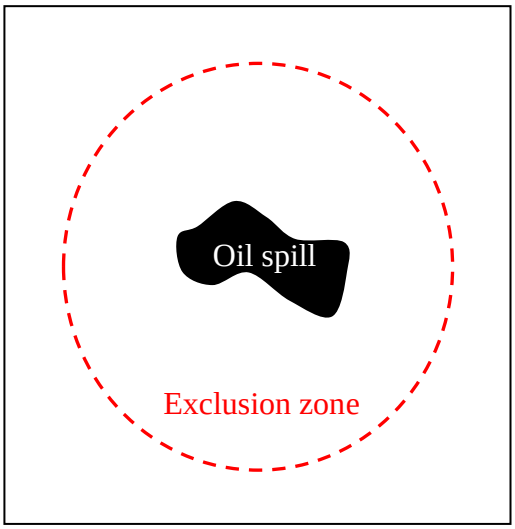


Figure 3-1: Safety exclusion zone

Once spill areas have been confirmed, implement safety exclusion zone(s) as needed, see Figure 3-1 and Table 3-2 .

Table 3-2: Exclusion zone strategy

Exclusion Zone	Extent of zone would depend on: • Proximity of spill to environmentally sensitive areas • Accessibility of spill site to the responders and public • Nearness of spill site to urban or populated areas • Drainage/river flow
Resources	• Personnel as needed to maintain security for the area • Communications equipment (i.e. 2-way radios or “walkie-talkie”) • Gas monitoring detector should be set up to facilitate the site entry protocol
Actions	• Cordon off area with clear markings (i.e. “DO NOT CROSS”, “DANGER”) • Put clear and visible signs and markings along the periphery of the cordoned area (i.e. “DO NOT CROSS”, “DANGER”) • Prevent the public from coming near or in the vicinity of the spill by posting safety personnel in the area. If possible, alert police for possible assistance in policing the area **Note: on the water, the zone is not static but moving with the flow**

3.2 "MONITOR AND EVALUATE"

There is a need to monitor exactly where the spill is and how it is moving in order to formulate future response and to assess how the spill evolves (see Table 3-2). Particular focus should be made when the spill escapes outside the well location perimeter.

Table 3-2: Monitor and Evaluate

Monitor and Evaluate	Monitor and evaluate spill source, location and behaviour: • Search for the origin of the pollution • Determine the nature and the characteristics of the oil • Forecast the evolution of the spill • Locate the affected areas and assess their extent
Resources	• Communications equipment (i.e. cell phone or 2-way radios) • Gas monitoring detector as required • Camera, video-camera, binoculars. • GPS • Sampling equipment
Actions	• Assess and report on the current situation at site of spill • Review and examine location of spill • Assess immediate environmental and social sensitivities • Provide a forecast its potential evolution in order to prepare or guide operations

3.3 ON LAND

3.3.1 Permeable Ground

When responding to spills on permeable surfaces, it is important to minimise the amount of oil that can penetrate below the surface; this may require the oil to be spread over a large surface area in an attempt to reduce head pressure on the surface to prevent penetration. This may well be the preferable option compared to long-term operations of subsoil and groundwater clean-up.

3.3.2 Impermeable Ground

If oil spills on impermeable ground, the response should first prevent the oil from further spreading and potentially contaminating other surface areas. Once contained, the oil will then need to be recovered through either manual or mechanical methods

ON LAND SPILLS

- Impermeable surfaces
  - stop release flow as quickly as possible
  - block inlets to drains, cable ducts, etc.
  - limit spread using ground booms, sorbent booms, earth banks, sandbags.
  - collect oil from pools and surfaces by pumping, vacuuming and by use of sorbents, aided by water spray if necessary
- Bunded areas
  - stop release flow as quickly as possible
  - ensure outlets such as surface water drains, are blocked
  - stop any leaks through bund penetrations e.g. around pipes
  - collect oil from pools and surfaces by pumping, vacuuming and use of sorbents, aided by water spray if necessary
- Open areas
  - stop release flow as quickly as possible
  - limit spread by building earth dams, digging interceptor trenches and/or collecting pits, and using ground booms and sorbents booms as necessary
  - collect oil from pools, trenches, pits and surfaces by pumping, vacuuming, and the use of sorbents
  - if the soil is highly permeable, containment that concentrates oil in pools may increase the speed that it soaks into the soil - use a water bottom or liner in the containment area
  - scrape off contaminated soil and move it to an impermeable surface or container for weathering or further treatment
  - thin layers of surface oil may be left to dry out for a few days before scraping.

VEGETATED AND AGRICULTURAL AREAS

- Immediate response
  - stop release flow as quickly as possible
  - prevent further oil from entering vegetated areas if possible using on-land spill techniques
  - avoid disturbing the affected areas by clean-up personnel, equipment and traffic until a specific plan has been approved
  - develop a specific clean-up plan for approval by management and the authorities. Use specialist environmental expertise
- Vegetation clean-up
  - put the approved plan into effect deploying and managing resources to minimise impact on the surrounding vegetation while achieving effective clean-up

3.4 WATER COURSES

IF SPILL REACHES WATER WAY

- Immediate response
  - stop release flow as quickly as possible
  - prevent further oil from entering waterways using on-land spill techniques by constructing earth bunds
  - If oil enters the water way consider building gravel berms and weirs as necessary
  - Use deflection berms in the waterway to recover oil
  - develop a specific clean-up plan for approval by management and the authorities. Use specialist environmental expertise
- Clean-up
  - put the approved plan into effect deploying and managing resources to minimise impact on the surrounding vegetation while achieving effective clean-up

3.4.1 On Static Water

On larger areas of static water, boom can be used to contain the floating oil. The water bodies can be subject to wind-induced wave action, causing the oil to drift, therefore making it necessary to prioritise the containment to prevent further spreading (see Figure 3-2). Where lakes etc. are fed and drained by watercourses, their inlets and outlets need to be protected, methods described in oil on moving water can be utilised.

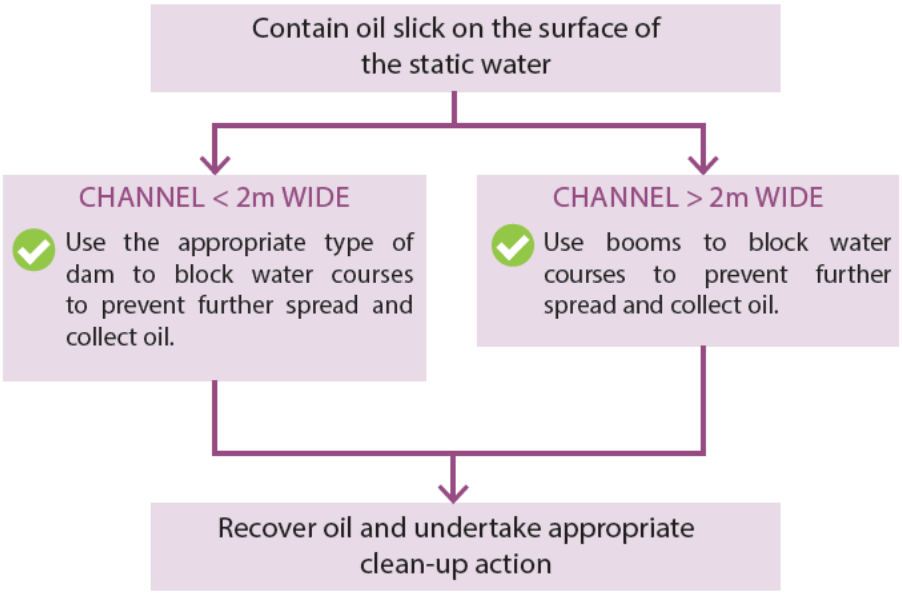


Figure 3-2: Response on Static Water

3.4.2 On Moving water

As over 60% of inland oil spills occur in rivers with currents in excess of 0.5 metres per second, various techniques and equipment, including booms and dams, have been developed to suit the relevant environmental conditions (See Figure 3-3). In currents faster than 1 metre per second, it is advisable to use techniques that allows water to flow freely subsurface whilst containing the oil solely on the surface of the water, such as a spade, wooden plate or even a sand bag dam.

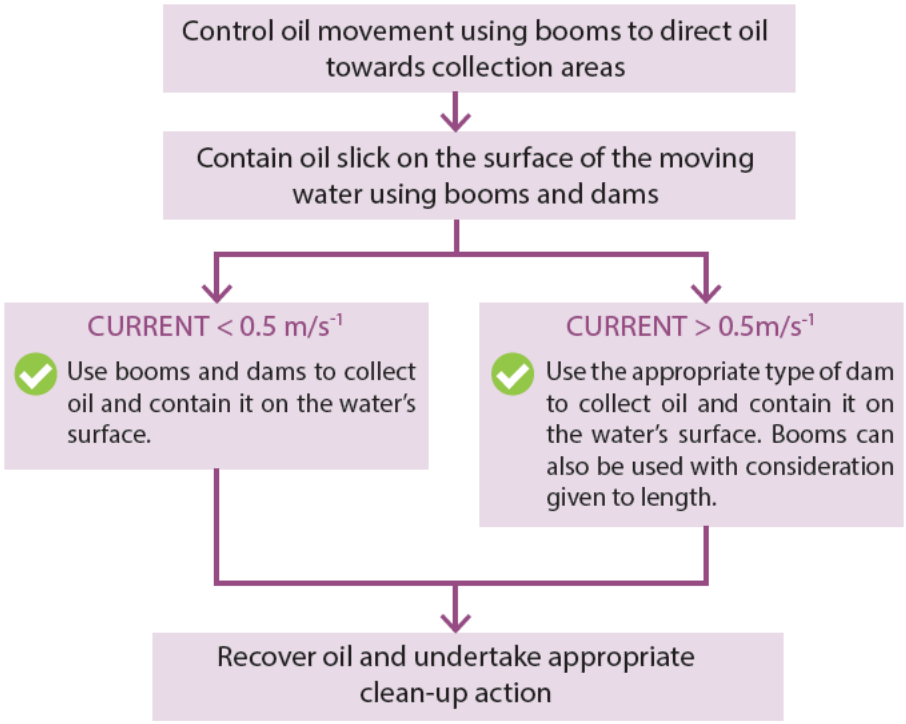


Figure 3-3: Response on Moving Water

3.5 CONTAINMENT

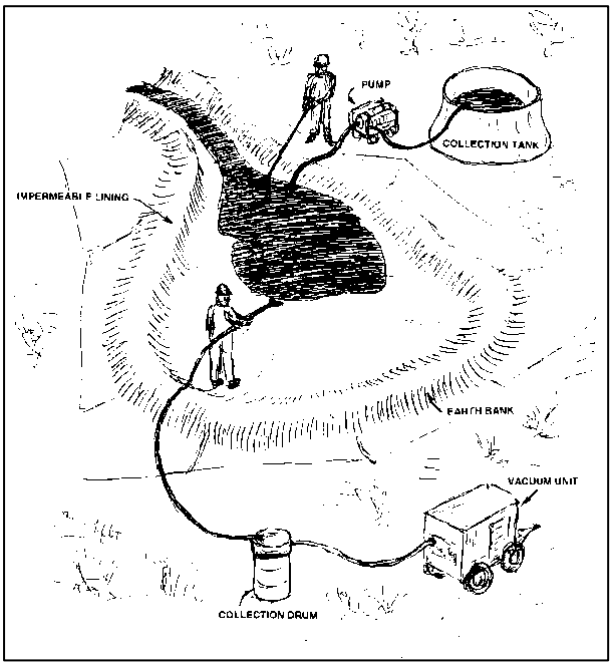
3.5.1 On Site - Small Spillages

The operations will have a suitable spill response kits as illustrated in Figure 3-4 , Section 8.1 provides a list of equipment available on site.

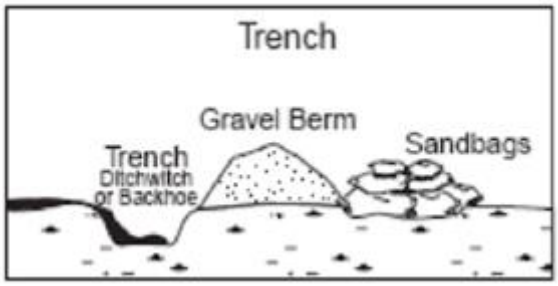
Figure 3-4: On site Spill Response Kit

3.5.2 Gravel Berms

Oil spilt on land can be corralled or contained within easily constructed berms as shown in Figure 3-5 .



Containment Berm



Berm with Trench for Recovery

Figure 3-5: Gravel Berms for Spill Containment on Land

The quickest way to construct a berm is to use a bulldozer to clear the vegetation along the alignment of the berm followed by a road grader to cut a ditch with an angled blade to side cast the material into a berm, see Figure 3-6 below. A grader in first gear cutting a ditch with an angle blade would travel at about 4 km/hour. The time for two passes along a 1 km distance would be about half an hour. The soil excavated from two passes of the road grader would be enough for a 1 m high berm.

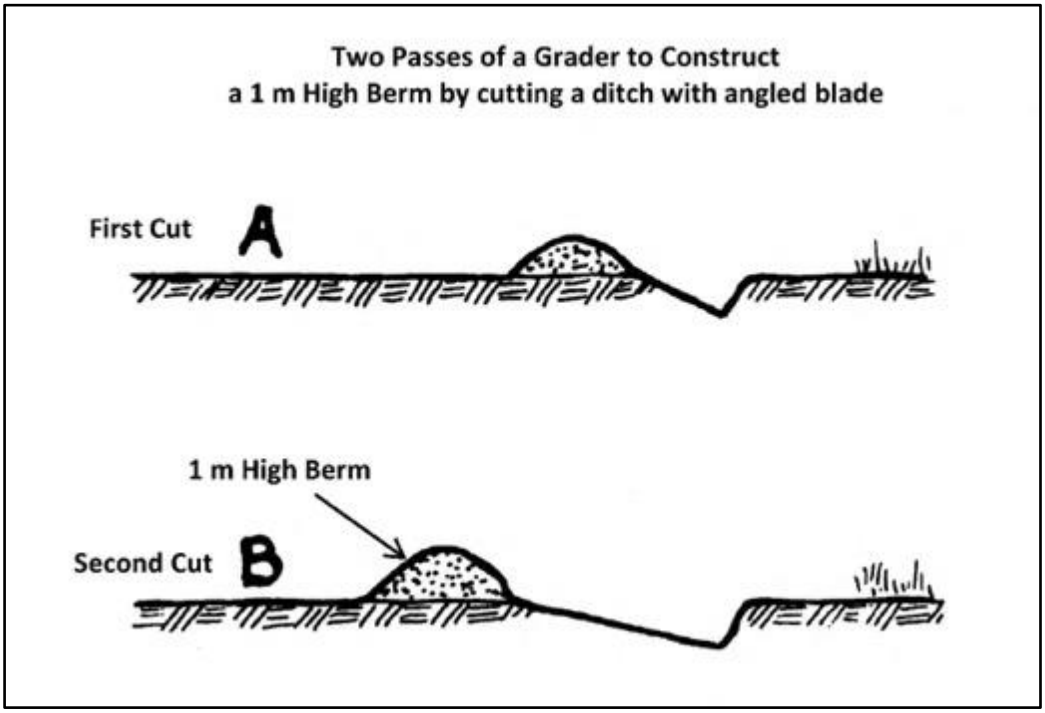


Figure 3-6: Grader Used to Cut an initial containment Berm

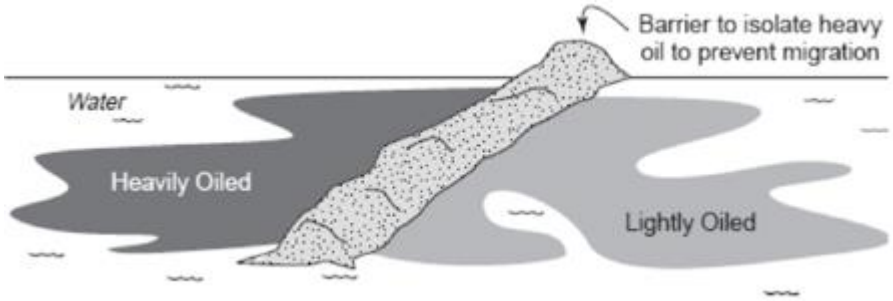
If drainage gullies are crossed along the berm alignment the bulldozer can be used to push material into the gully to block flow along the gully.

The bulldozer would need about one hour to clear a 1 km length of 4 m to 6 m width through the typical vegetation that occurs around the well site areas in two passes, travelling at a low speed of about 2 km/hour.

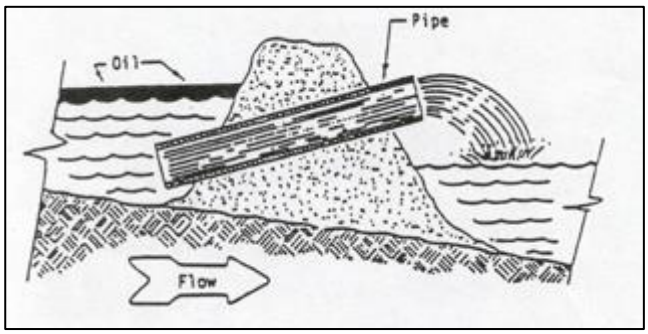
Estimates of the time required to mobilise equipment to site and to construct the first response berms are included in Table 3-3 and Table 12-1 below.

3.5.3 River Berms and Booms

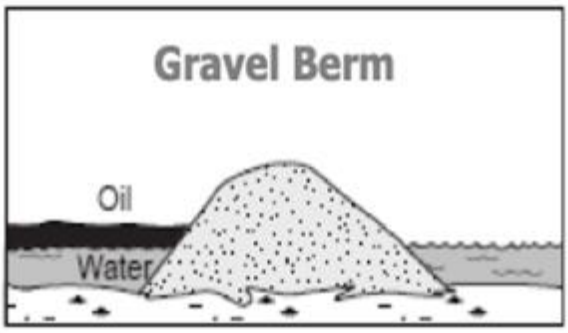
If oil escapes into a water course, berms may need to be constructed to contain the oil and prevent it from flowing further downstream and contaminating the surrounding area, examples are shown if Figure 3-7 and Figure 3-8 .. It is important to maintain a water flow through the berm in order to avoid having a negative impact on the ecosystem downstream. Berms can be used in both narrow waterways and water courses with steep sides.



Gravel Berm Across Slow Moving Water



Berm in Moving Water



Berm in Still Water

Figure 3-7: Gravel Berms for Spill Containment on Water

Booms can be used to deflect the flow of oil to limit any further spread and contain it ready for recovery. However, boom deployment is limited to slow moving deeper water, in shallow fast flowing rivers oil will escape under the boom in flows >0.5m/s. Different techniques can be employed depending on the quantity of oil spilled and the surrounding operational and environmental conditions, such as the width of the channel, depth of water, flow rate and the presence of meanders.

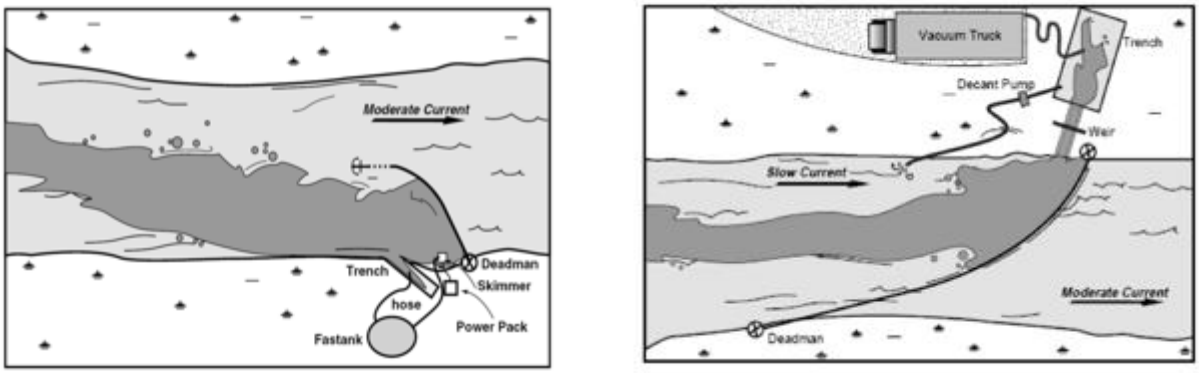


Figure 3-8: Deflection Booms for Rivers

3.6 RECOVERY OF OIL

To reduce the impact of an unintentional release, spills will be contained as quickly as possible and as close to the well site as possible. Where size permits, spills will be contained on site, the containment available on each site is shown in Table 3-3 below.

Table 3-3: Rusa-1 Well Site Containment Volumes

	Days	Rate (m^3/day)	Rate (bbl/day)	Total Vol (m^3)	Total Vol (bbl)	Berm (m^3)	Berm (bbl)	Max. Berm Height (mm)
Worst Case Spill	90	400	2,516	36,000	226,440	36,295	228,296	2,900
Maximum Credible Spill	30	200	1,258	6,000	37,740	9,377	58,981	1,400
Onsite Containment				950	5,976			

Note: Volume contained on the well pad within the 300 mm high perimeter containment berm

The containment design is dependent on topography and surrounding features. The site-specific containment plan as presented in Section 12 utilises the existing geomorphological features (ridgelines, depressions etc), infrastructure (drains, pondage) in order to limit the extent of the flow between source and containment and subsequent recovery, see in Figure 12-2 and Figure 12-3 below. Based on the trajectory analysis, multiple layers of protection are designed to preclude the potential for a spill to impact on any area other than the cleared land.

The response strategy includes measures to divert any surface water from rainfall away from the site so that it does not add excess volume to the requirement for containment of oil. Selection of the containment sites also considers sensitivities as follows:

- Environmentally Sensitive areas identified such as primary woodland, wetland, and lagoons, important flora and fauna habitats, especially birds and crocodile.
- Areas of moderate population density where impact of spill is detrimental and may require provision of alternative accommodation for a short period during the response operations.
- Irrigation areas where flat lying land and irrigation channels would spread the oil over significant area with reduced means of control.

Clean-up is best accomplished by manual recovery which is labour intensive but the best environmental option when compared to the use of heavy equipment, particularly in sensitive areas. Manual recovery utilises large numbers of people collecting stranded oil with the necessary tools, shovels etc.

Manual recovery can be enhanced if the size of spill demands by using a multitude of machinery, including (specialist) pumps and vacuum equipment, scrapers, graders and oil skimmers. Figure 3-9 illustrates a recovery option.

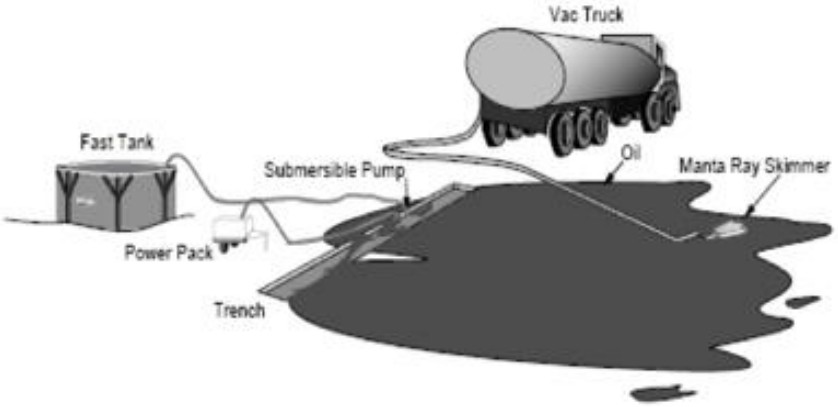


Figure 3-9: Recovery of Spilt Oil

Sorbants made of natural oleophilic materials such as straw, coconut husks, and synthetic materials (polypropene), can be introduced to selectively absorb the oil but will still require disposal.

In-situ burning may be considered when physical recovery is not feasible, particularly in inaccessible places and remote areas, some environments may recover from burning more readily than if left oiled without treatment. In-situ burning should be considered as part of a best practicable option assessment depending on what other options available locally, see Michel, J. (2018).

Manual recovery is the most principal method of clean-up and involves teams of workers using suction hoses, pumps, and vacuum trucks to recover spilled oil. The oiled materials are collected in buckets and drums for transfer to a processing station. Workers may also use rakes, shovels, and other tools to remove oil and debris once bulk oil is removed. While manual clean-up is a slow, painstaking process, it generates less waste than other techniques, thus this with bioremediation is the preferred clean-up option.

Once bulk oil is removed, there will be a residual area of contaminated soil within the containment bund that can be bioremediated using a variety of methods as described here.

3.7 REMEDIATION

The response strategy described in this OSCP is to contain any spilt oil that escapes the rig site in pre-arranged containment areas using the topography immediately down slope from each site. The size and location of these containment areas are identified in Section 12 using trajectory analysis.

Once contained, natural process of evaporation will account up to 50% of the spilt volume, since the oil is light and volatile. Little or no oil will penetrate the ground given the prevailing clay soils throughout the area. Contained oils will be recovered by mechanical means and transported away from the site for a series of treatment options, such as, use in oil burning power plants, incorporation into roadbed materials, solidification in brick manufacture, incineration, and various bioremediation techniques.

3.7.1 Bioremediation

Oil as an organic product is largely biodegradable in the presence of naturally occurring microscopic organisms - oleophilic bacteria. The process of using endemic microbes to decompose oil is an example of bioremediation and supplemented with fertilisers, can speed up this process as much as tenfold.

Natural biodegradation of contaminants tends to be rate limited due to limitations on the biological processes. These limitations may be overcome by optimizing the biological conditions. The most important factors for control of biological degradation of hydrocarbons are:

- An adequate supply of hydrocarbon degrading bacteria.
- Availability of sufficient oxygen (and mixing) for cell metabolism.
- Availability and balance of nutrients and micro-nutrients necessary for optimum bacterial metabolism.
- Moisture control.
- Temperature and pH.

The landfarming process involves the controlled and repeated application of waste on a soil surface in order to biodegrade hydrocarbon constituents by using microorganisms naturally present in the soil. The landfarming area is periodically tilled to provide the necessary mixing and oxygen transfer. Active landfarming may include addition of water, nutrients and other materials to enhance the biodegradation process in the waste/soil mixture, and to prevent the development of conditions that might promote leaching and mobilization of inorganic contaminants. The conditions under which degradation takes place are typically aerobic. Volatilisation and dilution are two other important mechanisms for reduction of degradation products in land applications of waste. Landfarming should not be confused with landfilling or burial, in which the waste is deposited in man-made or natural excavations for an indefinite period of time. The conditions under which landfilled and buried wastes are stored are usually anaerobic, which typically results in much slower degradation.

Considerations for the application of landfarming should also include the site topography and hydrology, and the physical and chemical composition of the waste and resultant waste/soil mixture. Waste application rates should be controlled to minimise the possibility of run-off. When a facility is properly designed, operated, and monitored, landfarming is usually a relatively cost-effective and simple technique.

Depending on soil conditions, landfarming may require a liner and/or groundwater monitoring wells. Moisture control to minimize dust (particulates) may also be necessary during extended dry conditions. Hydrocarbon concentrations are monitored during the process to measure progress and determine whether biodegradation processes are successful or should be enhanced.

3.7.2 Composting

Composting is a solid phase biological treatment technique similar to landfarming. Biodegradation rates are enhanced by improving porosity, aeration, moisture content, and operating temperature. It may be possible for compost mixture with up to ten percent hydrocarbon to be reduced to less than one percent in four to eight weeks. Characteristics of composting are:

Contaminated soil is mixed with bulking agents (e.g. wood chips, straw, rice/coconut husks) to provide increased porosity and aeration potential. Care should be taken to ensure the bulking agent provides sufficient porosity to allow aeration even at high moisture levels.

Manure or agricultural wastes may be added to increase the water holding capacity of the waste/media mixture and to provide trace nutrients. Nitrogen and phosphorous based fertilizers, as well as trace minerals (e.g. Fe, Cu, Mo, Mn, Zn, B, Co, Ni) may be added to enhance microbial activity.

Mixtures of the waste, soil (to provide indigenous bacteria) and other additives, may be placed in piles small enough (less than 3 feet deep) to be tilled for aeration, or placed in containers or on platforms designed to allow forcing of air through the composting mixture. Composting in closed containers allows for control of volatiles.

The compost mixture is maintained near 40-60 percent water by weight to provide optimal moisture conditions for biodegradation.

Compost systems are characterized by elevated temperatures (30-70 ^{o}C) within the compost mixture. The elevated temperature increases microbial metabolism but should be closely monitored to ensure temperatures do not exceed 70 ^{o}C (may cause cell death). Temperature may be controlled by tilling the soil pile or by forced aeration.

The degradation of organic compounds using composting techniques can be much more efficient than landspreading or landfarming techniques. In addition, treated waste is contained within the composting facility and its properties may be readily monitored. Composted wastes that meet health-based criteria may be reused as soil conditioners, landfill cover, clean fill, etc.

3.7.3 Rotary Kiln Incineration - Cement Plants

Because of its durability and ability to incinerate almost any waste, regardless of particle size or composition, the type of incinerator best suited for many oil industry wastes is the rotary kiln. A rotating kiln tumbles the waste to provide extensive contact with hot burner gases.

The use of a cement kiln is usually an attractive and less expensive alternative to incineration of oily wastes and sludges. Oily waste after dewatering may go into a fuel blending programme to replace fuel otherwise needed to fire the kiln.

The retention time and temperature (typically 800 ^{o}C) within a cement kiln are adequate to achieve thermal destruction of organics. The ash from wastes combusted in the kiln will become incorporate into the cement matrix. These ashes may provide a desirable source of aluminium, silica, clay and other minerals that are typically added in the cement raw material feed stream.

4 RESPONSE - ROLES AND RESPONSIBILITIES

Timor Resources is responsible for the preparation and implementation of the project's Oil Spill Contingency Plan (OSCP). TR Operations Manager is responsible to mount any oil spill response off-site. The Drilling Contractor shall maintain appropriate capability in order for immediate response to Tier 1 spills at the rig site. Timor Resources are responsible for:

- Developing and maintaining an OSCP for spills in the project area with support from the Drilling Contractor with regard to the rig site
- Maintaining appropriate oil spill response materials as required under the OSCP including contractor services and resources both equipment and labour.
- Conducting appropriate training for oil spill response to ensure proficiency in responding to spills.
- Ensuring management and insurers are fully briefed on matters concerning claims for damage resulting from a spill.

4.1 TIMOR RESOURCES EMERGENCY RESPONSE STRUCTURE

Crisis and Emergency events are managed through a multi-tiered system as shown in Figure 4-1. As discussed in Section 2.4, a response is Tiered depending on the severity of the incident and its effect, and different levels of the organisation are involved from the immediate responder(s) at the scene, the Site Emergency Response Team (SERT) at the operating site, the Incident Management Team (IMT) in Dili, to the Crisis Management Team (CMT) at the corporate office in Brisbane. Note that the Oil Spill Response Team (OSRT) is a sub-set of the SERT, thus any oil spill would require the SERT to be mobilised as well as the OSRT.

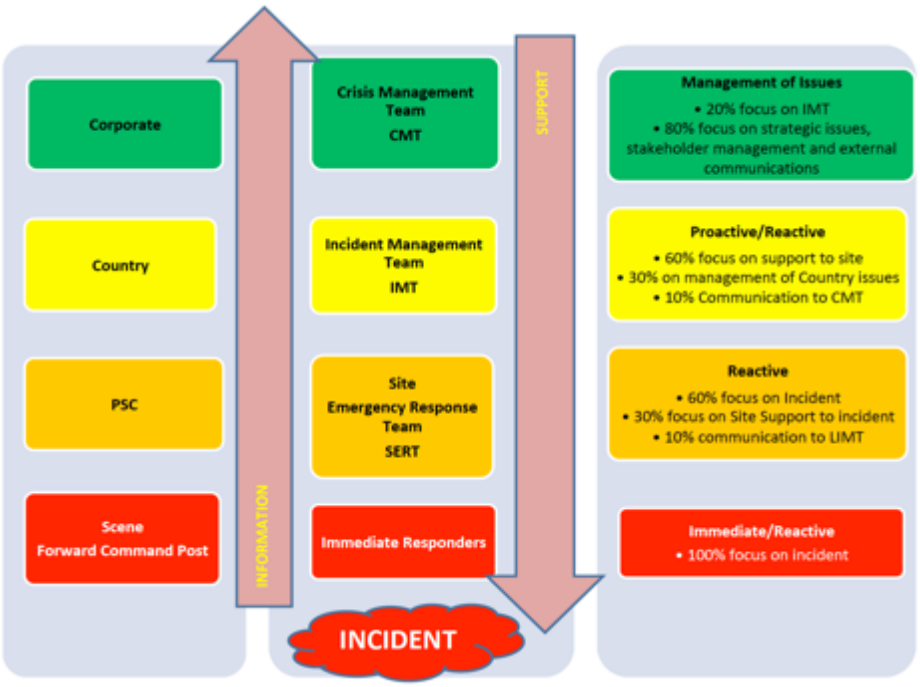


Figure 4-1: Timor Resources Incident Management Structure

In terms of operational response Timor Resources operates the internationally recognised Incident Management System (IMS) and best industry practice is provided in IOGP/IPIECA 2014, as described in Section 4.2 below.

4.2 INCIDENT MANAGEMENT SYSTEM (IMS)

IMS allows for the timely combination of resources and manpower during an emergency and promotes communications among responders. IMS requires that one individual has authority over all incident activities, this position is known as the Incident Commander (IC). In the case of an oil spill the Operations Manager will take the IC role. IMS is applicable to all scales of spills.

A structured Incident Management System (IMS) is critical in establishing command and control during a response to an emergency. IMS includes a modular organization that has pre-identified roles, responsibilities, reporting relationships and authorities necessary to manage an incident. IMS also includes a planning process necessary to ensure a direct link between the incident management objectives and response actions being taken in the field.

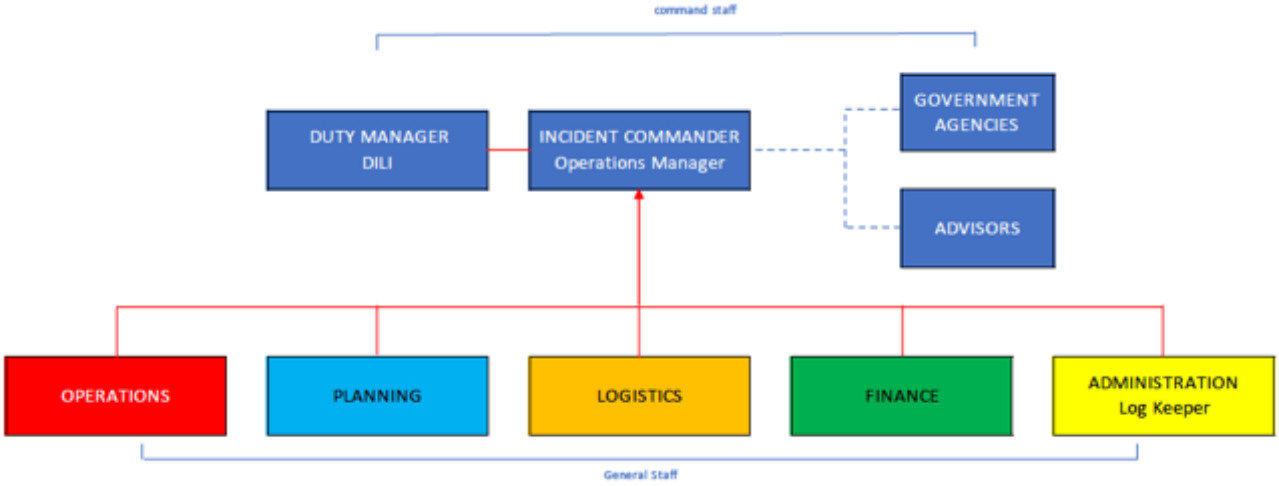


Figure 4-2: Organizational structure of the IMs

Responsibilities in each functional area include:

- **Command** - provide overall management and authority
- **Operations** - Oil Spill Response Team direct oil spill response operations
- **Planning** - prepare oil spill response action plan and maintain situation and resources status
- **Logistics** - provide services and support to the incident
- **Finance/Administration** - provide financial controls and claims management

Incident Commander maintains a strategic perspective to assess incident potential, establish an oil spill response strategy, and to provide clear direction for the response. The IC establishes the incident objectives and ensures that all team members work to accomplish these objectives through the Incident Action Plan.

Country Manager is responsible for liaison with government through ANPM, as and when necessary, and prepares information about the incident to the news media, to incident personnel and to other appropriate agencies and organisations.

HSE Officer acts as the **On Scene Commander (OSC)** at the spill location/Forward Command Post and supervises the Oil Spill Response Team (OSRT). OSC develops and implements response actions and ensures personnel and public safety are addressed.

Oil Spill Response Team (OSRT) performs all tactical response operations to achieve key oil spill response priorities. The site based OSRT adopts the IMS structure and details are provided in Section 5, see for example, Figure 5-1 .

Logistics Team provides services and support to the oil spill response effort in the form of personnel, facilities, and materials.

Finance Team provides financial controls, supports contracting and procurement, tracks incident costs, manages claims, and accounts for reimbursements, in addition to providing tracking of all expenditures and recording of costs for personnel, equipment and assets. Incidents may involve claims for damage to property, business disruption, health or medical claims.

Administration Team provides administrative services in support of the Incident Commander and Country Manager as appropriate.

4.3 INCIDENT MANAGEMENT TEAM - DILI

The Timor Resources Incident Management Team is shown in Figure 4-3 .

Figure 4-3: Timor Resources Incident Management Team

PART B – ACTION PLAN

5 ACTIONS

5.1 PERSON SIGHTING SPILL

Any person discovering an oil leak/spill should:

- Proceed up-wind of leak.
- Notify the PIC giving a concise report stating:
- Location of leak
- Extent and size of leak
- Any action taken

- Seek assistance from Area Supervisor/Operator.
- Do not re-enter or allow other persons into affected area.
- If safe to do so use the on site spill response kit.

5.2 ON THE RIG SITE

5.2.1 Rig Superintendent (for rig incidents)

SMALL SCALE SPILLAGE

- STOP or REDUCE further spillage of oil.
- If there is a threat of fire suspend all response operations until the threat is eliminated.
- Account for personnel in the area of spill and ensure their safety. Report incident to TR Drilling Supervisor/Company Man.
- Assess the spill situation (see Section 7: Form 01 Pollution Report POLREP):
- determine the source of the spill, if possible
- determine the type of oil spilled
- estimate the spill volume
- estimate the direction and speed of the spill movement if the spill has escaped containment (e.g. fuel tank bund/location drainage bund and is moving off site).
- Assess weather conditions. Provide Drilling Supervisor with regular status reports.

WELL RELATED INCIDENT

Any rig incident related to a well control issue will always take primacy and the rig SERT will lead, any oil spill response will be secondary and lead by the OSCT.

5.2.2 Timor Resources Drilling Supervisor - Company Man

- The Drilling Supervisor shall immediately notify the TR Operations Manager (Incident Commander) and Oil Spill Response Team Leader (On Scene Commander) when a rig spillage moves off site i.e. outside the site drainage bund.
- Immediate notification shall be followed by a written notification as detailed in Section 7 - Form 02 Preliminary Spill Assessment.

- It is important to remember that an effective response strategy will require an on-going assessment of environmental and spill conditions. Once the initial spill assessment has been made, additional monitoring may be initiated by the IC and the spill assessment will be continuously updated.

5.3 TIMOR RESOURCES HSE OFFICER - ON SCENE COMMANDER

1. Mobilise Forward Command Post (FCP).
2. If the threat of fire or explosion exists, suspend all response operations until eliminated.
3. Account for personnel and public in the area of spill and ensure their safety.
4. Assess the spill situation
   - determine the source of the spill, if possible
   - determine the type of oil spilled
   - estimate the spill volume
   - estimate the direction and speed of the slick's movement (Section 7 - Form 02 Preliminary Spill Assessment).
5. Assess weather conditions.
6. Determine whether it is safe to activate the recommended response strategies. This decision will be based on the assessment of personnel safety considerations, the status of the source, and the ability of the response equipment to function effectively.
7. Make preliminary assessment of the resources at risk.
8. Initiate surveillance of oil spill.
9. Provide the IM with regular status reports.
10. Co-ordinate response operations with the SERT, as required.
11. Maintain a log of events, decisions, contacts.

5.4 TIMOR RESOURCES OPERATIONS MANAGER - INCIDENT COMMANDER

1. IC receives notification of spill and decides on appropriate level of immediate response.
2. Alert General Manager Exploration.
3. Confirm if SERT(s) have been activated as appropriate.
4. Confirm validity and details of first contact information.
5. Liaise with rig SERT or mobilise SERT for non-drilling related spillages.
6. Ensure following information has been received as a minimum:

- location of spill
- type of oil spilt
- category of spill
- direction of movement
- response

7. Take immediate remedial actions to restrict or stop the spread of the problem.
8. Direct operations resources and activities as the situation demands
9. Formulate and follow tactical plans to deal successfully with the spill
10. Decide on SERT support requirements.
11. Inform and maintain communication with TR Duty Manager and Country Manager who is responsible for Government liaison through ANPM.
12. Ensure a chronological record of events is maintained - Administration Function i.e. logkeeper

The Oil Spill Response Team (OSRT) organisation is shown in Figure 5-1 illustrating communication flow.

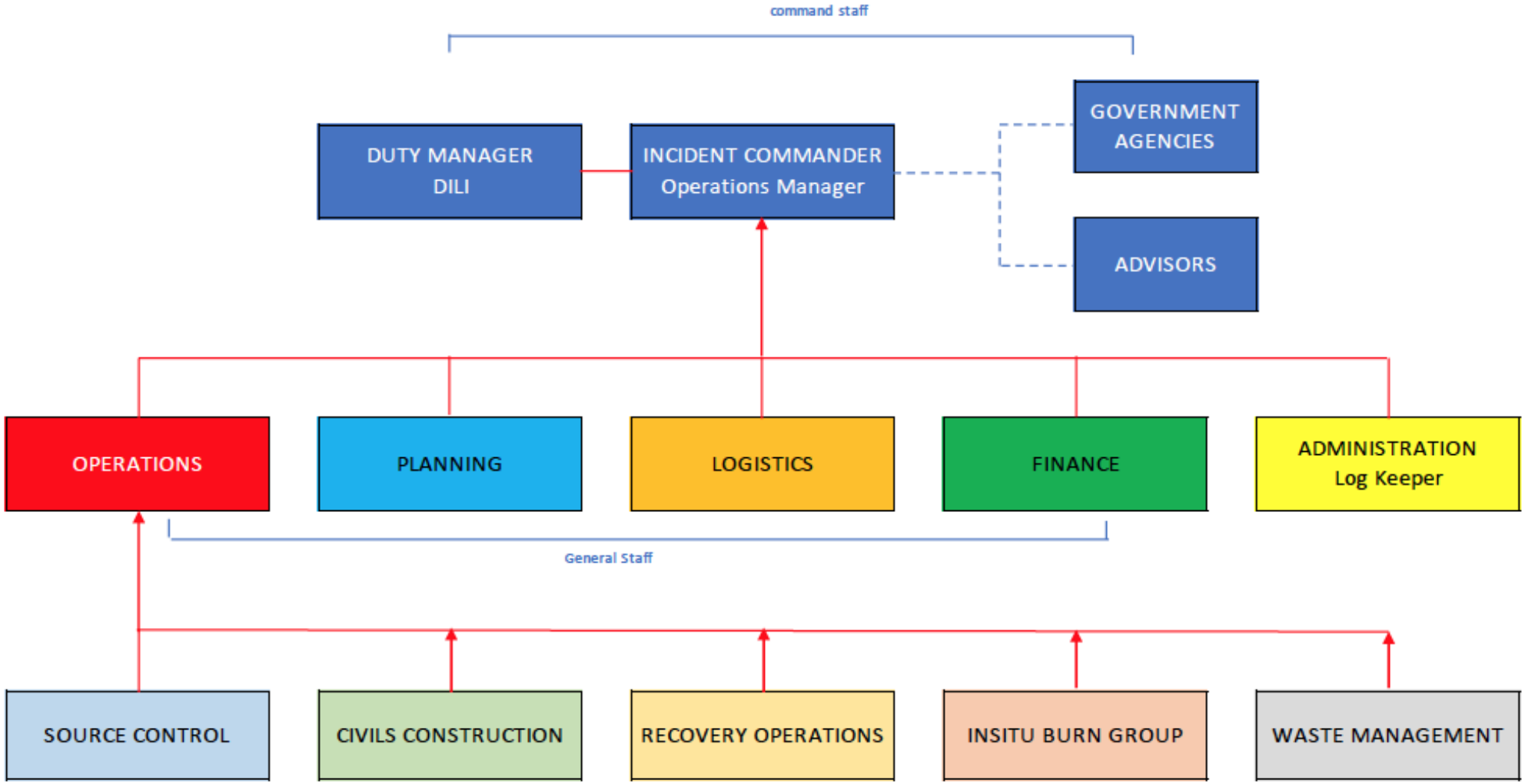


Figure 5-1: Oil Spill Response Team (OSRT) Organisation

5.5 INCIDENT RESPONSE ORGANISATION - DILI

1. General Manager Exploration - assess situation from information received and considers if IMT mobilisation needed. If IMT mobilised delegated Incident Manager.
2. Consider and determine response strategy with the On-Scene Commander
3. Notify CEO
4. HSE Officer Mobilise additional clean-up resources if needed
5. Contact Specialist Environmental Advisors as necessary
6. Provide advice on clean-up strategies, hazards to clean-up personnel, collected oil disposal, etc.
7. Liaise with On-Scene Commander
8. Manage the response as the situation develops
9. Maintain a log of events

5.6 INCIDENT MANAGEMENT TEAM

1. General Manager Exploration assesses situation with IMT
2. Consider & determine response strategy
3. Provide advice to OSC
4. Mobilise/authorise additional resources
5. Contact CEO, Partners and ANPM
6. Handle media enquiries with approval from CEO/ANPM
7. Maintain a log of events

6 COMMUNICATIONS AND EMERGENCY CONTACT DETAILS

6.1 COMMUNICATIONS

6.1.1 Rig

At least one landline telephone and one facsimile should be readily available at all times to ensure that the personnel conducting the operation have access to outside authorities. Records of all communications (telephone conversations, emails, faxes and file notes) must be entered in the log book in chronological order.

6.1.2 Rig/Logistics Warehouse Haemano

The project has VHF base station at Haemano camp. There will also be numerous hand-held portable VHF units for use by OSRT staff.

6.2 OIL SPILL RESPONSE - EMERGENCY CONTACT LIST

6.2.1 Rig Manger

Contact Point	Ficky Indrwan
Title	Rig Manger
Department/Organization	Eastern Drilling
Phone	+62 813 1055 8757
Email	drilling.super@eastern-drilling.com

6.2.2 Rig Superintendent

Contact Point	Haryo Dipo / Nurjaya
Title	Rig Based Incidents SERT Team Leader
Department/Organization	Eastern Drilling
Phone	+670 7435 9575 / +670 7435 9591
Email	rig.superintendent@eastern-drilling.com

6.2.3 Drilling Supervisor/Company Man

Contact Point	Jon Benesch
Title	Rig Based Incidents SERT Member
Department/Organization	Timor Resources Drilling Department
Phone	1-814-810-7686
Email	jbenesch@hotmail.com / jon.benesch@timorresources.com.au

6.2.4 TR Operations Manager - Incident Commander (IC)

Contact Point	Luis Pereira
Title	Oil Spill Incidents - Incident Commander
Department/Organization	Timor Resources Operations Department
Phone	Ph: +670 7704 2531
Email	luis.pereira@timorresources.com.au

6.2.5 HSE Officer - On Scene Commander

Contact Point	Roy Arthur Matakupan
Title	Oil Spill Incidents On-Scene Commander
Department/Organization	Timor Resources HSE Department
Phone	+62 877 8234 1392
Email	safety@eastern-drilling.com

6.2.6 TR IMT - Dili

Contact Point	**Jan Hulse**
Title	General Manager Exploration
Department/Organization	Timor Resources
Phone	+670 75 942 489
Email	Jan.Hulse@TimorResources.com.au
Address	Timor Plaza CBD 3 Suite # 303 Comoro Dili Timor -Leste

6.2.7 ANPM

Contact Point	HSE
Title	24 Hour Emergency Number
Department/Organization	HSE Directorate Autoridade Nacional do Petróleo e Minerais (ANPM)
Phone	Ph: +670 77745577
Email	hse.staff@anpm.tl
Address	Autoridade Nacional do Petróleo e Minerais (ANPM) Edifício do Ministério das Finanças, Pisos 6 e 7 Apartado 113 Aitarak Laran Díli, Timor-Leste

6.3 SITE EMERGENCY RESPONSE - EMERGENCY CONTACT LIST

6.3.1 Contact Details - Timor Resources Staff and Management

Name	Job Title	Contact Details	Alternative Contact Details	Notes (e.g. First Aid Trained)
Timor Resources Duty Manager Emergency number	Timor Resources 24/7	+670 7705 5300	-	Duty Manager 24/7 receives initial call from IM at site
Suellen Osborne	Managing Director	+670 7616 4501	+61 448 227 794	
Jan Hulse	General Manager Exploration	+670 7594 2489	+61 427 317 952	
Robin O'Leary	GM Exploration Growth and Ne Ventures	+670 7617 6272	+61 413 598 747	
Filomeno De Andrade	Country Manager	+670 7784 6630	+61 416 553 495	
Luis Pereira	Operation Manager	+670 7704 2531		
Felix Soares	Accounting and Finance Manager	+670 7723 9111		
Ana Belo	Geophysicist	+670 7757 2749		First Aid & Basic Life Support Trained
Jacinto Soares	Geologist	+670 7735 5595		First Aid & Basic Life Support Trained
Veronica Belo	Community Liaison officer	+670 7799 7699		First Aid & Basic Life Support Trained
Octavianus Maher Bere	Junior Local Content Office	+670 7705 8408		
TBC	Admin Officer	+670 7759 9187		

TBC	HSE Officer			
TBC	HSE Officer			
Joni da Costa Queirius	Camp Boss	+670 7743 4197		

6.3.2 Contact Details - Drilling Contractor

Name	Job Title	Contact Details	Alternative Contact Details	Notes (e.g. First Aid Trained)
Haryo Dipo / Nurjaya	Rig Superintendent	+670 7435 9575 / +670 7435 9591	+62 813 1055 8757	ED Duty Manager 24/7 receives initial call from IM at site. Email: rig.superintendent@eastern-drilling.com
Joni	Light Vehicles Driver	+670 7743 4197		
Erno	Truck Supervisor	+670 7669 1132		
Ficky Indrawan	Drilling Rig Manager	+62 813 1055 8757		Email: drilling.super@eastern-drilling.com
Roy Arthur Matakupan	HSE – Safety Performance Coach	+62 877 8234 1392		Email: safety@eastern-drilling.com First Aid & Basic Life Support Trained

6.3.3 Contact Details - Field: Local Authority - Manufahi/Ainaro Municipality

Organisation	Name / Role of Contact	Contact Details	Alternative Contact Details	Notes
Municipal Health services	Mrs. Florencia Corte-Real Tilman - Director Mr. Julio da Costa Xavier	+670 7823 9842 +670 7825 8663		24/7
Manufahi Police Station	Mr. Joni Viana - Head of Police	+670 77337915		
Manufahi Administrator Municipality	Mr. Arantes Isac Sarmento	+670 773 0499		
Manufahi Post- Administrator	TBC	+670 7730 4221		
Manufahi Bombeiros - Fire Fighter	Fire Fighter – Director Mr. Mateus Pereira	+670 7818 1429 +670 7800 7831		
Manufahi EDTL – Power Station	Director of Power Plant	+670 7735 1433		
Manufahi EDTL – Power Station	Emilio de Jesus Power Plant	+670 7815 4749		
EDTL Ainaro	Julio	+670 7825 6376		
Same Post- Administrator	Amandio da Conceicao	+670 7730 4221		
Betano Police Station	Abrao de Jesus - UPS Police	+670 7531 3658		
Administrator Sub District Hatudo	Rogerio da Costa	+670 7806 6813		
Hatudo Police Station	Mr Tomas Yeosep - Police Commander	+670 7514 4310		
Hatudo Hospital		+670 7817 9147	+670 7732 0999	
Ainaro PNTL Commander	Justino M	+670 7731 2381		

6.3.4 Contact Details - Field: Hospital, Primary MEDEVAC Contact Details & Services

Name	Contact Details	Operating Hours	Notes
Manufahi Hospital	+ 670 213 0011 +670 7823 9842 Director Florencia Corte-Real Tilman	09.00 – 17.00	For Emergency Issue 24/7 proceed to Emergency unit care Manufahi Hospital
Hatoudo Hospital		+670 7817 9147 +670 7732 0999	
Covalima Hospital	+670 7825 8525 Mr. Andre +670 223 0011 +670 7723 7601 +670 7825 8526 Mrs. Judith Imaculada	09.00 – 17.00	For Emergency Issue 24/7 proceed to Emergency unit care Covalima Hospital diwanoelsuai@gmail.com
Medevac Support Stamford Medical Services	+670 7772 111 Hotline Emergency 24/7 Switchboard 331 0141, 331 1209	09.00 – 17.00	Derek Chua - 7743 4980 derek.chua@stamfordmedical.com info@stamfordmedical.com
MEDEVAC Aircraft Service Provider Mission Aviation Fellowship (MAF)	+670 7732 7771 MEDEVAC DIL-SUAI-SAM	12/7 Daytime only	Reservation for 24/7 Aircraft type: GippsAero GA8 Airvan x2
Red Cross Timor Leste	+670 7811 0609 (24/7) Sefriano Sufa First Aid Manager	09.00 – 17.00	Red Cross Timor Leste is 24/7 to provide assistance for coordinating with National Ambulance to the remote locations within project area.

6.3.5 Contact Details - Dili: Government, Hospital, Primary MEDEVAC Contact Details & Services

Name	Contact Details	Operating Hours	Notes
HSE ANPM	+670 7774 5577 Emergency number 24/7	09.00 -17.00	Alternative contact details: Ms. Verawati Corte-Real - +670 7732 7634
Timor Resources Duty Manager Emergency number	Timor Resources 24/7	24/7 +670 7705 5300	Duty Manager 24/7 receives initial call from IM at site
Emergency Call Ambulance Hospital Nacional Guido Valadares (HNGV) – Dili	3311044 (24/7)	In case of Emergency Only Call Ambulance central Dili base, they will direct and assist caller to get any Medevac in municipalities referred.	In case of Emergency Only Call Ambulance central Dili base, they will direct and assist caller to get any Medevac in municipalities referred.
Hospital National Guido Valadares (HNGV) - Dili	333 1113 Head of Director HNGV	09.00 – 17.00	In case of emergency TR proceed to 3311044 (24/7)
Medevac Support Stamford Medical Services	+670 7772 111 Hotline Emergency 24/7 Switchboard 331 0141, 331 1209	09.00 – 17.00	Derek Chua - 7743 4980 derek.chua@stamfordmedical.com info@stamfordmedical.com
MEDEVAC Aircraft Service Provider Mission Aviation Fellowship (MAF)	+670 7732 7771 MEDEVAC DIL-SUAI-SAM	12/7 Daytime only	Reservation for 24/7 Aircraft type: GippsAero GA8 Airvan x2
Red Cross Timor Leste	+670 7811 0609 (24/7) Sefriano Sufa First Aid Manager	09.00 – 17.00	Red Cross Timor Leste is 24/7 to provide assistance for coordinating with National Ambulance to the remote locations within project area.

6.3.6 Contact Details - Other Organisations

Organisation	Contact Details	Notes
National Police Headquarter National Operations Centre	Tel: 112 (24 hour) Tel: 331 2383 (24 hour)	
PNTL Headquarters Department of External Relationship	Julio Soares Maia +670 7731 2433 Rosinha do Carmo +670 7739 4446 Aliança dos Santos +670 7732 5881	09:00AM – 17:00PM
Fire Brigade Services	Tel: 115 (24 hour) *(limited English Language Skills),*	7800 7831 / 7818 1429 (Manufahi), 7712 3740 (Mr. Antonio Santos)
ZEEMS Plane Dili - Suai-Dili	Mr. Carlos Guterres +670 7823 9842 OR +670 7832 5080 Mr. Diogo Ximenes	Back up Medevac & Commercial flight services (crew change)
AERO DILI	+670 7715 8899 Mrs. Emiliana Guterres Marketing Officer	Back up Medevac & Commercial flight services (crew change)
Environment Agency- DNCPIA	Tel: +670 3339119 Tel: +670 7708 7435 (Sra. Amenica Fernandes)	09:00AM – 17:00PM *Difficult to contact, suggest to using 24/7 ANPM-HSE emergency contact*.

6.3.7 Contact Details - Extended Services

Name	Contact Details	Operating Hours	Notes (e.g. Key Holder)
Air Ambulance Services Careflight International (DIL-DRW/SGP)	+61 2 9893 7638 (24/7) General Inquiries (+61) 2 9843 5100 international@careflight.org	Can be in Dili within 3 hours from phone call (2 hours activation, 1-hour flight)	Air Ambulance Services Careflight International (DIL-DRW/SGP)
Medical Air Service Worldwide	+61 2 6145 0119 +65 3163 5446		
TL Australian Embassy	Tel: 332 2111 (office hours only) Tel.: +61 421 269 080 (24/7 hour, sms)	If abroad, 24/7 consular assistance: +61 2 6261 3305	TL Australian Embassy
Federal Insurance Timor S. A	Perosi Su'a (Representative) Tel.: +670 331 0098 Mob.: +670 7770 2337 / 7789 3909	Email: psua777@gmail.com Website: fpiinsurance.com	Federal Insurance Timor S. A
Marsh Pty Energy Package Insurance	Richard Foxall - Managing Principal	+61 8 9289 3803	Policy No. SE 2020 20194 01

6.3.8 Contact Details - National, Local TV & Radio Stations

Radio Station	Name / Role of Contact *(if applicable)*	Contact Details	Alternative Contact Details *	Notes (e.g. Coverage, Frequency)
TV & Radio Timor-Leste	Luis Pinto, Media Coordinator	+670 7723 7635	Info RTTL: 73960050 info@rttlep.tl Info News: infonewstv@rttlep.tl Info Program TV: infoprogramtv@rttlep.tl Info Program Radio: infoprogramradio@rttlep.tl Info New radio: infonewsradio@rttlep.tl Technical Support: techsupport@rttlep.tl Marketing RTTL: marketing@rttlep.tl	09:00AM – 17:00PM
RTTL Media Coordinator in Manufahi	Julio Guterres	+670 77252785	Info RTTL Dili Base: 73960050	24/7
RTTL Media Coordinator in Covalima	Carlito dos Reis	+670 77369891	Info RTTL Dili Base: 73960050	24/7
GMN TV, Journal Diário	Embelina Amaral Media Coordinator	+670 77492089		09:00AM – 17:00PM

PART C – APPENDICES

7 FORMS

FORM 01	**POLLUTION REPORT (POLREP)**	
INITIAL REPORT		
NAME OF PERSON REPORTING:	☐ Individual ☐ Rig Operations ☐ Other Operations: Logistics/Transport/Warehouse	
DATE	TIME:	
LOCATION: REFERENCE POINT:	LAT.	LONG.
PROBABLE SOURCE OF OIL SPILL:		
FOLLOW-UP REPORT		
NAME OF PERSON REPORTING:		
LOCATION OF INCIDENT	LAT.	LONG.
SOURCE OF OIL SPILL		
CAUSE OF OIL SPILL:		
DATE/TIME OF REPORT:		
CONTACTS- PHONE: FAX: EMAIL:		
OIL TYPE OR DESCRIPTION:		
SPILL HAS BEEN CONFIRMED: YES / NO		
NATURE AND EXTENT OF POLLUTION:	☐ CONTAINED ON SITE	☐ OFF SITE
MOVEMENT OF SPILL:		
LEAKAGE STOPPED: YES/NO	WEATHER/WATERCOURSE TYPE: GULLY-STREAM-RIVER-POND-LAKE/RIVER FLOW SPEED:	
SAMPLE TAKEN: YES/NO	BY WHOM:	
PHOTOGRAPHS TAKEN: YES/NO	BY WHOM:	
CONTACTS DETAILS: PHONE: FAX: EMAIL:		
ACTION(S) TAKEN:		
DETAILS OF EQUIPMENT USE:		
ADDITIONAL INFORMATION:		

Form 02	**SPILL ASSESSMENT & REPORT FORM**				
REPORT TO:		DATE:			
FROM:		TIME:			
SPILL INFORMATION					
TIME OF SPILL: AM/PM		QUANTITY OF OIL:			
LOCATION OF SPILL:		QUANTITY IN WATER:			
REASON/CAUSE OF SPILL:		TYPE OF OIL:			
		DESCRIPTION OF SPILLS/SLICKS			
		COLOUR: LENGTH:			
		WIDTH: OTHER:			
ENVIRONMENTAL CONDITIONS					
WIND SPEED:		WIND DIRECTION:			
RIVER STATE:		CURRENT SPEED (Est):			
ACTION TAKEN TO CONTROL SPILL		**LEVEL OF RESPONSE (Tier)** **(E= *Emergency &Immediate Action Required*)**			
		Site/Rig Request:	**E**☐	**1** ☐	**2** ☐	**3** ☐
		IC Confirmed:	**E**☐	**1** ☐	**2** ☐	**3** ☐
		GM Exploration Confirmed:	**E**☐	**1** ☐	**2** ☐	**3** ☐
ENVIRONMENTAL/SOCIAL/SAFETY HAZARDS					
SPECIFIC REQUESTS/COMMENTS					

Form 03	**PRELIMINARY SHORELINE OILING ASSESSMENT**
LOCATION:	REPORTING DETAILS:
MAP (No):	ASSESSMENT BY (Name):
MAP REFERENCE:	POSITION:
Name of Shoreline or Location Description:	DATE: TIME:
	REPORT TO (Name):
	POSITION:
	DATE REC'D: TIME:

REASON FOR ASSESSMENT
(Tick as appropriate)

☐ Public Report	☐ OSCT Request	☐ Known Spill
☐ Exercise Only	☐ Other	

OIL DISTRIBUTION & CHARACTER

Shoreline Type	
Percentage Oil Cover	
Oil Band Width	
Length of shoreline Oiled	
Depth of Oiling	
Surface Oil Thickness	
Appearance	
Debris Present	
Oiled Debris	

DIAGRAM/NOTES

8 RESOURCES AND THIRD-PARTY SUPPORT

8.1 TIER 1 – FACILITY OIL RESPONSE KIT (MINIMUM REQUIREMENT)

6 Absorbent Boom (12cm x 3m)
100 Absorbent Pads (40cm x 50cm)
4 Absorbent Pillows (40cm x 50cm)
2 Oil absorbent poly-roll
2 Pairs Nitrile Gloves
2 Pair Goggles
1 Jar of Plug n Dike
10 Disposable Bags w\Ties
1 Roll barrier/exclusion tape (yellow/black)

8.2 LOCAL/NATIONAL LABOUR AND HEAVY EQUIPMENT/CIVILS CONTRACTORS

1. Contact person: Kris
- Telephone: +670 7740 8888
- Company: Tinolina Unipessoal, Lda Same Operation Base
- Services: General Contractor, Material Supply, Crushed stone, Asphalt Plant, Water Borehole, Heavy Equipment and Transporter
- Address: Rua Fomento III, Dom Aleixo – Comoro Dili, Timor-Leste. Tinolinacomp.lda@gmail.com

2. Contact person: Julio do Carmo
- Telephone: +670 7744 4433
- Company: Maun Alin Suai Unipessoal Lda
- Services: Heavy equipment hire
- Address: Suai Villa, Covalima Municipality, Timor-Leste

3. Contact person: Tomas Madeira Chung
- Telephone: +670 7724 5771
- Company: Unidade Unipessoal Lda
- Services: Heavy equipment hire
- Address: Suai Villa, Covalima Municipality, Timor-Leste

4. Contact person: Zhang Kui
- Telephone: +670 7579 5108
- Company: LZS Mechancis Unipessoal Lda
- Services: Heavy equipment hire
- Address: Suai Villa, Covalima Municipality, Timor-Leste

5. Contact person: Ruy Miguel Lopes
- Telephone: +670 77230883
- Company: EDS Unipessoal, Lda
- Services: Heavy equipment hire and construction
- Address: Camaneca, Suai Villa, Covalima Municipality, Timor-Leste

6. Contact person: Akoli
- Telephone: +670 7657 2888, 7618 7084
- Company: Star King Raw Material industry
- Services: Heavy equipment hire and construction
- Address: Hasai, Mota Raiketan, Covalima Municipality, Timor-Leste

7. Contact person: Bruce Li

- Telephone: +670 7377 1952
- Company: Covec – CRFG Lda
- Services: Heavy equipment hire and construction
- Address: Hasai, Mota Raiketan, Covalima Municipality, Timor-Leste

8. Contact person: Salvador Tilman
- Telephone: +670 7726 1078
- Company: Sacom Construcoes Lda
- Services: Heavy equipment hire
- Address: Asu Inus, Tibar, Bazartete, Liquica Municapility, Timor-Leste

9. Contact person: Erik Stroke
- Telephone: +670 7723 0540
- Company: RMS Unipessoal, Lda
- Services: General Contractor, Material Supply, Crushed stone, Asphalt Plant, Water Borehole, Heavy Equipment and Transporter
- Address: Comoro River Road Dili Timor Leste

8.3 OIL SPILL COMBAT TEAM JAKARTA

In the event of an incident, OSCT can be contacted by telephone: +62 21 31925454.

8.3.1 Types of Onshore Response Equipment

Generator & Working Lights for Night Operations

Multipurpose Power Pack 10 KW

High Temperature Pressure Washer

Oil Absorbents

Aerial Surveillance Slickfly

Onshore Skimmer MiniMax 25

Onshore Compact Boom
MK-2

Fast Flow
Skimmer System

Light
Disc Skimmer

Self-Erecting
Temporary Oil Storage Tank

Nearshore
Disc Skimmer

Vacuum
Skimmer

8.3.2 Memorandum of Understanding with OSCT

MEMORANDUM OF UNDERSTANDING

OIL SPILL COMBAT TEAM INDONESIA

And

TIMOR RESOURCES

Timor Resources

20th April 2021 – 20th April 2022

THIS MEMORANDUM OF UNDERSTANDING is made on the 20th April 2021 between:

1. **OIL SPILL COMBAT TEAM Indonesia (OSCT) existing under the laws of Indonesia and whose principal address is**
   Delta Silicon II Industrial Park F2/1, Lippo Cikarang, Bekasi, West Java, Indonesia
   And
2. **TIMOR RESOURCES (TR)** (TIN: 2003 092 | ACN: 615 768 904) **and whose principal address is**
   Timor Plaza - Suite #303 CBD 3, Comoro, Dili, Timor-Leste

TR and OSCT shall individually be referred to as **"Party"** and collectively as **"Parties"**

WHEREAS The Parties are willing to work together in order to respond to oil spills resulting from TR exploration drilling campaign in Timor Leste Exploration Blocks PSC TL-OT-17-08 and 09, and acknowledge the benefits of mutual cooperation and assistance in their efforts to improve overall capability in preparing for and responding to oil spills in TR's exploration campaign in 2021.

NOW IT IS HEREBY AGREED that:

1. This Memorandum of Understanding shall come into effect from date of the MOU (or a proper date to be agreed) and remain valid until the 20th April 2022 unless early termination in accordance with this MOU or mutually extend by both Parties.

2. With the intent of OSCT providing personnel and equipment to combat an oil spill related to TR Exploration Drilling Operations in Timor-Leste PSC TL-OT-17-08 and 09:

   2.1 OSCT commits to respond to any oil spill incident at TRs request, and to provide expertise, technical and logistical assistance in the event of a major oil spill.

   2.2 The Parties recognise the importance of delivering an efficient and effective response to major oil spills and that the purpose of this agreement is to help facilitate that objective.

2.3 Closely work together and provide the necessary OSR equipment and personnel support in case of an oil spill event, especially Tier 2 and Tier 3 oil spills in the field.

2.4 Such other works or activities by mutual cooperation and assistance to effectively improve overall capability in preparing for and responding to oil spills in Timor Leste.

3. Nothing herein shall constitute any party as a partner or agent of the other and each party shall bear its own costs in connection to its performances herein.

4. Information exchanged under this Memorandum of Understanding will remain confidential except where specifically otherwise agreed:

4.1 Parties agree to maintain the confidentiality of information exchanged under this MOU during a period of MOU and shall only disclose to its officers, directors, employees, advisors, counsel and representative on a need to know basis and shall ensure that such person shall keep in strict confidentiality. The information exchanged shall not be conveyed in any form to a third party without the prior written consent of the Disclosing Parties.

4.2 Information received hereunder may only be used for the purpose of this MOU.

4.3 Information exchanged hereunder shall not be subject to the provisions set forth above in this clause 4, if;

(1) it was in the public domain at the time of disclosure to the receiving Party; or
(2) it was known to the receiving Party at the time of the disclosure; or
(3) it is later received, without confidentiality restrictions, from a third party having a lawful right to disclose it; or
(4) it is required by applicable law, or by a governmental regulations, to be disclosed.

5. Intellectual property including, information, specifications, flowcharts, diagrams, documents, drawings etc. in whatever format together with the copyright in them shall remain the property of the originating party and returned upon request unless specifically otherwise instructed by the disclosing party.

6. Either Party shall be entitled to terminate this Memorandum of Understanding at any time during the term of this MOU by giving thirty (30) days prior written notice to the other Party of its intent to terminate this MOU.

IN WITNESS whereof, the parties herein have executed this Memorandum of Understanding the day and year first above written.

Signed for and on behalf of

TIMOR RESOURCES

By

.....

Name : Luis Pereira
Title : Operations Manager

Witness

.....

Name : Filomeno de Andrade
Title : Country Manager

Signed for and on behalf of
PT. OSCT INDONESIA

By

.....

Name : Hariadi Soeharsono
Title : Director

Witness

.....

Name : Yodi Satya
Title : Operations Director

8.4 WILD WELL CONTROL

In the event of an incident, Wild Well Control can be contacted by telephone: +65

8.4.1 Memorandum of Understanding with Wild Well Control

Memorandum of Understanding April 2021
WELL CONTROL EMERGENCY RESPONSE

OVERVIEW

Wild well Control agrees to support and to respond with the mobilization of equipment as necessary to Timor-Leste's South Coast, in the event of an "Oil Spill Response" or "Well Control" event, for onshore Operator Timor Resources during Q3-Q4 2021.

Wild Well Control commits to respond to any well control events.

Wild Well has been safely preventing and resolving all types of well control events worldwide for 45 years. Wild Well is a reliable, experienced, and accessible well control company trusted by Operators around the globe. With unmatched years of experience, extensive numbers of trained personnel, strategic emergency response locations, and a supreme track record for successfully completed jobs, Wild Well has the resources needed to ensure a timely response to all well control and pressure control events.

Wild Well Equipment in the region:

- Firefighting equipment (pumps, hoses, nozzles, etc.)
- High pressure pumping (cement/frac pumps, etc.)
- Surface pressure control equipment (choke manifolds, pump/flow lines, valves, crosses, tees, chokes, etc.)
- BOPE (blowout preventers, drilling crosses, spacer spools, etc.)
- Diagnostic logging services (noise, temp, caliper, stuck pipe, etc.)
- Wellhead equipment (casing heads, slips, valves, etc.)

Wild Well maintains the largest inventory of well control, firefighting, and special services equipment in the industry. Wild in only a matter of hours the equipment can be mobilized to any part of the world. In addition. Because Wild Well designs, engineers, and fabricates a majority of the specialized well control equipment itself, the history of all of the equipment movements and maintenance have been tracked through an electronic inventory system; ensuring that it is ready at all times for shipment to remote areas in response to a well control emergency.

Blow Out and Well Control Response

Catastrophic well control incidents occur unexpectedly and necessitate immediate emergency response, regardless of time or day. With the world's largest and most experienced staff of Well Control Specialists, Wild Well maintains Blowout & Well Control Response teams on standby at all times – 24 hours a day, 7 days a week, 365 days a year – thus ensuring rapid response to the site of the incident to mitigate uncontrolled fires, well flows, etc., and restore control of the well.

- Well capping
- Well re-heading
- Well-related fire suppression

9 WASTE MANAGEMENT

9.1 WASTE MANAGEMENT STRATEGY

Oil spill clean-up operations, particularly on shore, may result in substantial quantities of oil and oily mixture which must inevitably be dealt with.

The objective of the spill response effort is to remove oil from impacted areas as soon as possible and treat, recycle, or dispose of recovered oily material in the most efficient and environmentally feasible manner. Waste disposal includes in-situ burning, landfill disposal, stabilisation for use in land reclamation or road foundations and destruction through biological processes.

The disposal option chosen will depend upon the amount and type of oil and debris, the location of the spill, environmental and legal considerations, and the likely costs involved. In the case of large spills, it may be necessary to store collected material for some time before it can be dealt with.

Formal and commercial waste management infrastructure in Timor Leste is very limited, and is managed under District Sanitation Departments in Covalima and in Dili where it operates the Tibar waste site. It may be necessary to examine alternative management options. To manage the disposal of oily waste material, TR will:

- Adopt policies and practices during the spill response to minimise the amount of oily waste material generated and collected e.g. the strategy to concentrate spilled oil within specified containment bunds will enable the maximum volume of hydrocarbon to be recovered and transported for use in an electricity generating power plant.
- Pursue the option to conduct insitu burning in the absence of a robust in-country waste management service.
- Adopt clean-up techniques to minimise the amount material collected.
- Discuss options with District Sanitation Departments in Covalima and in Dili.
- Appoint suitably qualified and recognised waste management companies for management, collection, transport, containment, temporary storage and disposal of wastes. Two companies are authorised for handling oily wastes - Caltech General Contracting Lda and Elemloi Lda, and advise the ANPM accordingly.
- Conduct site inspections prior to use and when the site has been rehabilitated.
- Sign off each waste site in consultation with a representative of ANPM.

9.2 PROCEDURE FOR MANAGEMENT OF RECOVERED OILY WASTE

During the oil spill response TR will:

- Where possible, temporary storage facilities should be operated under a system of controlled segregation and inventory (e.g. liquids and solids separated).
- Recovered oil and associated matter that is contained in temporary storage should remain in temporary storage until the appropriate recycling or disposal option has been decided.
- Recycle or dispose of the recovered oil in accordance with consents.

9.3 TYPE AND NATURE OF THE OIL AND OILY DEBRIS

- As a general rule oils that behave as non-persistent oils, such as expected in this programme, will not require collection and disposal as they will dissipate naturally to a large extent and are

amenable to in-situ burning. If the oil can be collected soon after being spilled, it is likely to be fluid and relatively free of contamination and could be used in oil fired power plants.

- Each may require a different method of treatment and disposal. The type and volume of oily waste generated will depend on a number of factors, such as:
  - volume and type of oil spilled
  - environmental conditions (weather, sea state, etc)
  - characteristics of the sites impacted
  - clean up or recovery technique adopted.
- Oil stranded on the shore will normally be associated with quantities of solids and it is often difficult to separate the oil in a form suitable for recycling. Three main types of waste may be collected from the shore:
  - oil mixed with sand, pebbles, cobbles
  - oil mixed with wood, weed or garbage
  - solid tarballs.

9.4 STORAGE

The response strategy discussed previously and presented in detail in Section 12 for each site, is to concentrate the material to allow time for natural processes to take place and to select the appropriate disposal method. In remote areas transportation may not be feasible thus in-situ burning should be considered.

9.4.1 In-Situ Burning

In-situ burning is recognized as a viable alternative for cleaning up oil spills on land and water. It can rapidly reduce the volume of spilled oil and eliminate the need to collect, store, transport, and dispose of recovered oil, and can also shorten the response time to a spill, thus reducing the chances that the spill will spread on the water surface or further into land (Michel 2018).

The intentional ignition of spilled oil on land or wetlands as part of an oil spill response plan is an accepted response tactic to reduce the impacts of oil in these habitats. Burning is often considered when access is limited, to reduce the amount of waste for transport and disposal, when there is a need to quickly remove the oil before it spreads and can affect sensitive resources or when other methods are likely to cause significant adverse impacts to the habitat. Burning is best conducted in habitats that are unvegetated or have grassy vegetation; burning of upland forests, swamps and mangroves is not recommended. It is preferred to have a water layer over the soil or, at a minimum, moist soils, to reduce thermal impacts to roots and tubers. Most crude oils and heavy refined products leave a burn residue that must be removed to reduce impacts to wildlife and speed recovery. Light crude oils and refined products will not leave a burn residue. However, burning will not remove oil that has penetrated into the soils, and these kinds of unburned residues must be removed after the burn.

Burned habitats often recover within 1–2 growing seasons, with exceptions for fire-intolerant vegetation, when the oil was toxic and affected the vegetation before the burn was conducted, very hot burns that damaged the roots, oil that penetrated deep into the soils or for vegetation that was flooded for long periods after the burn (Michel 2018).

9.5 LOGISTIC TRANSPORT

Transport of material to a disposal site can become a major cost item. It is therefore beneficial to reduce the amount of material to be transported by separating oil from water and sand during temporary storage.

9.6 RECOVERY AND TREATMENT

Under some circumstances, it may be possible to recover the oil for eventual processing or blending with fuel oils for electricity generating plants or for use in road materials. This should always be the first option to consider. A possible recipient for processing or blending is the Betano power stations. However, the quality of the material must be good since the plants can only operate with feedstocks meeting a narrow oil specification.

9.7 DISPOSAL

Plastic bags should be regarded as a means of transporting oil material rather than storage, since they tend to deteriorate under the effect of sunlight, releasing their contents. It should also be borne in mind that if the content is ultimately to be treated in some way prior to disposal, it will usually be necessary to empty the bags and dispose of them separately. Wherever dug, pits should be filled in after complete removal of the oil and, as far as possible, the area restored to its original state.

Perhaps the most common disposal route adopted, when recovery of oil is impractical, is dumping in designated landfill sites. The co-disposal of oil and domestic waste is often an acceptable method even though degradation of the oil is likely to be slow due to the lack of oxygen. However, oil appears to remain firmly absorbed by all types of domestic waste with little tendency to leach out.

9.7.1 Stabilisation

An approach that is sometimes applicable is to bind the material with inorganic substance such a quicklime (calcium oxide). This forms an inert product that does not allow the oil to leach out. The stabilised material can be disposed of in road construction where there is not a requirement for high load-bearing properties.

9.7.2 Biodegradation

Oil and oily wastes can sometimes be broken down using biological processes. Biodegradation of oil by microorganisms can only take place at an oil-water interface, so that on land the oil must be mixed with a moist substrate. The rate of degradation depends upon temperature and availability of oxygen and appropriate nutrients, containing nitrogen and phosphorus.

There are a number of products on the market which contain oil degrading bacteria and other microorganisms. Some are intended for direct application to oil on shoreline together with nutrients to support the degradation process. Attempts to use these products in actual spills have met with very little success mainly due to the oil concentrations being too high and the difficulty in maintaining the required nutrient levels on a tidal shoreline. A more recent development which appears promising involves the addition of oil soluble nutrients to accelerate the process of natural degradation. These nutrients are more likely to remain at the oil-water interface rather than become dissolved in the sea.

A more effective approach is to distribute the oil and debris on land set aside for the purpose a technique sometimes referred to as land farming. It may take as long as three years before the bulk of the oil is broken down, although degradation rates can often be increased by regular aeration of the soil and by the addition of fertilisers, such as urea and ammonium phosphate. The method is only likely to be applicable to relatively small spills because of the amount of land required (0.25 hectares for 100 tonnes of oil).

10 CLAIMS, COMPENSATION & INTERNATIONAL REGULATORY FRAMEWORK

10.1 CLAIMS AND COMPENSATION

10.1.1 General Guidance

The "*polluter-pays-principle*" is enshrined in Decree Law No.26/2012 -Environmental General Law which stipulates that "*the cost of measures to prevent, combat, reduce and compensate activities that can have a negative impact on the state of the environment shall be borne by the polluter*". When an oil spill occurs claims for clean-up costs and damages can be brought against the person responsible for the incident and his insurer. Polluter shall be responsible for compensating for damages and losses caused by oil spill incidents. Timor Resources carries pollution insurance - Seepage and Pollution, Clean-up and Contamination.

10.1.2 Claim Process

Claims may arise from damage, loss and costs including:

- Environmental and resources destruction
- Costs of surveying and evaluating to determine damages and losses
- Human loss and health impact
- Public and personal assets
- Costs involving mobilisation of oil spill response equipment
- Facilities and manpower
- Handling of claims and compensation procedures.

Damage assessment should be carried out diligently to provide definitive evidence, thus professional consultancy may be required. Depending on the amount and nature of the claim, the claims report should be broken down into different categories, such as:

- Expense for preventive measures taken and clean up
- Replacement and repair costs
- Economic loss.

Each claim should contain the following particulars:

- The name and address of the claimant and his representative, if any
- The date, the place and specific details relating to the claim
- The type of oil, the clean-up measures taken, and the kind of pollution damage as well as the place where it was experienced
- The amount of the claim.

The Finance and Administration Section provides financial controls for the response, supports contracting and procurement, tracks incident costs, manages claims, and accounts for reimbursements. Therefore, the Section provides tracking of all expenditures and recording of costs for response personnel, equipment and assets. Incidents often involve claims for damage to property, business disruption, or other issues such as health or medical claims.

10.2 TIMOR RESOURCES SEEPAGE AND POLLUTION, CLEAN-UP AND CONTAMINATION INSURANCE

MARSH

Richard Foxall | Managing Principal
Marsh Pty Ltd
ABN 86 004 651 512
225 St Georges Terrace
PERTH WA 6000
GPO Box W2025
PERTH WA 6001
+61 8 9289 3803 Fax +61 8 9289 3880
Richard.Foxall@marsh.com
marsh.com.au

14 December 2020

CERTIFICATE OF CURRENCY
ENERGY PACKAGE INSURANCE

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE HOLDER. IT DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICY. IT IS PROVIDED AS A SUMMARY ONLY OF THE COVER PROVIDED AND IS CURRENT ONLY AT THE DATE OF ISSUE. FOR FULL PARTICULARS, REFERENCE MUST BE MADE TO THE CURRENT POLICY WORDING

NAMED ASSURED
Timor Resources Pty Ltd and/or Autoridade Nacional do Petroleo e Minerais and/or Eastern Drilling Limited.

ASSURED'S ADDRESS
Level 19, 10 Eagle Street, Brisbane, Queensland 4000, Australia

Project Office Address: Timor Plaza, Cbd 3, Suite#303, Comoro, Dili, Timor Leste

POLICY PERIOD
From: 4:00 p.m. on 15 December 2020 Local Standard Time at the address of the Named Insured
To: 4:00 p.m. on 15 December 2021 Local Standard Time at the address of the Named Insured

INSURER

NAME	POLICY NUMBER	REFERENCE NUMBER
Munich Re Syndicate Singapore Pte Ltd and others	SE 2020 20194 01	OFAR/202011/001/003

SITUATION
Onshore Timor Leste

INTEREST INSURED
Section 1 – Property Damage

Section 2 - Operators Extra Expense:
- Section 1A - Control of Well Insurance
- Section 1B - Redrilling / Extra Expense
- Section 1C - Seepage and Pollution, Cleanup and Contamination
- Section 2 - Care, Custody and Control Endorsement

LIMITS OF LIABILITY

Section 1
Any one occurrence per location – As per schedule attached.

Section 2	
In respect of drilling wells, any one Occurrence Combined Single Limit	USD 20,000,000
In respect of all other wells, any one Occurrence Combined Single Limit	USD 20,000,000
Any one occurrence in respect of Care, Custody and Control	USD 2,000,000

Indemnity is subject to the terms and conditions of the Policy, including any applicable Sub-Limit of Liability and Deductible.

In accordance with the ongoing commitment by Marsh to quality management philosophies, this certificate has been verified for accuracy of content by:

Yours faithfully,

Richard Foxall
Managing Principal

.....

Section 1 – Oilfield Property Schedule of Values:

Item	Insured Value	Interest
Cementing Pump Trailer	$290,000	100.00%
BOP	$90,000	100.00%
Frac Tank	$90,000	100.00%
Kobelco Crane 2x	$411,400	100.00%
Komatsu Wheel Loader	$420,282	100.00%
Mini Camp / Sleeper	$69,722	100.00%
Prime Mover	$140,000	100.00%
Rig & Tools	$2,853,269	100.00%
Swabbing Tools	$75,000	100.00%
Tesco Top Drive	$280,000	100.00%
Betano Camp	$125,000	100.00%
Haemono Camp	$65,000	100.00%
	$4,909,673	

11 REFERENCES

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12 DRAINAGE TRAJECTORY ANALYSIS, SENSITIVITY MAPS AND RESPONSE LAYOUT

12.1 OIL SPILL TRAJECTORY ANALYSIS

- The Primary control for Oil Spill is prevention: A Multi Barrier Well Control systems will be used at all times whilst conducting drilling operations.
- Secondary measures include onsite containment and removal of contaminated soil.
- If the spill volumes exceed the capacity to contain onsite a tertiary containment operation will be executed to prevent the spill reaching environmental sensitive or urban areas (High Consequence areas "HCA"). The containment is designed to minimise the area of impact and facilitate removal of contamination.

12.2 SITE SPECIFIC CONTAINMENT PLAN

The design for containment is based on topography and surrounding features. The location containment plan, where appropriate, utilises existing geomorphological features (ridgelines, depressions etc), infrastructure (drains, pondage) and limits the extent of the flow between source and containment.

A conservative approach has been adopted where the full volume of a spill expelled is trapped by the containment strategy. In reality a large proportion (>50%) of the spill will be reduced by evaporation (Section 2.6.2). No reduction in containment volume has been factored for penetration of the spill into the soil profile, and this will be a minor amount in any case (Section 2.6.1).

The methodology has the aim of limiting the area of impact and containing the spill as close to the site as practical and includes a means of diverting surface water away from containment to prevent addition to containment volumes. The decision on berm placement and height is based on the calculation of flow rate and relative to the calculation of Maximum Credible and Worst-Case spill cases.

Natural and man-made structures are used where applicable to reduce the size of berms and increase the speed of construction. In the case of a spill construction will be conducted in a manner which rapidly contains the spill, building the berm perimeter for its full length at a lower level and then increasing the heigh to provide the required capacity.

The Trajectory analysis has used a 5x5m LiDAR Digital Elevation Model ("DEM") to compute drainage direction and catchment areas. The LiDAR has been levelled to ground control points established during the seismic and site topographic surveys.

Once the strategy for berm placement was decided and drafted for each location, the GIS data was transferred to a MOVE ™ 3D modelling package and Geocellular volumes calculated between the DEM, the perimeter berm and the spill surface. Trajectory models are discussed in Section 2.7.

12.3 DATASET, UNCERTAINTY AND LIMITATIONS

The extent of onshore oil spills is determined from a number of primary factors:

Surface Topography

The primary dataset used for the trajectory modelling is a 5x5m Digital Surface Model (DSM) generated from LiDAR acquisition as provided by RDTL. The data has been processed to produce a DSM which reflects not only the ground level but includes tree canopy and buildings etc. With LiDAR data it is possible to produce a Digital Elevation Model (DEM), depicting the true ground elevation, from the raw data

automatically in areas less than ~90% canopy cover (subject to LiDAR point density), or manually for buildings or in areas of dense cover. Since Timor Resources does not have access to raw LiDAR data to reprocess to DEM this is a data limitation.

Quantification of evaporation rates

This is primarily a function of the physical and chemical characteristics of the oil, surface area and depth of free oil, depth of soil penetration linked to soil characteristics. The most likely oil to be recovered is low sulphur with a density of approximately 35° API, calculated from analysis of non-biodegraded recoveries of oils from seeps and previous wells. This oil is similar in properties to blended diesel fuel for which several published models are available. Evaporation rate for diesel at the oil/air interface can result in a reduction of 50% by evaporation in approximately 3 days (Fingas 2011), dependent on surface area and depth. The initial evaporation rate is rapid and then declines as more light Carbon chains have evaporated and the oil becomes heavier. Evaporation rates of oil that has penetrated the ground surface is generally slower and is also a function of the depth of penetration and type of soil, particularly porosity (Uzoije et al 2011).

Data limitations for evaporation dispersion modelling are related to the resolution of the DSM, particularly in flatter terrain, sparse regional soil profile data and uncertainty in relationship with:

- Depth of Soil Penetration. Soil type, permeability, depth of vadose zone etc
- Biodegradation, introduce soil from Weimarok or other perennial seeps that contain oil microbes to accelerate process.

12.4 RUSA-1

The Rusa-1 Well site (Figure 12-1) is located on the western side of the Caraulun River in Suco Foho-Ai-Lico, the village of Sesurai is to the east of the river. The upstream catchment area for surface water run-off is relatively large (311,311m2) and is naturally directed around the well site by two bounding gullies with a confluence to the southwest. The areas surrounding the well site are a mixture of naturally wooded and plantation trees, to the west and southwest are a number of habitations that are intermittently occupied for the purpose of tending crops.

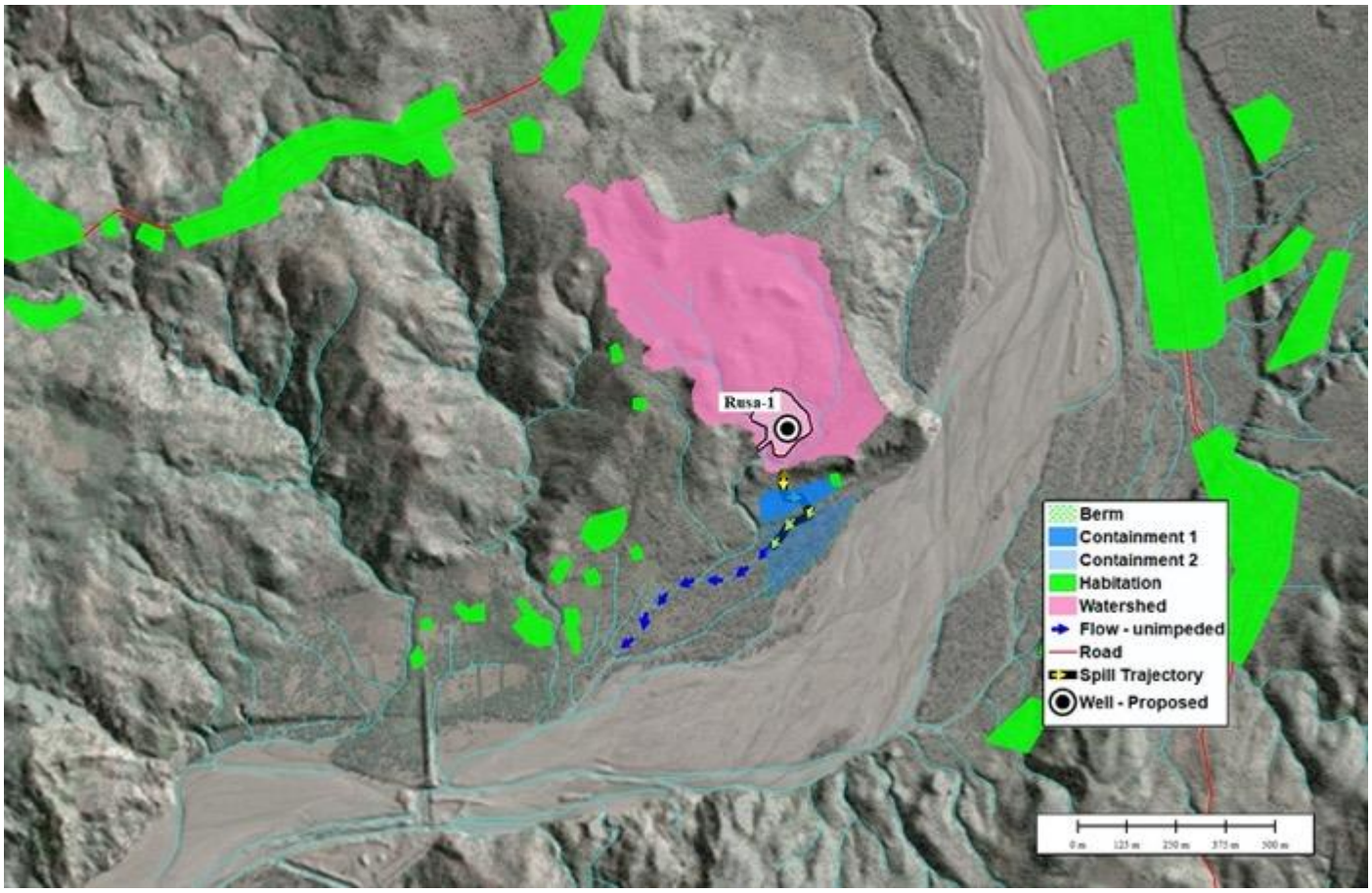

Figure 12-1: Rusa-1 Location

From G&G studies, the most likely unassisted flow rates are expected to be less than 1258 bbl/day (200m^3/day), however the rates could be as high as 2,516bbl/day (400m^3/day) if they exceed this expectation.

The planning has considered the surrounding area that may be impacted in the unlikely event of a significant Oil Spill, including:

- • Environmentally Sensitive areas identified with primary woodland, wetland, and lagoons close to the shoreline. Important flora and fauna habitats, especially bird and crocodile.
- • Areas of moderate population density where impact of spill is detrimental and may require temporary accommodation.
- • Irrigation areas where flat lying land and irrigation channels would spread the oil over significant area with reduced means of control.

Based on spill trajectory analysis the most significant features are the Caraulun River, where the flow path enters 1.04km from the well site, and an intermittently occupied house to the south at the limit of a planned containment area. The watershed catchment for rainfall and surface rainfall is relatively large so potential commingling of water and oil in a rainfall event needs to be avoided to prevent overflow of oil in containment berms.

The containment plan (Figure 12-2) is therefore designed to:

Construct berms that prevent a potential spill entering the Caraulun River, this has been achieved by diverting the flow from the rig over the southern bounding gully (natural watercourse) and the placement of berms on an upper and lower natural terrace downstream of the site. The initial containment will be to the upper containment and then spill over, via a berm top pipe to the lower containment.

Avoid, if possible, damage to the dwelling on the eastern edge of the upper containment from encroaching oil. A detailed topographic survey has been conducted for the area but, due to Covid-19 travel restrictions, the accurate benchmark elevations are to be acquired. Once the benchmarks are established prior to drilling the berm height will be programmed so as to prevent damage to the dwelling. A compensation agreement will be established, prior to drilling, in the case of damage to the dwelling or crops.

The flow from the well site will be diverted at the southern boundary and over the gully towards containment booms via an elevated pipe or culvert. Subject to final design this will either be constructed prior to drilling or material prepared for rapid installation.

To reduce the impact of an unintentional release the spill is to be contained as quickly as possible and as close to the well site as possible.

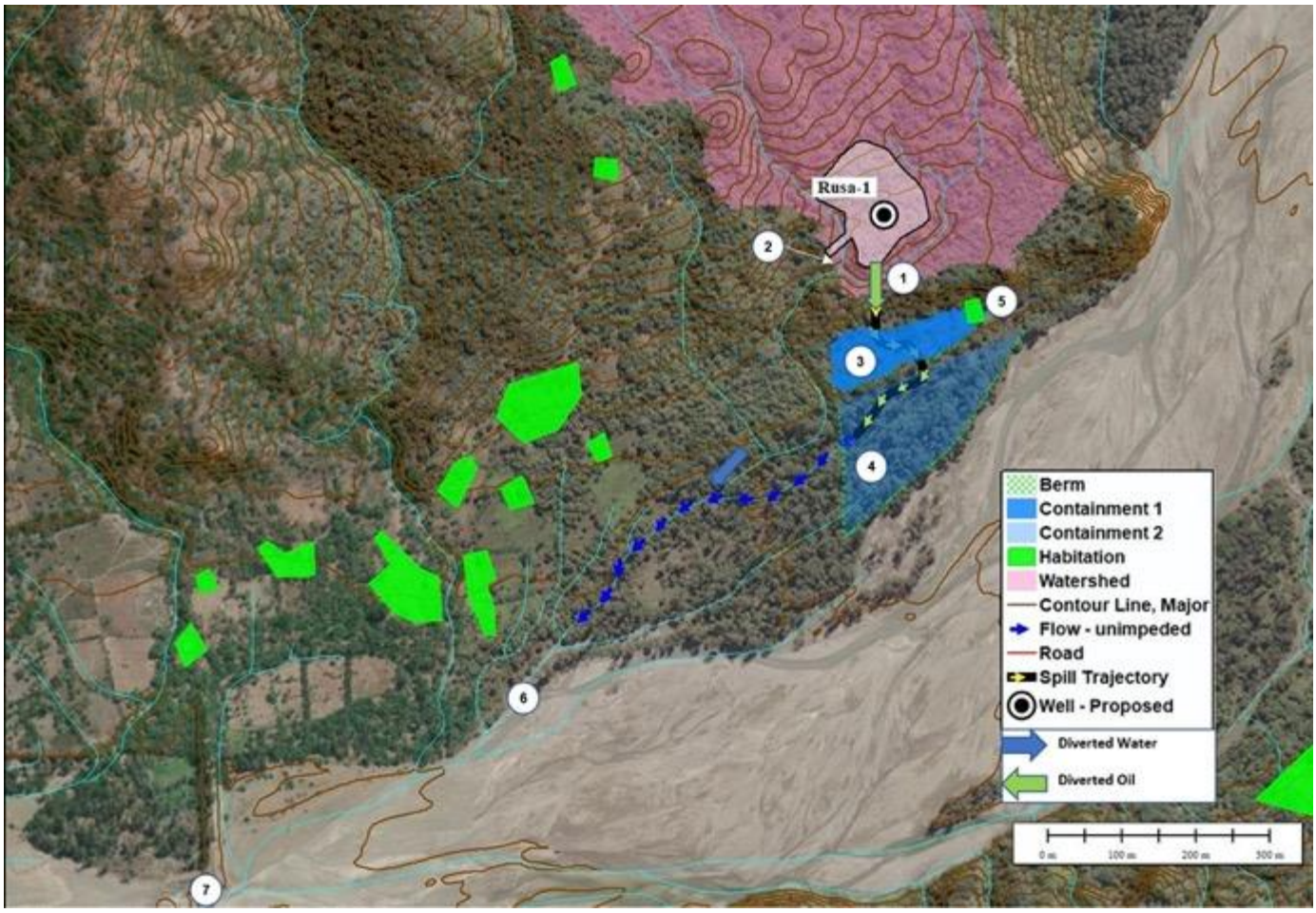

Figure 12-2: Rusa-1 Spill Trajectory Analysis and Containment.

Key to numbered control points in Figure 12-2 :

[1] Spill trajectory from Pollution Control Pit gate valve on the southern perimeter of well site, the outflow is diverted across the natural drainage course towards the upper containment area.

[2] The point of confluence of two watercourses that drain surface run-off water to the Caraulun River, these will not be diverted, allowing natural flow to bypass the spill containment.

[3] The upper berm construction will provide containment of Maximum Credible Spill. This containment will also be constructed as the first stage of control for a worst-case spill.

[4] A lower containment area will be constructed after or concurrently with the upper containment in the event of a worst-case spill.

[5] Intermittently occupied dwelling at the edge of the upper containment area.

[6] The point at which the natural surface water run-off enters the Caraulun River.

[7] Caraulun River irrigation dam.

Given the very conservative approach to not consider evaporation, biodegradation and other volume reducing processes, actual berm heights could be reduced.

In the event of a spill the following procedure will be activated:

- Close PCP gates to contain spill to site.
- Assess spill rate if flow is continuous.
- Initiate construction of Maximum Credible Spill case berm.
- Open PCP gate and divert spill flow to the upper containment, via the diversion pipe/culvert.
- If necessary, start construction of the Worst-Case lower berms based on spill rate (this may be done concurrently with construction of upper containment).

The calculated rates and volumes are provided in Table 12-1 , Worst and Maximum Credible case volumes are shown pictorially in Figure 12-3 .

Table 12-1: Rusa-1 Containment Volumes

	Days	Rate (m^3/day)	Rate (bbl/day)	Total Vol (m^3)	Total Vol (bbl)	Berm (m^3)	Berm (bbl)	Max. Berm Ht (mm)
Worst Case Spill	90	400	2,516	36,000	226,440	36,295	228,296	2,900
Maximum Credible Spill	30	200	1,258	6,000	37,740	9,377	58,981	1,400
Onsite Containment				950	5,976			

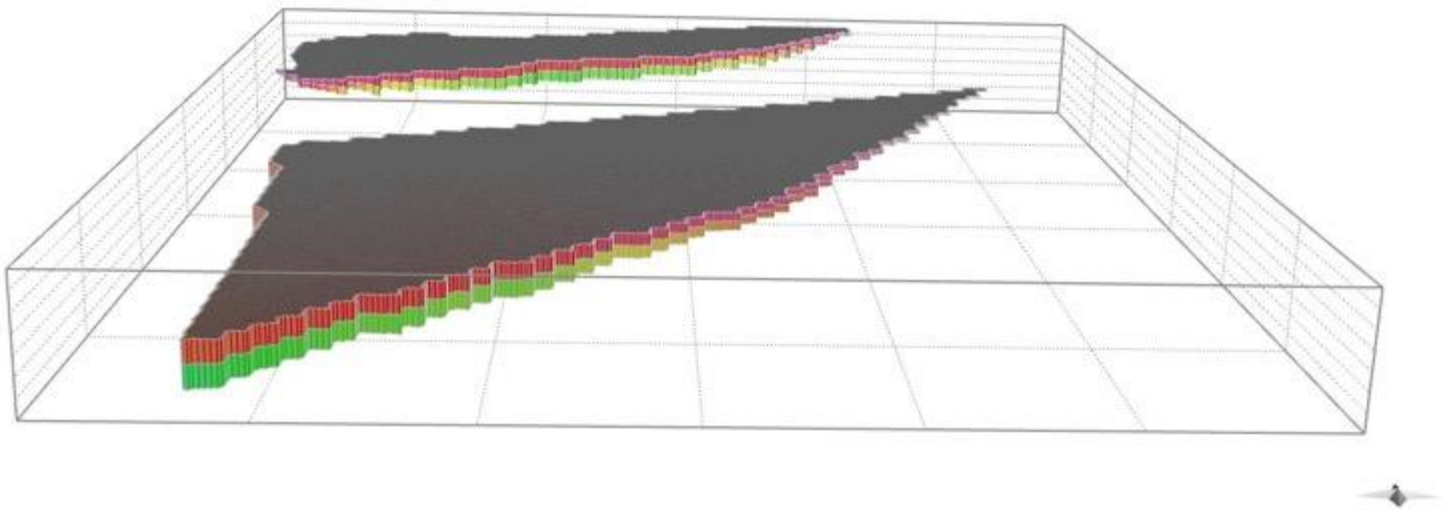

Figure 12-3: Rusa-1 Maximum Credible and Worst Case Geocellular Volumes

The time to construct the berms (Table 12-2) is calculated from a Civil Engineers estimate of 800m/hr for an initial 1m high berm, with rate reduces proportionally for increase in height. The time calculated is based on maximum berm height so is conservative as the actual height will taper to 300mm at the top of the containment. The time to construct the Worst-Case containment (20.83 days) assumes that the Maximum Credible Case containment is constructed first with a spill point to this lower containment. Also tabulated are the volume safety factors for no evaporation and evaporation cases.

Table 12-2: Berm Construction Time and Safety Factors

	No Evaporation Safety Factor (%)	Safety Factor with 50% Evaporation (%)	Time to fill onsite (days)	Time to fill onsite (hours)	Berm Length (m)	Time to construct Berm (hr)*	Time to construct Berm (days)*	Time required after start of spill to commence berm construction (days)
Worst Case Spill	1%	102%	25.8*	620	565	8.19	0.34	20.75
Maximum Credible Spill	56%	213%	4.8	114	273	0.48	0.02	4.73

Notes:
*includes Max. Credible Spill Containment
WCS - Worst Case Spill
MCS - Maximum Credible Spill
*800m/hr to construct based on 1m berm; 1 hour dozer, 30min grader. Grader starts 45 min after dozer. Adjusted for berm height, half speed if >2000mm berm)