AUSTRALIAN DRILLING ASSOCIATES

BASS STRAIT CONSORTIUM

OIL SPILL CONTINGENCY PLAN

2008/09

Rev 2

Issue Date	Rev	Description	Prepared By:	Reviewed By:	Approved By	Approved for use Date:
15/1/08	**A**	Initial issue	K Reeks	**D Parker**	**P Barrett**	**N/A**
3/2/08	**B**	Initial issue + Minor Updates	K Reeks	**D Parker**	**P Barrett**	**N/A**
22/2/08	**0**	Minor Updates	K Reeks	**D Parker**	**P Barrett**	**22/2/08**
17/3/08	**1**	Inclusion of Appendix 10	K Reeks	**D Parker**	**P Barrett**	**17/3/08**
4/7/08	**2**	Inclusion of Tasmanian Information	J Ang	**K Reeks**	**P Barrett**	**12/7/08**

Table of Contents

1. INTRODUCTION 10
1.1 OSCP Philosophy 11
1.1.1 OSCP Principals 11
1.2 Structure of OSCP 12
1.3 Scope of OSCP 13
1.4 OSCP Aim and Objectives 13
1.5 Priorities 13
1.5.1 Geographical Limitations of this OSCP 14
1.5.2 Scale of Incident 14
1.5.3 Types of Oil 15
1.6 Integration with other Plans 15
1.7 Compliance with Pollution Control Regulations 16
1.8 Responsibilities of ADA and Contractors 16
1.9 OSCP Authority 17
2. PART 2 – PLANNING AND PREPARATION 18
2.1 Purpose of Planning and Preparation 18
2.2 ADA Response Organisation 18
2.3 BSC Permit Holder Emergency Management Team 18
2.4 ADA Emergency Response Group 18
2.4.1 Responsibilities of the BSC and Contractor Companies 19
2.5 Statutory Incident Reporting 19
2.5.1 Reportable Incidents 19
2.5.2 Reporting Recordable Incidents 19
2.5.3 Written Report of Reportable Incidents 20
2.6 Division of Responsibility 20
2.7 State Organisations 21
2.7.1 Department of Primary Industries and Department of Infrastructure, Energy and Resources 21
2.7.2 Tasmanian Marine Oil Spill Contingency Plan (TasPlan) 22
2.7.3 VicPlan 23
2.7.4 VicPlan-MPCP 23
2.8 Regional Organisation 23
2.9 BSC Arrangements 23
2.10 Industry Arrangement 23
2.11 National Arrangements 24
2.12 Oil Spill Classifications - Levels of Response 24
2.13 Responsibility for Determining Response Level 25
2.14 Oil Spill Risk Assessment 28
2.14.1 OSRA Oil Spill Prevention and Control Measures 28
2.14.2 Environmental Maps and Charts 29
2.15 Oil Spill Trajectory Modelling 29
2.16 Conduct of Environmental Impact Assessment 30
2.16.1 Oil Spill Exposure Assessment 30
2.16.2 Methodology 31
2.16.3 Community Consultation 31
3. PART 3: RESPONSE (MITIGATION) 33
3.1 Purpose of Response 33
3.2 Mitigation Philosophy and Priorities 33

3.2.1 Health and Safety ... 33
3.2.2 Primary Response Guidelines ... 34
3.2.3 Primary Response Strategy ... 34
3.3 Reporting an Oil Spill ... 34
3.3.1 Internal Reporting Requirements ... 34
3.3.2 Government Reporting Requirements ... 36
3.4 Immediate Actions ... 36
3.4.1 Call-Out Protocols ... 36
3.4.2 ADA Response Team Personnel ... 36
3.5 Spill Monitoring ... 37
3.5.1 Observation from Vessels/Barge ... 38
3.5.2 Aerial Survey of Oil on Shorelines ... 38
3.6 Monitoring - Natural Processes ... 38
3.7 Slick Trajectory ... 39
3.7.1 Method ... 39
3.7.2 Determine Resource Needs ... 40
3.8 Use of Dispersants ... 41
3.8.1 Considerations ... 41
3.8.2 Constraints ... 41
3.8.3 Dispersant Application Methods ... 41
3.9 Shoreline Protection ... 45
3.9.1 Protection Priorities ... 45
3.9.2 Shoreline Assessment ... 46
3.9.3 Shoreline Cleanup Strategies ... 46
3.10 Onsite Waste Storage ... 48
3.10.1 Temporary Onsite Waste Storage ... 48
3.10.2 Waste Management Responsibility ... 49
3.10.3 Procedures and Priorities ... 49
3.10.4 Waste Management Plan ... 49
3.10.5 Segregation of Wastes ... 49
3.10.6 Onsite Handling ... 50
3.10.7 Offsite Transport and Storage of Waste ... 51
3.10.8 Waste Separation ... 51
3.10.9 Waste Disposal ... 51
3.10.10 Waste Management Logistics ... 52
3.10.11 Logistics Protocols ... 52
3.10.12 Equipment and Personnel ... 52
3.10.13 Personal Protection Equipment ... 53
3.10.14 Transport ... 53
3.10.15 Medical Services ... 53
3.10.16 Communications ... 53
3.11 Wildlife Response ... 53
3.12 Obtaining Additional Equipment, Supplies and Manpower ... 54
3.12.1 International Equipment ... 54
3.12.2 Assistance and Action Requested at Airport ... 54
4. PART 4: RECOVERY ... 55
4.1 Purpose ... 55
4.2 Scope ... 55
4.3 Termination of the Primary Spill Response ... 55
4.3.1 Tier 1 Incident Control ... 55
4.3.2 Tier 2/3 Incident Control ... 55

4.4 Stand-Down Procedures 56
4.4.1 Deciding Final and Optimal Shoreline Cleanup Strategy 56
4.4.2 Marine and Aviation Response 56
4.4.3 Shoreline Response 56
4.4.4 Incident Control 57
4.4.5 Written Report 57
4.4.6 End of Emergency Checklist 57
4.4.7 Incident Debrief 58
4.4.8 Incident Investigation 58
APPENDIX 1: BSC CONTACT DIRECTORY 59
APPENDIX 2: OSCP ROLES/RESPONSIBILITIES 60
APPENDIX 3: SUMMARY ENVIRONMENTAL INFORMATION 61
APPENDIX 4: RESPONSE EQUIPMENT 62
APPENDIX 5: OIL BEHAVIOUR AND CHARACTERISTICS 63
APPENDIX 6: SPILL TRAJECTORY MODELLING 64
APPENDIX 7: RIG AND VESSEL SPECIFICATIONS 65
APPENDIX 8: PERMIT SPECIFIC SPILL RESPONSE 66
APPENDIX 9: MATERIAL SAFETY DATA SHEETS 67
APPENDIX 10: OIL SAMPLING AND HANDLING PROCEDURES 68

Preface

This Bass Strait Consortium (BSC) Oil Spill Contingency Plan (OSCP) covers all offshore activities associated with ADA managed BSC drilling campaigns in Bass Strait for 2008/09.

The OSCP outlines the steps required for the management of responses to marine oil spills up to and including Tier 1 spills that are the responsibility of the respective Permit Holders being represented under the BSC by ADA. The OSCP complements the ADA Bass Strait Drilling Emergency Response Plan (ERP).

The ERP is to be referred to for any spills of hazardous materials or for spills accompanied by other emergencies. This document is to be read in conjunction with the Victorian Marine Oil Pollution Emergency Management Plan.

Document Control

DOCUMENT DETAILS			
Document Title:	Bass Strait Consortium Oil Spill Contingency Plan		
Document No.:	CEM-ERM-002	**Authorised By:**	ADA Operations Manager

CONTROLLED COPY DISTRIBUTION LIST			
OSCP	**Name or Location**	**Organisation**	**Issue Date**
Initial Response*	**Name or Location**	**Organisation**	

The OSCP Custodian is responsible for ensuring the Plan is revised and accepted by DPI before commencement of any offshore activities. The Custodian is also responsible for reviewing the Environmental Plan to ensure compliance with ADA requirements.

BSC OSCP TRANSMITTAL RECEIPT

This form is to be completed by each recipient of the accompanying ADA/BSC Oil Spill Contingency Plan (OSCP). Please remove this form from this document, complete the details and return to the ADA OSCP Custodian, within seven (7) days of receipt:

ADA Drilling Superintendent (OSCP Custodian)

Ph: (03) 8610 3000 / Fx: (03) 8610 3030

Level 5, Rialto Nth Tower

525 Collins St, Melbourne, Vic 3000

Australia

Note #1: The recipient acknowledges receipt of the ADA/BSC OSCP:

The recipient has read the document and understands both his/her responsibilities and obligations, in the event of an emergency and understands the responsibility for ensuring that all amendments to the OSCP which may subsequently be supplied are incorporated into the OSCP as soon as possible.

Note #2: The ADA/BSC OSCP is a **confidential and controlled document** and should not be given, either in whole or part, to unauthorised personnel without the written consent of the ADA ERG Leader.

Recipient:

Name: _____

Position: _____

Address: _____

Telephone: Office: _____ Home: _____ Fax: _____

E-mail: _____

Signature: _____ Date: _____ Day _____ Month _____ Year

THIS PAGE INTENTIONALLY LEFT BLANK

Abbreviations

Term	Description
AC	Aviation Coordinator
ADIOS	Automated Data Inquiry for Oil Spills (oil weathering model developed by NOAA)
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
BSC	Bass Strait Consortium
CA	Combat Agency
CC	Communications Coordinator
CLO	Community Liaison Officer
DEP	Department of Environment Protection
DEPHA	Department of Environment, Parks, Heritage and the Arts
DEWHA	Department of Environment and Heritage (includes former EA)
DIER (TAS)	Department of Infrastructure, Energy and Resources (Tasmanian)
DITR	Commonwealth Dept. Industry, Tourism and Resources
DPI	Department of Primary Industries (Victorian DA)
DPIW	Department of Primary Industries and Water
DSV	Drilling Supervisor
E&P	Exploration and Production
EA	Environment Australia (has changed to DEH)
EARL	East Asia Response (Private) Limited (Singapore)
EIA	Environmental Impact Assessment
EMA	Emergency Management Australia
EMT	(Client) Emergency Management Team
EPA	Environment Protection Authority
EPG	Environment Protection Group (AMSA)
ERG	ADA Emergency Response Group
ERGL	(ADA) Emergency Response Group Leader
ERR	Emergency Response Room
ESC	Environmental and Scientific Coordinator
HFO	Heavy Fuel Oil
IAP	Incident Action Plan
IC	Incident Controller
ICC	Incident Control Centre
IMT	Incident Management Team
IPIECA	International Petroleum Industry Environmental Conservation Association
LCA	Lead Combat Agency
LO	Logistics Officer
MAC	Mutual Aid Contact (AMOSPlan term)
MAST	Marine and Safety Tasmania
MC	Marine Coordinator
MLC	Materials and Logistics Coordinator
MLO	Media Liaison Officer
MLU	Media Liaison Unit
MOC	Marine Operations Coordinator
MODU	Mobile Offshore Drilling Unit
MPC	Marine Pollution Coordinator
MPCP	Marine Pollution Contingency Plan

Term	Description
MRCC	Maritime Rescue Coordination Centre
MSDS	Materials Safety Data Sheet
MSV	Marine Safe Victoria
NATPLAN	National Plan
NOPSA	National Offshore Petroleum Safety Authority
NPMC	National Plan Management Committee
NPOG	National Plan Operations Group
NRT	National Response Team
OH&S	Occupational Health and Safety
OHS C	Occupational Health and Safety Coordinator
OIM	Offshore Installation Manager
OO	Operations Officer
OSCP	Oil Spill Contingency Plan
OSRA	Oil Spill Response Atlas
OSTM	Oil Spill Trajectory Model
P&I Club	Protection and Indemnity Club
PIC	Person In Charge
PO	Planning Officer
POLREP	Pollution Report
POWBONS	Pollution of Waters by Oil and Noxious Substances Act
QHSE	Quality, Health, Safety and Environment
SA	Statutory Agency
SAR	Search and Rescue
SC	Shoreline Coordinator
SITREP	Situation Report
SSO	Site Safety Officer

1. Introduction

This OSCP has been developed for the drilling and associated operations of the Bass Strait Consortium (BSC) 2008/09 drilling campaigns being managed by ADA for activities in the Gippsland, Otway and Bass Basins of Bass Strait. The OSCP outlines the measures required for the appropriate management of any marine oil spill that may occur as a result of the campaign.

Figure 1: Gippsland Basin Campaign Area

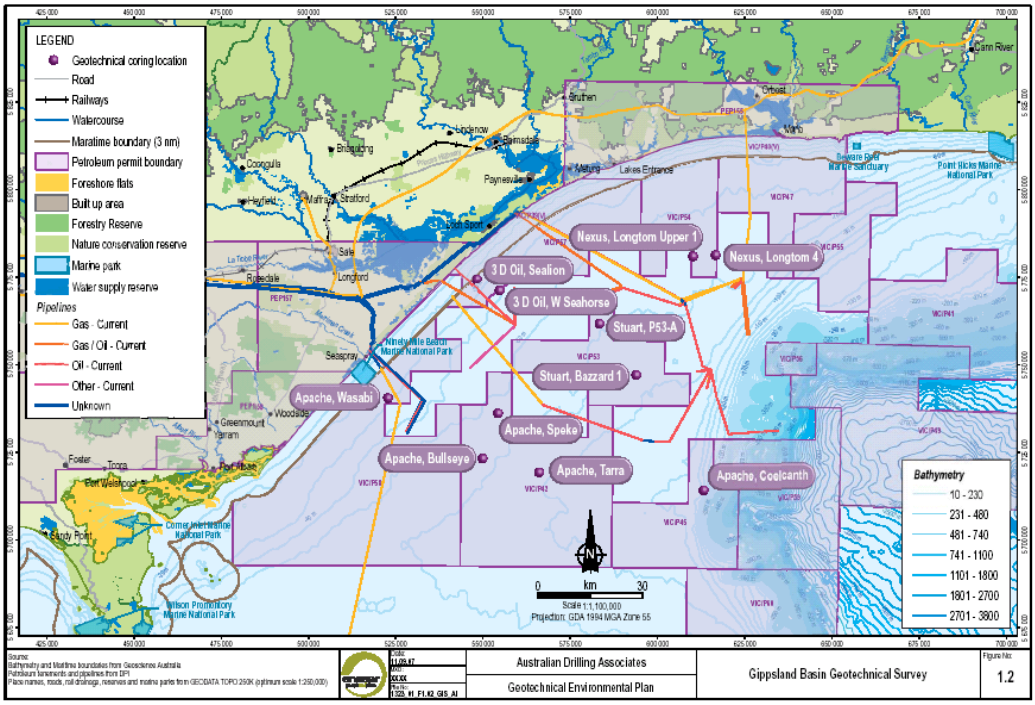


Figure 2: Otway Basin Campaign Area

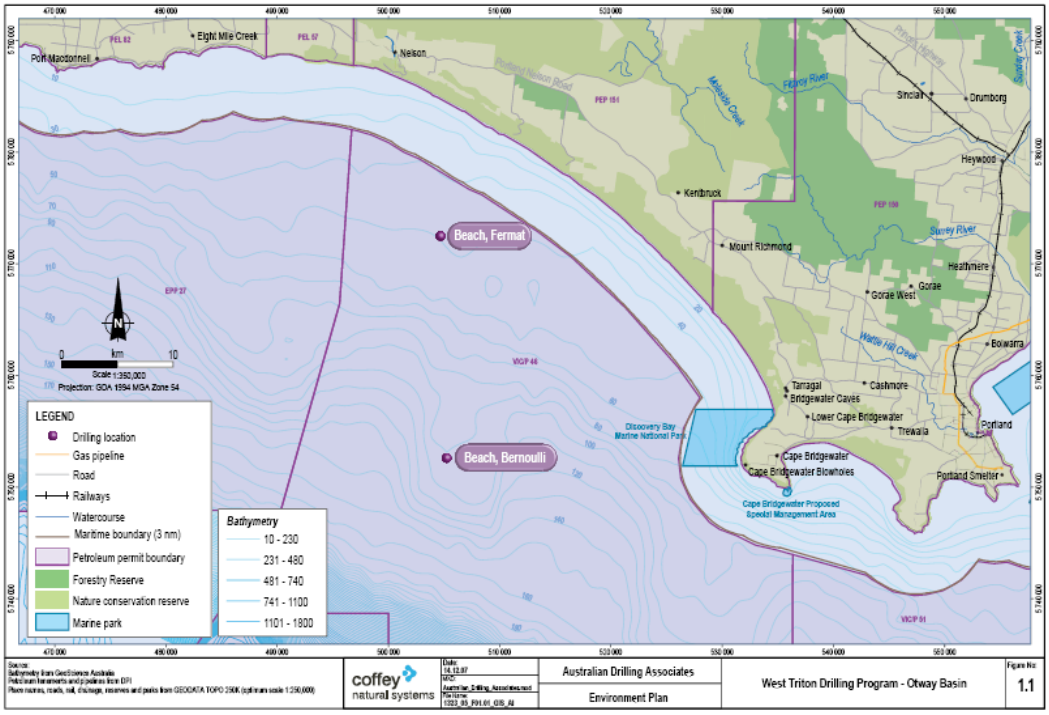
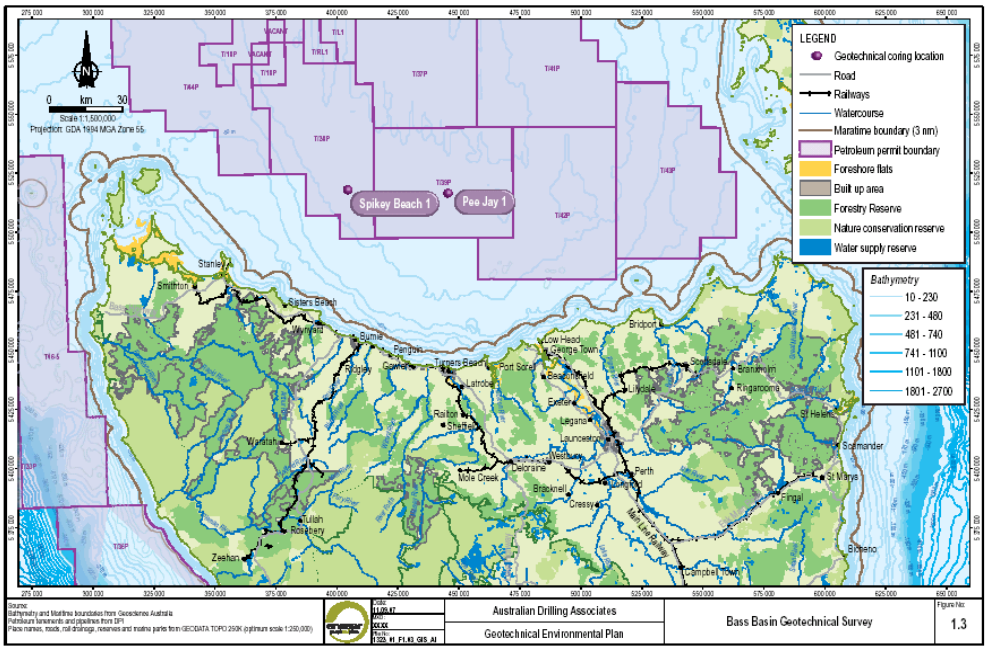


Figure 3: Bass Basin Campaign Area



1.1 OSCP Philosophy

The OSCP is an integral plan identifying the preparation for, response to and recovery from any potential campaign oil spill incidents. Relevant interfaces with vessels contracted for the BSC campaign are identified in the OSCP.

Training and emergency drills for such incidents will be undertaken onboard the rig, vessels and as appropriate at onshore locations with appropriate support teams. Both the rig and all contracted vessels are required to present their OSCP's to ADA for review as part of the prerequisites for finalizing contracts with rig and vessel providers.

1.1.1 OSCP Principals

The philosophy of this OSCP is based on three principles which are demonstrated in Figure 4, these principals are:

1. Prepare for (i.e. Preparation - Prevention);
2. Respond to, and appropriately manage (i.e. Mitigation); and
3. Recover from an unintended oil spill associated to the BSC campaign.

Figure 4: Emergency Management Cycle

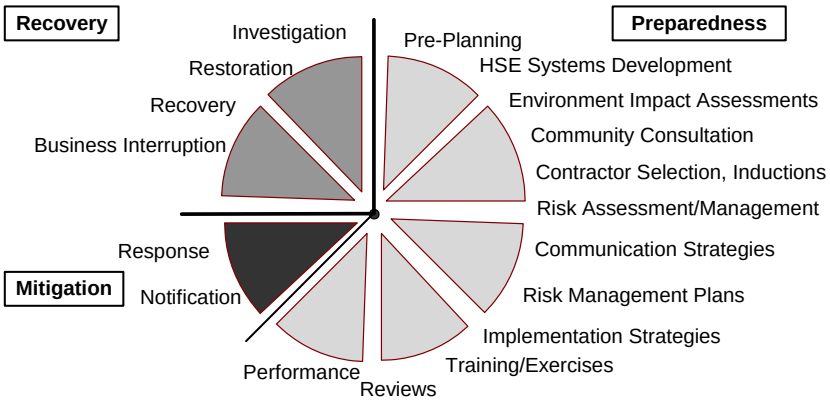
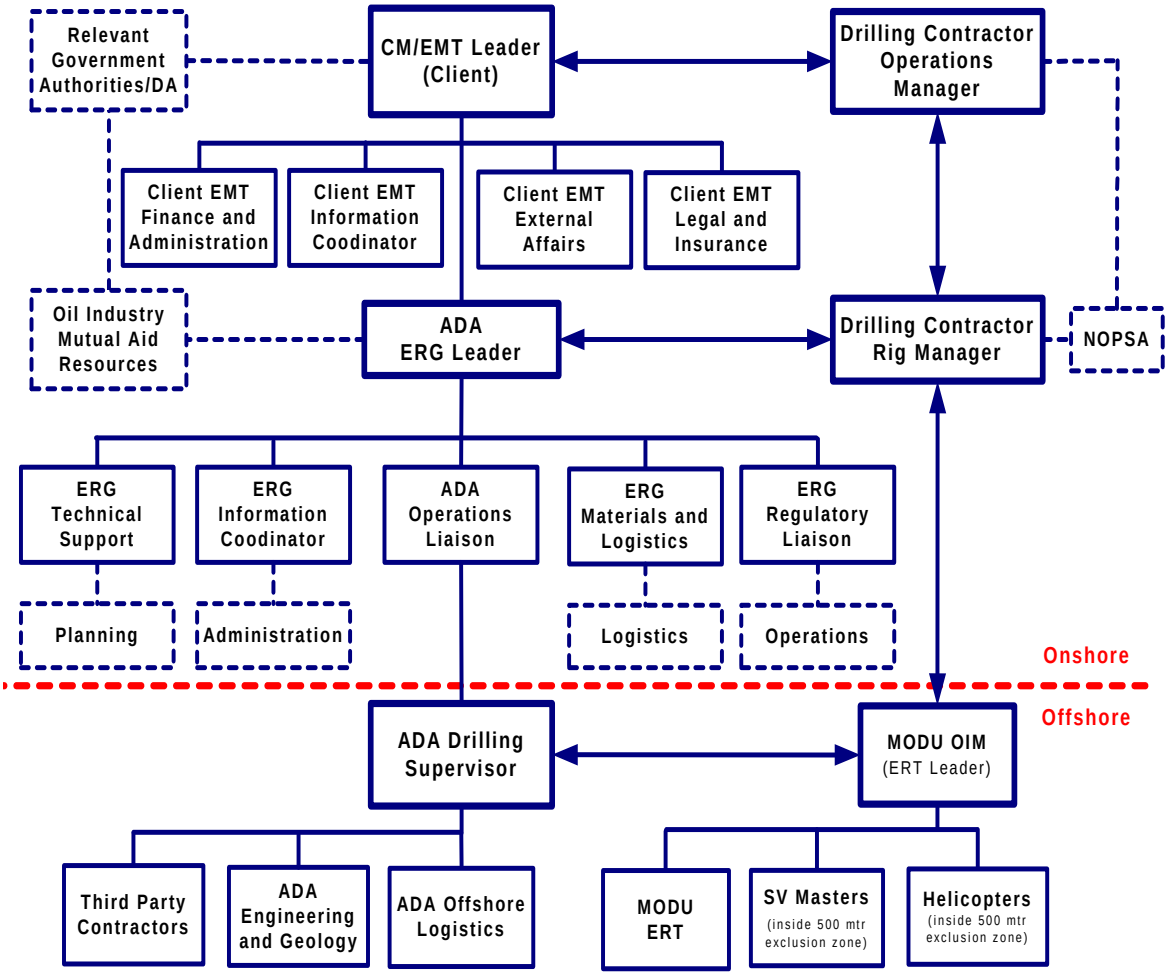


Figure 5: Organisation of BSC Client/ADA Tier 1 Spill Response Management



1.2 Structure of OSCP

The OSCP is divided into five core parts:

- **Part 1 - Introduction (this Section):** which provides a general overview of the BSC campaign and details the structure and use of the Plan, its scope, ADA responsibilities, regulatory considerations and essential information in the form of quick-reference flow charts and figures;
- **Part 2 - Preparation:** details the activities undertaken during the preparation and prevention phases to ensure the BSC has in place methodologies to actively prevent an oil spill occurring prior to the drilling campaign commencing, these include (but are not limited to):
  - Development of an Environmental Impact Assessment (EIA) to understand the potential impacts of an oil spill;
  - Conduct of oil spill trajectory modelling and an oil spill risk assessment;
  - Community consultation with local communities, fisheries and industry and establishment and development of relevant interfaces;
  - Conduct of the approvals and compliance process;

  - Establishment of interfaces with the relevant Government response arrangements and agencies and the ADA response organisation.

- **Part 3 Response:** details the BSC response and mitigation actions to be taken in the event an oil spill should occur and identifies activities to be conducted during the initial response including the appropriate interface and handover to the relevant spill response regulatory authorities;
- **Part 4 Recovery:** details the actions to be taken during the recovery phase of a BSC oil spill response;
- **Part 5 Appendices:** provides the supporting data including report proformas, document templates and response support information.

1.3 Scope of OSCP

This OSCP has been developed to address potential oil spills associated with offshore exploration drilling and associated activities undertaken by ADA on behalf of multiple clients. The OSCP will be updated as the BSC campaign progresses and will incorporate production related activities as required. The activities covered by the current OSCP include:

- Pre-Drilling, mobilisation and demobilisation activities of the MODU;
- Well drilling, completions by the MODU and associated activities;
- Supply vessels and anchor handling tugs and other associated vessel activities.

All well sites are defined as under the management control of ADA, however, prime contractors are responsible for the development of their own OSCPs, which must meet the requirements of the BSC OSCP and will be reviewed by ADA for compliance.

1.4 OSCP Aim and Objectives

Aim: To minimise the effect of a marine oil pollution incident, resulting from BSC offshore drilling operations, through the implementation of appropriate planning and rapid, effective and appropriate response activities.

Objectives:

- To ensure ADA responds according to the priorities set in Section 1.5 or by the external Incident Controller during a response;
- Ensure procedures used by ADA are consistent with those used by Victorian, Tasmanian and Commonwealth agencies as detailed in the Victorian Marine Oil Pollution Emergency Management Plan, TasPlan and the National Marine OSCP;
- Clarify requirements and ensure a full and effective integration with and utilisation of industry and government response efforts and resources;
- Identify protection and cleanup priorities;
- Protect the interests of the BSC and ADA (through the above points).

1.5 Priorities

The priorities for any oil spill response guided by this OSCP are:

- **Oil Spill Prevention:** ADA's first priority is the prevention of oil spills with activities designed and operated to minimise the possibility of accidental discharges of any spill

substance to the environment. Contractor activities are also required to meet international and BSC pollution prevention, design and operational standards;

- **Human Health and Safety:** In all spill prevention and response activities the safety of employees, contractors and the community will have the highest priority;
- **Preservation of the Environment:** If an oil spill has occurred into the marine environment as a result of BSC activities, ADA and relevant BSC Permit Holder will assess the potential impact on sensitive environments and initiate appropriate control activities such as the use of chemical dispersants.

  If the spill is small, or poses no threat to sensitive environments, then active dissipation may not be necessary and the oil may be allowed to naturally disperse. Environmental sensitivities are further discussed in the BSC Environment Impact Assessment (EIA);
- **Protection of Coastal Shoreline:** In the event that shorelines are threatened by an oil spill, and containment and recovery methods are ineffective or cannot be used, ADA/client will work with the relevant regulatory authorities to endeavour to protect shorelines from any impact by oil.

  Priority will be given to shorelines identified as being of particular sensitivity. If shorelines are impacted by oil, ADA will initiate the cleanup of oil in a manner that is effective, efficient and designed to minimize damage from either oil or cleanup activities.

  Shoreline cleanup will be undertaken in full consultation with relevant BSC Permit Holder, community groups and Authorities.
- **Minimise Impacts on Commercial Interests:** ADA will ensure strategies are in place to minimise the potential impact on the integrity of local commercial interests (aquatic related industries, local industries, recreational boating, professional fishing other facilities etc.) as well as the BSC's commercial interests in all spill response actions;
- **Reporting:** ADA, on behalf of the operators, will report any oil spills in accordance with statutory requirement to report any oil spill to the Designated Authority. All spills of any size also require in-house ADA reporting.

1.5.1 Geographical Limitations of this OSCP

This OSCP covers all activities undertaken by ADA on behalf of the BSC within all permit areas and transit routes for Support Vessels for Tier 1 spills. Other geographical parameters for Tier 2 or greater spills will be as directed by the designated Lead Response Agency.

1.5.2 Scale of Incident

The OSCP details the actions and procedures to be taken by ADA personnel for all minor or Tier 1 spill scenarios and for the transition of spill response management to a relevant Statutory Authority.

Appendix 2 provides checklists and procedures for a Tier 1 response level. Higher Tier checklists and procedures are provided in the VicPlan-MOP and TasPlan. A representative example of potential spill scenarios and volumes for the BSC Drilling Campaign are provided in Table 2.

Table 2: Potential Spill Scenarios and Volumes

Incident	Oil Type	Indicative Release
On deck spills/leakages	Diesel/lube'/waste oil	<50 litres (0.05 m^3)
Refuelling accident(1)	Diesel	Up to 10 m^3
Uncontrolled crude discharge during production testing	Crude	0.5 m^3 but possibly up to 10m^3 (rare)
Vessel-vessel collisions(2)	Diesel	up to 80m^3
Loss of supply vessel	Diesel	~500m^3 (inc. cargo)
Blowout	Crude	~1000m^3/day (potentially more)

***(1)** Hose rupture or tank overfill **/ (2)** Supply vessel with say, fishing vessel, loss of entire fuel tank*

1.5.3 Types of Oil

The three typical types of oil likely to be involved in the BSC Campaign are:

Crude Oils: The type of crude oil that may be encountered during exploration cannot be predicted with certainty although most crude's in the region are light to medium.

Diesel Oils: Diesel oils are generally light although they vary in their pour point and hence, volatility, diesel oils rapidly spread at sea and although classed as "persistent oils", slicks tend to break up quickly.

Lubricating Oils: Lubricating oils are rapidly spreading oils and tend to emulsify at sea resulting in an increased volume of the slick, emulsions may become viscous if weathered and this may reduce the effectiveness of skimmers.

Classification: Classification of oils, their behavior at sea and significance for spill response is summarized in Appendix 5.

1.6 Integration with other Plans

ADA and Contractor Plans: The OSCP interfaces with the following plans:

- ADA Emergency Response Plan (ADA ERP);
- BSC Campaign Environmental Plans;
- Drilling Contractor Onshore Emergency Response Plan;
- Drilling Contractor MODU Emergency Response Manuals;
- MODU and Support Vessel Shipboard Emergency Response Plans and Oil Spill Plans.

National and State Plans: Spill response is supported by the procedures and resources of:

- Victorian Offshore Petroleum Operations (Exploration and Production) Emergency Management Plan (VicPlan-Offshore Petroleum);
- Victorian Marine Oil Pollution Emergency Management Plan;
- State Oil Spill Contingency Plan;
- National Plan for the Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances (the National Plan);
- National Marine Oil Spill Contingency Plan;
- Tasmanian Marine Oil Spill Contingency Plan (TasPlan);
- Port's Oil Spill Contingency Plans.

Commonwealth and State response arrangements are outlined in Part 2.

Industry Plans: Industry support arrangements are documented in the Australian Marine Oil Spill Centre Plan (AMOS Plan), industry support is summarised in Part 2.

West Triton Drilling Program Environment Plan: The Environment Plan (EP) for the proposed BSC drilling campaign has been developed in accordance with Commonwealth regulatory requirements, under the *Petroleum (Submerged Lands) (Management of the Environment) Regulations 1999*. The EP will be submitted to the Victorian Department of Primary Industries (DPI) and the Department of Infrastructure, Energy and Resources (DIER (TAS)) (the designated Authorities for Victoria and Tasmania respectively for approval. Note the Department of Environment, Parks, Heritage and the Arts (DEPHA) is the Designated Authority for oil spill response.

1.7 Compliance with Pollution Control Regulations

This OSCP is compliant with the following:

Commonwealth: Petroleum (Submerged Lands) Act (P(SL)A),1967 (administered by the Department of Industry, Tourism and Resources (DITR) through the Victorian Department of Primary Industries (DPI) and the Department of Infrastructure, Energy and Resources (DIER (TAS));

- Environment Protection and Biodiversity Conservation Act 1999 (administered by DEWHA);
- Petroleum (Submerged Lands) (Management of Safety on Offshore Installations) Regulations, 1996 (administered through NOPSA);
- Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 (administered through DPI and DIER (TAS));
- Schedule of Specific Requirements as to Offshore Petroleum Exploration and Production, 1995 and amendments (administered through DPI and DIER (TAS));
- Protection of the Sea (Prevention of Pollution by Ships) Act, 1983 and amendments (administered by AMSA).

Victorian: Marine Act, 1988 (administered by the Department of Infrastructure (DoI);

- P(SL)A 1982 (administered by DPI);
- Port Services Act, 1995 (administered by Marine Safety Victoria (MSV);
- Pollution of Waters by Oil and Noxious Substances Act, 1987 (POWBONS, jointly administered by MSV and EPA).

Tasmanian:

- Environmental Management and Pollution Control Act 1994;
- Pollution of Waters by Oil and Noxious Substances Act 1987 (POWBONS);

1.8 Responsibilities of ADA and Contractors

Staff and Contractors: It is the responsibility of all ADA/BSC staff and contractors to:

- Be **familiar** with the contents of the OSCP;
- **Know** their designated oil spill response role;

- **Know** the reporting and immediate response requirements.

Reporting: There is a statutory requirement to report all oil spills to the sea that are over 80 litres (0.5 barrels) to DPI, DIER (TAS), DEPHA and NOPSA. The DEPHA is the Tasmanian statutory authority for oil spills while the DIER (TAS) is the Designated Authority who approved the EP.The OIM of the Rig or the Master of any Support Vessel must report all discharges to the sea of oil or oily mixture to the relevant authority (POWBONS, S11 and S12):

- AMSA, if spill is > 3 n miles from shore;
- DPI and DEPHA if spill is < 3 n miles from shore;
- Port Authority if spill occurs within a Port;
- **All** spills also require ADA in-house reporting (requirements are detailed in Part 3).

Vessel Masters: In addition to the preceding, the OIM and Vessel Masters are required to ensure the following are also adhered to:

- Any vessel with a gross tonnage of >400t must maintain an Oil Record Book (POWBONS, S13);
- If any leakage or spillage occurs during the loading/offloading of a flammable liquid, the loading operation must cease immediately, all valves be closed and the Harbourmaster notified (Port Authorities Act, r140);
- If any oil/oily ballast water leaks or spills onto the deck the scupper plugs are to be checked to confirm they are in location, they are not to be removed and steps are to be taken to prevent oil/oily ballast water going overboard (Port Authorities Act, r140);
- Any incident involving damage to a vessel, port installation or other property in, or associated with, the port must be reported to the Harbourmaster, by the Company (Port Authorities Act, r170);
- The owner or master of a vessel and the owner/occupier/ person in charge of a terminal/depot/storage tanks/pipeline etc (and their agents) must prevent the escape or discharge of oil/flammable liquid/liquid derived from oil to any water land or vessel within the port (Port Authorities Act, r184).

1.9 OSCP Authority

This OSCP has been developed in accordance with oil spill response guidelines of:

- BSC OSCP Requirements;
- International Incident Command System (ICS);
- International Petroleum Industry Environment Conservation Association (IPIECA) (2nd Edition March 2000); and
- International Maritime Organisation (IMO)

This OSCP also seeks to meet international obligations of Australia under the following:

- MARPOL 73/78;
- International Convention of Oil Pollution Prevention Response and Cooperation (OPRC) 1990;
- International Oil Pollution Compensation Fund Convention 1992.

2. Part 2 – Planning and Preparation

2.1 Purpose of Planning and Preparation

This section details the planning and preparatory activities undertaken by the BSC to prevent oil spills, prior to and during the Bass Strait campaigns for 2008/09. In the unlikely event an oil spill should occur, this section also provides guidelines to ensure ADA is prepared to appropriately respond. Activities include (but are not limited to):

- Completion of appropriate approvals and regulatory compliance process;
- Determination of the various Divisions of Responsibility;
- Conduct of oil spill trajectory modelling and an oil spill risk assessment;
- Conduct of an Environmental Impact Assessment (EIA);
- Community Consultation Program;
  - Establishment and development of interfaces with the relevant community-based agencies and authorities,
- Establishment of interfaces with the relevant Government and international response arrangements, agencies and response equipment.

2.2 ADA Response Organisation

Response Teams: The ADA shore-based Emergency Response Group (ERG) is responsible for the initial spill response and for managing Tier 1 responses on behalf of the BSC Permit Holder. ADA has an established spill response organisational structure managed by two teams:

- ADA Emergency Response Group (ERG);
- BSC Permit Holder Emergency Management Team (EMT).

The relationship between these and external agencies is demonstrated in Figure 1.

2.3 BSC Permit Holder Emergency Management Team

The BSC Permit Holder Emergency Management Team (EMT) is responsible for managing the wider implications of an oil spill and will provide support to the ADA ERG or Government On-Scene Incident Controller (OSIC) in aspects such as media, Government or community liaison. The EMT will operate from their EMT Response Room at their respective location. For the Pee-Jay-1 well Beach Petroleum will manage the response on behalf of Benaris the permit holder.

2.4 ADA Emergency Response Group

ERG Structure: The ADA ERG encompasses the Melbourne based Drilling staff and ADA Materials and Logistics personnel; see Figure 5 for the ADA ERG structure for a Tier 1 spills.

This structure is consistent with the ICS structures adopted under the National Plan and VicPlan-MOP. Although the Tier 1 ADA ERG is small, all key ICS functions are allocated. The allocation of ADA ERG roles is shown in Figure 5.

ERG Activation: The ADA ERG structure is flexible and will reflect the scale of the response. The ADA ERG Leader will appoint staff to the ADA ERG, and allocate functions, as required. For other emergencies, a larger ADA ERG may be mobilised.

Location: ADA ERG members may be mobilised to site, to the Logistics Shore Base or in the ADA offices in Melbourne. Melbourne-based personnel will operate from the designated Emergency Response Room (ERR) in the ADA offices (Board Room).

Role Checklists: Tier 1 checklists for nominated ADA ERG members are provided in Appendix 2 of this OSCP.

2.4.1 Responsibilities of the BSC and Contractor Companies

All personnel involved in the BSC Campaign are required to be alert for signs of spillage or oil slicks, including personnel on supply vessels and helicopters. All spills in the vicinity of the MODU are to be reported in the first instance to the MODU OIM or Vessel Master and the ADA Drilling Supervisor (DSV).

Beyond the immediate vicinity of the MODU or during transit of supply vessels or when in port, spills are to be reported to the ADA DSV and then the relevant Port Authorities.

2.5 Statutory Incident Reporting

A reportable incident is defined by the P(SL)A MoE Regulations as 'an incident mentioned in the environment plan for the activity that has caused, or has the potential to result in, moderate to catastrophic environmental consequences as categorised by the risk assessment process undertaken as part of the preparation of the Environment Plan'.

The DPI (Victoria) or the Department of Infrastructure, Energy and Resources (Tasmania) will be notified of all reportable incidents as soon as practicable, and not later than 2 hours following the first occurrence of the reportable incident or the time that the operator becomes aware of the reportable incident, in accordance with regulation 26 of the P(SL)A MoE Regulations. A written report will be provided to the DPI or DIER (TAS) within 3 days of the first occurrence of the reportable incident.

2.5.1 Reportable Incidents

There is a statutory requirement to report all reportable oil spills to the sea (in accordance with MoE Part 3 Section 26: Notifying Reportable Incidents) to:

- Given to DA representative verbally ASAP or not later 2 hours for escalating or major spills)by the ADA Drilling Manager prior to sending a written report within 48 hours (;
- DA within 8 hours (minor spills) and written report within 48 hours of spill/discovery;
- Harbour Master verbally by the contracted support vessel Master (for all spills).
- Marine Safe Victoria (MSV) or Marine and Safety Tasmania (MAST) giving particulars of the incidents. This information shall include the name of vessel, location, weather condition, type of spill and quantity or any other information necessary for immediate recovery and clean-up operations.
- Department of Environment Parks, Heritage and the Arts on 24 hour emergency hotline number. Refer to Contact Directory appendix 1

2.5.2 Reporting Recordable Incidents

A recordable incident as defined by the P(SL)A MoE Regulations (MoE Part 1 Section 4: Definition) for an operator of a petroleum activity as an incident arising from the activity that:

- Breaches a performance objective for the Environment Plan that applies to the activity; and
- Is not a reportable incident.

In accordance with regulation 26B of the P(SL)A MoE Regulations, a monthly written report of all recordable incidents will be submitted to the DPI or DIER (TAS) as soon as practicable after the end of a calendar month (and not later than 15 days after the end of the calendar month), and contain a record of all recordable incidents that occurred during the calendar month.

2.5.3 Written Report of Reportable Incidents

The operator of an activity must submit a written report of a reportable incident in accordance with the regulation "MoE Part 3 Section 26A: Written report of reportable incidents" are:

- Given to DA ASAP or not later 3 days or if the DA further specifies another period and must contain;
  - Material facts,
  - Any action taken to avoid or mitigate any adverse environment impacts of the reportable incident and
  - Corrective action that has been taken / proposed to be taken to prevent similar reportable incident.

The operator of an activity must submit a written report of a reportable incident in accordance with the 'MoE Part 3 Section 26B: Reporting Recordable Incidents' regulation will be managed as per the following:

- Given to DA;
- Related to a calendar month;
- ASAP or not later 15 days after the end of the calendar month;
- Contain:
  - A record of all recordable incidents that occurred during the calendar month;
  - Material facts concerning the recordable incidents;
  - Any action taken to avoid or mitigate any adverse environment impacts of the reportable incident and
  - Corrective action that has been taken / proposed to be taken to prevent similar reportable incident.

2.6 Division of Responsibility

Statutory Agencies: The National Plan defines the Statutory Agency (SA) as the Government Agency which has responsibility to ensure that an adequate spill response plan is prepared and, in the event of an incident, that a satisfactory response is implemented.

Table 3: Statutory Agency/Response Management Agencies

Location	Spill Source	Agency	Legislation
Commonwealth Waters	Offshore E&P	AMSA	Petroleum (SL) Act 1967
	Vessels	AMSA	Protection of the Sea (Prevention of Pollution by Ships) Act, 1983
Victorian Waters	Offshore E&P	DPI/MSV	Petroleum (SL) Act 1985
	Vessels	DPI/MSV	SEMAC P S No 7 and POWBONS
Tasmanian	Offshore E&P	DIER (TAS)	Petroleum (SL) Act 1982

Location	Spill Source	Agency	Legislation
Waters	Vessels	DEPHA	POWBONS
Port Waters	Vessels (1)	Port Operator or	Port Authorities Act 1999
		DPI/MSV Tas Ports	POWBONS

(1) Includes MODU if in Port

Lead Combat Agency: Under the National Plan, the Combat Agency is the agency (either industry or government) that directs and manages the spill response. In Victoria and Tasmania the term Lead Combat Agency is used for this Agency, the term Combat Agency referring to any agency participating in the response.

The Lead Combat Agency/ may be the Company responsible for the spill, the Statutory Agency or other agency at the request of the Statutory Agency. Nominated, or potential, Lead Combat Agencies are shown in Table 4.

Table 4: Nominated Lead Combat Agencies

Spill Location	Spill Source	Lead Combat Agency		Relevant OSCP
		Tier 1	Tier 2/3	
Commonwealth waters	Offshore E&P	ADA	ADA(1)	ADA OSCP
	Vessels	ADA	AMSA	National Marine OSCP
Victorian waters within 3 nm	Offshore E&P	ADA	ADA(1)	ADA OSCP
	Vessels	ADA	MSV	Regional Control Agency OSCP(2)
Tasmanian Waters within 3 nm	Offshore E & P	ADA	ADA(1)	Regional Control Agency OSCP(2)
	Vessels	ADA	DEPHA	
Within Port	Vessels(3)	ADA	Port Authority	Port OSCP

***(1)** ADA may request relevant Government nominated Lead Combat Agency to assume control (see LCA/CA for vessel spills) / **(2)** The OSCP for the nominated "First Response Agency" will also be activated (see Section 2.3) / **(3)** Includes MODU if in Port.*

2.7 State Organisations

2.7.1 Department of Primary Industries and Department of Infrastructure, Energy and Resources

The Victorian Department of Primary Industries (DPI) is the Designated Authority for the offshore Bass Strait areas of BSC operation. The Department of Infrastructure, Energy and Resources (DIER (TAS)) is the Tasmanian equivalent Designated Authority. The DPI and DIER (TAS) requires the Permit Holder (BSC) to seek assistance from other government agencies if required but overall responsibility remains with the Permit Holder.

The Permit Holder may request that a Government Agency (MSV or DEPHA) to assume the Lead Combat Agency. This request would be directed to DPI for spills within Victorian waters, DIER (TAS) for spills within Tasmanian waters or to AMSA (see Contact Directory in Appendix 1).

Plan documents arrangements for emergency (including oil spills) preparedness and response for offshore oil and gas exploration in Victoria, Tasmania and adjacent Commonwealth waters.

Note: The DPI and DIER (TAS) do not assume a Lead Combat Agency role.

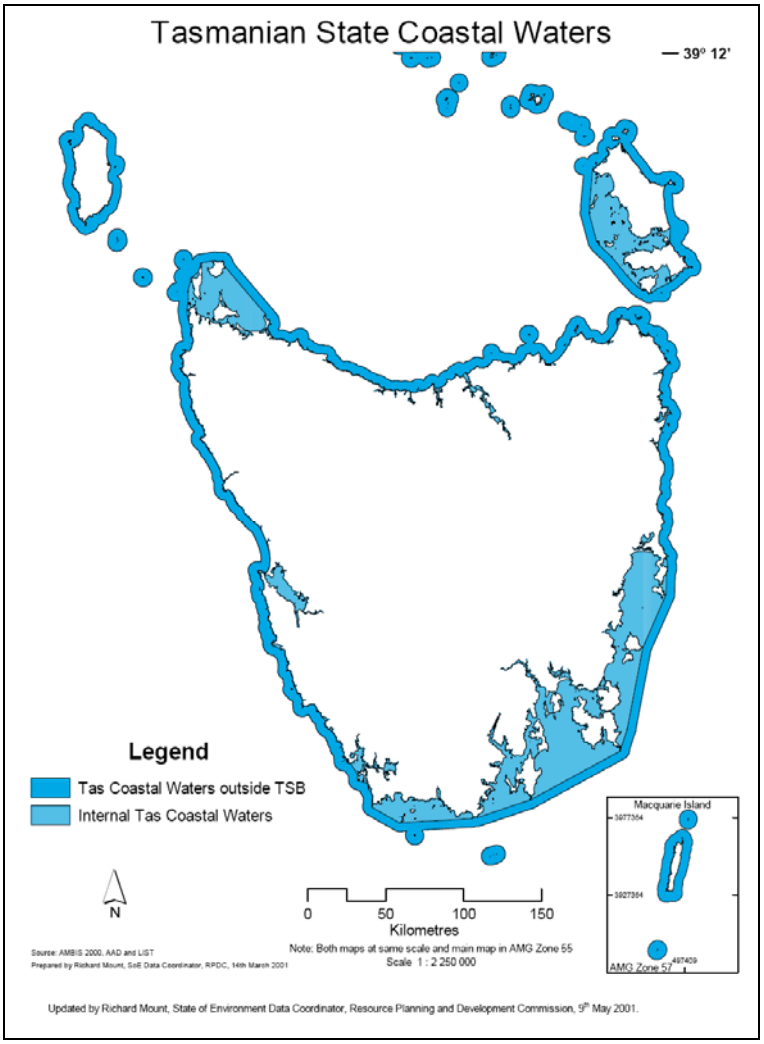
2.7.2 Tasmanian Marine Oil Spill Contingency Plan (TasPlan)

The Environment Division of the Department of Environment, Parks, Heritage and the Arts (DEPHA) has the legislative responsibility for the Tasmanian Marine Oil Spill Contingency Plan (TasPlan) to ensure there is an effective response to oil pollution events in Tasmania.

The roles of the Environment Division of the DEPHA and the Tasmanian Ports Corporation Pty Ltd as Response Agencies are described in the Deed of Agreement between Marine and Safety Tasmania, the Crown (through the DEPHA) and the Tasmanian ports Corporation Pty Ltd.

TasPlan operates within the framework of the NatPlan which is administered by AMSA. Tasmania is responsible for State Waters within a 3 nm limit of the territorial sea baseline (Figure 6).

Figure 6. Tasmanian Coastal Waters



2.7.3 VicPlan

Marine Safety Victoria (MSV) has the legislative responsibility for the Victorian Oil Spill Plan (VicPlan) to ensure there is an effective response to oil pollution events in Victoria.

MSV provides an interface with AMSA in the management of resources allocated to the mitigation of oil pollution events in state waters.

2.7.4 VicPlan-MPCP

To manage the response to a marine pollution event the Victorian coastline is divided into four VicPlan Marine Pollution and Response regions.

All wells to be drilled in the BSC campaign are to be drilled in commonwealth waters, however the wells to be drilled in the Gippsland Area Permit Vic/P57 and Vic/P58 are close to the 3nm zone which may affect state waters and hence come under the control of the MSV.

2.8 Regional Organisation

Victorian waters are divided into Marine Oil Pollution Response Regions and Ports. The response regions are (1) Portland, (2) Port Phillip, (3) Western Port and (4) Gippsland.

Figure 7: Marine Pollution Response Regions and Ports

2.9 BSC Arrangements

In the event of a minor or Tier 1 spill, ADA resources to combat minor oil spills includes the contracted Support Vessels with Tier 1 spill equipment onboard, additional resources include the contracted helicopter and chemical dispersant available locally. Equipment and materials available on support vessels and onshore for Tier 1 spill response are detailed in Appendix 4.

2.10 Industry Arrangement

For spills up to and including Tier 1, industry spill response resources are available through the Australian Marine Oil Spill Centre (AMOSC) based at North Corio Quay, Geelong, Victoria, details of response equipment available are provided in Appendix 4.

AMOSC: Industry assistance available through the industry funded response facility includes:

- AMOSC spill response equipment;

- Oil company equipment based at various locations;
- Trained industry response ("Core Group") personnel.

AMOS-Plan: Procedures for accessing oil industry assistance for a spill response, through AMOSC, are documented in "AMOSPlan". As a member of AMOSC, resources are available to ADA at the request of an ADA "Authorising Officer" (see Contact Directory - Appendix 1).

2.11 National Arrangements

In the event of a major spill (Tier 2 or Tier 3), the resources available through the MSV, DPI,DEPHA, MAST, AMSA and other agencies and response support are provided in Appendix 4.

2.12 Oil Spill Classifications - Levels of Response

Oil spills are classified under international classifications according to size or 'Tiers'. It is necessary to classify an oil spill as soon as practicable in order to identify the level and nature of potential assistance required to combat the spill, and to commence call-out and mobilisation of appropriate resources. The classification system is outlined in Table 5, the MODU's OIM, ADA DSV or Support Vessel Masters are responsible for making this initial estimate.

Response Tiers: Spill response is based on three "Tiers" defined according to:

- Agency assuming the role of Lead Combat Agency/Combat Agency;
- Number of agencies called upon to respond and amount of resources mobilised.

These in turn will depend on the:

- Type and volume of oil spilled;
- Location of the spill and resources or environments at risk.

These are illustrated in Table 5 and procedures for the determination of the response Tier are detailed in Part 4.

Tier 1: Any response that can be handled by local (on-site) ADA resources with support from the land-based ADA ERG and the BSC Permit Holder EMT. These are generally small to moderate (0 - 10 tonnes) spills of light crude or diesel that are unlikely to impact shorelines or other sensitive resources.

Tier 2: Any response that cannot be managed by the on-scene (MODU or Vessel), Supply-Base, Melbourne-based resources of ADA (i.e. available ADA resources cannot prevent the impact of oil on shorelines or on identified resources, spills between 10- 1000 tonnes).

Government Agencies would then be requested to assist or to assume the Lead Combat Agency role. The ADA ERG Leader will take charge of coordinating ADA involvement and activating the ERG/EMT as required and with the direct interface with the Lead Combat Agency.

Tier 3: These are major spill responses (>1000 tonnes) which require the mobilisation of Government, ADA, and Industry (AMOSC) resources. The nominated Government Lead Combat Agency will usually assume operational control of the spill response. The ADA ERG will remain active in order to support the broader response.

Note: Both Tier 2 and Tier 3 responses are managed by combined ADA/Industry and Government teams. This may be under the direction of the Government appointed Lead Combat Agency/Combat Agency.

Table 5: Summary Description of Response Tiers

Tier	Spill Size (Potential Economic or Environmental Harm)	Volume (m^3)	Typical Incidents Possible "Triggers" for Response Tier[(2)(3)]	Typical Level of Response	Control
1	Small (Minimal - Short Term Impact)	< 10 m^3 (0-10 tonnes)	Ship transfer, bunkering at a MODU, Vessel or mooring	BSC OSCP (Individual company/in-house capability)	ERG Leader (ADA)
2	Medium (Local or Medium Term Impact)	Up to 1,000 m^3 (10-1,000 tonnes)	Shipping incidents in ports, pipeline failures, near shore exploration or production	Regional Response Plan (VicPlan/TasPlan: Tier 1 response plus other industry and/or government capabilities)	ADA with Govt assistance or nominated Agency as per Table 2.2[(1)]
3	Large (Regional or Long Term Significance and Impact)	> 1000 m^3 (> 1,000 tonnes)	Major incidents involving tankers or vessels with large bunker oil volumes, offshore exploration blowouts	National Response Plan (NatPlan: Total national resources, with the addition of international resources)	

Table 5a: Indicative Resources Mobilised

Indicative Resources Mobilised[(3)]												
ADA/BSC												
AMOSC/Industry												
Victoria, Tasmania State												
AMSA												
International												

***(1)** ADA would request either AMSA or MSV to take control of the response if this proved beyond ADA resources / **(2)** See Section 4.3 / **(3)** Indicative only, highly dependent on a number of considerations.*

Standby, or partially mobilised.

Mobilised or likely to be mobilised.

2.13 Responsibility for Determining Response Level

Tier 1: ADA in consultation with the BSC Permit Holder, will assess if internal management of the spill is achievable; this assessment will be confirmed by the MSV or DEPHA. If ADA and the BSC Permit Holder can competently manage the spill then it is defined as Tier 1 response.

Note: The Statutory Agency can reassess the response at any time and escalate the Tier and the response. If a Tier 2 or Tier 3 response is required, a Government Incident Controller (IC) may be appointed and an Incident Management Team (IMT) will be formed under either the National Marine OSCP (administered by AMSA) or the MSV VicPlan or TasPlan.

Tier 2 or Tier 3: If it is acknowledged that ADA cannot manage the response with the available resources or for other reasons, then ADA (or DPI) may request another agency to take the role of Lead Combat Agency. The decision on whether a response is a Tier 2 or a Tier 3 response

is decided by the Lead Combat Agency or Commonwealth Combat Agency. Guidelines for determining the response Tier are provided in Table 5.

IMT Structure: If a Tier 2 or Tier 3 response is required, a Government Incident Controller (IC) may be appointed and an Incident Management Team (IMT) will be formed under either the NatPlan (administered by AMSA), VicPlan or the TasPlan.

IMT Role Checklists: Role checklists for a Government IMT are provided in the VicPlan-MOP or TasPlan.

Incident Control: Incident Control will be exercised by the nominated Lead Combat Agency (see Figure 6.

Role of ADA/BSC: ADA personnel may be requested by the Lead Combat Agency IC to assume a position in a Tier 2/3 response IMT. In this instance, the ADA ERG Leader in consultation with the BSC Member EMT, may nominate relevant ADA or EMT personnel to be part of the IMT, the Victoria Executive Response Group or the Tasmanian State Marine Pollution Committee (SMPC) and to liaise with State/Commonwealth authorities.

Table 6: Lead Combat Agency Incident Management Functions

Function		Role	ADA Interface
Incident Control	Incident Controller	Overall control of the response	Usually ADA/Client initially for Tier 1, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	BSC Media Liaison*	Manages media relations, prepares press statements, organises press briefings and supports the IC/Vic MSV in dealing with media	Appointed by ADA/Client for all Tier 1 spills and above
	Environmental and Scientific Coordinator (ESC)**	Overall coordination of environmental and scientific advice to the IC, the ESC may be in the ICC or with the ADA Vic ERG	ESC is typically an officer from DSE, or from the Environment Division of DEPHA an AMSA nominated officer may act as ESC for spills in Commonwealth waters
	Community Liaison**	Ensuring that community concerns are addressed and for liaison with any indigenous groups likely to be impacted	Initially appointed by Client if recreational, heritage or commercial sites are likely to be impacted, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	Incident Safety	For larger responses an Incident Safety Officer (ISO) may be appointed by the IC to oversee safety management	ADA HSE Manager will liaise with Incident Safety Officer
Planning	Coordination and review of Incident Action Plans. Planning personnel will collate the information and consolidate the policy, objectives, strategies and tactics developed by the Incident Controller/IMT, specific functions include:		
	Situation	Collection, processing and organisation of information (e.g. oil spill trajectory modelling, weather, sea-state)	Client oil spill modelling initially used for Tier 1 spills until handover to relevant authority
	Resources	Tracking of the deployment of resources	Relevant authority under VicPlan/TasPlan for Tier 2 >
	Environment	Responsible for the collection and collation of environment	ADA HSE Manager may liaise with local DEP or DEPHA personnel via

Function		Role	ADA Interface
		data/ advice (e.g. obtains environmental data from relevant Government Agencies, the ESC and local sources)	the ESC, or Client EMT may assume this responsibility
	Consultation*	Community and commercial consultation	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
Operations	Undertakes all "field" operations in the response		
	Marine	Coordination and direction of all activities undertaken by waterborne craft and equipment	Initially assumed by ADA/Client, reverting to relevant authority under VicPla/TasPlan for Tier 2 >
	Aviation	Coordination and direction of all activities undertaken utilising aircraft (e.g. aerial dispersant spraying, aerial surveillance and transport)	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
Operations Continued	Shoreline	Planning and coordination of shoreline assessment and cleanup activities	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	Wildlife**	Implementation of the VicPlan Oiled Wildlife Plan or the Tasmanian Oiled Wildlife Plan (i.e. the collection, treatment and rehabilitation of oiled wildlife)	Relevant authority under VicPlan/TasPlan for Tier 2 >
	Occupational Health and Safety	Development and implementation of the OHS Sub-Plan	ADA HSE Manager to liaise with Planning Section
	Waste Management	Coordination of containment, storage, transport and disposal of recovered oil and oily waste, also instruction in on-site handling, storage and/or separation and treatment	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
Logistics	Responsible for ensuring that the IMT is provided with adequate resources to enable an effective response, specific functions include:		
	Procurement	Acquisition of personnel and equipment	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	Services	Acquisition of services and facilities	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	Transport	Provision of air, land and sea transport services	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	Communications	Communications Sub-Plan and for ensuring the provision of communications services/support	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	Medical	Provision of medical services where needed	Initially assumed by ADA HSE and/or Client reverting to the relevant authority under VicPlan/TasPlan for Tier>2

Function		Role	ADA Interface
Admin and Finance	Responsible for the provision of administrative services to the IC, Sections and Units of the IMT, and for the management of financial (costs) information, functions include:		
	Administration	Administrative services: telephones, computers, fax, radios and message services	Initially assumed by ADA/Client, reverting to relevant authority under VicPlan/TasPlan for Tier 2 >
	Finance	Accounting and contracting services	Tier 1 assumed by ADA/Client, liaison with relevant authority under VicPlan/TasPlan for > Tier 2
	Records	Collation and filing of records and forms including, time-sheets, equipment use and personnel records	Tier 1 assumed by ADA/Client, liaison with relevant authority under VicPlan/TasPlan for Tier 2 >
	ICC Management	Ensure effective operation of ICC including management of information transfer within the ICC, (Status Boards, faxes, messages, dispatch), meeting schedule, ICC security etc.	Relevant authority under VicPlan/TasPlan for Tier 2 >

**Denotes functions delegated to BSC Roles / ** Denotes functions reserved for Government officers.*

2.14 Oil Spill Risk Assessment

Reference: *BSC Campaign – Quantitative Oil Spill Exposure Assessment for the Otway and Bass Drilling Programs (refer to Appendix 6)*

An oil spill risk assessment (OSRA) for the BSC Campaign was conducted in 2007 by Coffey Natural Systems (Coffey Natural System/Asia-Pacific ASA Pty Ltd, November 2007) the immediate objective of the OSRA was to determine the potential risk of oil spills from operations of the MODU and support vessels to be used in the BSC Campaign.

The result of the OSRA have been used as the basis for determining the potential risk to coastal resources and communities and concludes by presenting an Oil Spill Management Plan (this OSCP) which provides for preventive and mitigative measures.

The intent of this OSCP is to ensure nil or minimal risks and threats to the environment and communities who lie along the likely path of the oil spill trajectory will be ensured.

The OSRA report presents the methods used, identifies the oil spill hazards associated with the MODU operations, models the oil spill trajectory considering three (3) release volume scenarios.

Additionally the OSRA characterizes the marine and socio-economic environment lying along the likely path of any oil spill trajectory, presents the expected impacts of an oil spill to the environment, derives and analyses the oil spill frequencies and probabilities.

The OSRA also presents measures to either prevent oil spill occurrences and to mitigate against actual releases to ensure minimal impact to the coastal resources.

The BSC Campaign will be governed by policies, rules and procedures that are designed to prevent spills and accidents with preventive and contingency measures built into operating procedures to prevent accidents.

2.14.1 OSRA Oil Spill Prevention and Control Measures

The following oil spill prevention and control measures are being adopted for the drilling stages of the project as a result of the OSRA:

- All vessels contracted or chartered for the BSC Campaign shall be required to have an OSCP as well as oil spill containment/recovery equipment, supplies and relevant dispersants;
- All spilled fluid to be flowed into recycling/separation tanks to allow settling out and recovery of oil (the desired product) and subsequent sub-sea discharge of water;
- Provision of reserve/stand-by tanks onboard vessels for emergency containment;
- Hydro-test/leak test fuel transfer hoses after installation and prior to use;
- Setting-up of Fire Prevention System to prevent any fires or explosion of volatile substances on board (e.g. ensure flare is away from the rig/vessel's hazardous areas and accommodation spaces; install wind vane to monitor changes in wind direction especially during flaring, install fire systems and alarms; conduct of regular fire drills; assign fire control teams/leaders, etc);
- A temporary restricted zone of 500m from the MODU is designated and disclosed through AMSA Notice to mariners to prevent any untoward incidents with other vessels.

2.14.2 Environmental Maps and Charts

Maps and charts identifying location facilities and associated sensitive areas of the BSC Campaign are identified in the BSC Campaign EIA.

2.15 Oil Spill Trajectory Modelling

Reference: *BSC Campaign – Oil Spill Risk Assessment Oil Spill Trajectory Modelling*

Samples of trajectory modelling identifying the average time to shoreline contact are provided in Tables 7-12. Detailed results of trajectory modelling are provided in the EIA in Appendix 6

Table 7: Summary of Annualised Stochastic Modelling at Spikey Beach-1

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline contact (hours)	Average time before shoreline contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	4	29	96	7	9
Crude oil spill	2	20	76	23	4

Table 8: Summary of Annualised Stochastic Modelling at Bernoulli

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline contact (hours)	Average time before shoreline contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	15	13	62	25	31
Crude oil spill	42	15	73	18	4

Table 9: Summary of Annualised Stochastic Modelling at Fermat

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline contact (hours)	Average time before shoreline contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	26	7	39	23	29

Table 10: Summary of Annualised Stochastic Modelling at Sealion

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline contact (hours)	Average time before shoreline contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	29	5	34	24	30
Crude oil spill	30	4	29	156	26

Table 11: Summary of Annualised Stochastic Modelling at P53-A.

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline contact (hours)	Average time before shoreline contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Crude oil spill	5	43	99	22	4

Table 12: Summary of Annualised Stochastic Modelling at Longtom Upper-1

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline Contact (hours)	Average time before shoreline Contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	5	26	91	9	11
Condensate spill	11	33	123	10	3

2.16 Conduct of Environmental Impact Assessment

2.16.1 Oil Spill Exposure Assessment

Reference: *BSC Campaign Quantitative Oil Spill Exposure Assessment for the Otway and Bass Drilling Program – Appendix 6*

Reference: *BSC Campaign – Environment Plan / West Triton Drilling Program – Otway and Bass Basins – Appendix 3*

The Oil Spill Exposure Assessment report assists in quantifying the risk of exposure to surrounding shorelines and environmental resources in the unlikely event of a hydrocarbon spill. The assessment examined five hypothetical spill scenarios that are applicable to the BSC Gippsland drilling activities, two hypothetical spill scenarios for the Bass Basin drilling activities and three hypothetical scenarios for the Otway Basin drilling activities:

a) A 80 m^3 surface spill of diesel oil, representing a storage tank rupture from a supply vessel, at the Spikey Beach-1 well;

b) A 600 m^3 surface spill of crude oil, representing an accidental oil well blowout, at the Spikey Beach-1 well;

c) A 80 m^3 surface spill of diesel oil, representing a storage tank rupture from a supply vessel, at the Bernoulli and Fermat wells;

d) A 448 m^3 surface spill of gas condensate, representing an accidental gas well blowout, at the Bernoulli well;

e) A 80 m^3 surface spill of diesel oil, representing a storage tank rupture from a supply vessel, at the LongTom Upper-1 and Sealion wells;

f) A 600 m^3 surface spill of crude oil, representing an accidental oil well blowout, at Sealion and P53-A exploration wells; and

g) A 448 m^3 surface spill of gas condensate, representing an accidental gas well blowout, at the LongTom Upper-1 well.

The ASA oil spill trajectory and fates model (OILMAP) was used to simulate the drift and spread of oil from the chosen exploration wells (LongTom Upper-1, Sealion, P53-A Spikey Beach-1, Fermat and Bernoulli) to surrounding locations under the influence of the ambient winds and tides.

All trajectory and weathering simulations were based on local environmental conditions (winds, tides and water temperature) and the chemical and physical characteristics of typical Bass Strait light crude (API^{o}58). The 200 hypothetical single spill trajectories used to generate the probability results were sampled from local wind data spanning 10 years (1997-2006).

2.16.2 Methodology

The oil spill modelling study was carried out as two independent, yet integrated stages. Firstly, the tidal currents were generated for the study area using an ocean/coastal circulation model HYDROMAP.

Secondly, OILMAP was used to determine the expected movement and weathering of any hydrocarbons spills under the influence of winds and the tidal currents. An overview of each model is described in the BSC Campaign Quantitative Oil Spill Exposure Assessment for the Gippsland, Bass and Otway Drilling Programs.

2.16.3 Community Consultation

Community consultation was undertaken with the relevant local community organizations and non-governmental organizations which may have specific interests in the area. In addition, the Oil Spill Trajectory Modeling further defines the geographical boundary of the study area and the local communities who may lie along the path of the oil spill trajectory.

A consultation plan has been established to record the contact details of relevant stakeholders, to document consultation undertaken and the relevant outcomes, such as commitments and requirements for the drilling program.

Stakeholder consultation details to date are listed in Table 13. Further contact with these groups will update them on the progress of the BSC Drilling Campaign.

Table 13: Stakeholder Consultation

Stakeholder	Contact	Date	Matters Discussed
Border Protection Command	bpliaison@customs.gov.au	To be advised 2 weeks prior	Security advice
AFMA	Bronwen Jones	20/8/07	Advice on locations and fisher groups contact
AMSA	–	To be advised 2 weeks prior	Contact with Rescue Co-ordination Centre (RCC)
Commonwealth Fisheries Assn	Peter Franklin	17/8/07	Advice on locations and fisher groups contact
	Chris Melham	28/5/08	Update advice in drilling locations and timing.

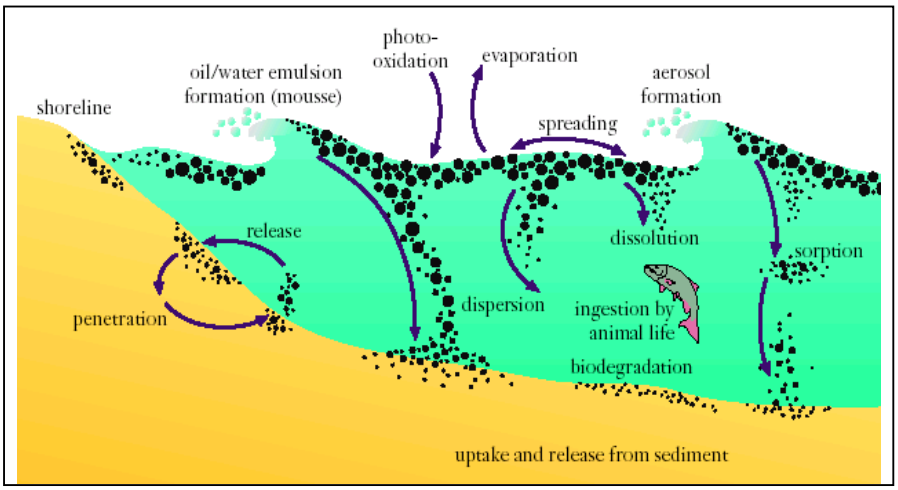
Stakeholder	Contact	Date	Matters Discussed
Otway and Gippsland Consultation			
DPI	Terry McKinley Cynthia Crowe	1/6/07 meeting then ongoing	EP requirements
Warrnambool DSE	Mandy Watson	7/8/07	Advice on locations, whale presence in Otway.
		12/6/08	Update advice on drilling locations and timing.
Seafood Industries Vic	Ross McGowan	17/8/07	Advice on locations
		26/11/07	Status of consultation update.
		28/5/08	Update advice on drilling locations and timing.
Victorian Scallop Industry Association	Steve Melissakis	16/8/07	Advice on locations
		28/11/07	Preliminary geo tech coring activity request for safe clearance.
Portland DPI Regional Fisheries Officer	Charlie Cooper	15/8/07	Advice on locations.
Portland Professional Fishermen's Association	Steve Nathan	16/8/07	Advice on locations.
		28/05/08	Update advice on drilling locations and timing.
SA Rock Lobster Advisory Council	Roger Edwards	16/8/07	Advice on locations.
South East Trawl Fishing Industry Association	Gail Richie	16/8/07	Advice on locations
South East Non-Trawl Fishing Industry Association	Charlie Farqhar	20/8/07	Advice on locations
Lakes Entrance Fishermen's Cooperative	Peter Clark/Dale Summer	16/8/07	Advice on locations
VRFish	Christopher Collins	16/8/07	Advice on locations
Deakin University (Warrnambool) blue whale research group	Peter Gill	21/8/07	Advice on locations.
		12/6/08	Update advice on drilling locations and timing.
Tasmanian Consultation			
Tasmanian Fishing Industry Council	Neil Stump	12/9/07	Advice on geotechnical program and locations of coring.
		28/5/08	Update advice on drilling locations and timing
Tasmanian Association of Recreational Fishing	Anne Purtill	12/09/07	Advice on geotechnical program and locations of coring.
		28/5/08	Update advice on drilling locations and timing

3. Part 3: Response (Mitigation)

3.1 Purpose of Response

This section details the response or mitigation activities and the roles and responsibilities of ADA/BSC personnel to appropriately respond to an oil spill associated to the BSC Campaign in the unlikely event one should occur. An example of the various impacts and activities process associated to a spill on water is demonstrated in Figure 8.

Figure 8: Oil Activity Process Following a Spill



3.2 Mitigation Philosophy and Priorities

All oil spill responses are to be based on a 'Net Environmental Benefit Analysis' (NEBA) strategy which means that the measures effected should be those that will result in the greatest reduction in environmental impacts for the available means and resources. For most spills the BSC response priorities will be:

- Monitoring – allow natural weathering and dispersal;
- Mechanical containment and recovery;
- Chemical dispersion of surface slicks;
- Shoreline response.

The response to spills will be based on avoiding or limiting environmental impacts. Under a Tier 1 spill scenario BSC will have responsibility for determining the appropriate action to prevent or limit environmental harm, with advice as required from MSV/DPI or DEPHA as required.

Under Tier 2 or 3 the provisions of the regional VicPlan, TasPlan and National OSCP will be initiated and priorities are determined within this framework with direction for BSC response activities provided by either the MSV DOE, DEPHA or the PCG.

3.2.1 Health and Safety

Due consideration shall be given to the health and safety of all personnel involved in a spill response at all times and in particular when handling dispersants. Personnel nominated will be required to be familiar with instructions on the safe use of dispersants and material safety data sheets (MSDS) for the dispersants will be provided by the dispersant provider.

All ADA and/or contractor HSE requirements and standard operating procedures are to be observed and enforced during all spill response activities. Medivac procedures are provided in the ADA Drilling ERP and BSC Client Site Specific ERP.

3.2.2 Primary Response Guidelines

The primary objective of any oil spill response on water and in particular in the open sea, is to avoid oil reaching any shoreline and in particular sensitive environments on the shoreline. Possible strategies for supporting this strategy include:

- Oil is best contained and recovered mechanically if possible;
- Oil spills are best collected as close to the spill sources as possible;
- Primary response focus is always best directed towards preventing oil from reaching any shoreline;
- If mechanical recovery is not effective or possible, chemical dispersants and or propeller or thruster agitation should be considered to break up the spill slick.

3.2.3 Primary Response Strategy

Isolate Spill Source: The primary ADA response strategy for any spill of any size is to immediately isolate the spill source and contain the spill substance.

With spills close to the MODU, the OIM/ ADA DSV or Support Vessel Master shall confirm the observation, the spill source and extent, and take any immediate action required to prevent any continued flow of spill substance.

Isolate Ignition Source(s): As appropriate, the OIM to determine likely ignition sources and initiate isolation procedures to minimize the potential for the sources to create a fire hazard.

3.3 Reporting an Oil Spill

Notification: The DSV will initially assume the ADA Incident Controller role to ensure all appropriate company and statutory notification are made. Reporting sequence and protocols are identified in Figure 9, with general guidelines provided below.

3.3.1 Internal Reporting Requirements

On-Site Observer: Any person onboard a MODU or Support Vessels who observe an oil slick, spill or potential spill are required to report it immediately to the OIM or Master of the Vessel.

Person In Charge: The MODU OIM supported by the ADA DSV; the Master on any Support Vessels will:

- Respond in accordance with the Facility ERP or OSCP;
- Verify the incident and obtain preliminary information;
- Vessel Master for vessels associated with drilling operations will report to the OIM within the 500m safety zone (the OIM will report any spills to the ADA Drilling Supervisor);
- The ADA DSV will report the spill details to the ERG Leader.

ADA ERG Leader: The ADA ERG Leader is typically the Drilling Manager.

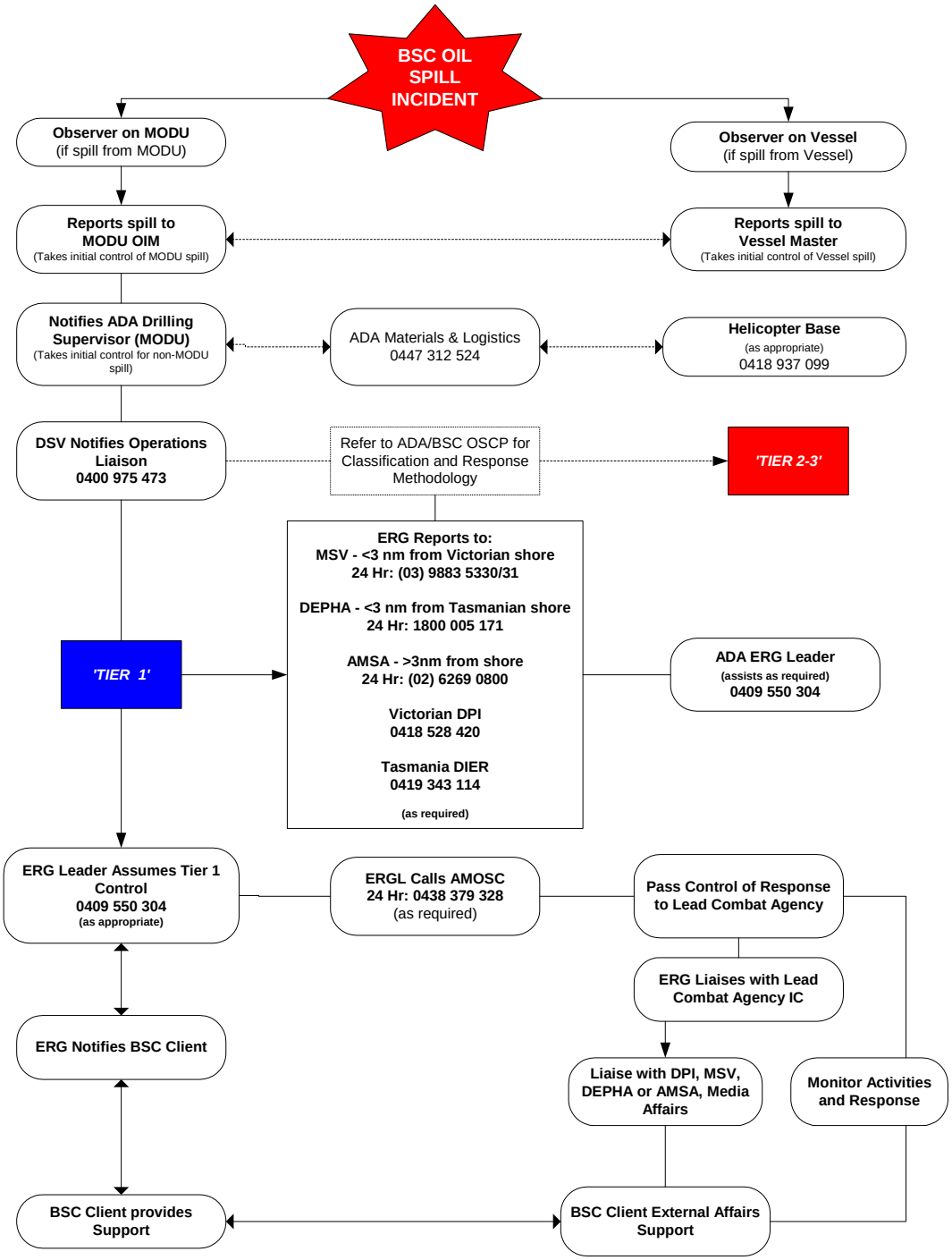
MODU Spills: Any spills from the MODU, or associated drilling operations are required to be reported to the OIM and ADA Drilling Supervisor.

Spills from Barge/Vessels: The Vessel Master is responsible for reporting spills from support vessels. If in the 500m safety zone lease area these must be reported directly to the OIM and ADA Drilling Supervisor. If the vessel is in port or in transit the spill is to be reported to the ADA Shore Base who will report the spill to the OIM.

All Spills: **All** spills must be reported to the ADA ERG Leader.

Reporting Sequence: The reporting sequence is shown in Figure 9.

Figure 9: Reporting Sequence for Spills from MODU or Vessels



3.3.2 Government Reporting Requirements

All Spills: All spills over 80 litres (0.5 barrels), to the sea, that occur from exploration activities, including from associated shipping, must be reported to the DPI (Victoria), DEPHA (Tasmania) and NOPSA.

However, it is ADA practice to report all spills to the marine environment to the MSV DPI and the DEPHA, this is the responsibility of the ADA ERG Leader for drilling activity spills.

Spills from Vessels: All spills from Support Vessels must be reported to:

- AMSA, if in Commonwealth waters, or
- MSV if in Victorian State waters, DEPHA if in Tasmanian state waters;
- Port Authority (Harbourmaster) if within Port - responsibility of the Vessel Master.

3.4 Immediate Actions

3.4.1 Call-Out Protocols

Table 14 summarises the personnel authorised to callout response teams and resources and the assembly points for personnel.

Table 14: Notification and Callout

Group/ Organisation	Notified/Mobilised By	Call-out Via (1)	Assembly Point
MODU-Personnel	OIM/Drilling Supervisor	Internal	As Directed
Support Vessel Personnel	Master	Internal	As Directed
	Otherwise: ERG Leader via OIM/Drilling Supervisor		
Shore base Personnel	In Port: Vessel Master	VHF radio	As Directed
	Otherwise: ERG Leader via Materials and Logistics Coordinator	Pager/Telephone	As Directed
ADA ERG (Melbourne)	ERG Leader	Pager/Telephone	ERR (Board Room)
EMT (Melbourne)	EMT Leader	Pager/Telephone	EMT Room (Board Room)
AMOSC	ADA Authorised Callout Officer (see Appendix 1)	Telephone Duty Officer	As Directed
AMSA	ERG Leader or Statutory Agency(2)	Telephone	As Required
Vic DPI / MSV DEPHA/DIER (TAS)	AMSA(3) or Port Authority	Telephone	As Required
Resources/ Contractors	As authorised by ERG Leader or EMT Leader	Telephone/Fax	As Requested

***(1)** Contact Directory (Appendix A) / **(2)** This may be requested through the Port Authority or Vic DPI or MOC / **(3)** For spills in Commonwealth waters from shipping.*

3.4.2 ADA Response Team Personnel

Response team personnel are to refer to Figure 10 - Spill Response Flow Chart for immediate action guidelines and their respective Response Checklists in Appendix 2 for responsibilities.

3.5 Spill Monitoring

Objectives: The trajectory, volumes and weathering state of oil slicks from the MODU or support vessels are to be continually monitored and assessed in order to predict any potential impact on sensitive resources. The methodology applied to calculate oil slick trajectory using wind and current vectors is demonstrated in Figure 12.

Contain and/or Monitor Spill Substance: ADA's initial response strategy is to contain the spill substance if possible or to continuously monitor the spill in accordance with the spill response flow chart (see figure 10) and the oil spill action plan (see Figure 11). At the discretion of the Incident Controller the Supply Vessel may be used to disperse the oil.

Figure 10: Spill Response Flow Chart

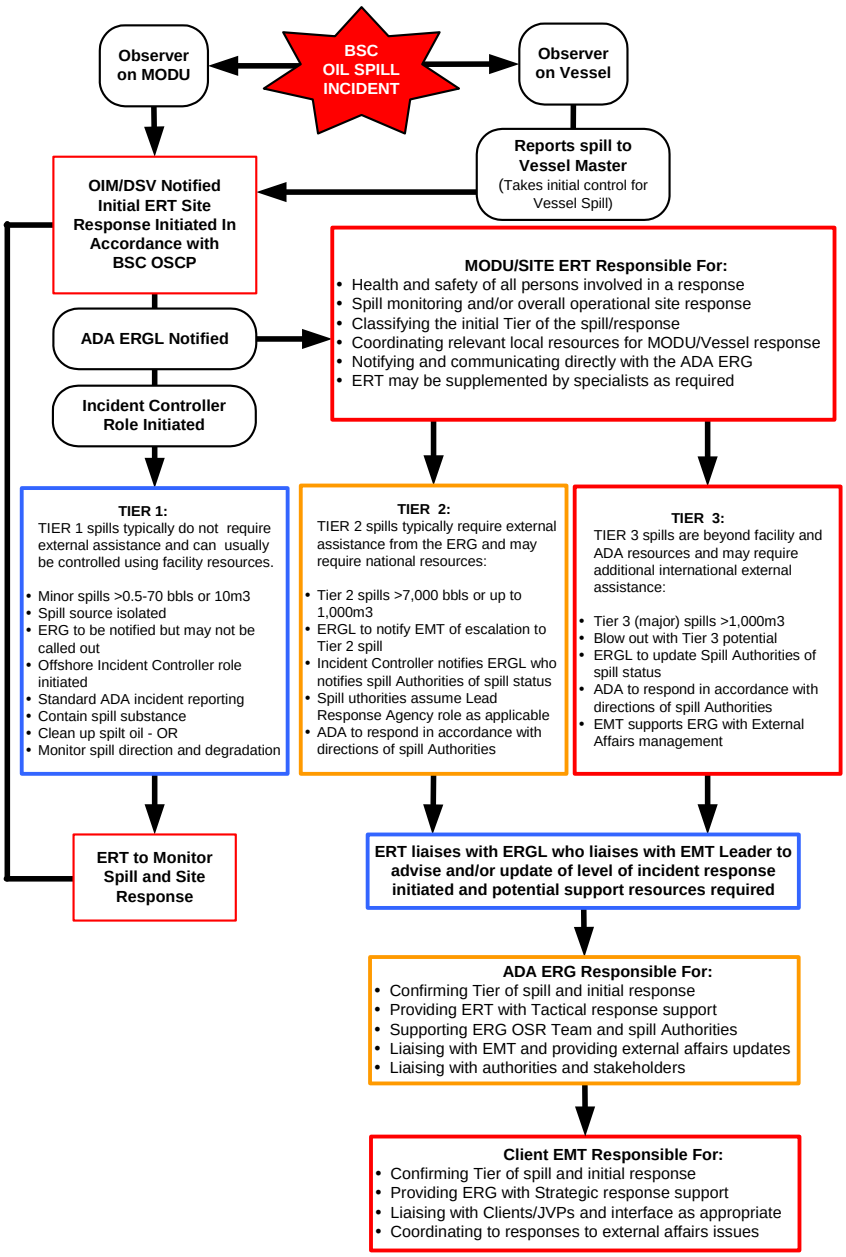
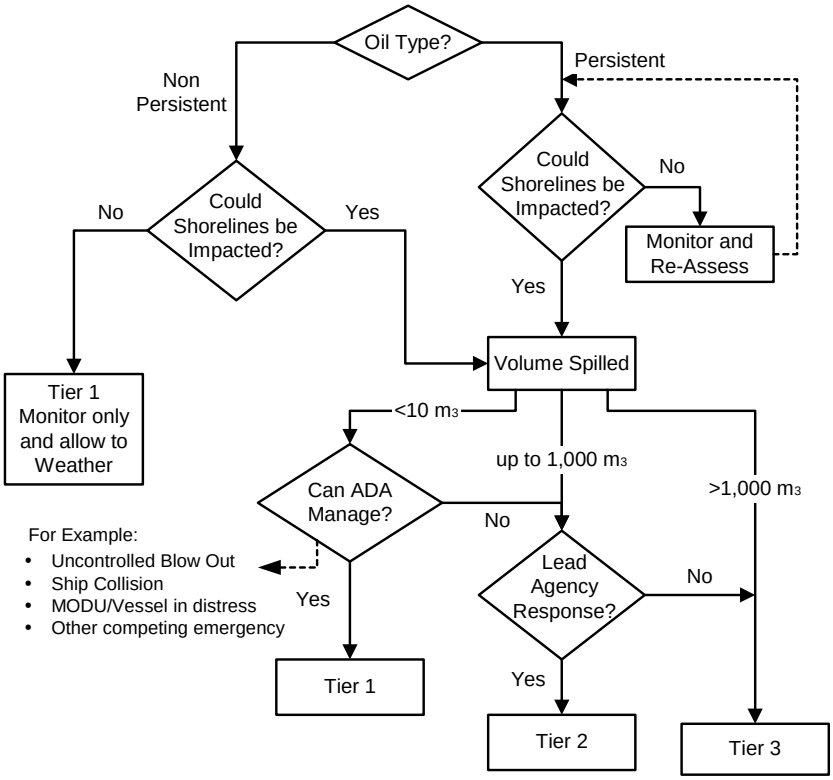


Figure 11: Oil Spill Action Plan



3.5.1 Observation from Vessels/Barge

Estimation of slick size can be difficult, Support Vessels are best used to monitor the general direction and spill size and in the event the spill escalates and/or the oil slick moves towards sensitive areas, Support Vessel Masters may be required to:

- Agitate the surface slick with thrusters or propellers' to help break up the slick;
- Confirm potential shoreline oil impact in areas not clearly seen from air (e.g. mangrove fringes);
- Collect samples of the oil.

3.5.2 Aerial Survey of Oil on Shorelines

Alternatively, aerial surveillance is also an option however information obtained during aerial surveillance is generally limited to:

- Location and width of oily bands;
- Length of ocean or shoreline oiled or potential for oiling;
- Estimated influence of wind speed combined with current speed (refer to Figure 12);
- Presence of reefs or other inshore hazards (important in areas where access is only available from the sea);
- Presence of access roads (this needs ground-truthing).

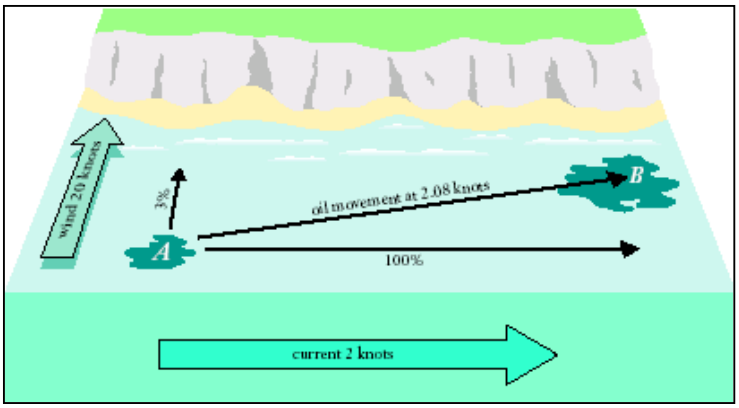
3.6 Monitoring - Natural Processes

Surface oil slicks tend to dissipate and break up naturally and this may be rapid, the rate of break up depends on:

- Oil type (light, low wax oils such as condensates/diesel fuel dissipate and break up rapidly);
- Sea State (high sea states favour break up);
- Winds (high winds are favourable).

Note: This is the favoured option for spills of light crude or diesel fuel oil.

Figure 12: Influence of Wind Speed Combined with Current Speed



3.7 Slick Trajectory

Computer Models: Movement and behaviour of an oil slick may be estimated using the computerised oil spill trajectory model available from the EIA.

Local information on the wind shift direction for a given month: Refer to the quantitative oil spill exposure assessment for the BSC Campaign for information regarding the surface advection velocities used in the simulations.

Computer Models: Movement and behaviour of an oil slick may be estimated using the computerised oil spill trajectory model provided with the ADA OSCP; also available from AMSA.

Manual Estimates: Spill trajectory can be estimated by adding the vector of current velocity to approximately 3% of the wind velocity, as illustrated in Figure 13.

3.7.1 Method

Estimates of spill volumes can often be made on the basis of the cause and duration of the spill. It is also possible to estimate the volume of a slick on the basis of its appearance at sea, and the area covered (see Table 15).

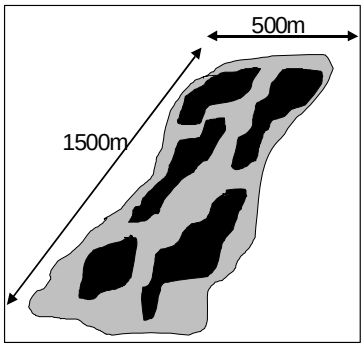
Table 15: Guidelines for Estimating Slick Volumes at Sea

Appearance of Slick	Volume of Oil per Km^2		
	m^3	Tonnes	Barrels
Barely visible except under some light conditions	0.05	0.04	0.31
Silvery sheen	0.10	0.09	0.43
Rainbow – iridescence or bright bands of colour	0.30	0.24	1.89
Dull Colours, colours still visible but are dull	1.00	0.85	4.29
Dark black or brown (or very dark colour)	2.00	1.70	12.40

Figure 13: Calculating Slick Volumes at Sea

The surface area of the slick can be estimated by:

1. Flying the length and breadth of the slick and equating the time taken to fly over the slick and the aircraft speed.
2. Calculating the slick area (i.e. length x breadth), and
3. Multiplying the area by the percentage of the slick that is oil (i.e. not clean water).
4. The areas covered by the various oil thicknesses should be calculated.
5. Calculate oil volumes using Table 6.1 (see example below).



Area =1.5km x 0.5km = 0.75 sq km.

40% of slick is black oil. So area of black oil is 40% of 0.75 sq km = 0.3 sq km.

Using Table 5.1, volume in black oil is approximately: 2 x 0.3 = 0.6 cubic metres.

60% of slick is sheen. So area of sheen is 60% of 0.75 sq.km = 0.45 sq km.

Using Table 5.1, volume of oil in the sheen is approximately:

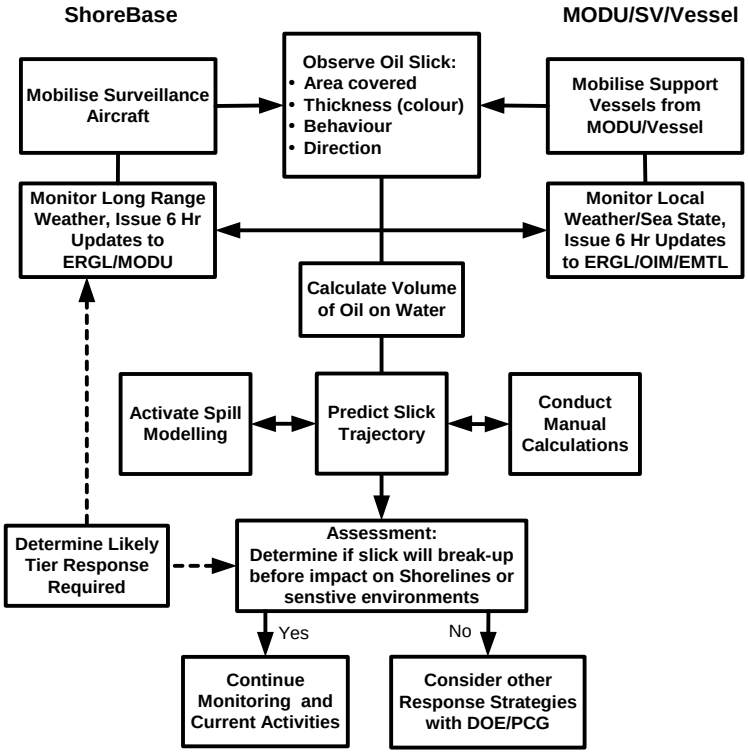
0.05 x 0.45 = 0.0225 cubic metres.

Note that the sheen contains very little oil and estimated volume, in this example, is about 0.6 cubic metres of oil or oily emulsion.

3.7.2 Determine Resource Needs

ADA ERG Leader may authorize logistics support and mobilize additional personnel as required. There may also be a need to mobilize an oil spill specialist to the MODU/vessel for guidance/assistance with monitoring, cleanup and determining response strategies.

Figure 14: Determining Offshore Response Strategies



3.8 Use of Dispersants

Dispersants are chemicals that act to "break-up" surface slicks and result in oil becoming mixed into the upper layers of the water column (i.e. 0-5m depths).

Note: Approval must be requested from the DPI/EPA prior to the commencement of the campaign

3.8.1 Considerations

Dispersants should only be used to reduce fire risk posed by spills of light to moderate crude oils or diesel and to facilitate the break-up of spills of heavy oils, or;

- When there is a net environmental benefit (i.e. when any potential harm produced by dispersed oil is less than from untreated oil).

Except for safety reasons, dispersants should not be used unless permission has been given by the DPI/EPA in state waters and AMSA in commonwealth waters. The decision whether to use dispersants is based on a number of considerations, which are identified in Figure 15: Dispersant Application Decision Tree.

3.8.2 Constraints

Weather and Sea State: Response strategies are constrained by a number of environmental considerations, sea states in the region often exceed these conditions and containment and recovery may be difficult.

Oil Type: The strategy is suitable for use on all oils except very volatile light oils and condensates (Group I oils). Disc skimmers are unlikely to be effective and the effectiveness of weir systems must be monitored closely, brush skimmers may be more effective. No attempt should be made to recover fresh, light crude oils (Group I and II) until their characteristics have been determined.

Equipment: The effectiveness of some equipment is restricted to a particular range of oil characteristics (usually viscosity is the constraint) or sea states. It is important that weather conditions (particularly temperature) and the character of the oil are known before equipment is activated or deployed. Figure 16 provides the containment and recovery strategy guidelines.

Application: The response strategy may also be constrained by logistics considerations:

- Availability of spotter aircraft required to assist vessels to locate oil, (unless oil slick is thick and easily identified);
- Spraying time of aircraft may be limited if a slick is a long way offshore;
- Permission obtained from DPI/EPA in state waters and AMSA in commonwealth waters for the use of dispersants if they are to be used below 30 m water depths (except in Emergencies).

3.8.3 Dispersant Application Methods

Vessel Spray Boom: Support Vessels will be equipped with an approved dispersant and dispersant spray mechanisms. Generally, dispersant will be applied from the Support Vessels only if the slick trajectory is moving in the direction of intertidal reefs or sensitive shorelines and if the oil is above its pour point.

Aviation Resources: Helicopters, spray buckets and fixed wing dispersant spraying aircraft can be utilised if spraying of slicks is required, these are accessed via AMOSC or AMSA.

Figure 15: Dispersant Application Decision Tree

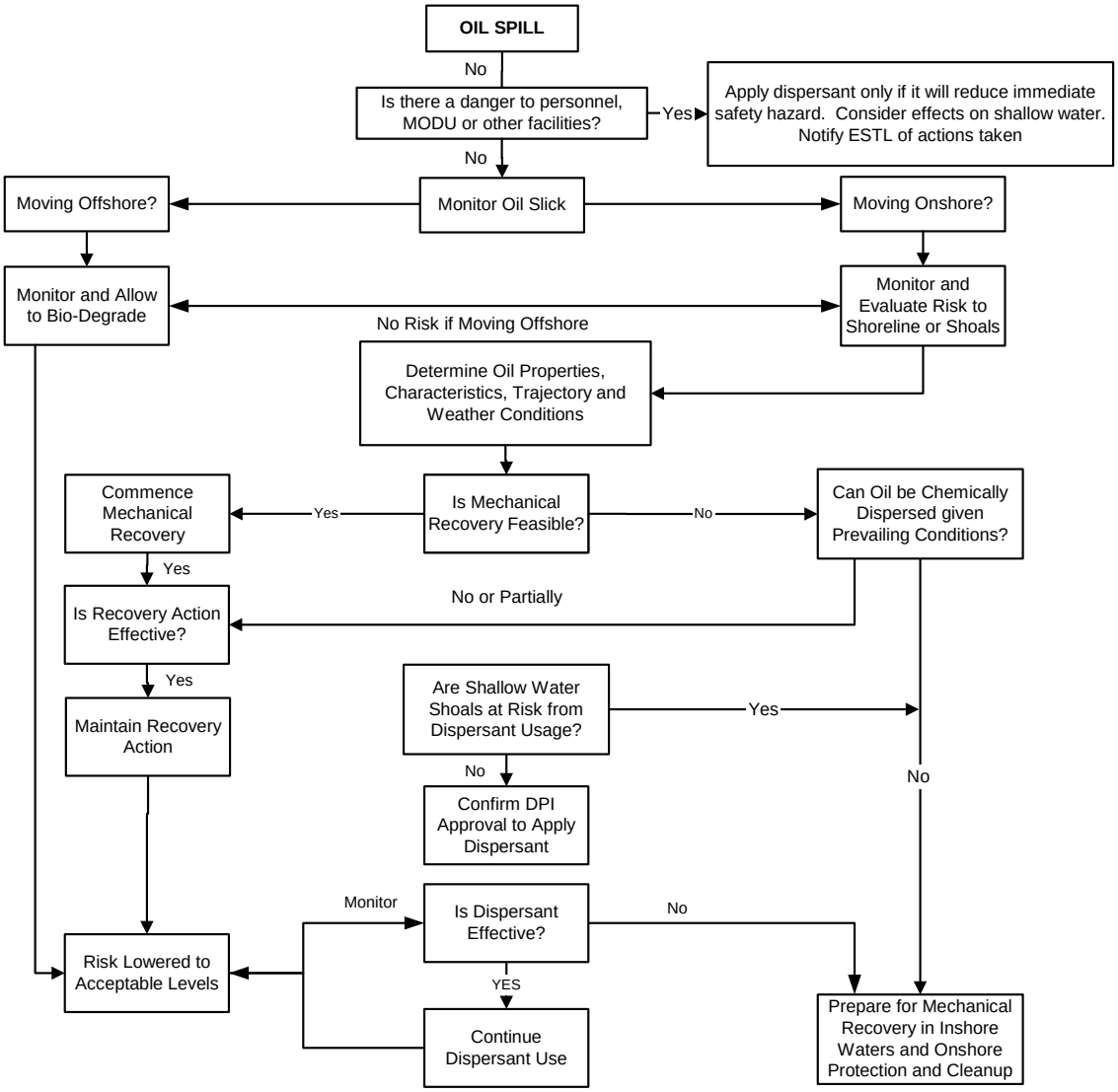


Table 16: Operational Constraints for Offshore Response Options

Response Strategy		Constraint				
		Sea State[1]	Current (Knots)[2]	Wind (Knots)	Oil Viscosity[3]	Other
Boom	Containment	3-4	1.0	14-22	-	Vessel availability
	Deflection	3-4	2.0	14-22	-	
Skimmers	Weir	1	1.0	7	<1000	Recovered waste oil storage availability
	Disc	2-3	1.0	11-14	<1000	
	Mop/Belt	3-4	1.0	14-22	>1000	
	Vacuum	1	1.0	7	-	
Physical Breakup[4]		-	-	-	-	Oil type
Dispersants	Vessels	4	-	22.0	<2000[4]	-
	Aircraft	5	-	27.0	<2000[4]	Range
Monitoring		-	-	-	-	Visibility

***(1)** Beaufort scale. See Table 7.3 / **(2)** 1 Knot = 0.5m/second or 1.8 km per hour approximately / **(3)** cSt = Centistokes / **(4)** This method should not be used on lube' oil or fresh spills of diesel.*

Figure 16: Containment and Recovery Strategy Guidelines

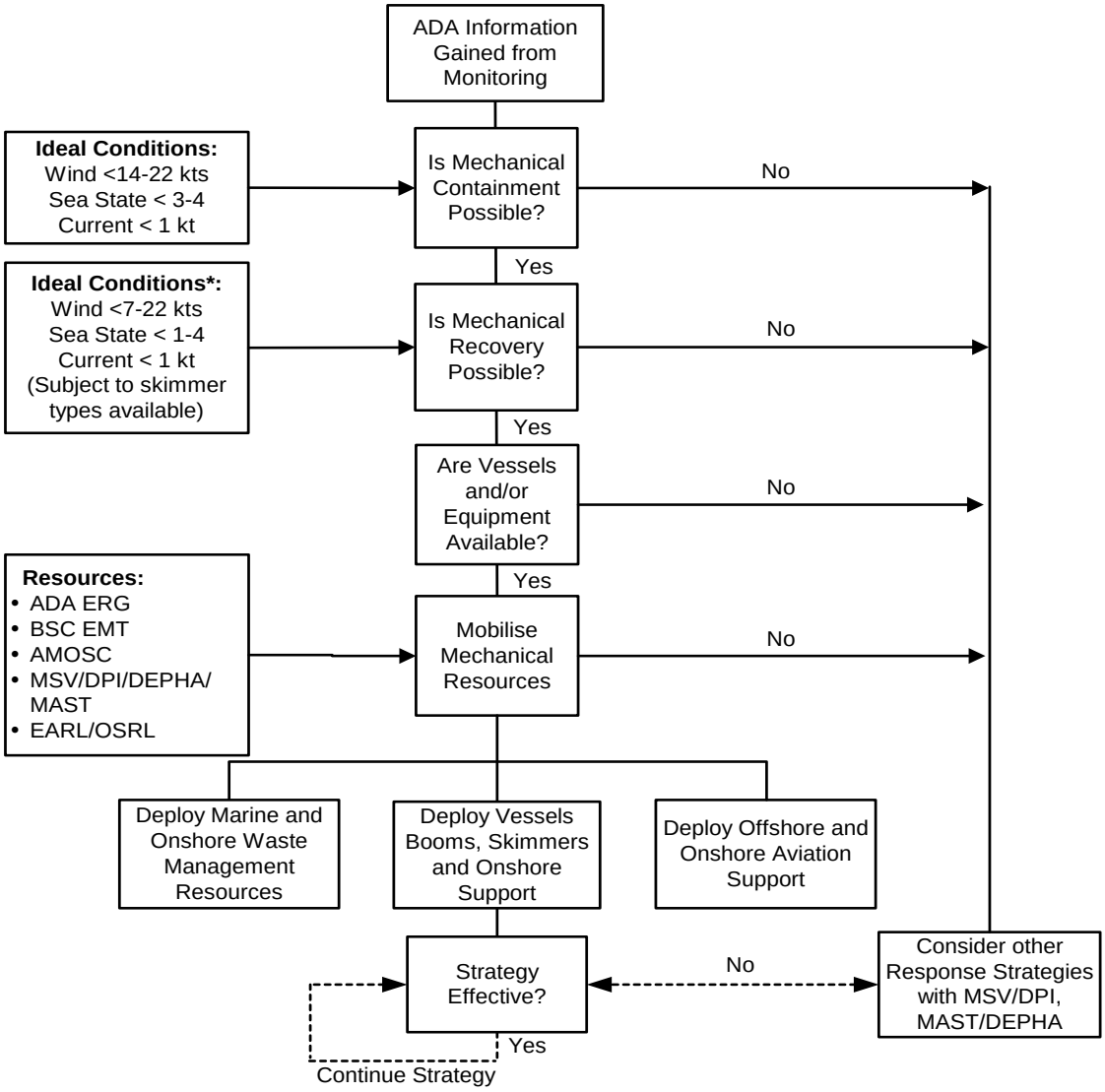


Table 17: Offshore Response Matrix

Est. Time Until Impact	<48 hours				>48 hours			
Oil Group[1]	**I**	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
Immediate Response Strategies								
Monitor: Natural Processes	**R**	**F**			**R**	**R**	**C**	**C**
Containment & Recovery		**NA**	**NA**	**NA**		**NA**	**NA**	**NA**
– (a) Weir Skimmers		**NA**	**NA**	**NA**		**NA**	**NA**	**NA**
– (b) Oleophilic Skimmers		**NA**	**NA**	**NA**		**NA**	**NA**	**NA**
– (c) Vacuum Skimmers		**NA**	**NA**	**NA**		**NA**	**NA**	**NA**
Dispersant Application		**C**	**C**	**C**		**C**	**C**	**C**
Physical Break-up		**F**	**F**			**R**	**F**	
Sorbent Recovery	**F**	**F**	**F**	**F**	**NR**	**F**	**F**	
Shoreline Protection	**R**	**R**	**R**	**R**	**NR**	**R**	**R**	**R**
Secondary Response Strategies (Day 2 and beyond)								
Natural Processes	**R**	**F**			**R**	**R**	**C**	
Containment and Recovery	**NR**	**R**	**R**	**R**	**NR**	**R**	**R**	**R**
– (a) Weir Skimmers	**NR**	**R**	**R**	**R**	**NR**	**R**	**R**	**R**
– (b) Oleophilic Skimmers	**NR**	**R**	**R**	**R**	**NR**	**R**	**R**	**R**
– (c) Vacuum Skimmers	**NR**	**R**	**R**	**R**	**NR**	**R**	**R**	**R**
Dispersant Application	**NR**	**C**	**C**	**C**	**NR**	**C**	**C**	**C**
Physical Break-up	**NR**	**F**			**NR**	**F**		
Sorbent Recovery	**NR**	**R**	**R**		**NR**	**F**		
Shoreline Protection	**R**	**R**	**R**	**R**	**NR**	**R**	**R**	**R**

Key		Oil Group	
R	*Recommended - preferred option*	*I*	*Very light crude's and Condensates*
F	*Feasible, but not preferred option*	*II*	*Diesel and Light crude's*
NA	*Feasible but not available because of location of resources or other logistics Constraint*	*III*	*Tropical and marine diesels, Lube oil, crude and other medium crude's*
C	*Conditional. Possibly useful but may have adverse effects, assessment and approval required*	*IV*	*Bunker C Fuel oils, Heavy Crude's*
NR	*Not required, oil not expected to persist*	*(1) Refer to Appendix E*	
	Not recommended - either not feasible, not safe or has significant adverse effects		
NR	*Not recommended and not required in any case*		

Note: *Crude should be considered a typical Group II oil if sea surface temperatures are above the oil's pour point of 20ºC. If temperatures are close to this temperature or below this temperature then the crude should be considered to behave more like a high pour point (Group IV) oil. Response operations must be closely monitored to ensure that equipment and strategies are effective.*

Table 18: Beaufort Scale

Beaufort Scale	Wind Speed(1)		Description		Wave Height(2)	
	Mean	Range	Wind	Sea	Mean	Max.
0	0	<1	Calm	Flat	-	-
1	2	1-3	Light air	Ripples	0.1	0.1
2	5	4-6	Light breeze	Small wavelets, no breakers	0.2	0.3
3	9	7-10	Gentle breeze	Large wavelets, some breaking crests and scattered white horses	0.6	1.0
4	13	11-16	Moderate breeze	Small waves, fairly frequent white horses	1.0	1.5
5	19	17-21	Fresh breeze	Moderate waves, many white horses, occasional spray	2.0	2.5
6	24	22-27	Strong breeze	Large waves, extensive white foam crests, some spray	3.0	4.0
7	30	28-33	Near gale	Sea rises, white foam from breaking waves in streaks	4.0	5.5
8	37	34-40	Gale	Moderate, long waves, white foam blown in long streaks	5.5	7.5
9	44	41-47	Strong gale	High waves, dense streaks of foam, wave crests begin to topple	7.0	10.0
10	52	48-55	Storm	Very high waves, long hanging crests, foam in large patches, sea surface largely white	9.0	12.5
11	60	56-63	Violent storm	Extreme waves (small-medium ships lost to view), foam covered sea surface, reduced visibility	-	-
12	-	>64	Hurricane/ Cyclone	Air filled with foam and spray. Driving spray, very reduced visibility	>14	-

***(1)** In knots (~0.5m/second or 1.8 km/hr) / **(2)** In metres.*

3.9 Shoreline Protection

Shorelines can be protected through marine strategies or by a number of inshore or onshore protection methods (see Table 19). The response agency responsible for shoreline cleanup will vary according to the area impacted. In most cases the Environmental Protection Agency (EPA) will be the primary agency responsible.

Generally, any large-scale cleanup will be undertaken as part of a State-led response (i.e. Tier 2 or 3 response). Usually a 'Shoreline Coordinator' (SC) will be appointed by the Government Incident Controller to direct the shoreline response or the Environment Division of the DEPHA.

3.9.1 Protection Priorities

Priorities for shoreline protection and cleanup will be set in consultation with the relevant authorities. The aims of shoreline response strategies are to:

- Protect sensitive shorelines from the impact of oil;
- Clean oil impacted shorelines;
- Rehabilitate oil-affected biological communities;

- Monitor oiled shorelines when oil cannot be removed.

The likely trajectory of a spill is to be defined using the spill trajectory modelling in this OSCP. Priority is to be given to protecting reefs for marine priority protection areas) and for preventing the spill from reaching beaches or other shorelines. In this instance the use of booms to protect reefs and influence the movement of the slick are to be considered.

Table 19: Protection Methods for Shoreline Types

		Method of Protection			
		Booms		Earth/Other	Inshore
Shoreline Type		**Deflection**	**Exclusion**	**Barriers**	**Dispersant**
A	Exposed Bedrock Cliff/ Seawalls				**F**
B	Exposed Bedrock Platform or Reef	**F**	**F**		**F**
C	Sheltered Bedrock Platform or Reef	**R**	**F**		**F**
D	Exposed Boulder/Cobble/ Rip rap	**F**	**F**		**F**
E	Sheltered Boulder/ Cobble/ Rip rap	**R**	**F**	**F**	**F**
F	Pebble Beaches	**R**	**R**		**F**
G	Sand Beaches	**R**	**R**	**R**	**F**
H	Mud/ Sand Flats	**R**	**R**		**C** (1)
I	Mangroves	**R**	**F**		**C** (1)
J	Saltmarshes	**R**	**R**		**C** (1)
K	Seagrass (Shallow/ Intertidal)	**R**			(1)
L	Shallow/ Intertidal Corals	**R**	**F**		(1)
M	Natural Inlets/ Channels	**R**	**R**	**R**	
N	Marinas/ Artificial Waterways	**R**	**R**	**F**	**F**

(R) *Recommended - preferred option /* ***(F)*** *Feasible, but not preferred, assessment needed /* ***(NA)*** *Feasible - not available because of resources or other logistics constraint /* ***(C)*** *Conditional - possibly useful but may have adverse effects, assessment and approval required*

Not recommended - either not feasible, not safe or has significant adverse effects

(1) *CAUTION: Dispersants should not be used on or close to these shorelines.*

3.9.2 Shoreline Assessment

Shoreline assessment is undertaken in order to:

- Determine whether cleaning is required;
- Quantify the amount and character of oil present;
- Confirm priorities for cleaning, in consultation with the appropriate authorities;
- Determine the type of cleanup required for each oiled beach segment.

Form OSCP 006 is provided for use with this assessment.

3.9.3 Shoreline Cleanup Strategies

Considerations: Shoreline cleanup strategies must be developed in consideration of shoreline character:

- Substrate type and shoreline type;
- Exposure to wave action;
- Biological, social or economic resources;
- Access available;
- Nature of the oil (viscosity etc.);
- Amount of oil present and distribution of oil on the beach and in the sediments;
- Available equipment, labour and waste storage areas.

Options: General cleanup guidelines are provided in Table 20 and 21.

Table 20: Summary of Considerations for Cleanup of Oil Spills.

Shoreline Type[(1)]		Comment
A	Exposed Bedrock Cliff and Seawalls	Generally considered to be of low sensitivity. Oil not likely to be persistent and wave reflection may prevent oil impact. May "self clean" but oil may refloat and impact other areas if not cleaned up.
B	Exposed Bedrock Platform or Reef	
C	Sheltered Bedrock Platform or Reef	Oil persistence depends on degree of exposure, porosity of rock and extent of fissures and cracks in the platform. Cleanup activities largely dependent on environmental effects of cleanup.
D	Exposed Boulder/ Cobble and Rip rap	Oil likely to penetrate sediment. Biological diversity highly variable. Persistence of oil is dependent on amount of fine material between boulders or cobble and exposure.
E	Sheltered Boulder/ Cobble and Rip rap	
F	Pebble Beaches	Generally of low biological diversity and abundance. Oil may penetrate into sediment and required vigorous cleaning.
G	Sand Beaches	Generally, low sensitivity. Low viscosity oils may percolate, or be reworked, into sediment. Oil persistence dependent on, substrate penetration/burial; and seasonal beach dynamics. Seek advice.
H	Intertidal Mud/ Sand Flats	Oil not likely to penetrate wet sediments. Biologically may be diverse. Ensure that environmental advice is sought. Cleanup, if attempted, should be done with care, using manual methods. Protection a priority.
I	Mangroves	Oil may persist in sediments for years. Biologically diverse and often important habitat for birds. Some manual cleanup - with expert advice only. High Protection priority.
J	Saltmarshes	
K	Seagrass (Shallow/Intertidal)	Cleanup is highly dependent on substrate type but seagrasses are easily damaged by cleanup. Seek expert advice, high protection priority
L	Shallow/Intertidal Corals	Sensitive to damage by oil and cleanup. Seek advice, high protection priority
M	Natural Inlets/ Channels	Urgent assessment. Priority for protection and cleanup is dependent on freshwater water outflow and tidal exchange, character of adjacent shorelines and presence of sensitive resources (birds, dugongs, crayfish and fish spawning areas). Generally high protection priority.
N	Marinas/ Artificial Waterways	

(1) *Shoreline type codes are as per Table 14*

Table 21: Shoreline Oil Spill Cleanup Matrix

		Shoreline Type[1]													
Cleanup Methods		**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**
Natural Processes		**R**	**R**	**F**	**F**	**F**	**R**	**F**	**R**	**C**	**C**	**C**	**C**	**C**	**R**
Manual Cleanup		**F**	**F**	**R**	**R**	**R**	**R**	**R**	**C**	**C**	**C**	**C**	**C**	**R**	**R**
Trenching					**F**	**F**	**F**	**F**							
Mechanical Sediment Removal							**F**	**R**	**C**						
Mech. Sediment Reworking							**R**								
Water Washing (Deluge)			**F**	**F**	**F**	**F**	**R**	**F**	**F**	**F**	**F**	**F**	**C**	**C**	
Water Washing (Low P) [2]			**F**					**F**	**R**	**F**	**F**	**F**	**C**	**C**	
Water Washing (High P) [2]		**C**	**C**	**C**	**C**	**R**	**F**								**F**
Hot Water Washing (Low P) [2]		**C**													**F**
Hot Water Washing (High P) [2]		**C**													**F**
Sand Blasting/Steam Cleaning		**C**													**F**
Vacuum Recovery		**F**	**F**	**F**	**F**	**F**	**F**	**R**	**R**	**C**	**C**	**C**	**C**	**R**	**C**
Excavation, Cleaning and Replacement of Sediment					**F**	**F**	**F**								
Cutting Oiled Vegetation		**C**	**C**	**C**	**C**	**C**	**C**	**C**		**C**	**C**			**C**	**C**
Chemical Cleaning		**C**	**C**	**C**	**C**	**C**	**C**								**C**
Bioremediation:	Nutrient Enhancement				**C**	**C**	**C**	**C**		**C**	**C**				
	Microbial Addition				**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	

(R) *Recommended - preferred option /* ***(F)*** *Feasible - but not preferred, assessment needed /* ***(NA)*** *Feasible – but not available because of resources or other logistics constraint /* ***(C)*** *Conditional - possibly useful or may be considered but may have adverse effects or result in damage, assessment and approval required / (NR) Not required, oil not expected to persist*

Not recommended - either not feasible, not safe or has significant adverse effects

(1) *See Table 13 /* ***(2)*** *Low P = <50 PSI, High P = >50 PSI*

3.10 Onsite Waste Storage

3.10.1 Temporary Onsite Waste Storage

Onsite storage of waste may present a number of problems, and care must be taken in the siting of waste storage areas. Local authorities, EPA, DPI and waste management contractors must be consulted prior to the commencement of waste storage activities.

Secondary pollution must be avoided during onsite waste storage, the following methods are to be considered if specialised storage containers are not available.

Oily Sediment - No Free Oil:

- Stored above the high-tide mark in pits no deeper than 1 m;
- Avoid vegetated areas and low-lying areas when considering storage sites.

Oily Sediment or Debris - Some Free Oil:

- Shallow pit lined with plastic, edges to be elevated above sediment level, depth of pit not to be such that intrusion of sediment water occurs;
- Plastic bags; no more than one third full and stored above the high-tide mark;

- Use of 200 litre drums, these are not to be filled to the top; (two thirds full is sufficient), drums are to be covered if possible to avoid the entry of rainwater with consequent overflow.

Free Oil - Oily Debris:

- Storage pits and drums as per oily sediment/some free oil, except that greater care is needed in the siting of temporary storage pits;
- Unless sediment water is encountered, pits to be deeper than above and left no more than two thirds full if possible;
- Storage pits to be covered.

3.10.2 Waste Management Responsibility

ADA is responsible for ensuring that adequate arrangements are made for the storage and disposal of oil recovered during a tier one spill. In a tier 2/3 response waste management will be coordinated from the ICC. It is the responsibility of the ERG Leader, supported by the ERG Materials and Logistics to ensure a suitable Waste Management Plan is implemented.

3.10.3 Procedures and Priorities

Aims: During an oil spill cleanup, the disposal of waste material must not pose any threat to the local communities or the local environment. Waste volumes are to be minimised and in general, disposal priorities shall be:

- Recycling of oil and any other waste materials (e.g. paper, drums);
- Land farming;
- Landfill and incineration.

3.10.4 Waste Management Plan

For any spill likely to produce significant amounts of waste, a Waste Management Plan is to be developed to ensure:

- Oily waste is properly handled and stored;
- Oil and oily debris is adequately segregated, treated and stored at point of collection;
- Oil and oily debris is rapidly collected and taken to designated sites for storage, treatment or disposal;
- Treatment or disposal practices ensure that the waste poses no future threat to the environment.

Note: It is important to note that the volumes of oily waste recovered from shorelines may be significantly greater than the volume of oil spilled.

Temporary Storage: A temporary waste handling base is to be established, this will allow for the separation of waste, the selection of suitable disposal routes and may use local facilities.

3.10.5 Segregation of Wastes

On Site: Where possible, wastes will be segregated in accordance with the preferred segregation shown in Table 22. For large spills or those where it is not possible to effectively segregate wastes in the field, the broader 'field' segregations can be used.

Methods: It may be required to separate oil from associated water, sediment and debris, in order to minimise volumes, this is not to be attempted on the spill site.

Table 22: On Site Segregation of Wastes

Field Segregation		Preferred Segregation
Liquid	Oils	Non emulsified oils
		Emulsified oils
	Wastewater	Water from temporary storage
		Water from heat or gravity separation of emulsions
		Water from chemically demulsified oil
Solid	Oils	High pour point oils
		High viscosity emulsions
		Tar balls
	Oily debris	Oil mixed with cobble or sand
		Oil mixed with wood, vegetation, plastics or sorbents

3.10.6 Onsite Handling

Offshore: Small tankers, barges or towed flexible containers (e.g. "Dracones") may be used for moving collected oil from the skimming vessels to a nominated shore waste station.

On Shore: Table 23 lists equipment available for transport and storage of wastes along shorelines. Attention is to be given to the prevention of secondary pollution, leaching and/or spillage of oil from vehicles or containers.

Vehicles are to be sealed using plastic sheeting and rubbish skips and other containers are also to be sealed prior to use.

Note: Any container used for storage must be covered if rain is possible, to avoid overflow.

Table 23: On Site Storage and Handling of Wastes

Waste Type	Container	Handling	
Liquid Oils and Wastewater	200 litre drums	Onshore	Half fill only, care needed in handling
	Fast tank(1) or	Onshore	Can be used for transport on truck with care.
	Vacuum trucks	Onshore	Not to be used on volatile oils
	Skips	Onshore	Bottom drainage hole needs to be plugged
	Large flexible bags/containers (e.g. Flexidam)(1)	Offshore and onshore	Onshore to be loaded onto flat-bed trucks prior to filling
	Barges and Dracones(1)	Offshore	Not suitable for use inshore
Solid Oils and Oily Debris	200 litre drums	Onshore	Half fill only, care needed in handling
	Skips	Onshore	Bottom drainage hole needs to be plugged
	Plastic bags	Onshore	Half fill only, to be transported or handled using Bobcat or Front-end Loader

***(1)** Available via MSV, Port Authority, DPI, AMOSC or AMSA.*

3.10.7 Offsite Transport and Storage of Waste

Contractors: Only State licensed waste contractors shall be used, regional waste contractors are listed in Appendix 1.

Caution: Care is to be taken that all vessels, vehicles, or containers used for the transport of oily wastes are effectively sealed and leak-proof.

3.10.8 Waste Separation

Waste separation is usually undertaken offsite at a designated waste processing area, a number of preliminary treatment options may be used to separate stored waste, these are shown in Table 24.

Table 24: Separation and Disposal of Waste Materials

Waste Type	Separation Method
Non emulsified oils	N/A
Emulsified oils	Heat treatment, Gravity separation(1) and/or Demulsifiers(2)
Water from temporary storage areas	N/A(3)
Water from heat or gravity separation	N/A(3)
Water from chemically demulsified emulsion	N/A
High pour point oils	N/A
High viscosity emulsions	N/A
Tar balls	Sieve to remove sand(1)
Oil and sediment	Collect oil leaching from storage pits or piles(1)
	Wash with water or solvent
Oil mixed with wood or other debris	Collect oil leaching from storage pits or piles(1)
	Wash with water

***(1)** May be undertaken at the point of collection (shoreline) / **(2)** May be undertaken at the point of collection but is not preferred / **(3)** Will not be undertaken on site.*

3.10.9 Waste Disposal

Waste must be disposed of in accordance with EPA Guidelines or in Tasmania in accordance with an approval issued by the Director, EPA. The EPA will typically assist the Incident Controller in the temporary storage and transport of wastes and will assist responsible parties identifying potential waste storage and disposal contractors.

Table 25: Disposal Methods and Regional Sites

Type of Material	Service Provider Disposal Site	Possible Disposal Method
Liquid Oil Waste (oil with some water)	Dutson Downs Hazards Waste Facility run by Gippsland Water	Recycle
Oily Water (water with some oil)		Oil-water separator
Oil-Water Emulsions		Demulsify/ recycle oil
Solid Oily Waste	As Above	Landfill, Oil content should be <30ppm

Type of Material	Service Provider Disposal Site	Possible Disposal Method
Non Oily, Non Putrescible Solid Waste Materials		Landfill or Recycle where possible: • Paper • Drums • Batteries • Glass • Aluminium/metals
Putrescible Wastes		Incineration, Landfill
Hazardous Wastes (other than oil)	As Above	This should not be produced, contact Environmental Adviser ASAP

(Note all empty chemical containers (dispersants) are classified as hazardous waste)

3.10.10 Waste Management Logistics

The ERG Materials and Logistics is responsible for tracking transport resources and for ensuring that appropriate transport is obtained from hire companies or other sources. The Logistics function is responsible for the provision of equipment, personnel, services and support materials for the ERG.

Tier 1: For small-scale responses, the Logistics function is managed by the ERG Materials and Logistics, located in Melbourne or at the offshore Supply Base. ERG Materials and Logistics is responsible for locating and obtaining local equipment and services.

Tier 2/3: In most large-tiered spill responses, the nominated Incident Controller (IC) will appoint a Logistics Officer to manage logistics.

3.10.11 Logistics Protocols

ERG Materials and Logistics is charged with keeping an accurate record of all equipment, personnel, services and materials obtained, this record will include:

- ADA ERG Leader authorisation for procurement/activation of resources;
- Date requested / Date received;
- Record of ADA ERG or other personnel supplied with resources;
- Date of return of non-consumable items;
- Record of demobilisation (cleaning and repair) and return of resources.

3.10.12 Equipment and Personnel

ERG Materials and Logistics may request assistance from the respective port Harbourmaster for spills within the Port. The ERG Leader may (through the DPI, MSV, DEPHA, MAST or AMSA) request Victorian, Tasmanian or National Plan equipment or personnel, however the need to do this would indicate a Tier 2/3 response is imminent.

Industry equipment is available through AMOSC, equipment located within the Ports that can be requested is listed in Appendix 4 and National equipment can be requested by the DPI/DEPHA or the MSV/MAST from AMSA (see also Appendix 4).

3.10.13 Personal Protection Equipment

It is the responsibility of the Person in Charge of the spill response and waste management activity to ensure that all personnel are supplied with:

- Appropriate personnel protective equipment (PPE);
- Accommodation and catering;
- Transport or other support.

3.10.14 Transport

ADA Field teams and personnel responding to a BSC oil spill for, or on behalf of ADA will be transported to and from their work-sites by transport provided by ADA. Private vehicles will not be permitted to be used.

Some restrictions also exist with regard to the transport of non-government personnel in government vehicles. All ADA ERG personnel and Contractors are to log their details with the ERG Materials and Logistics:

- Vehicles type and registration number;
- Whether government vehicle, hire car or personal;
- Any restrictions on use.

ERG Materials and Logistics is responsible for tracking transport resources and for ensuring appropriate transport is obtained from hire companies or other sources.

3.10.15 Medical Services

Medical services are listed in the Contact Directory in Appendix 1. Medivac procedures are provided in the ADA Emergency Response Plan.

3.10.16 Communications

For Tier 1 responses, the ERG Leader may delegate the ERG Information Coordinator or another team member to ensure all effective communications are maintained between locations and ERG personnel.

3.11 Wildlife Response

Wildlife rescue/rehabilitation may be required as part of the oil spill response activities. Important considerations in any wildlife response are to:

- Ensure the safety of the workforce; and
- Coordinate with the proper agencies and experienced rehabilitation organizations.

Capture of and care for oiled wildlife can be a hazardous activity and a rescue program will be successful only if people are not placed at unreasonable risk.

Following a significant oil spill, where there is a threat to wildlife, the Statutory Agency must be notified immediately.

The most effective method for protecting wildlife populations is to minimize potential exposure to surface oil. Hence, the primary response strategy for wildlife protection shall be controlling the release and spread of spilled oil to reduce the risk of exposure to species and/or habitat.

Wildlife deterrent techniques can also be used to move wildlife from locations that are in the projected pathway of spilled oil. Deterrent must be planned and executed carefully so the wildlife will not move into other oiled areas. Deterrent techniques include:

- Noise, including shotgun, air horns, alarm sounds, etc
- Scare devices, including helium-filled balloons and scarecrows on oiled beaches
- Herding wildlife using aircraft, boats, or other vehicles
- Human presence

Potential impacts of deterrent program shall also be considered, especially on sensitive habitats or species.

3.12 Obtaining Additional Equipment, Supplies and Manpower

If coordination of international equipment becomes an ADA responsibility a number of considerations are to be taken into account. Liaison with the Controller of Immigration is to be initiated by the ERG Materials and Logistics to expedite priority clearance, a member of the response team is required to meet experts on arrival to brief them.

3.12.1 International Equipment

For the Controller of Customs to expedite a prompt clearance and Tax Exemption on international equipment, early notification of the following details will be required:

- Equipment type, make, model, manufacturer and age;
- Quantity of equipment and request for direct off loading.

3.12.2 Assistance and Action Requested at Airport

- Request assistance from Director of Civil Aviation forklifts at the airport;
- Inform Commissioner of Police for security clearance;
- Prepare trucks to assemble at the airport;
- Arrange forklifts for offloading equipment at site(s);
- Prepare inventory for equipment;
- Prepare report on condition of equipment when arrived.

4. Part 4: Recovery

4.1 Purpose

This section details the recovery activities and the roles and responsibilities of ADA personnel to appropriately recover from an oil spill associated to the BSC Campaign.

4.2 Scope

The recovery phase often commences while the response phase is still being undertaken. This section details the recovery activities and the roles and responsibilities of ADA personnel to appropriately recover from a BSC oil spill.

4.3 Termination of the Primary Spill Response

4.3.1 Tier 1 Incident Control

A Tier 1 response is terminated by the ADA ERG Leader in consultation with the Client EMT Leader. Termination will only occur when all field spill response operations have ceased and all equipment is recovered.

Equipment cleaning, repairing and returning to source is typically managed under the recovery phase. Support personnel, undertaking functions such as finance may continue under the recovery phase until all claims are processed and costs are determined.

Tier 1 Marine and Aviation Response: Marine and aviation response operations are stood down when:

- All oil has been recovered; or
- Surface oil slick has broken up; or
- Oil slick has drifted out to sea and is beyond the range of BSC response options and is unlikely to return; or
- All oil has impacted shorelines and is unlikely to be refloated; in this case a Tier 2 or Tier 3 response will be initiated and marine response resources will remain on standby until shoreline response is terminated.

4.3.2 Tier 2/3 Incident Control

A Tier 2 or Tier 3 response is terminated at the request of the designated Lead Combat Agency Incident Controller. The Client EMT Leader will authorise the stand-down of ADA personnel and/or ADA contracted oil spill specialists.

Tier 2 and/or Tier 3 Marine and Aviation Response: Marine and aviation response operations are stood down when:

- All oil has been recovered; or
- Surface oil slick has broken up; or
- Oil slick has drifted out to sea and is beyond the range of GPC response options and is unlikely to return; or
- All oil has impacted shorelines and is unlikely to be refloated and marine and aviation response resources will remain on standby until shoreline response is terminated.

Shoreline Response: Shoreline cleanup operations may be terminated only under the direction of the MSV/DPI or the State Marine Pollution Controller and will generally be conducted when:

- All accessible shorelines are clean (i.e. free of oil); or
- Cleanup is having no further net benefit or having a deleterious effect on the shoreline or associated flora/fauna; or
- Remaining oil is judged to be acceptable or of little or no adverse effect.

4.4 Stand-Down Procedures

4.4.1 Deciding Final and Optimal Shoreline Cleanup Strategy

ERG Leader to review the reports from each location on the status and conduct of the operation. The ADA Incident Controller shall recommend to the ERG/Client EMT for the termination of operations after assessing the following:

- Spill is no longer posing a threat;
- Major beach cleaning work has completed and only minimum beach cleaning crew required.

4.4.2 Marine and Aviation Response

Upon receipt of response termination the ADA DSV/OIM will ensure that all:

- Personnel are accounted for;
- Equipment is recovered and cleaned;
- Vessels return to their respective berths;
- Equipment is safely offloaded and transported to a site for cleaning or repair;
- Equipment returned is logged;
- Equipment is returned to the correct owner/ location.

4.4.3 Shoreline Response

The ERG Leader or nominated Shoreline Coordinator will ensure all:

- Equipment is retrieved, returned to the relevant location for cleaning and redistribution and/or stowed away;
- Equipment not collected is identified and secured;
- Cleanup team members are transported back to the relevant base for demobilisation;
- Shorelines and stand down camps are left free of litter and/or other refuse;
- Equipment is safely offloaded, transported to a site for cleaning and maintenance;
- Equipment returns are logged;
- Re-order of consumed materials is initiated;
- Repairing or replacing damaged equipment is arranged;
- Restoration of temporary storage sites;
- Equipment is returned to the correct owner/ location;

- Waste management operations have a clear recovery strategy to work to;
- Local community liaison is conducted to ensure the community are aware of all stand down activities and recovery phase actions to follow.

4.4.4 Incident Control

The ERG Leader will hold a post-spill debriefing for any spill response in which the ADA ERG has been activated, the debrief will address:

- Spill causes (if known);
- Spill response (i.e. speed, operation, effectiveness);
- Equipment suitability;
- Health and safety issues (if any);
- Integration of OSCP and procedures with other response agencies.

4.4.5 Written Report

For any spill incident the ERG Leader is to ensure all relevant ADA Team Leaders contribute to a written incident report which is to include:

- Name / address of the claimant;
- Date / location of incident;
- Identity of source involved and incident cause;
- Typed and quantity of spill;
- Geographical impact;
- Evidence in the form of chemical analysis or movement of floating oil, to establish the original source of pollution and link it with the claim;
- Support claims for clean-up expenses;
- Review the contingency plan;
- Cost incurred in prevention and control of oil pollution;
- Direct economic loss;
- Costs for replacement and repair of property.

Note: The Government will claim the costs of cleaning up any spill from either the Spiller or appropriate Fund. On notification of termination of operations, the following steps are to taken

4.4.6 End of Emergency Checklist

ADA Incident Controller: The ADA Incident Controller to declare the Tier 1 on-site emergency is over when:

- BSC operations and/or supporting facilities have been returned to a safe condition;
- All personnel have been accounted for.

ADA ERG Leader: ERG Leader is responsible for declaring the end of an emergency once:

- BSC operation and/or supporting facilities have been returned to a safe condition as advised by the ADA Incident Controller;

- All people have been accounted for;
- All authorities, organizations and/or support services contacted during the response have been advised the incident is over.

4.4.7 Incident Debrief

ERG Leader to hold a post-spill debriefing for any spill response in which the BSC response personnel have been activated.

4.4.8 Incident Investigation

All BSC incidents will be investigated and reported on, investigation procedures are set out in the ADA HSE MS Manual.

Table 26: End of Emergency Checklist

On standing down from an emergency, the following issues must be considered:

1. On-going resources for incident control and post incident recovery (if required);
2. Final information release and/or notification to some, or all, of the following:

- Relevant ERT or support personnel
- Contractor Management
- Emergency Services
- Relevant Authorities
- Suppliers and/or contractors
- Media
- Industry Mutual aid
- Trade unions
- All EMT and relevant support personnel
- Regulatory authorities
- Employees (off and on duty)
- Third Parties
- Joint Venturers and customers
- Government support agencies
- Environmental agencies
- Local community and pressure groups

3. Debrief of all personnel (including people currently relieved or stood down);
4. Close down additional security arrangements;
5. Finalise additional catering and other services;
6. Initiate counselling (as required) for those involved in the incident;
7. Compile and file all documents relating to the response;
8. Arrange for full incident investigation and analysis;
9. Approve/comment on incident debriefing reports and recommended actions;
10. Carry out follow-up review to ascertain effectiveness of:

- Incident callout
- Overall emergency response
- Site and/or ERT functions
- Interface with other ERT's

11. Recommend revision of Emergency Plans as required.

Appendix 1: BSC Contact Directory

AUSTRALIAN DRILLING ASSOCIATES

OFFSHORE GIPPSLAND BASIN - VICTORIA

SHOREBASED DRILLING

EMERGENCY CONTACT DIRECTORY (Appendix 1 of CEMP 002)

2008/09

Rev 6 (Contact Directory Only)

Issue Date	Rev	Description	Prepared By:	Reviewed By:	Approved By	Approved for use Date:
Feb 08	0	Initial issue	W Sabron	D Parker	P Barrett	14/02/08
Feb 08	1	Updated issue	W Sabron	D Parker	P Barrett	22/02/08
Feb 08	2	Updated issue (To Be Read Together With Client Specific ERP & OSCP)	W Sabron	D Parker	P Barrett	27/02/08
Apr 08	3	Updated issue – As above & Reformatting	W Sabron	D Parker	P Barrett	02/04/08
Apr 08	4	Updated issue – Amendment of contact numbers	W Sabron	D Parker	P Barrett	28/04/08
May 08	5	Updated issue – Amendment of contact numbers	W Sabron	D Parker	P Barrett	16/05/08
June 08	6	Updated issue – Amendment of contact numbers	W Sabron	D Parker	P Barrett	17/06/08

APPENDIX 1 – CONTACT DIRECTORY

A1. TABLE OF CONTENTS

APPENDIX 1 – CONTACT DIRECTORY _____ 3
A1. TABLE OF CONTENTS 3
A2. EMERGENCY NOTIFICATION MATRIX 5
A3. MODU WEST TRITON FREQUENCIES 6
A4. MODU WEST TRITON CONTACTS 6
A5. SEADRILL PERSONNEL CONTACTS 6
A6. SWIRE PACIFIC VESSELS FREQUENCIES 7
A7. SWIRE PACIFIC VESSELS CONTACTS 7
A8. SWIRE PACIFIC PERSONNEL CONTACTS 7
A9. BRISTOWS HELICOPTERS CONTACTS 8
A10. LOGISTICS SHORE BASE CONTACTS 8
A11. ADA EMERGENCY RESPONSE GROUP 9
A12. ADA EMERGENCY SUPPORT GROUP (PART OF ERG) 10
A13. ADA AMOSC AUTHORISING OFFICER 10
A14. ESSO AUSTRALIA PTY LTD 11
A15. BASS STRAIT CONSORTIUM PARTICIPANTS' / JOINT VENTURE PARTNERS 13
A16. REGULATORS / LEGAL INFO CONTACTS 14
A17. OTHER BASS STRAIT CONSORTIUM 3RD PARTY CONTRACTORS 15
A18. OIL SPILL SPECIALISTS 17
A19. MUTUAL AID CONTACTS 19
A20. VICTORIAN STATE AUTHORITIES 20
A21. FEDERAL AUTHORITIES 27
A22. TASMANIAN STATE AUTHORITIES 31
A23. OTHER DRILLING CONTRACTORS 32
A24. WILDLIFE REHABILITATION 32
A25. FISHERY GROUPS 33
A26. OTHER OIL COMPANIES / OPERATORS 34
A27. WASTE MANAGEMENT COMPANIES 35
A28. OTHER HELICOPTER SERVICE PROVIDERS 36
A29. OTHER MARINE SERVICE PROVIDERS 37
A30. MEDICAL SERVICES 38
A31. AIRPORTS / AIR TRAFFIC 40

A32. WELL CONTROL SPECIALISTS..... 41

A2. EMERGENCY NOTIFICATION MATRIX

EMERGENCY ORGANISATION	ALL OFFSHORE EMERGENCY	Evacuation	POB	Unknown Vessel Approach	Oil or Hazardous Spills, EMP Breaches	Collision / Hull Damage MODU or Support Vessel	SAR Vessel	MEDIVAC	SAR Aircraft	Aviation Incident e.g. Helicopter crash	Fatality	Security Incident (MTOFSA)	Criminal Act	Illegal Boarding	If ongoing Government Assistance Is Required	Title	Contact Numbers	Time of Contact	Reply Received	Response Action / Notification
BSC Client	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Refer To A9	Refer To A7			
AMSA	✓1	✓1	✓1	✓1	✓	✓1					✓1	✓1	✓1	✓1	✓1	Main Switchboard (Canberra) S&R and Oil Spill (24 hrs - Maritime): (24 hrs – Aviation): Facsimile: AMSA Victoria AMSA Tasmania (If Required)	(02) 6279 5000 1800 641 792 1800 815 257 1800 622 153 (03) 8612 6000 (03) 6424 1597			
AusSAR							✓1		✓1	✓1						a) Aviation SAR: Emergency (24 hrs): Facsimile: b) Maritime SAR: Emergency (24 hrs): Facsimile:	1800 815 257 1800 622 153 1800 641 792 or (02) 6230 6811 (02) 6230 6868			
Airservices Australia									✓	✓						a) Melbourne Duty Officer (24 hrs): Facsimile: b) Air Traffic Control(24 hrs): Facsimile:	(03) 9235 7420 or (03) 9235 7402 (03) 9235 2744 (08) 8238 7992 (08) 8234 4174			
ATSB (Aus. Trans. Safety Bureau									✓1	✓1						Aviation, Marine and Incident Notifications (24 hrs): Facsimile:	1800 011 034 (02) 6274 6434			
DPI VIC DIER Tasmania DEPHA Tas.	✓1	✓1	✓1	✓1	✓	✓1	✓1		✓1	✓1	✓1	✓1	✓1	✓1	✓1	Petroleum Reg. Manager Emergency Pager (24 hrs): Petroleum Division Switchboard: Facsimile: DIER Tasmania (Bass Basin Activity) Director of Mines, Dr Tony Brown 24 x 7 Oil Spill Within Tas. Water	0408 543 154 136 186 (03) 9412 5101 (03) 9412 5152 1300 135 513 (AM Only) 0419 343 114 (24 hrs) 1800 005 171			
Police											✓1	✓	✓2	✓2		Police Victoria & Tasmania (24hrs): Coronial Court VIC Victoria Police Air Wing Victoria Water Police Squad Tasmania Police – Marine Services	000 (03) 9684 4380 (03) 9374 1311 (03) 9399 7500 (03) 6230 2475			
MSV (Marine Safety Vic) MAST (Marine and Safety Tasmania)					✓	✓										Switchboard (24 hrs): Pollution Emergency Incident Emergency Launceston (If Required) Hobart (If Required)	(03) 9655 3399 (03) 9883 5331 (03) 9883 5330 (03) 6334 3281 (03 6233 8801			
Port Authority					✓	✓										a) Geelong Port Marine Controllers (24 hrs) Operations Manager b) Port of Portland Switchboard (24 hrs)	035 247 0200 035 247 0300 0417 391794 (03) 5525 0900 0419 375 848			
Air Ambulance								✓								Essendon Airport (24 hrs) Flight Coordinator Latrobe Valley Airport Bendigo Airport	(03) 8341 9910 1300 883 100 (03) 5176 1265 (03) 5441 8631			
NOPSA	✓															Duty Officer - Notification (24 hrs):	(08) 6461 7090			
Workcover Authority (VWA)	Notification to WorkSafe will be initiated for any ADA/Bass Strait Consortium participants' related incidents associated to health and safety incidents at any ADA/ Bass Strait Consortium participants' related shorebase operations (i.e port or logistics operations bases, onshore responses to oil spills etc.)															WorkSafe Duty Officer (24 hrs): Facsimile Reports: (Online Report Acceptable)	132 360 (03) 9641 1091			

Notes: (1) It is a legislative requirement that the government authority (e.g. DPI / Police) is notified. If the emergency is likely to affect waters governed by other regulatory authorities, then they should also be notified. (2) Notify Police, if warranted.

A3. MODU WEST TRITON FREQUENCIES

Location	Communication	Frequency
Mobile Operation Drilling Unit (MODU): West Triton	H.F Marine:	Monitor 2182 / 4125 Distress Watch DSC 2187.5 KHz
	VHF Marine Radio:	Monitor 16 & 72
	Non Directional Beacon (NDB) (XMH ID Letters)	462 KHz ID 31987
	VHF Aero:	126.4 KHz (as required by Helicopter)

A4. MODU WEST TRITON CONTACTS

Support	Contact	Phone	Email
Mobile Operation Drilling Unit (MODU): West Triton	SEADRILL Radio Room	0061(0)862635772	WTriton.ADMIN@seadrill.com
	SEADRILL OIM	0061(0)862635773	WTriton.OIM@seadrill.com
	SEADRILL Tool Pusher	0061(0)862635778	
	ADA Drilling Supervisor	0061(0)863136824	west.wsm@australiandrilling.com.au
	ADA Materials	0061(0)863136825	west.mlc@australiandrilling.com.au
	ADA Conference Phone	0061(0)863136826	
	ADA Safety	0061(0)863136821	west.hseq@australiandrilling.com.au
	Service Office	0061(0)863136823	

A5. SEADRILL PERSONNEL CONTACTS

Company	Contact	Business	After Work	Facsimile	Email
Seadrill	Rig Manager, Paul Basey	0407 747 789	0407 747 789	(03) 9676-2086	pbasey@intgroup.com.au
	HSE Manager, Greg O'Neill	+65 64115076	+65 9665 4413		greg.oneill@seadrill.com
	Operations Manager, Bruce Worthington	+65 6411 5079	+65 9666 7218		bruce.worthington@seadrill.com

A6. SWIRE PACIFIC VESSELS FREQUENCIES

Location	Communication	Frequency
Swire Pacific Vessels Pacific Battler & Pacific Valkyrie:	Working Channel with MODU:	VHF 11
	H.F Marine:	Monitor 2182
	VHF Marine Radio:	Monitor 16

A7. SWIRE PACIFIC VESSELS CONTACTS

Support	Contact	Phone	Other Info	Email
Support Vessel: Swire Pacific Offshore Pty Ltd	Sat Phone:	Dial 0011 1480 7682 500 (Auto Voice Message) & Wait (Caller Prompted To Enter 12 Digit Number)		
	M/V Pacific Battler	Dial 0011 1480 7682 500, Followed By 8816 318 52213 OR;		
		Dial 0011 8816 318 52213		
		Master: 0427 103 821	Call Sign: 9V5944	pacific.battler@swireships.com
	M/V Pacific Valkyrie	Dial 0011 1480 7682 500, Followed By 8816 318 52436 OR;		
		Dial 0011 8816 318 52436		
		Master: 0417 103 848	Call Sign: 9V6791	pacific.valkyrie@swireships.com

A8. SWIRE PACIFIC PERSONNEL CONTACTS

Support	Contact	Phone	Facsimile	Email
Swire Pacific Offshore	Ops & HSE Mgr Steve Harris	0412 928 275 08 9430 5434	08 9430 7849	partick.thirley@bristowgroup.com
	Markerting Mgr Richard Gould	0419 769 757 08 9478 3388	08 9478 3844	craig.harrington@bristowgroup.com

A9. BRISTOWS HELICOPTERS CONTACTS

Support	Contact	Phone	Facsimile	Email
Helicopter: Bristows Helicopters Australia Essendon Airport	Pilot in Charge	0418 934 099		essops@bristowgroup.com
	Engineer in Charge	0417 944 034		
	Operations	0407 449 484		
	Check-In Desk	03 9379 4720		
Bristows Helicopters Australia	Bus. Dev. Mgr Patrick Thirley	0418 121 795 08 9478 3388	08 9478 2493	partick.thirley@bristowgroup.com
	Managing Pilot Craig Harrington	0419 769 757 08 9478 3388	08 9478 3844	craig.harrington@bristowgroup.com
	Commercial Manager Ron Scherpenzeel	0411 118 358 08 9478 3388	08 9478 2493	ron.scherpenzeel@bristowgroup.com

A10. LOGISTICS SHORE BASE CONTACTS

Support	Contact	Phone	Facsimile	Email
Logistics: Gippsland Maritime Logistics Geelong Port	Logistics Supervisor	0458 330 017 (24 hrs) 0488 548 560 0458 330 057		logistics@gippslandmaritime.com
Gippsland Maritime Logistics	Gino Cecchi	0458 334 492	03 9855 1091	keith.thomson@gippslandmaritime.com
	David Williams	0458 330 024	03 9855 1091	david.williams@gippslandmaritime.com
K&S Freighters Portland, VIC (For Drilling Client Specific)	Operations Manager, David Whitehead	03 5523 4144 0419 829 792 03 5523 4526 (A/H)	03 5523 5647	david.whitehead@ksgroup.com.au
	Operations Supervisor, Reece Whitehead	03 5523 4144 0402 899 313	03 5523 5647	reece.whitehead@ksgroup.com.au

A11. ADA EMERGENCY RESPONSE GROUP

Role	Contact	Business	After Hours	Facsimile	Email
Switchboard	Receptionist on Duty	03 8610 3000	0409 550 591	03 8610 3030	
Emergency Response Room	Operations Liaison	03 8610 3035	03 8610 3035	03 8610 3030	err@australiandrilling.com.au
ERG Leader	Phil Stratford (1°)	03 8610 3003	0409 550 591	03 8610 3030	p.stratford@australiandrilling.com.au
	Paul Barrett	03 8610 3004	0400 975 473	03 8610 3030	p.barrett@australiandrilling.com.au
	Rob Oliver	03 8610 3038	0447 558 742	03 8610 3030	r.oliver@australiandrilling.com.au
ERG Operations Liaison	Paul Barrett (1°)	03 8610 3004	0400 975 473	03 8610 3030	p.barrett@australiandrilling.com.au
	Rob Oliver	03 8610 3038	0447 558 742	03 8610 3030	r.oliver@australiandrilling.com.au
	Phil Stratford	03 8610 3003	0409 550 591	03 8610 3030	p.stratford@australiandrilling.com.au
ERG Materials & Logistics	Geoff Rawlings (1°)	03 8610 3012	0447 312 524	03 8610 3030	g.rawlings@australiandrilling.com.au
	Mandy Ceglar	03 8610 3019	0488 305 628	03 8610 3030	m.ceglar@australiandrilling.com.au
	Michael Grant	03 8610 3006	0447 205 156	03 8610 3030	m.grant@australiandrilling.com.au
ERG Technical Support	Mark Nasarczyk (1°)	03 8610 3007	0418 513 988	03 8610 3030	m.nasarczyk@australiandrilling.com.au
	Rajiv Tikkoo	03 8610 3008	0434 081 465	03 8610 3030	r.tikkoo@australiandrilling.com.au
	Sam Modi	03 8610 3039	0438 322 554	03 8610 3030	s.modi@australiandrilling.com.au
	Carl MacDonald	03 8610 3042	0421 287 187	03 8610 3030	c.macdonald@australiandrilling.com.au
ERG Regulatory Liaison	Kerri Reeks (ISRM)	03 8605 4816	0411 471 805	03 8601 1180	kerri@isrm.com.au
	Wafir Sabron	03 8610 3025	0403 674 184	03 8610 3030	w.sabron@australiandrilling.com.au
	Tanya Moussa	03 8610 3045	0421 643 097	03 8610 3030	t.moussa@australiandrilling.com.au
ERG Information Coordinator	Tanya Moussa (1°)	03 8610 3045	0421 643 097	03 8610 3030	t.moussa@australiandrilling.com.au
	Neil Troup	03 8610 3020	0423 781 250	03 8610 3030	n.troup@australiandrilling.com.au
	Manelle Moussa	03 8610 3023	0422 851 077	03 8610 3030	m.moussa@australiandrilling.com.au

A12. ADA EMERGENCY SUPPORT GROUP (PART OF ERG)

Role	Contact	Business	After Hours	Facsimile	Email
IT Support	Neil Troup (1°)	03 8610 3020	0423 781 250	03 8610 3030	n.troup@australiandrilling.com.au
Relative Response Administration / Facilities	David Lindell (1°)	03 8610 3022	0488 300 375	03 8610 3030	d.lindell@australiandrilling.com.au
	Roz Lewis	03 8610 3015	0409 142 409	03 8610 3030	r.lewis@australiandrilling.com.au
	Manelle Moussa	03 8610 3023	0422 851 077	03 8610 3030	m.moussa@australiandrilling.com.au
Reception	Receptionist on Duty (1°)	03 8610 3000	0409 550 591	03 8610 3030	
	Roz Lewis	03 8610 3015	0409 142 409	03 8610 3030	r.lewis@australiandrilling.com.au
	Mandy Ceglar	03 8610 3019	0488 305 628	03 8610 3030	m.ceglar@australiandrilling.com.au

A13. ADA AMOSC AUTHORISING OFFICER

Role	Contact	Business	After Hours	Facsimile	Email
ERG Leader	Phil Stratford (1°)	03 8610 3003	0409 550 591	03 8610 3030	p.stratford@australiandrilling.com.au
	Paul Barrett	03 8610 3004	0400 975 473	03 8610 3030	p.barrett@australiandrilling.com.au
	Rob Oliver	03 8610 3038	0447 558 742	03 8610 3030	r.oliver@australiandrilling.com.au

A14. ESSO AUSTRALIA PTY LTD

Contact	Work	Other	Facsimile
ESSO Production Control Room (Longford)	(03) 5149 6225 (03) 5149 7263		
Chris Finlay Esso Australia BBMT Terminal Supervisor (On-Duty)	(03) 5688 0237 0407 846 457		03 5688 1495
Deepinder Singh Esso Bass Strait, Long Island Point Marine Supervisor	(03) 5970 7524	0400 115 234	(03) 5970 7615
Esso Long Island Point Stu Jefferies	(03) 5970 7521 132222#45249	0418 514 858	03 5970 7570
Platform Direct Lines - Barracouta	(03) 5142 2615		
Platform Direct Lines - Bream A	(03) 5142 2835		
Platform Direct Lines - Cobia	(03) 5142 2715		
Platform Direct Lines - Flounder	(03) 5142 2675		
Platform Direct Lines - Fortescue	(03) 5142 2705		
Platform Direct Lines - Halibut	(03) 5142 2725		
Platform Direct Lines - Kingfisher A	(03) 5142 2805		
Platform Direct Lines - Kingfisher B	(03) 5142 2815		
Platform Direct Lines - Mackerel	(03) 5142 2735		
Platform Direct Lines - Marlin	(03) 5142 2625		

Contact	Work	Other	Facsimile
ESSO Production Control Room (Longford)	(03) 5149 6225 (03) 5149 7263		
Chris Finlay Esso Australia BBMT Terminal Supervisor (On-Duty)	(03) 5688 0237 0407 846 457		03 5688 1495
Platform Direct Lines - Snapper	(03) 5142 2635		
Platform Direct Lines - Tuna	(03) 5142 2655		
Platform Direct Lines - West Kingfish	(03) 5142 2825		
Platform Direct Lines - West Tuna	(03) 5142 2665		
Longford Heliport - Manned 0530 to 1700 7 days/wk	(03) 5149 6500		
Tower frequency - 129.75			

A15. BASS STRAIT CONSORTIUM PARTICIPANTS' / JOINT VENTURE PARTNERS

BSC Participants'	Contact	Designation	Work	After Hours	Facsimile	Email
Apache Energy	Randy Scott (1°)	Drilling Supt.	0417 770 335	0417 770 335	08 9422 7442	randy.scott@aus.apachecorp.com
	Mitch Elkins	Drilling Manager	08 9422 7211	0417 770 338	08 9422 7442	mitch.elkins@aus.apachecorp.com
	Michael Bark	H&S Coordinator	08 9422 7568	0438 307 955	08 9422 7442	michael.bark@aus.apachecorp.com
	Myles Hyams	Env. Manager	08 9422 7442	0419 934 495	08 9422 7442	myles.hyams@aus.apachecorp.com
3D Oil	Noel Newell (1°)	Managing Director	03 9650 9866	0419 897 097	03 9639 1960	nnewell@3doil.com.au
	Jon Keall	Exploration Mgr.	0439 038 054	0439 038 054	03 9639 1960	jkeall@3doil.com.au
	Leonie Chapman	HSE Coordinator	03 9885 9648	0418 122 336	03 9885 0582	leonie@chapmanconsulting.com.au
Nexus Energy	Nexus Crisis Room		03 9660 2566	03 9660 2566	03 9654 9303	cmt1@nxs.com.au
	John Ah-Cann	1° 1st Contact CMT Leader	03 9660 2570	0423 409 750	03 9654 9303	jahcann@nxs.com.au
	Kevin Lanigan	2° 1st Contact CMT Leader	03 9660 2514	0406 632 584	03 9654 9303	klanigan@nxs.com.au
	Michelle Zaunbrecher	1st CMT Coordinator	03 9660 2529	0403 413 637	03 9654 9303	mzaunbrecher@nxs.com.au
	Keith Edwards	1° 2nd Alt. CMT Leader	03 9660 2507	0417 392 750	03 9654 9303	kedwards@nxs.com.au
	Graham Bunn (1°)	2° 2nd Alt. CMT Leader	03 9660 2527	0408 318 013	03 9654 9303	gbunn@nxs.com.au
	Kerri Reeks (ISRM)	2nd CMT Coordinator	03 8605 4816	0411 471 805	03 8601 1180	kerri@isrm.com.au
	Ian Tchacos	1° 3rd Alt. CMT Leader	03 9660 2501	0417 090 224	03 9654 9303	itchacos@nxs.com.au
	Keith Edwards	3rd CMT Coordinator	03 9660 2507	0417 392 750	03 9654 9303	kedwards@nxs.com.au
Stuart Petroleum	Mark Mussared (1°)	Exploitation Mgr	08 8113 3690	0417 664 754	08 8410 0250	mark.mussared@stuartpetroleum.com.au
	Iain MacDougall	Eng. & Prod. Mgr	08 8113 3609	0401 710 091	08 8410 0250	iain.macdougall@stuartpetroleum.com.au
	Tino Guglielmo	Managing Director	08 8113 3602	0407 336 668	08 8410 0250	tino.guglielmo@stuartpetroleum.com.au
Beach Petroleum	Peter Cook (1°)	Drilling Manager	08 8433 1410	0418 833 034	08 8338 2336	peter.cook@beachpetroleum.com.au
	Neil Gibbins	Exploration Mgr	08 8433 1421	0412 543 065	08 8338 2336	neil.gibbins@beachpetroleum.com.au

A16. REGULATORS / LEGAL INFO CONTACTS

BSC Participants'	Contact	Designation	Business	After Hours	Facsimile	Email
National Offshore Petroleum Safety Authority (NOPSA)	Nyuk Tsen	Case Officer / OHS Inspector (Perth)	24 Hour 08 6461 7090 0401 202 055 0417 770 335	24 Hour 08 6461 7090 08 6461 7019	08 6461 7037	nyuk.tsen@nopsa.gov.au
	Bruce Armour	OHS Inspector (Melbourne)	03 8866 5702 0417 398 821	0417 398 821	03 8866 5706	bruce.armour@nopsa.gov.au
	Ray Wells	Team Leader (Melbourne)	03 8866 5701 0412 371 995	0412 371 995	03 8866 5706	ray.wells@nopsa.gov.au
Minerals and Petroleum Regulation Branch, Department of Primary Industries, Victoria	Switchboard Customer Service Centre	-	03 9412 4011 136 186	-	-	
	Terry McKinley	Manager, Petroleum Regulations	0418 528 420 03 9658 4414	0418 528 420	03 9658 4499	terry.mckinley@dpi.vic.gov.au
	David Wong	Principal Petroleum Operations Adviser.	0418 564 648 03 9658 4415	0418 564 648	03 9658 4499	david.wong@dpi.vic.gov.au
	Cynthia Crowe	Petroleum Environment Adviser	03 9658 4419	0428 398 676	03 9658 4499	cynthia.crowe@dpi.vic.gov.au
Department of Infrastructure, Energy & Resources, Tasmania	DIER Head Office Contact		1300 135513			webmaster@dier.tas.gov.au

A17. OTHER BASS STRAIT CONSORTIUM 3RD PARTY CONTRACTORS

Company	Name	Work	Facsimile	Email
Baker Hughes - Drilling Fluid Centrifuge/Mudlogging	Marc Quesnel	0437 780 205 08 9217 7147		
Cameron - Wellhead & SST	Trevor Fielder	0488 672 408 03 9361 4407		trevor.fielder@c-a-m.com
	Andrew Scofield	0407 704 146		andrew.scofield@c-a-m.com
Dril-Quip - Conductor & Wellhead & Mudline	Keith Petley	08 9322 8600	08 9322 8500	Keith_Petley@Dril-Quip.com
Expro Group Australia Pty Ltd	Canning Vale Duty Phone	0411 155 532	08 9213 5599	
	West Perth Office	08 9213 5555		
	Ed Anderson Area Manager	0413 123 435		ed.anderson@exprogroup.com
Fugro Offshore Survey - Rig Positioning	Bob Waugh	08 6241 1301 +64 6 769 504		b.waugh@fugro-btw.co.nz
Halliburton - Barite – GEL – Mud Chemicals	Hayden Butler	03 9581 7520 0410 220 916	03 9581 7599	hayden.butler@halliburton.com
Halliburton - Cement & Cementing Chemicals	Andrew Stobie	03 9581 7500 0421 608 267	03 9581 7599	andrew.stobie@halliburton.com
Halliburton - Cement & Cementing Services	Troy Heidecker	03 9581 7514 0410 030 665	03 9581 7599	troy.heidecker@halliburton.com
Marubeni Itochu Steel	Brad Calautti	0411 073 436	08 9483 1701	brad.calautti@mitubulars.com.au

Company	Name	Work	Facsimile	Email
- Casing		08 9483 1727		
Marubeni Itochu Steel - Casing	Ian Radford	0411 073 437 08 9483 1718		ian.radford@mitubulars.com.au
Rignet - Communications	Alex Tay	+65 6491 2002 +65 9664 7363		alex.tay@rig.net
Schlumberger	Wireline, Colin Carter	0428 103 789 03 5149 5611		ccarter@sale.oilfield.slb.com
	Directional Drilling, Bevan Morrison	0401 994 284 03 9674 7131	03 9674 7255	bmorrison@slb.com
	Base Manager / Drilling & Measurement Mike McDermott	0401 716 091 03 5149 5613	03 5143 2450	MMcdermott@slb.com
Tamboritha - ROV Services	Wayne Ham	0412 905 373 08 9322 1252	08 9322 1352	wjham@tamboritha.com.au
Weatherford - Casing Running	Neil Hensen	0429 852 546		neil.hensen@ap.weatherford.com

A18. OIL SPILL SPECIALISTS

Agency	Contact	Phone	After Hours	Facsimile
AMOSC	Geelong Switchboard Duty Officer Centre Manager Ivan Skibinski	03 5272 1555 (24 hr) – 0438 379 328 03 5272 1555 0418 398 363		(03) 5272 1839 (03) 5272 1839
AMOS Plan	Mobil Oil Australia Head Office Emergencies – 24 hrs McClean, David Williams, Michael Grgic, Illija Shell Company of Australia Emergencies – 24 hrs Van de Zaag, Rob	 03 8633 8444 1800 023 005 03 9286 5682 03 9286 5759 03 9286 5520 03 9666 5444 1800 651 818 03 9392 1224	03 9483 0083	 (03) 8633 8445 (03) 9286 5577 (03) 9286 5588 (03) 8823 4800
Bird Rehabilitation Penguin Parade Phillip Island Taronga Zoo Sydney Libby Hall – Supervisor Wildlife Rehab Ema Walraven – Senior Curator		 (03) 5956 8300 (02) 9969 2777 (02) 3378 4751 (02) 9978 4609	 (02) 9978 4751 (02) 9807 3558	 (03) 5956 8394 (02 9978 4500 (02) 9978 4516 (02) 9978 4613
Esso Australia BBMT Terminal Supervisor Switchboard		(03) 5688 0237 (03)9270 3333		(03) 5688 1495
Environmental Advisor: Terrens, Greg		(03) 9270 3172	(03) 9676 9551	(03) 9270 3794
Coffey Solutions, Senior		(03) 9882 3555		(03) 9882 3533

Agency	Contact	Phone	After Hours	Facsimile
Consultant Biologist - Gwyther, David				
Capricorn Environmental Consultants – Yepoon Principal Consultant Hayes, Terry / faydee@cqnet.com.au		(07) 4939 4711	(07) 4939 4711	(07) 4939 4769
Esso Australia – West Kingfish Platform Oil Spill Response		(03) 5142 2820		
Oil Spill Sample Testing Australian Government Analytical Laboratories (AGAL) Sydney		(02) 9229 0111		(02) 9449 1653
GEMS (Environment Modelling System) Melbourne Oil Spill Trajectory Modelling Hubert, Dr Graeme		(03) 9712 0016		(03) 9712 0017
GEMS (Perth) Oil Spill Trajectory Modelling Langry, Scott		(08) 9379 8946	(08) 9480 5095	(08) 9379 8947
Australian Maritime Resources AMSA Dispersant Spraying Contractor Wayment, Ted		(08) 8281 8433	(24 hr) (08) 8449 4141	(08) 8242 3132

A19. MUTUAL AID CONTACTS

Contact	Work	After Hours	Other	Facsimile
Esso Bass Strait Deepinder Singh	(03) 5970 7524		0400 115 234	(03) 5970 7615
Esso Long Island Point Stu Jefferies	(03) 5970 7521 132222#45249		0418 514 858	03 5970 7570
Mobil Altona Robert Ferrie	03 9286 5940		0400 685 770	03 9286 5588
Shell Newport Andy Hogg	03 9392 1215		0417 352 787	03 9392 1341
Caltex Newport Hem Kumar	03 9287 9551		0410 717 035	03 9287 9572
Shell Geelong Huck Poh	03 5273 8488		0419 521 480	03 5273 8215
BP Melbourne John Taylor	03 9680 5640		0419 704 577	03 9680 5657
Mobil Yarraville Peter Reale	03 9286 5061		0418 107 646	03 9689 7813

A20. VICTORIAN STATE AUTHORITIES

Contact	Work	After Hours	Other	Facsimile
Bureau of Meteorology Melbourne (IDD++61 3) Forecasts General 24hr Duty Forecaster General Inquiries – Forecasts and Warnings	(03) 9669 4916 (03) 9669 4965 (03) 3669 4981 (03) 9669 4000			 (03) 9663 2059 (03) 9669 4979 (03) 9669 4964
Victoria Weather By Phone Service – Bureau of Meteorology	Contact Number			
Full State Service	1900 955 363			
Melbourne Metropolitan Service	1900 926 109			
Melbourne Metropolitan Temperature and Weather Observations Service	1900 926 121			
Port Phillip and Western Port Service	1900 926 110			
VIC Coastal Waters Service	1900 969 930			
Central Coast, Cape Otway to Wilson's Promontory Service	1900 969 931			
Northern Tasmania Coastal Waters Service	1900 969 932			
East Coast, Wilson's Promontory to 60 nm east of Gabo Island Service	1900 969 933			
West Coast, SA/VIC border to Cape Otway Service	1900 969 934			
VIC Coastal Waters Service (including Gippsland Lakes)	1900 969 966			
Yacht Forecast for Port Phillip and Western Port	1900 920 557			

Contact	Work	After Hours	Other	Facsimile
VIC Coastal, Land Weather and Flood Warnings	1300 659 217			
National Weather By Phone Service – Bureau of Meteorology	Contact Number			
National Telephone Weather Services Directory	1900 926 113			
National Telephone Weather Service	1900 955 369			
National Marine Service	1900 955 370			
Department of Human Services DHS Emergency Call Centre	1300 650 172 (030 9096 0000			
Recovery Manager - Gippsland Region Houlihan, Geoff	(03) 5177 2597		0419 344 384	
Deputy Recovery Manager – Gippsland Region Caulfield, Doug	(03) 5177 2542		0409 008 494	
Department Primary Industries (IDD++61 3) – Switchboard Customer Service Centre	(03) 9412 4011 136 186			
Senior Petroleum/Pipeline Engineer Department Primary Industries David Wong (David.Wong@dpi.vic.gov.au)	(03) 9658 4415	0418 564 648	0418 564 648	(03) 9658 4499
Principal Petroleum and Geothermal Environment Adviser, Department Primary Industries Cynthia Crowe (Cynthia.Crowe@dpi.vic.gov.au)	(03) 9658 4419	0428 398 676	0428 398 676	(03) 9658 4499

Contact	Work	After Hours	Other	Facsimile
Manager, Petroleum Regulations Department Primary Industries McKinley, Terry (Terry.McKinley@dpi.vic.gov.au)	(03) 9658 4414	0418 528 420	0418 528 420	(03) 9658 4499
Principal Petroleum Resources Advisor Department Primary Industries Dr Kourosh Mehin (kourosh.mehin@dpi.vic.gov.au)	(03) 9658 4416	0419 597 010	0419 597 010	(03) 9658 4499
Director: Roberts, Phil	(03) 9658 4457	0419 307 179	0419 307 179	(03) 9658 4499
Department of Sustainability and Environment Port Phillip Regional Office Switchboard	136186 (03) 9296 4400			
Manager Fisheries Gippsland Miller, Doug	(03) 9296 4541			(03) 9296 4710
Gippsland Manager Brown, Kevin	(03) 5952 5910		0417 359 473	(03) 5952 5721
Senior Property Manager Andy Crabtree	(03) 5172 2189			(03) 5172 2111
Manager Biodiversity Group– Port Phillip Region Mark Winfield	(03) 92964633		0419751006	(03) 92964708
Manager Biodiversity Group Proxy Ron Waters	(03) 92964633		0408134310	(03) 92964708
Coastal Cleanup activities Wayne Malone	(03) 9296 4633		0419342963	(03) 92964708

Contact	Work	After Hours	Other	Facsimile
Environment Protection Authority				
Melbourne (IDD++61 3) Duty Officer - Information Centre Gippsland Regional office	(03) 9695 2777 (03) 9695 2722 (03) 5173 9800	1800 444 004 A/H Pollution Watch Line		(03) 5174 7851
Marine Safety Victoria				
Oil Spill 24 h marine pollution	(03) 9883 5331			
Oil Spill 24 h vessel incident	(03) 9883 5330			
Marine Operations Manager Melbourne Mark Smallwood	(03) 9655 9788		0408 215 614	(03) 9655 6611
Marine Pollution Response Manager Stephen Turner	(03) 9655 6250		0439 304 438	(03) 9655 6611
Business hours Switchboard	(03) 9655 3399			
Skilled Maritime Services Melbourne (IDD++61 3) – Switchboard	(03) 9645 6630			(03) 9645 6608
Manager - Winship, Steve			0409 258 403	
Assistant Manager - Magro, Joe			0402 056 943	
Port Protective Services - Cropley, Ben	(03) 9645 3524	(03) 9789 0303	0413 273 872	(03) 9645 2953

Contact	Work	After Hours	Other	Facsimile
Toll Geelong Port – Switchboard Marine Controllers	(03) 5247 0200 (03) 5247 0300			(03) 5272 1560 (03) 5247 0379
Operations Manager - Stanley, Ken	(03) 5247 0312		0417 391 794	(03) 5272 1560
Toll Western Port				
Switchboard	(03) 5983 9406			(03) 5983 8684
Operations Manager Dick Cox	(03)5983 9406		0417 391 794	(03) 5272 1560
Road Transport Services				
Dyers Transport – Cecil King	(03) 9791 4468 (03) 9791 4866			(03) 9794 5757
Toll Fast Victoria	133 278			
OPC – Phil Dent	(03) 9398 3011		0418 359 526	(03) 9398 3044
State Coroner's Office Melbourne (IDD++61 3)	(03) 9684 4444 (24hrs)			(03) 9682 1206
Parks Victoria – Wilsons Promontory Switchboard Emergency Number 24 hr	(03) 5680 9555 (03) 5680 9512			(03) 5680 9516
Coast Watch Switchboard				
24 hr Customs Hotline Radio Room Melbourne	1800 061 800			
Switchboard 24 hr	(02) 6275 6000			

Contact	Work	After Hours	Other	Facsimile
Fire Department - Fire Call 24 hr Swithboard	000 (03) 5226 6200			(03) 9665 4244
Fire Call 24 hr	000			
Switchboard Melbourne	(03) 9662 2311			
Victoria Police				
Emergency	000			
Search & Rescue	1800 135 729			
Air Wing Essendon	(03) 9374 1311			
State Emergency Services				
Emergency 24 hr	(03) 9696 6111			
East Gippsland Office 24 hr	(03) 5153 1322			
Gippsland Ports Committee of Management				
Harbour Master Rob Anderson	(03) 5150 0500		0407 558 262	(03) 5150 0501
Port Manager of East Gippsland Shayne Clarke	(03) 5155 6900		0429 018 800	(03) 5155 6901
Port Manager of South Gippsland Alan Smith	(03) 5688 1303		0428 113 324	(03) 5688 1658

Contact	Work	After Hours	Other	Facsimile
Port of Melbourne Authority Melbourne				
Duty HSO **24 hr**	**(03) 9687 3515**			
Head Office **Switchboard**	**(03) 9628 7555**			**(03) 9612 3599**
Shipping Management Centre 24 hr	**(03) 9644 9777**			
Navigation Services Manager **Muir, Capt. Tim**	**(03) 9612 3540**	**(03) 9808 5105** **106 030** **# 372 881**	**0418 385 301**	**(03) 9612 3599**
Paulusz, Charles	**(03) 9612 3542**	**(03) 9580 5082**	**0418 345 496**	**03) 9612 3550**
Victorian Workcover Authority **Melbourne (IDD++61 3)** **Switchboard** **First point of emergency contact - 24 hours**	**(03) 9641 1555**	**132 360**	**0407 833306**	**(03) 9641 1201** **(incident notification)**

A21. FEDERAL AUTHORITIES

Contact	Work	After Hours	Other	Facsimile
Australian Customs Service Coast Watch (IDD++61 2) Operations Room Customs Information and Support Centre	Customs Hotline 1800 061 800 1300 363 263	(24 hrs) (02) 9275 6000		(02) 6275 6275
Airservices Australia - Flight Services Contract for Restricted Airspace Canberra (IDD++61 2) Switchboard (National) Melbourne (IDD++61 3) Air Traffic Services	1300 301 120 (03) 9339 2666			(02) 6268 5688
AusSAR Aviation 24 hr Maritime 24 hr	1800 815 257 1800 641 792			
Australian Maritime Safety Authority (AMSA) Switchboard Maritime (24hr)	(02) 6279 5000 (02) 6230 6811			(02) 6279 5021 (02) 6230 6868
Australian Search & Rescue (AusSAR) (IDD++61 2) Rescue Coordination Centre (RCC) Australia Search & Rescue Aviation (24hr) Aviation Free Call Search & Rescue Maritime (24hr) Maritime Free Call	(02) 6230 6880 (02) 6230 6899 (02) 6230 6899 1800 815 257 (02) 6230 6811 1800 641 792		1800 815 257 1800 641 792	(02) 6230 6868 (02) 6230 6868 (02) 6230 6868
Operations Manager - Young, John	(02) 6279 5710			

Contact	Work	After Hours	Other	Facsimile
				(02) 6230 6868
Devonport (IDD++61 3) Fitzpatrick, Mike Schwartz, Alan	(03) 6424 1597 (03) 6424 1597	(03) 6424 6864 (03) 6427 0430	0408 144 634 0408 144 635	(03) 6424 8009 (03) 6424 8009
Marine Environment Protection Unit - Canberra (IDD++61 2) - Switchboard	(02) 6279 5000		1800 641 792 (24 hrs)	(02) 6279 5021 (02) 6230 6868
Marine Environment Protection Unit – Victoria Regional Office (IDD++61 3) - Switchboard	(03) 8612 6000			
GM – Emergency Response Baird, David General Manager PA	(02)6279 5700 (02)6279 5777	(02) 6292 9054	0418 622 824	(02) 6279 5071 (02) 6279 5757
Manager Environment & Protection Response Greg Chaffey	(02)6279 5650	(02) 6269 0800	0418 633 107	(02) 6279 5076
Operations & Training Co-ordinator Beck, Greg	(02) 6279 5929	(02) 6269 0799	0418 623 353	(02) 6279 5076
Senior Operations Co-ordinator - Brown, Keith	(02) 6269 5873 (02) 6279 5873	(02) 6269 0832	0419 484 446 0418 481 215	(02) 6279 5076 (02) 6279 5757
Melbourne (IDD++61 3) Manager - Ship Safety (South) Mackay, Bob / O'Neil, Sean	(03) 9674 3010 (03) 8612 6010	(03) 9872 5347 Pager 1300 555 555 # 171 373	0418 497 784 0408 697 312	(03) 9674 3003 (03) 8612 6004
Australian Transport Safety Bureau (ATSB) Canberra (IDD++61 2) Aviation Incidents Switchboard	1800 011 034 (02) 6274 6141	1800 011 034 (24hrs)		(02) 6274 3117

Contact	Work	After Hours	Other	Facsimile
CSIRO - Wildlife & Ecology Canberra (IDD++61 2) – Switchboard	(02) 6242 1600 1300 363 400			(02) 6242 1555
Site Manager (24 hr) CSIRO Moore, Bob	(02) 6242 1620			
Dept. of Agriculture, Fisheries & Forestry Canberra (IDD++61 2) - Switchboard	(02) 6272 3933			(02) 6272 5161
Minister for Agriculture, Fisheries & Forestry	(02) 6277 7520 (02) 6272 3933			(02) 6273 4120
Department Secretary	(02) 6272 4180 (02) 6272 4182			(02) 9272 4906 (02) 6272 5161
Managing Director for National Offices	(02) 6272 5848			(02) 6272 5697
Dept. of Employment, Workplace Relations & Small Business Canberra (IDD++61 2) - Switchboard	(02) 6121 6000			
Minister for Employment Services	(02) 6277 7540			(02) 6273 5188
Department Secretary	(02) 6121 7500			(02) 6121 7508
Department of Environment & Heritage Canberra (IDD++61 2) - Switchboard	(02) 6274 1111			(02) 6274 1666
Minister for Environment, Heritage & the Arts Hon Peter Garnett	(02) 6277 7640			(02) 6273 6101
Dept. of Industry, Science & Resources Canberra (IDD++61 2) Switchboard	(02) 6213 6000			(02) 6213 7000

Contact	Work	After Hours	Other	Facsimile
Manager Offshore Safety & Security Section Butler, Paul	(02) 6213 7960	(02) 6262 6862	0419 260 241	(02) 6213 7950
Manager Environment Section Lloyd, Chris	(02) 6213 7934	(02) 6242 9048		(02) 6213 7950
Senior Policy Officer	(02) 6213 7973			(02) 6213 7950
Department of Industry, Tourism & Resources - Switchboard	(02)6213 6000 Switchboard 1800 024 095			(02) 6213 7000
Manager Environment Section, Bruce Wilson	(02) 6213 7901			(02) 6213 7950
Senior Policy Officer, Steve Tantala	(02) 6213 7934			(02) 6213 7654
General Manager, Offshore Petroleum, John Griffiths	(02) 6213 7928			(02) 6213 7955
Civil Aviation Safety Authority (CASA) Switchboard	131 757			
Flying Operations Team Leader, Moorabbin Anderson, Matthew	(03) 9518 2720			
Director (Canberra) - Byron, Bruce	(02) 6217 1001			(02) 6217 1444
PA - Ramsey, Jane	(02) 6217 1013			(02) 6217 1444

A22. TASMANIAN STATE AUTHORITIES

Contact	Work	After Hours	Others	Facsimile
Department of Infrastructure, Energy & Resources, Hobart	1300 135 513	1300 135 513	-	-
Marine and Safety Tasmania	03 6233 8801 (Hobart)	-	03 6334 3281 (Launceston)	03 6233 5662 (Hobart) 03 6334 3384 (Launceston)
Tasmania Police	000 (Emergency)	-	131 444 (Non Emergency)	03 6230 2414
State Emergency Service, Tasmania	03 6230 2700	-	-	03 6234 9767
Australian Maritime Safety Authority, Tasmania	03 6424 1597	-	-	03 6424 8009
Coronial Court, Tasmania	03 6336 2808 (Launceston)	-	-	03 6336 2770 (Launceston)
Department of Primary Industries and Water (DPIW)	1300 368 550	-	03 6233 8011	03 6234 1335
Hotline for Whale and Dolphin Sightings in Tasmania	0427 942 537	-	-	-
Department of Environment, Parks, Heritage and the Arts	03 6233 5512	-	-	03 6233 5905
Minister's Office	03 6233 6756	-	-	03 6336 2767
Environment	03 6233 6518	-	-	03 6233 3800
Parks and Wildlife Service	03 6233 5732	-	-	03 6223 8308

A23. OTHER DRILLING CONTRACTORS

Contact	Work	After Hours	Other	Facsimile
Ensco Offshore: Perth Switchboard	(08) 9211 3388			(08) 9211 3390
Transocean: Perth Switchboard	(08) 9213 3700			(08) 9213 3777

A24. WILDLIFE REHABILITATION

Contact	Work	After Hours	Other	Facsimile
Switchboard Penguin Parade Phillip Island	(03) 5956 8300			(03) 5956 8394
Switchboard Taronga Park Zoo Sydney	(02) 9969 2777			(02) 9978 4500
Libbi Hall Wildlife Rehabilitation Supervisor	(02) 9978 4751	(02) 9907 9496		(02) 9978 4516
Erna Walvaren Senior Curator	(02) 9978 4609	(02) 9807 3558	0418 257 959	(02) 99784613

A25. FISHERY GROUPS

Contact	Work	After Hours	Address	Facsimile
Scallop Fisheries Association Adrian Jackson	03 5155 3330		81 Seaview Parade, Kalimna, Victoria 3909	
Chairman South East Fishery Association (SEFA) Charlie Farquhar	(03) 6266 4137		72 Gums Road, Mountain River, Tasmania, 7109	
Industry Representative South East Trawl Fishing Industry Association (SETFIA) Dr. Ian Knuckey	(03) 5258 4399 0408 581 599		22 Bridge Street, Queenscliff, Victoria 3225	
Twofold Bay Fisheries Chairman South East Trawl Fishing Industry Association (SETFIA) Fritz Drenkhahn	(02) 6496 2003		PO Box 288, Eden, NSW 2551	
General Manager Lakes Entrance Fishing Co-op (LEFCOL) Dale Sumner	(03) 5155 1688		PO Box 1125, Lakes Entrance, Victoria 3590	
Executive Officer Seafood Industry Victoria (SIV) Ross McGowan	(03) 9824 0744		Level 2/177 Toorak Road, South Yarra, Victoria 3141	
Chief Executive Officer Southland Fish Supplies Steve Buckless	(02) 6496 3350		210 Imlay St. Eden NSW 2551	
Chairman San Remo Fishermen's Co-op Steven Brockwell	(03) 5678 5206		Marine Pde San Remo VIC 3925	

A26. OTHER OIL COMPANIES / OPERATORS

Contact	Work	After Hours	Other	Facsimile
BHP Billiton Petroleum P/L Level 46, Central Park, 152-158 St. George's Terrace, PERTH, WA 6000	(08) 9278 4611		0419 346 550	
Esso Australia (Melbourne) 12 Riverside Quay, South Bank VIC 3006	(03) 9270 3333	132222#45326 (24 hours)	0417 358 392	(03) 9270 3992
Shell Company of Australia Ltd Hawthorn, Vic	Switchboard (03) 9666 5444	Emergency 24 hours 1800 651 818		(03) 8823 4800
Chevron Australia Pty Ltd 250 St George's Terrace, Perth WA 6000	(08) 9216 4000	08 9184 9762 (24 hours)	0419 915 131 (Mobile)	(08) 9216 4444
Woodside Offshore Petroleum P/L 1 Adelaide Terrace, Perth WA 6000	(08) 9224 4111	0419 042 016		(08) 9325 8178

A27. WASTE MANAGEMENT COMPANIES

Contact	Work	After Hours	Other	Facsimile
Waste Disposers				
Veolia Environmental Services Brooklyn	**(03) 9626 2222**			
Gippsland Water Gippsland	**(03) 5146 3233**			
Ron J Hunters Yarram	**(03) 5182 5928**			
Brambles Gippsland	**(03) 8509 8100**			
Waste Transporter				
WK & MA Ferguson P/L Longford	**(03) 5149 7235**			
Moconna P/L Sale	**(03) 5144 3900**			
Shelden P/L Tooradin	**(03) 5998 3524**			
Tomlins, Denis Albert Tooradin	**(03) 5998 3524**			
Ron J Hunters Yarram	**(03) 5182 5928**			

A28. OTHER HELICOPTER SERVICE PROVIDERS

Contact	Work	After Hours	Other	Facsimile
Bristow Helicopters Australia				
Pilot in Charge Engineer in Charge Operations General Manager: Troup, Dennis	(24 hrs (08) 9277 8399		0407 997947 0407 997946 0419 855677 0408 428 658	(08) 9479 1008
Jayrow Helicopters				
Acting Base Manager Tooradin Craig Heskey	(03) 5991 9591		0447 341 7796	(03) 5998 3022
Flight Safety Officer Jason Cusack	(03) 5991 9591		0410 686 549	
Base Administrator Tooradin Ingrid Altmeppten	(03) 5991 9591		0423 452 545	
CHC Helicopters (Adelaide)				
Regional Manager (Sales) Switchboard - Bowles, Capt. Graham	(08) 8372 7700 (08) 8372 7702		0418 808 883	(08) 8373 3366
Resource Manager: Barraclough, Craig	(08) 8372 7700		0407 306 787	
East Sale	(03) 5146 7600			
LaTrobe Valley	(03) 5176 1288			
Helicopter Resources Pyap Switchboard Victoria	(03) 5977 4506			(03) 5977 4491
The Helicopter Service Australia Vernon, Mitch	(03) 9379 4500		0428 222 207	(03) 9379 9988

A29. OTHER MARINE SERVICE PROVIDERS

Contact	Work	After Hours	Other	Facsimile
Farstad Shipping Melbourne Dick Hall	(03) 9254 1666	Emergency 24 hours (03) 9254 1505	0412 568 780	(03) 9254 1655
Lewmarine Geelong (IDD++61 3) Switchboard	(03) 5221 1577			(03) 5221 3251
Teekay Shipping Pty Ltd Sydney (IDD++61 8) Switchboard Managing Director Bendy Paul	(02) 9316 1000 (02) 9316 1010	 (02) 9771 3758	 0418 800 930	(02) 9316 1001

A30. MEDICAL SERVICES

Contact	Work	After Hours	Other	Facsimile
MEDEVAC – Helicopter Emergency Medical Service (HEMS) Victoria Air Ambulance Victoria, Essendon Airport Flight Co-ordinator, Essendon Air Ambulance Base Air Ambulance Base, Latrobe Valley Airport Air Ambulance Base, Bendigo Airport	(24hours x 7) (03) 8341 9910 1300 883 100 (03) 5176 1265 (03) 5441 8631	(24hours x 7) (03) 8341 9910		
Aerial Medical Service - Helimed 1	Message Bank (03) 5176 1269		0405 148 005	(03) 5174 4403
Ambulance 24 hr	000			
Alfred Hospital Emergency Department	(03) 9076 3405	24 hours 03 9076 3405		(03) 9276 6063
Alfred Hospital Casualty Admitting Officer	-	Switchboard 03 9076 3405		
Epworth Hospital – (Dennis Hogg)	(03) 9426 6666			
Latrobe Regional Hospital Switchboard Emergency Department	(03) 5173 8000 (30) 5173 8222			(03) 5173 8444
MDS Online	www.mdsonline.com/Defalut.asp			
Poisons Information Line	131126			
Onshore Emergency Doctors: Dr. Grant Ramage	(03) 9670 9385	0412 319 991	Home: 03 9817 5697	(03) 9600 4951

Contact	Work	After Hours	Other	Facsimile
Dr.Michael Baynes **Baynes Occupational Consulting** **Suite 306, 370 St Kilda Road, Melb VIC 3004** **baynes@bigpond.com**	**(03) 9686 4656**	**Only Day Time**	**-**	**(03) 9686 4659**
Portland Medical **Seaport Medical Centre** **6 Fern Street, Portland VIC 3305** **seaport@hotkey.net.au**	**(03) 5523 2322**	**-**	**-**	**(03) 5523 6171**

A31. AIRPORTS / AIR TRAFFIC

Contact	Work	After Hours	Other	Facsimile
Airservices Australia - flight Services Canberra (IDD++61 3)	Contact for Restricted Airspace			
Switchboard (National)	1300 301 120	1300 301 120		(02) 6268 5688
Air Traffic Control 24 hr Systems Supervisor	(03) 9235 7402			
Air Traffic Control Operations Manager Operations Room	(03) 9235 7420			
Melbourne (IDD++61 3)				
Air Traffic Services	(03) 9339 2666			
West Sale Aerodrome	(03) 5142 3384 (03) 5142 3333			903) 5149 2202
Fixed Aircraft Services				
TNT Air Charter Sydney Bairnsdale Air Charter	131150 (03) 5152 4617	+ 0428 524 617 0428 514 982		(02) 5146 6319
East Sale RAAF Base Sale (IDD++61 3)				
Switchboard Fire and Rescue	(03) 5146 6111 (03) 5146 6313			
Orbost Service Shoreland Air Services	(03) 5154 8265		0427 516 606	

A32. WELL CONTROL SPECIALISTS

Contact	Work	After Hours	Other	Facsimile
Asia/Pacific (Corporate HQ): Alert Disaster Control (Asia) P/L Loyang Offshore Supply Base, Singapore mail@alert.com.sg	(65) 6545 5088 (24 Hours)			(65) 6545 3033
Oceania - Alert Disaster Control, Keilor Village, Vic 3036 - dwulf@alert.com.sg	(61) 03 8361 6526			(61) 03 9449 2511
Alert Disaster Control (Middle East) LTD. Building #34, Oil Field Supply Center Jebel Ali, UAE alert@emirates.net.ae	(9714) 883 2343 (24 Hours)			(9714) 883 2395
Boots and Coots Services Richard Hatteberg rhatteberg@boots-coots.com Danny Walzel DWalzel@boots-coots.com Mike Foreman Mforeman@boots-coots.com Bud Curtis Bcurtis@boots-coots.com 7908 N. Sam Houston Parkway W., 5th Floor. Houston, WellControl@boots-coots.com	+1 (713) 621 7911 +1 (281) 931 8884 1-800-BLOWOUT (256-9688)		+1 (713) 830 2716	(713) 621 7988 (281) 931 8302
Cudd Well Control -Houston, Texas (+ 1 713) VP Well Control Operations - Saulnier, Paul psaulnier@cudd.com	(713) 849 2769	(281) 890 8464	(713) 443 8464	(713)849 3861
Cudd Well Control - Elk City,Oklahoma USA (+ 1 580) President Well Control Ops - Roles. Ronnie rroles@cudd.com	(580) 243 5890	(580) 243 0111	(580) 515 3742	(580) 243 5894
Senior Well Control Engineer - Gibson, Gabe C. ggibson@cudd.com	(713) 849 2769	(218) 858 6499	(405) 850 9785	(713) 849 3861

ADA BSC

Contact Directory

Contact	Work	After Hours	Other	Facsimile
Lafayette, Louisiana USA / (IDD ++ 1 337) VP Technical Services - Goodman, Eddie egoodman@cudd.com	(337) 989 8495	(337) 856 1396	(337) 298 3364	(337) 984 6069
Advanced Coiled Tubing / Houston (+1 713) Executive Vice President - Kuhlman, Larry	(713) 937 6042 (24hr)		1 877 244 7228 (Pager)	(713) 937 6503
Wild Well Control Houston (+ 1 281) President Campbell, Pat - wildwell@wildwell.com	Houston (281) 784 4700 Midland (431) 550 6202	(936) 448 4643	(281) 308 1104 (Pager) (713) 829 1534	(281) 784 4750
High Arctic Well Control - Dubai UAE Hamriyah Free Zone Plot 2C #5 & 13	+971 6 526 1110			+971 6 526 1001

Appendix 2: OSCP Roles/Responsibilities

Appendix 2: Roles and Responsibilities

2.1 General Overview

Emergency and oil spill response "*roles*" and responsibilities are clearly defined and personnel assigned a role are responsible to ensure their clear understanding of the requirements and interfaces of the role. This requirement will assist to minimise confusion and ensure essential response activities are assessed and/or carried out.

This section of the OSCP provides guidance for key ADA personnel (in particular the ERG) who may assume an emergency response "*role*" identified in this OSCP, during an oil spill emergency associated with the ADA/BSC drilling related activities.

2.2 Oil Spill Role Philosophy

Subject to the size of the spill involved, the location and the potential impact, the management of the spill response may be assumed either by ADA resources or may be immediately assumed by a state or federal regulatory authority charged with the management of Tier 2 and 3 oil spills.

"Roles" are not a rigid list of prescribed activities or duties, they are a flexible series of prompts, designed to cater for an escalating range of events and/or a change in the severity of an emergency. The "role" methodology is not designed to cater for every likely or specific emergency event; it is also not intended for all prompts to be considered, or at all, only to be used as a resource, appropriate to the incident response required at the time.

2.3 Pre-Emergency

In order to ensure effective actions are taken in the event of an oil spill, all personnel assigned a role should, as appropriate:

- Establish and maintain familiarisation with the OSCP, the key emergency respondents and the respective notification and callout requirements;
- Establish/maintain "goodwill" contact with all relevant response agencies, their key personnel and respective notification and callout requirements

2.4 Oil Spill Response Support

The safety of personnel, the MODU, vessel or facility concerned and protection of the environment are the primary concerns at all times during an ADA response to an oil spill incident. As such the oil spill response role at the MODU, vessel or facility is to eliminate the source of the spill, regardless of size.

Personnel initially assuming an ADA OSCP "*role*" may change during a response as more appropriate personnel mobilise. It is the responsibility of the ERG Leader (ERGL) to ensure all response personnel are kept informed of the current status of position holders at all times.

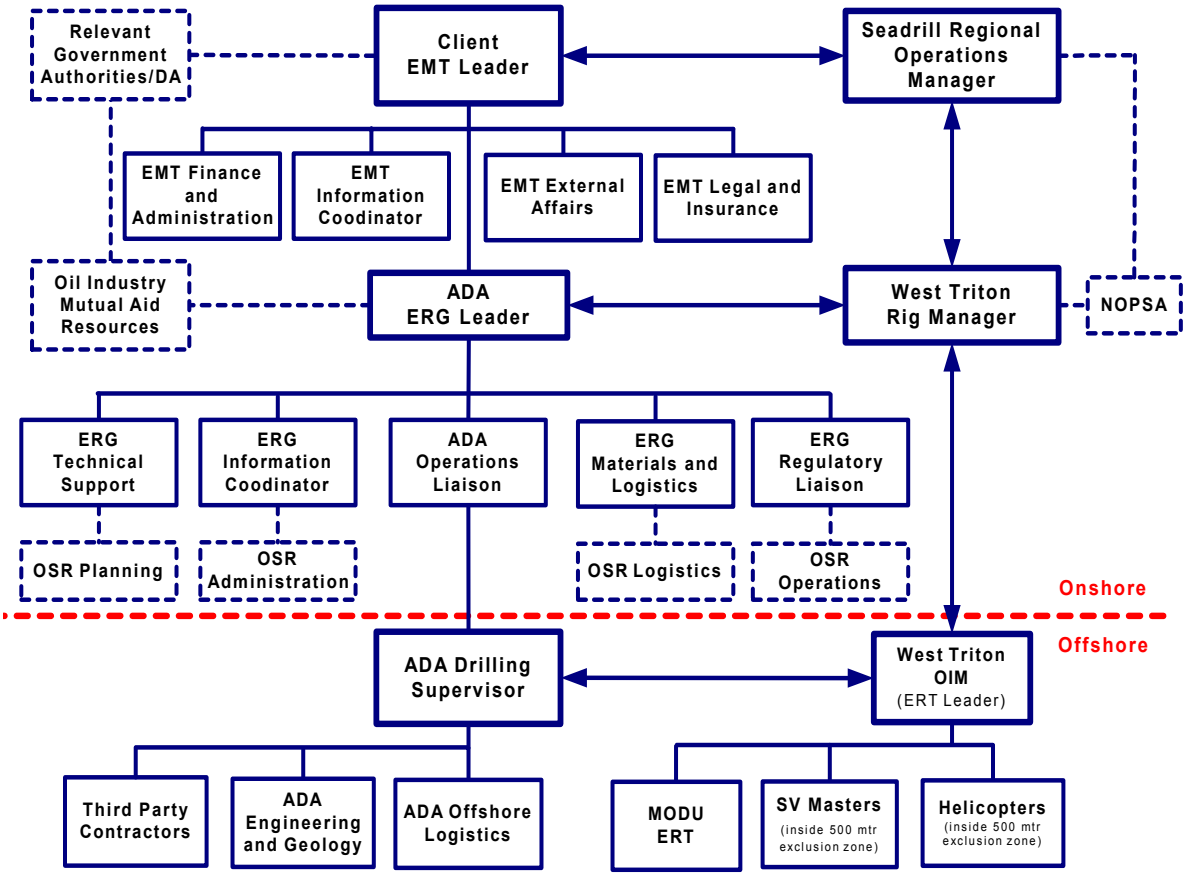
2.5 Raising the Alarm

When an oil spill occurs, the initial alert to ADA is typically made from the emergency's location by the ADA onsite representative (i.e. Drilling Supervisor (DSV) or Materials and Logistics Supervisor etc.) to the ADA Drilling Superintendent (ADA Operations Liaison) who will in-turn will either assume the role or notify the ADA ERG Leader (ERGL). An important element in raising the alert is to ensure the ERGL is notified immediately and the most appropriate resources are activated as soon as possible.

The need for such support will then be jointly agreed between the ADA DSV and the ERGL. Members of the ERG shall report to the Emergency Response Room (ERR) and provide appropriate support as required by the onsite OSR. The ERGL has the authority to take such actions considered reasonable to address any emergency, and to provide appropriate resources.

The ERGL is responsible for informing the Client EMTL, as soon as practicable, that an emergency has occurred and for providing ongoing status reports throughout the response and for implementing emergency response reporting processes which shall also be directed to the EMTL.

Figure 1: Organisation of BSC MODU/Vessel Tier 1 Spill Response Structure



2.6 MODU/Vessel/Facility Personnel

Emergency Actions	√
1. Report any emergency situation to their supervisor immediately and ensure supervisor is kept informed of any hazards which may affect the safety of MODU/Vessel/Facility or crew	☐
2. **MUST NOT** communicate with any Media under any circumstances; this is the responsibility of the Client Spokesperson only	☐

2.7 Witness to Spill

Emergency Actions	√
1. On seeing an oil spill or slick activate Manual Call Point/Alarm immediately	☐
2. Report nature and location of the oil spill/slick to the Supervisor immediately	☐
3. Take immediate action to isolate/cease the cause of the spill, if safe to do so	☐
4. Follow emergency alarm procedures and go to muster point/assembly area	☐
5. An observer of an oil slick, away from a Facility, must notify the Control Room immediately and stand by for instructions from the Supervisor/OIM/Master	☐
Post Incident Actions	√
6. Contribute to the ERGL spill incident debrief	☐
7. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.8 Shorebase Person Taking Incident Call(s)

Emergency Actions	√
Respond in accordance with ADA Drilling ERP and OSCP including:	
1. Notify ERG Leader when initial calls begin coming in	☐
2. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
3. Ensure all future calls are taken away from the ERR room	☐
4. Use ERP Telephone Call Sheets (one call per page) from OSCP Proforma Section	☐
5. Do not confirm, deny or make statements on any aspect of the incident	☐
6. Do not divulge any ERG members names, positions or organisations	☐
7. Try to determine if calls are related to the emergency, if not take a message for a return call ("as no-one is presently available to assist")	☐
8. For emergency calls put caller through to ERG Leader or take a message for a return call	☐
9. For any media calls ensure ERG Leader is aware the media is on the phone when taking a "call back" message; do not discuss any matters with the media	☐
Post Incident Actions	√
10. Contribute to the ERGL spill incident debrief	☐
11. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
12. Collate messages and records and present to ERG Leader as pertinent	☐

2.9 MODU OIM

Emergency Role Profile
• **Liaise with the ADA Drilling Supervisor** • **Responsible for ensuring notification to NOPSA in reportable timeframe**

Tier 1 Spill Response Actions	
1. Respond in accordance with the MODU ERM, SOPEP and Operations Manuals	☐
2. Ensure immediate action is taken to isolate the source of the spill if MODU based	☐
3. For spill response on MODU, assume role off Offshore Incident Controller (IC)	☐
4. Liaise with ADA DSV and coordinate spill response measures	☐
5. With DSV consider need to secure well and temporarily delay drilling operations	☐
6. Confirm observation, source and extent of spill	☐
7. Alert supply vessel Masters as well as Pilots of any helicopters in the vicinity of the incident	☐
8. Follow all relevant ADA emergency OSCP procedures applicable to the incident	☐
9. Confirm observation, source and extent of spill and monitor movement and size of the spill	☐
10. Coordinate Support Vessel and Helicopter operations in the vicinity of the MODU	☐
11. Prepare a log of incident events and actions taken when time allows	☐
12. Assign personnel to monitor spill/slick, assess spill movement for initial spill 'POLREP'	☐
13. Alert Masters of supply vessels (and Pilots of helicopters in the vicinity if applicable)	☐
14. With DSV determine need for and request nearest supply vessels to prepare for application of dispersant and/or propeller agitation (if appropriate) subject to following constraints:	☐
– Sea state and winds	☐
– Equipment availability and/or deployment times	☐
– Oil characteristics	☐
15. Assess local weather conditions and sea state	☐
16. Ensure ADA ERG Leader is aware of the details of the spill and if any external assistance is required to control and/or monitor the spill	☐

Tier 2 / Tier 3 Spill Actions	√
17. Transmit Pollution Report (POLREP Form 001) to ADA Shorebase and Rig Manager	☐
18. Ensure appropriate SECURITE Navigation Warning is issued (as applicable)	☐
19. Transmit regular incident SITREP (OSCP Form 002) and other relevant reports to ERGL	☐
20. Liaise with relevant Regulatory Authority Incident Coordinator (as required)	☐
21. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

Post Incident Actions	√
17. Debrief personnel in your charge before standing them down	☐
18. Contribute to the ERGL spill incident debrief	☐
19. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.10 Drilling Supervisor (MODU)

Emergency Role Profile	
• **Liaise with the OIM and ERG Operations Liaison**	
Tier 1 Spill Actions	√
Respond in accordance with ADA Drilling ERP and OSCP including:	
1. Confirm observation, source and extent of spill	☐
2. Liaise with OIM and/or Vessel Master and assist with coordinating spill response measures	☐
3. Ensure immediate action is taken to isolate the source of the spill and contain substance	☐
4. For spill response away from the MODU, assume role off Offshore Incident Controller (IC)	☐
5. Ensure ADA Operations Liaison (and ERG Leader) is notified ASAP in event of an oil spill	☐
6. With OIM consider need to secure well and temporarily delay drilling operations	☐
7. If spill source is blowout defer Offshore Incident Controller role to OIM or other delegate	☐
8. Initiate immediate monitoring to assess any movement of the spill slick	☐
9. Coordinate supply vessels to track and sample the slick (as applicable)	☐
10. In consultation with the OIM and/or Vessel Master, determine the need for nearby support vessel support to use propeller agitation if appropriate	☐
11. Use the satellite tracking buoy if necessary	☐
12. Request aerial surveillance from ERGL as necessary	☐
13. Assess local weather conditions and sea state	☐
14. Notify ERGL of details of spill escalation and if any external assistance is required to control and/or monitor the spill	☐
15. Contribute to response strategy in the event of potential Tier 2-3 escalation	☐
16. Direct ADA and 3rd Party Contractor personnel onboard in the performance of their specific emergency response activities	☐
Tier 2 / Tier 3 Spill Actions	√
17. Transmit Pollution Report to ADA Shorebase	☐
18. Ensure SECURITE Navigation Warning is issued (if appropriate)	☐
19. Transmit regular Incident SITREP and other relevant proformas to ADA Shorebase	☐
20. Liaise with relevant Regulatory Authority On-Scene Incident Coordinator (as required)	☐
21. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
Post Incident Actions	√
20. Debrief personnel in your charge before standing them down	☐
21. Contribute to the ERGL spill incident debrief	☐
22. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.11 Support Vessel Master(s)

Pre-Emergency Actions	√
1. Ensure preparedness of Vessel to provide monitoring, containment, dispersant spraying and to prevent the escape or discharge of oil/flammable liquid/liquid from the Vessel	☐
Tier 1 Spill Actions	√
2. Respond in accordance with the Vessel ERM, SOPEP and Marine Operations Manual	☐
3. For Vessel spill take immediate action to isolate source of spill and contain substance	☐
4. Liaise with OIM and/or ADA DSV to coordinate spill response measures	☐
5. If leakage/spillage occurs during loading/offloading of a flammable liquid, loading operations to cease immediately, all valves closed and OIM/Harbour Master/Facility PIC notified	☐
6. For spill in MODU vicinity confirm to OIM if source is from MODU/Vessel and extent of spill	☐
7. Follow all relevant ADA emergency OSCP procedures applicable to the incident	☐
8. Initiate immediate monitoring to assess movement of the spill	☐
9. With DSV determine need for and prepare for application of dispersant and/or propeller agitation (if appropriate) subject to following constraints:	☐
– Sea state, winds and local weather conditions	☐
– Equipment availability and/or deployment times	☐
– Oil characteristics	☐
10. For Vessel spills in transit or in Port, report spill to Port Harbor Master/ Facility PIC and DSV	☐
11. Respond to SV port spill in accordance with Port Harbor Master instructions	☐
12. For transit/Port spills transmit Pollution Report (POLREP) to DSV	☐
Tier 2 and Tier 3 Spill Actions	√
13. Ensure appropriate SECURITE Navigation Warning is issued (as applicable)	☐
14. Continually liaise with DSV for spill response directions and likely requirements	☐
15. Liaise with relevant Regulatory Authority On-Scene Incident Coordinator (as required)	☐
16. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
Post Incident Actions	√
17. Debrief personnel in your charge before standing them down	☐
18. Contribute to the ERGL spill incident debrief	☐
19. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.12 Facility Person in Charge (i.e. Materials-Marine Support Base)

Pre-Emergency Actions	√
1. Ensure preparedness of Facility to provide monitoring, containment and/or prevent the escape or discharge of oil/flammable liquid/liquid from the Facility activities	☐
Tier 1 Spill Actions	√
2. Respond in accordance with the Facility ERM, OSCP and Operations Manual	☐
3. For Facility spill take immediate action to isolate source of spill and contain substance	☐
4. Liaise with ADA ERGL and/or ADA DSV to coordinate spill response measures	☐
5. If any leakage or spillage occurs during loading/offloading of a flammable liquid, loading operations to cease immediately, all valves closed and Harbour Master/ERGL notified	☐
6. For spill in Marine Base vicinity confirm with Master if source is from Vessel and spill extent	☐
7. Follow all relevant ADA emergency OSCP procedures applicable to the incident	☐
8. Initiate immediate monitoring to assess movement of the spill	☐
9. With Master determine need for and prepare for application of dispersant (if pre-approved) and/or propeller agitation (if appropriate) subject to following constraints:	☐
– Sea state, winds and local weather conditions	☐
– Equipment availability and/or deployment times	☐
– Oil characteristics	☐
10. For SV spills in transit or in Port, report spill to Port Harbor Master and DSV	☐
11. Respond to SV port spill in accordance with Port Harbor Master instructions	☐
12. For transit/Port spills transmit Pollution Report (POLREP) to DSV	☐
Tier 2 and Tier 3 Spill Actions	√
13. Continually liaise with DSV for spill response directions and likely requirements	☐
14. Liaise with relevant Regulatory Authority On-Scene Incident Coordinator (as required)	☐
15. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
Post Incident Actions	√
16. Debrief personnel in your charge before standing them down	☐
17. Contribute to the ERGL spill incident debrief	☐
18. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.13 ADA ERG LEADER

Pre-Emergency Actions	√
1. Maintain familiarisation with the ADA OSCP and key emergency respondent notifications	☐
2. Establish/maintain contact with all relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	**√**
3. Confirm your callout with MODU/Facility/Vessel	☐
4. Follow ADA emergency/OSR notification and activation pathway	☐
5. Provide spill control advice to DSV/On-Scene IC (as needed) DO NOT MICRO MANAGE	☐
6. Maintain close liaison with the incident site and provide OSR support as requested	☐
7. Confirm approval has been gained to apply dispersants (as required)	☐
8. If more than 80 ltrs (0.5 bbls) spilled; report to MSV/DA/NOPSA (refer Contact Directory)	☐
9. Notify MSV/DA/AMSA Liaison Officer(s) and report spill status (as appropriate)	☐
10. Consider need for mobilising ERG OSR external support to the Logistics Base	☐
11. Ensure dispersant spraying preparations and/or propeller/thruster agitation options are under consideration (as appropriate)	☐
12. Activate and request spill trajectory predictions from ADA Environmental Specialist	☐
13. Liaise with MSV/DA for incident reporting and Lead Response Team clarification	☐
14. Consider need for notifying/activating AMOSC/Mutual Aid OSR specialists	☐
15. Ensure surveillance by fixed wing aircraft/helicopter of spill is initiated, weather conditions are being monitored and dispersant preparations are under way if appropriate	☐
16. Consider need for notifying international OSR specialists (EARL, OSRL etc.)	☐
17. Check that ongoing weather forecasting is being monitored and regularly reported to ERG	☐
18. Contribute to MSV/DA/AMSA response strategy in the event of potential Tier 2-3 escalation	☐
19. If spill is/becomes unmanageable for existing ADA/BSC resources notify MSV/DA for declaration of spill status and assistance (see OSCP Emergency Classifications)	☐
20. Prepare handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 and Tier 3 Spill Actions	**√**
21. Liaise with and work under direction of Response Authority Incident Controller	☐
22. Consider potential media interest and follow general media response and external communications procedures throughout the incident	☐
23. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
Post Incident Actions	**√**
24. Refer to ADA SMS for post incident investigation methodology and procedures	☐
21. Debrief personnel in your charge before standing them down	☐
22. Hold OSR incident debrief	☐

2.14 ADA OSR SPECIFIC ROLES AND RESPONSIBILITIES

2.14.1 A DA On-Scene Incident Controller

Note:.....the OSR On-Scene Incident Controller's role is to manage and minimise effects of an oil spill and direct cleanup operations without undue risk

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents	☐
2. Establish/maintain contact with all relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	√
3. Liaise with ADA ERGL for incident briefing, response strategy and likely requirements	☐
4. Establish Incident Control and assume responsibility for ADA OSR operations	☐
5. Brief personnel and contractors in your charge with response strategy; remind them of the safe working practices – ensure HSE Advisor is appointed for each work group	☐
6. Request additional communications networks and resources as appropriate	☐
7. Liaise as required between OSR Aviation/Marine Operations, SVs and spotter aircraft	☐
8. Ensure appropriate SECURITE Navigation Warning is issued (as applicable)	☐
9. Implement incident HSE strategy and continually monitor	☐
10. Assess and provide appropriate guidance regarding incident hazards/risks to respondents	☐
11. Monitor effectiveness of security, safety and medical care arrangements	☐
12. Prepare spill resource allocation register and initiate spill assessment report to ERGL	☐
13. Liaise with containment and recovery operations	☐
14. Supervise surveillance, tracking and dispersant operations	☐
15. Monitor weather, sea states, deployment and movements of vessels and aircraft	☐
16. Liaise with OSR Logistics to determine extent of initial and ongoing catering, janitorial, accommodation services required	☐
17. Advise ERGL on likely waste management requirements	☐
18. Liaise with MSV/DA/AMSA Liaison Officer(s) for status update	☐
19. If spill residue likely to make landfall, mobilise personnel and/or equipment to landfall site in conjunction with MSV/DA/AMSA Liaison Officer(s)	☐
Tier 2 / Tier 3 Spill Actions	√
20. Liaise with relevant Regulatory Authority On-Scene Incident Coordinator (as required)	☐
21. Monitor recovered waste volumes and any constraints on storage of waste	☐
22. Consider relief/support of personnel in your charge; prepare handover reports and plans	☐
Post Incident Actions	√
23. Debrief personnel in your charge before standing them down	☐
24. Contribute to the ERGL spill incident debrief	☐
25. Supply data on response costs to ERG Information Coordinator	☐
26. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.2 ADA OSR Logistics Coordinator

Note:.....the OSR Logistics role (ERG Materials and Logistics) coordinates the provision of OSR equipment, transport, onshore medical resources, services and support materials for the ADA ERG

Reports To: Relevant OSR Incident Controller

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondent notifications	☐
2. Establish/maintain contact with all relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	√
3. On authorization from the ADA ERGL organise initial observation and dispersant spraying aircraft/support vessels as needed	☐
4. Implement a Logistics HSE strategy; nominate a HSE Advisor for each work group and monitor	☐
5. Review potential OSR equipment lists and begin sourcing availability	☐
6. Ensure aircraft are equipped with GPS and an experienced person acts as observer	☐
7. Ensure dispersant preparations for aerial application are under way as required	☐
8. For Vessel spills in transit or in Port, liaise with the relevant Port Authority and ERGL	☐
9. Contribute to response strategy in the event of potential Tier 2-3 escalation	☐
Tier 2 and Tier 3 Spill Actions	√
7. Liaise with MSV/DA/AMSA Liaison Officer(s) for assistance for Tier 2 spills or greater	☐
8. If necessary order additional quantities of approved dispersant and arrange transport	☐
9. If spill residue likely to make landfall, liaise with ERGL/MSV/DA/AMSA Liaison Officer(s) in regards to mobilising personnel/equipment to landfall site	☐
10. Ensure accurate records are maintained of OSR equipment, personnel, services and materials	☐
11. Liaise with relevant Regulatory Authority On-Scene Incident Coordinator (as required)	☐
12. Consider potential needs of initial/ongoing catering/accommodation services required	☐
13. With IC and ERGL consider likely approved transport needs for OSR team members	☐
Post Incident Actions	√
14. Debrief personnel in your charge before standing them down	☐
15. Contribute to the ERGL spill incident debrief	☐
16. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

6.13.3 ADA OSR Planning Coordinator

Note:.....the OSR Planning Coordinator role (ERG Technical Support) provides advice and support to the OSR strategic planning and implementation associated to oil spill minimisation

Reports To: Relevant OSR Incident Controller

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents	☐
2. Establish/maintain contact with all relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	√
3. Coordinate with and support ERG IC and ADA ERGL in monitoring of the spill movement	☐
4. Activate and coordinate OSR Dispersant Application role (as appropriate)	☐
5. Activate and coordinate OSR Surveillance and Tracking role (as appropriate)	☐
6. Activate and coordinate OSR Offshore Containment and Recovery role (as appropriate)	☐
7. Obtain/monitor weather and tide/current conditions and keep other ERG members updated	☐
8. Ensure incident HSE strategy is implemented and continually monitored	☐
9. Ensure approval has been gained to apply dispersants (as required)	☐
10. Contribute to response strategy in the event of potential Tier 2-3 escalation	☐
11. Prepare handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 and Tier 3 Spill Actions	√
12. Liaise with relevant Regulatory Authority On-Scene Incident Coordinator (as required)	☐
13. Obtain estimated spill trajectory or calculate using vector analysis method or computer model (liaise with contracted computer model provider), provide to MSV/DA/AMSA Liaison Officer(s)	☐
14. Assume other ERG roles as appropriate to the required response	☐
15. Continually liaise with Incident Controllers and ERGL as appropriate	☐
16. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
Post Incident Actions	√
17. Debrief personnel in your charge before standing them down	☐
18. Contribute to the ERGL spill incident debrief	☐

2.14.3 ADA OSR Operations Coordinator

Note:.....the OSR Operations Coordinator role (ERG Regulatory Liaison) provides regulatory, HSE advice and support in operational activities and strategies to minimise spill impacts

Reports To: Relevant OSR Incident Controller

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP, the key emergency respondents and the respective notification and callout requirements	☐
2. Establish/maintain "goodwill" contact with all relevant response agencies, their key personnel he respective notification and callout requirements	☐
Tier 1 Spill Actions	√
3. Coordinate with and support ERGL/relevant ICs in monitoring of the spill movement	☐
4. Activate/coordinate OSR Aviation Coordinator role (as appropriate)	☐
5. Contribute to response strategy in the event of potential Tier 2-3 escalation	☐
6. Ensure approval has been gained to apply dispersants (as required)	☐
7. Ensure incident HSE strategy is implemented and continually monitored	☐
8. Activate and coordinate OSR Maritime Coordinator role (as appropriate)	☐
9. Activate and coordinate OSR Environmental and Wildlife role (as appropriate)	☐
10. Activate and coordinate OSR Shoreline Coordinator role (as appropriate)	☐
11. Activate and coordinate OSR Shoreline Assessment and Clean-Up role (as appropriate)	☐
12. Activate and coordinate OSR Waste Management role (as appropriate)	☐
13. Obtain estimated spill trajectory or calculate using vector analysis method or computer model (liaise with contracted computer model provider)	☐
14. Assume other OSR roles as appropriate to the required response	☐
15. Obtain/monitor weather and tide/current conditions and keep other ERG members updated	☐
16. Continually liaise with Incident Controllers and ERGL as appropriate	☐
Tier 2 and Tier 3 Spill Actions	√
17. Liaise with relevant Regulatory Authority On-Scene Incident Coordinator (as required)	☐
18. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
Post Incident Actions	√
18. Debrief personnel in your charge before standing them down	☐
19. Contribute to the ERGL spill incident debrief	☐
20. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.4 ADA OSR Environment and Wildlife Coordinator

Note:.....the OSR Environmental/Wildlife Coordinator role (External Contractor Role) provides advice and support to identify environments, wildlife or habitats which have potential for impact by a BSC oil spill and/or clean-up; to facilitate support and strategies to minimise spill impacts

Reports To: OSR Operations Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents	☐
2. Establish/maintain contact with all relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	√
6. Liaise and maintain contact with relevant IC's for incident briefing and likely requirements	☐
3. Coordinate with and support OSR Operations Coordinator in monitoring the spill movement	☐
4. Ensure approval has been gained to apply dispersants (as required)	☐
7. Provide details to the ERGL of environmental resources/wildlife habitats at risk	☐
8. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
9. Ensure incident HSE strategy is implemented and continually monitored	☐
10. Monitor status of affected/threatened wildlife and their habitats for duration of spill/cleanup	☐
11. Support government environment/wildlife agencies in implementation of methods to exclude wildlife from affected/potentially affected areas	☐
12. Liaise with Tracking/Surveillance/Technical Advisers to develop plan to identify and protect wildlife and associated habitats affected/potentially affected by spill or spill clean-up	☐
5. Contribute to response strategy in the event of potential Tier 2-3 escalation	☐
13. Prepare handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 and Tier 3 Spill Actions	√
14. Liaise with relevant local environment/wildlife agencies including conservation groups	☐
15. Facilitate requests from environment/wildlife rescue agencies for equipment and personnel required to capture, transfer, clean, rehabilitate and release oiled wildlife	☐
16. Activate relevant environment contract resources as required	☐
17. Assist in set-up of rehabilitation sites (including sourcing necessary permits) (if requested)	☐
18. Obtain/monitor weather and tide/current conditions and keep other ERG members updated	☐
19. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐
Post Incident Actions	√
20 Debrief personnel in your charge before standing them down	☐
21 Contribute to the ERGL spill incident debrief	☐
22 Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.5 ADA OSR Offshore Containment and Recovery

Note:.....the OSR Offshore Containment and Recovery role (External Contractor Role) supervises on-water containment, recovery, requisitioning and deployment of OSR personnel and equipment

Reports To: OSR Planning Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents and notifications	☐
2. Establish "goodwill" contact with relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	√
3. Liaise with ERGL/OSR Planning Coordinator for incident briefing and likely requirements	☐
4. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
5. Ensure incident HSE strategy is implemented and continually monitored	☐
6. Request and supervise mobilisation of relevant containment and recovery equipment and prepare a resource allocation register	☐
7. Monitor containment and recovery effectiveness and progress	☐
8. Develop response strategy and coordinate containment and recovery operation	☐
9. Request necessary communications network link-up	☐
10. Consider need for permit to work system	☐
11. Assess and request temporary storage facilities	☐
12. Liaise with Waste Management personnel and advise on likely requirements	☐
13. Provide input to induction procedures of response personnel and contractors	☐
14. Prepare handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 / Tier 3 Spill Actions	√
15. Liaise with and work under direction of Response Authority Incident Controller	☐
16. Remain on call throughout incident; when off duty	☐
17. Consider need for relief of personnel in your charge	☐
18. Consider relief/support for your role; prepare handover reports and plans	☐
Post Incident Actions	√
19. Debrief personnel in your charge before standing them down	☐
20. Make arrangement for return, cleaning and checking of materials/equipment	☐
21. Supply data on committed costs to ERG Information Coordinator	☐
22. Contribute to the ERGL spill incident debrief	☐
23. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.6 ADA OSR Offshore Surveillance and Tracking

Note:.....the OSR Offshore Surveillance and Tracking role (External Contractor Role) coordinates and provides expertise in relation to aviation spill surveillance and recording of incident data

Reports To: OSR Planning Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents and notifications	☐
2. Establish "goodwill" contact with relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	√
3. Liaise with ERGL/OSR Planning Coordinator for incident briefing and likely requirements	☐
4. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
5. Ensure incident HSE strategy is implemented and continually monitored	☐
6. Assemble surveillance equipment, local area maps and charts	☐
7. Organise surveillance flights to view spill movement	☐
8. Ensure location and other relevant details are updated on spill surveillance maps in Emergency Operations Centre (EOC)	☐
9. Obtain projected spill trajectories from contracted computer model provider	☐
10. Provide accurate incident surveillance and other relevant details to ERG Information Coordinator for inclusion on incident charts in ERP room	☐
11. Prepare surveillance input and handover notes for Primary Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 / Tier 3 Spill Actions	√
12. Liaise with and work under direction of Primary Response Authority Incident Controller	☐
13. Video and photograph incident site for a permanent record	☐
14. Consider relief/support of personnel and/or your role; prepare handover reports and plans	☐
Post Incident Actions	√
15. Debrief personnel in your charge before standing them down	☐
16. Make arrangement for return and checking of materials/equipment	☐
17. Supply data on committed costs to ERG Information Coordinator	☐
18. Attend primary debrief before standing down	☐
19. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.7 ADA OSR Dispersant Application Coordinator

Note:..... the OSR Dispersant Application Coordinator role (External Contractor Role) coordinates and supervises the overall dispersant application operation for the 'on water' spill response

Reports To: OSR Planning Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents and notifications	☐
2. Establish "goodwill" contact with relevant response agencies and their key personnel	☐
Tier 1 Spill Actions	√
3. Liaise with ERGL/OSR Planning Coordinator for incident briefing and likely requirements and to formulate dispersant use strategy	☐
4. Coordinate and oversee all dispersant application contactor(s) activities	☐
5. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
6. Ensure incident HSE strategy is implemented and continually monitored	☐
7. Ensure all PPE, safety clothing and equipment is in place for dispersant handling	☐
8. Confirm details on dispersant type stockpiles and availability and provide to ERGL	☐
9. Identify requirements for additional immediate and long term stocks of dispersant	☐
10. Confirm Government approval for dispersant use has been given	☐
11. Liaise with OSR Logistics to arrange transportation of dispersant stocks and application equipment to load out points	☐
12. Provide relevant support information to Offshore IC and Dispersant support personnel	☐
13. Ensure location and other relevant details are updated on spill surveillance maps in ERR	☐
14. Liaise with OSR Marine/Aviation Coordinators regarding workboat and/or aircraft availability for observation and dispersant application	☐
15. Liaise with dispersant application personnel and monitor effectiveness of dispersant use	☐
16. Prepare dispersant operations input and handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 / Tier 3 Spill Actions	√
17. Liaise with and work under direction of Response Authority Incident Controller	☐
18. Maintain comprehensive documentation of all dispersant application activities	☐
19. Stay informed with predicted wind and weather forecasts	☐
20. Consider relief/support of personnel and/or your role; prepare handover reports and plans	☐
Post Incident Actions	√
21. Debrief personnel in your charge before standing them down	☐
22. Make arrangement for return and checking of dispersant materials/equipment	☐
23. Supply data on committed costs to ERG Information Coordinator	☐
24. Attend primary debrief before standing down	☐
25. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.8 ADA OSR Aviation Coordinator

Note:..... the OSR Aviation Coordinator role (External Contractor Role) arranges and coordinates aircraft and ground crews for OSR operations

Reports To: OSR Operations Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents and notifications	☐
2. Establish and maintain contact, with OSR Aviation contractor(s) and their key personnel	☐
3. Ensure relevant personnel are trained as observers for OSR aircraft surveillance	☐
Tier 1 Spill Actions	√
3. Liaise with ERGL/OSR Operations Coordinator for incident briefing and likely requirements	☐
4. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
5. Ensure incident HSE strategy is implemented and continually monitored	☐
8. Arrange PPE, safety induction of personnel and contractors around aircraft	☐
9. Liaise with OSR Surveillance and Tracking on requirements for spill monitoring flights	☐
10. Process requests for aircraft and determine availability of contractor aircraft	☐
11. Ensure a trained observer is on surveillance aircraft to identify oil on water (sheen or slick) or shoreline and to accurately report location to the DSV/OSR Offshore IC	☐
12. Where possible ensure aircraft observer takes photographs to aid ongoing assessments (refer to OSCP Aerial Guidelines for Estimation of Slick Volume)	☐
13. Confirm availability of deployment and operation of dispersant spray buckets	☐
14. Request air space restrictions around incident site as appropriate	☐
15. Liaise with relevant authorities re; approvals required for aircraft operations	☐
16. Prepare aviation operations input and handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 / Tier 3 Spill Actions	√
17. Liaise with and work under direction of Response Authority Incident Controller	☐
18. Advise Response Authority IC on current availability of aircraft and trained crews for extended surveillance flights; provide details on duty hours, maintenance and other relevant details	☐
19. Consider relief/support of personnel and/or your role; prepare handover reports and plans	☐
Post Incident Actions	√
20. Debrief personnel in your charge before standing them down	☐
21. Make arrangement for return and checking of materials/equipment	☐
22. Supply data on committed costs to ERG Information Coordinator	☐
23. Attend primary debrief before standing down	☐
24. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.9 ADA OSR Marine Coordinator

Note:..... the OSR Marine Coordinator role (External Contractor Role) arranges and coordinates vessels, equipment and personnel to monitor, contain, recover or disperse spills on water and to arrange for expertise in ship salvage, cargo containment/transfer as appropriate

Reports To: OSR Operations Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents and notifications	☐
2. Establish and maintain contact, with Marine contractor(s) and their key personnel	☐
Tier 1 Spill Actions	√
3. Liaise with OSR Operations Coordinator for incident briefing and likely requirements	☐
4. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
5. Liaise as required between Vessels and spotter/surveillance aircraft	☐
8. Monitor weather and sea states and advise OIM, ERGL and Vessel masters	☐
9. Monitor and track deployment and movements of vessels	☐
10. Ensure appropriate SECURITE Navigation Warning is issued (as applicable)	☐
11. Ensure incident HSE strategy is implemented and continually monitored	☐
10. Brief personnel and contractors in your charge with response strategy and remind them of safe working practices	☐
11. Liaise with MSV/DA/Port authorities/AMSA in requesting water traffic control if necessary	☐
12. Maintain a direct contact link with IC and monitor effect of marine response	☐
13. Monitor recovered waste volumes and advise SVs of any constraints on storage of waste	☐
14. Prepare OSR maritime operations input and handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 / Tier 3 Spill Actions	√
15. Liaise with and work under direction of Response Authority Incident Controller	☐
16. Consider relief/support of personnel and/or your role; prepare handover reports and plans	☐
17. Arrange for advice on vessel salvage and monitor salvage operations (as appropriate) and provide to ERGL and Response Authority Incident Controller	☐
Post Incident Actions	√
18. Debrief personnel in your charge before standing them down	☐
19. Make arrangement for return and checking of materials/equipment	☐
20. Supply data on committed costs to ERG Information Coordinator	☐
21. Attend primary debrief before standing down	☐
22. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.10 ADA OSR Onshore Incident Controller

Note:..... the OSR Onshore Incident Controller role (External Contractor Role) minimises effects of an oil spill impacting land and direct Tier 1 cleanup operations as appropriate

Reports To: OSR Operations Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents and notifications	☐
2. Establish and maintain contact with Emergency agencies and their key OSR personnel	☐
Tier 1 Spill Actions	√
3. Liaise and maintain contact with the ERGL/OSR Operations Coordinator for incident briefing and likely requirements	☐
4. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
7. Establish onshore Incident Control and assume responsibility for onshore OSR operations	☐
8. Ensure incident HSE strategy is implemented and continually monitored	☐
9. Liaise with Offshore IC and ERGL for incident briefing, response strategy development and likely resource requirements	☐
10. Arrange initial shoreline assessment, request maps depicting prioritised areas for protection or clean-up and report status to ERG	☐
11. Determine access routes to affected area(s) and potential impacts to access	☐
12. Request mobilisation of field communications	☐
13. Assess and provide appropriate guidance in regard to local incident site hazards or risks to life and property (quicksand, limited access, caves, wildlife etc.)	☐
14. Consider need for permit to work system	☐
15. Determine optimum incident command points with OSR personnel and Offshore IC	☐
16. Monitor effectiveness of security, safety and medical care arrangements	☐
17. Review effectiveness of containment and recovery, shoreline clean-up and waste management operations	☐
18. Stay apprised of ongoing weather forecasts for the next 12/24 hours	☐
19. Liaise with ADA Materials and Logistics Coordinator to determine extent of initial and ongoing catering/janitorial/accommodation services required	☐
20. Prepare Onshore OSR activities input and handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 / Tier 3 Spill Actions	√
21. Liaise with and work under direction of Response Authority Incident Controller	☐
22. Interface with MSV/DA/AMSA Liaison Officer(s) in regard to ongoing operational support	☐
23. Conduct regular briefings with local authorities on status of clean-up operations	☐
24. Consider relief/support of personnel and/or your role; prepare handover reports and plans	☐
Post Incident Actions	√
25. Debrief personnel in your charge before standing them down	☐
26. Attend primary debrief before standing down	☐
27. Supply data on committed costs to ERG Information Coordinator	☐
28. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

2.14.11 ADA OSR Waste Management Coordinator

Note:..... the OSR Waste Management role (External Contractor Role) coordinates the containment, storage, transport and disposal of recovered oil, oily waste and debris

Reports To: OSR Operations Coordinator

Pre-Emergency Actions	√
1. Maintain familiarisation with ADA OSCP and key emergency respondents and notifications	☐
2. Establish and maintain contact, with Waste Management agencies and their key personnel	☐
Tier 1 Spill Actions	√
3. Confirm your callout with OSR Operations Coordinator/Onshore IC	☐
4. Liaise/maintain contact with OSR Operations Coordinator for incident briefing and likely requirements	☐
5. Ensure incident HSE strategy is implemented and continually monitored	☐
6. Ensure all PPE and safety equipment are in place for handling waste products	☐
7. Provide input to induction procedures of response personnel and contractors	☐
8. Brief personnel/contractors in your charge with response strategy and safe working practices	☐
9. Supervise/instruct on-site handling, storage, separation, treatment and management of waste, recovered oil and associated oil spill debris	☐
10. Carry out shoreline assessment with OSR Waste Management personnel and identify optimum locations for control points	☐
11. Contact relevant Government agencies and obtain any necessary waste handling permits and authorisations	☐
12. Arrange for additional OSR personnel, equipment and services necessary to execute waste management strategy (as required)	☐
13. Confirm current lists of available OSR waste storage, treatment facilities, specialist haulage contractors and disposal sites	☐
14. Arrange transport to haul and dispose of all OSR waste material with approved provider	☐
15. Establish and maintain communication with MSV/DA Waste Management Representative	☐
16. Prepare waste management activities input and handover notes for Response Authority IC if spill escalates to Tier 2-3	☐
Tier 2 / Tier 3 Spill Actions	√
17. Liaise with and work under direction of Response Authority Incident Controller	☐
18. Arrange waste management sites for recovered oil and oiled debris with MSV/DA and clarify procedures and conditions to be followed	☐
19. Monitor effectiveness of all waste management contactors activities	☐
20. Consider relief/support of personnel and/or your role; prepare handover reports and plans	☐
Post Incident Actions	√
21. Debrief personnel in your charge before standing them down	☐
22. Make arrangement for return and checking of OSR materials/equipment	☐
23. Supply data on committed costs to ERG Information Coordinator	☐
24. Attend primary debrief before standing down	☐
25. Maintain personal log of events, actions, messages and decisions; provide to ERG Information Coordinator at the conclusion of any incident	☐

Appendix 3: Summary Environmental Information

SUMMARY ENVIRONMENTAL INFORMATION

The Environment Plan (EP) has been prepared to:

- Ensure that reasonably foreseeable environmental effects associated with the project are identified and that systems are in place to both protect the environment and manage environmental risk
- Outline the environmental management measures that will apply to the drilling program.
- Examine the environmental hazards and consequences associated with the program, assess environmental risk levels and develop management measures to ensure risks are kept to as low as reasonably practicable.
- Detail the environmental standards that are applicable to the project, set out environmental performance objectives for the project and propose criteria for measuring performance against these objectives
- Document this information:
  - For implementation by ADA employees and contractors.
  - For use by regulatory authorities in the environmental assessment and approval process.

The Environment Plan includes:

- Description of the proposal, including location of drilling program sites, timing and technical details of the vessel and equipment to be used.
- The legislative framework applicable to the proposed drilling program.
- The existing environment of the area, particularly any environmental or social sensitivity associated with the project area.
- The environmental risks associated with normal and abnormal (or emergency) operations.
- The environmental performance objectives, standards and criteria to measure such performance.
- ADA's Health, Safety and Environmental Policy and management objectives.
- The implementation strategy for the project and specific operational controls to be implemented to achieve the environmental performance objectives.

Below are the Ottway Basin and Bass Basin Environment Plan's table of contents which outline the structure and contents of each plan.

Otway Basin Environment Plan

1	**INTRODUCTION**	**1**
1.1	Project Outline	1
1.1.1	Drilling Program	1
1.1.2	Project Location	1
1.1.3	Drilling Program Timeframe	2
1.2	Project Proponent	2
1.2.1	Australian Drilling Associates Pty Ltd	2
1.3	Purpose of the Environment Plan	2
1.3.1	Objectives	4
1.3.2	Content	4
2	**LEGISLATIVE FRAMEWORK**	**5**
2.1	Commonwealth Legislation	5
2.1.1	Petroleum (Submerged Lands) (Management of Environment) Regulations 1999	5
2.1.2	Environment Protection and Biodiversity Conservation Act 1999	5
2.2	Victorian Legislation	5
2.3	International Agreements and Conventions	6
2.4	Codes of Practice and Guidelines	6
2.5	Environmental Policy Statement	6
3	**STAKEHOLDER CONSULTATION**	**7**
3.1	Relevant Stakeholders	7
3.2	Stakeholder Consultation Program	8
4	**DESCRIPTION OF THE ENVIRONMENT**	**9**
4.1	Physical Environment	9
4.1.1	Climate and Meteorology	9
4.1.2	Bathymetry	9
4.1.3	Oceanography	9
4.2	Biological Environment	10
4.2.1	Fish and Shellfish	10
4.2.2	Seabirds	10
4.2.3	Marine Mammals	10
4.2.4	Sharks	14
4.2.5	Seals	15
4.3	Heritage, Conservation and Areas of Cultural Significance	15
4.3.1	Conservation	15
4.3.2	Heritage	16

4.4 Socio-Economic Environment 17
4.4.1 Recreational Fishing and Tourism 17
4.4.2 Oil and Gas Production 17
4.4.3 Commercial Shipping 18
4.4.4 Commercial Fishing 18

5 POTENTIAL ENVIRONMENTAL HAZARDS AND CONSEQUENCES 21
5.1 Potential Hazards 21
5.1.1 Rig Positioning and Anchoring 21
5.1.2 Artificial Lighting 22
5.1.3 Noise Impacts 22
5.1.4 Interference with other Operators 24
5.1.5 Drilling Mud and Cuttings 24
5.1.6 Waste 25
5.1.7 Ballast Water Discharge 25
5.1.8 Spills 26

6 RISK ASSESSMENT 29
6.1 Hazard Identification 29
6.2 Hazard Scenario 29
6.3 Risk Matrix 30
6.4 Risk Reduction Measures 31
6.5 Environmental Hazard and Risk Assessment 31

7 ENVIRONMENTAL PERFORMANCE OBJECTIVES AND STANDARDS 43
7.1 Training 44
7.2 Environmental Roles and Responsibilities 45
7.2.1 ADA Operations Manager 45
7.2.2 ADA Site Representative 45
7.2.3 Support Vessel Master 45
7.2.4 Drilling Contractor 45
7.2.5 ADA Health, Safety and Environmental Manager 46

8 IMPLEMENTATION STRATEGY 7

9 MONITORING, AUDITING AND REPORTING 52
9.1 Environmental Monitoring 52
9.2 Auditing 52
9.3 Reporting on Routine Operations 52
9.4 Reporting on Non-routine Incidents 52

10 REFERENCES 54

Tables

Table 1.1 Well locations and permit areas. 2
Table 3.1 Stakeholder consultation 7
Table 4.1 Climate in the vicinity of the drilling program 9
Table 4.1 Cetaceans listed as migratory and likely to be found in the project area 11
Table 4.2 Other cetaceans that may occur within the project area 14
Table 4.2 Shipwrecks in the vicinity of the drilling program 17
Table 5.1 Potential hazards and consequences associated with the West Triton Drilling Program 21
Table 5.2 A comparison of underwater noise sources, their frequency and sound levels 23
Table 5.3 West Triton spill modelling results for Otway Basin 27
Table 6.1 Qualitative measures of consequence or impact 30
Table 6.2 Qualitative measures of likelihood 30
Table 6.3 Qualitative risk analysis matrix – level of risk 31
Table 6.4 Risk reduction philosophy 31
Table 6.5 Environmental risk assessment 33
Table 6.5 Environmental risk assessment (cont'd) 34
Table 6.5 Environmental risk assessment (cont'd) 35
Table 6.5 Environmental risk assessment (cont'd) 36
Table 6.5 Environmental risk assessment (cont'd) 38
Table 6.5 Environmental risk assessment (cont'd) 39
Table 7.1 Summary of environmental management objectives, standards and performance criteria 43
Table 7.1 Summary of environmental management objectives, standards and performance criteria (cont'd) 44
Table 8.1 Implementation strategy 48
Table 8.1 Implementation strategy (cont'd) 49
Table 8.1 Implementation strategy (cont'd) 51

Figures

Figure 1.1 West Triton drilling program well locations – Otway Basin 3
Figure 5.1 Otway Basin crude oil stochastic spill modelling and weathering curve **28**

Appendices

SCHEDULE **2**

WEST TRITON JACK-UP DRILL RIG **4**

ADAS HEALTH, SAFETY AND ENVIRONMENT POLICY **5**

MSDS LIST **6**

Bass Basin Environment Plan

1	**INTRODUCTION**	**1**
1.1	Project Outline	1
1.1.1	Drilling Program	1
1.1.2	Project Location	1
1.1.3	Drilling Program Timeframe	3
1.2	Project Proponent	3
1.2.1	Australian Drilling Associates Pty Ltd	3
1.3	Purpose of the Environment Plan	3
1.3.1	Environment Plan Content	4
2	**LEGISLATIVE FRAMEWORK**	**5**
2.1	Commonwealth Legislation	5
2.1.1	Petroleum (Submerged Lands) (Management of Environment) Regulations 1999	5
2.1.2	Environment Protection and Biodiversity Conservation Act 1999	5
2.2	Tasmanian Legislation	6
2.3	International Agreements and Conventions	6
2.4	Codes of Practice and Guidelines	6
2.5	Environmental Policy Statement	6
3	**STAKEHOLDER CONSULTATION**	**8**
3.1	Relevant Stakeholders	8
3.2	Stakeholder Consultation Program	9
4	**DESCRIPTION OF THE ENVIRONMENT**	**10**
4.1	Physical Environment	10
4.1.1	Climate and Meteorology	10
4.1.2	Bathymetry	10
4.1.3	Oceanography	10
4.2	Biological Environment	11
4.2.1	Benthic Invertebrates	11
4.2.2	Fish and Shellfish	11
4.2.3	Seabirds	12
4.2.4	Marine Mammals	12
4.2.5	Sharks	16
4.2.6	Seals	16
4.3	Heritage, Conservation and Areas of Cultural Significance	16
4.3.1	Conservation	16
4.3.2	Heritage	17

4.4 Socio-Economic Environment 17
4.4.1 Petroleum Exploration and Production 17
4.4.2 Commercial Shipping 17
4.4.3 Commercial Fishing 17

5 POTENTIAL ENVIRONMENTAL HAZARDS AND CONSEQUENCES 19

5.1 POTENTIAL HAZARDS 19
5.1.1 Rig Positioning and Anchoring 20
5.1.2 Artificial Lighting 20
5.1.3 Noise Impacts 20
5.1.4 Interference with other Operators 20
5.1.5 Drilling Mud and Cuttings 22
5.1.6 Waste 22
5.1.7 Introduction of Foreign Species 24
5.1.8 Spills 24

6 RISK ASSESSMENT 25
6.1 Hazard Identification 28
6.2 Risk Scenario 28
6.3 Risk Matrix 29
6.4 Risk Reduction Measures 30
6.5 Environmental Hazard and Risk Assessment 31

7 ENVIRONMENTAL PERFORMANCE OBJECTIVES AND STANDARDS 44

7.1 TRAINING 46
7.1.1 Induction 46
7.1.2 Meetings 47
7.1.3 Oil Spill Response Training 47
7.2 Environmental Roles and Responsibilities 47
7.2.1 ADA Drilling Manager 47
7.2.2 ADA Site Representative 48
7.2.3 Support Vessel Master 48
7.2.4 Offshore Installation Manager (OIM) 48
7.2.5 ADA HSE Manager 48
7.2.6 Drilling Rig HSE Adviser 48

8 IMPLEMENTATION STRATEGY 49

9 MONITORING, AUDITING AND REPORTING 54
9.1 Environmental Monitoring 54
9.2 Auditing 54

9.3 Reporting on Routine Operations 54
9.4 Reporting on Non-routine Incidents 54

10 REFERENCES 56

Tables

Table 1.1 Well locations and permit areas. 1
Table 3.1 Stakeholder consultation 8
Table 4.1 Climate in the vicinity of the drilling program. 10
Table 4.2 Cetaceans listed as migratory and likely to be found in the project area 13
Table 4.3 Other cetaceans that may occur within the project area 15
Table 5.1 Potential hazards and consequences associated with the West Triton Drilling Program 19
Table 5.2 A comparison of underwater noise sources, their frequency and sound levels 21
Table 5.3 West Triton spill modelling results for Bass Basin 25
Table 6.1 Qualitative measures of consequence or impact 29
Table 6.2 Qualitative measures of likelihood 29
Table 6.3 Qualitative risk analysis matrix – level of risk 30
Table 6.4 Risk reduction philosophy 30
Table 6.5 Environmental risk assessment 32
Table 7.1 Summary of environmental management objectives, standards and performance criteria 44
Table 8.1 Implementation strategy 50
Table 9.1 Monitoring program 54

Figures

Figure 1.1 West Triton drilling program well locations – Bass Basin 2
Figure 5.1 Spikey Beach crude oil stochastic spill modelling and weathering curve **27**

Appendices

SIGN-OFF SCHEDULE 2

WEST TRITON JACK-UP DRILLING RIG 4

SERVICE VESSEL SPECIFICATIONS 6

ADA, OPERATOR AND PERMIT HOLDERS HEALTH, SAFETY AND ENVIRONMENTAL POLICIES 8

Appendix 4: Response Equipment

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
PFA5109	RADIO TRANSCEIVER VHF GME		VIC	ALTONA	AMSA
WCE4983	BARGE LANDING CLAM 12M		VIC	ALTONA	AMSA
PALA120803	Spray unit vessel mounted vikospray		VIC	ALTONA	MOBALT
PDFA150	Boom Self Buoyant "Slickbar MkE"	800 m	VIC	ALTONA	MOBALT
PDCA125	Skimmer - Disc "Komara 12K MK2"		VIC	ALTONA	MOBALT
PDAA094	Skimmer - Weir "Manta Ray Head""		VIC	ALTONA	MOBALT
PDJA212	Boom "Spillco"	75 m	VIC	ALTONA	MOBALT
VCAA265	Trailer - Oil Spill		VIC	ALTONA	MOBALT
VCAA262	Trailer - Oil Spill		VIC	BARRY BEACH	ESSOBBMT
PDDA136	Skimmer - Rope Mop "OMI Mk 1-4EE"		VIC	BARRY BEACH	ESSOBBMT
MOSA347	Sorbent Boom	732 m	VIC	BARRY BEACH	ESSOBBMT
PDAA089	Skimmer - Weir "Ro-Skim"		VIC	BARRY BEACH	ESSOBBMT
PDHA183	Boom Self Inflating "Expandi 3000"	3000 m	VIC	BARRY BEACH	ESSOBBMT
PDFA111133	BOOM SELF BUOYANT PACIFIC GP 500	300m	VIC	GEELONG	VIC01
PAL109429	PUMP SKIMMER SYSTEM SPATE		VIC	GEELONG	VIC01
SH109435	SKIMMER HEAD WEIR FOILEX		VIC	GEELONG	VIC01
VCA4414	TRAILER BOAT		VIC	GEELONG	VIC01
PDA109423	SKIMMER WEIR FOILEX		VIC	GEELONG	VIC01
PDO105362	ANCHOR KIT SMALL 15KG SET OF 5		VIC	GEELONG	VIC01
WCA4408	PUNT ALUMINIUM QUINTREX SLOGGER 4.5M		VIC	GEELONG	VIC01
PAN105339	MOTOR OUTBOARD MERCURY 30HP		VIC	GEELONG	VIC01
VCA4417	TRAILER BOX TANDEM AXLE		VIC	GEELONG	VIC01
PBD109445	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	GEELONG	VIC01
PBD109446	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	GEELONG	VIC01
PDY1208032	Viscous oil snares	100 bags	VIC	GEELONG AMOSC	AMOSC
WCFA308	Vessel Oil Recovery Egmopol Barge		VIC	GEELONG AMOSC	AMOSC
PDY1208031	Beach washdown kit		VIC	GEELONG AMOSC	AMOSC
PDY120803	Decontamination kit		VIC	GEELONG AMOSC	AMOSC
WCEA301	Barge - Storage "Lancer"	25t	VIC	GEELONG AMOSC	AMOSC
WCEA299	Barge - Storage "Lancer" 25t		VIC	GEELONG	AMOSC

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
				AMOSC	
PDOA236	Boom Anchor Kit "Shore Anchors"		VIC	GEELONG AMOSC	AMOSC
PDOA237	Boom Anchor Kit "Shore Anchors"		VIC	GEELONG AMOSC	AMOSC
PFAA238	Communications - Base Station VHF/UHF		VIC	GEELONG AMOSC	AMOSC
PFAA239	Communications - Radio TX/RX UHF Handheld 3 units	3	VIC	GEELONG AMOSC	AMOSC
PFAA240	Communications - Radio TX/RX UHF Handheld 3 units	3	VIC	GEELONG AMOSC	AMOSC
PFAA241	Communications - Radio TX/RX VHF Handheld 3 units	3	VIC	GEELONG AMOSC	AMOSC
PFAA242	Communications - Radio TX/RX VHF Handheld 3 units	3	VIC	GEELONG AMOSC	AMOSC
PFAA243	Communications - Radio TX/RX VHF Airband Handheld	3	VIC	GEELONG AMOSC	AMOSC
PFAA244	Communications - Satellite TCS 9200 phone/fax		VIC	GEELONG AMOSC	AMOSC
PDOA227	Boom Anchor Kit including 12x30kg anchors		VIC	GEELONG AMOSC	AMOSC
PDOA228	Boom Anchor Kit including 12x30kg anchors		VIC	GEELONG AMOSC	AMOSC
PDOA229	Boom Anchor Kit including 12x30kg anchors		VIC	GEELONG AMOSC	AMOSC
PDOA230	Boom Anchor Kit including 12x30kg anchors		VIC	GEELONG AMOSC	AMOSC
PDOA231	Boom Anchor Kit including 12x30kg anchors		VIC	GEELONG AMOSC	AMOSC
PDOA232	Boom Anchor Kit including 12x30kg anchors		VIC	GEELONG AMOSC	AMOSC
PDOA233	Boom Anchor Kit "Shore Anchors"		VIC	GEELONG AMOSC	AMOSC
PDOA234	Boom Anchor Kit "Shore Anchors"		VIC	GEELONG AMOSC	AMOSC
PDOA235	Boom Anchor Kit "Shore Anchors"		VIC	GEELONG AMOSC	AMOSC
PDDA134	Skimmer - Rope Mop "OM 260 DP" on trailer		VIC	GEELONG AMOSC	AMOSC
PDDA135	Skimmer - Rope Mop "OM 260 DP" on trailer		VIC	GEELONG AMOSC	AMOSC
PDGA161	Boom Inflatable "Ro-skim Boom 1500" (with winder)	72 m	VIC	GEELONG AMOSC	AMOSC
PDGA162	Boom Inflatable "Ro-Boom 1500" (with winder)	3000 m	VIC	GEELONG AMOSC	AMOSC
PDGA163	Boom Accessory "Ro-Boom Power Pack"		VIC	GEELONG AMOSC	AMOSC
PDGA164	Boom Accessory "Ro-Boom Power Pack"		VIC	GEELONG AMOSC	AMOSC
PDGA165	Boom Accessory "Ro-Boom Power Pack"		VIC	GEELONG AMOSC	AMOSC
PDGA166	Boom Accessory "Ro-Boom		VIC	GEELONG	AMOSC

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
	Power Pack"			AMOSC	
PDGA167	Boom Accessory "Ro-Boom Power Pack"		VIC	GEELONG AMOSC	AMOSC
PDBA098	Skimmer - Suction "Ro-Vac"		VIC	GEELONG AMOSC	AMOSC
PDBA099	Skimmer - Suction "Ro-Vac"		VIC	GEELONG AMOSC	AMOSC
PDBA100	Skimmer - Suction "Ro-Vac"		VIC	GEELONG AMOSC	AMOSC
PDBA101	Skimmer - Suction "Ro-Vac"		VIC	GEELONG AMOSC	AMOSC
PDCA114	Skimmer - Disc "Komara 30K"		VIC	GEELONG AMOSC	AMOSC
PDCA115	Skimmer - Disc "Komara 30K"		VIC	GEELONG AMOSC	AMOSC
PDCA116	Skimmer Disc Komara 12K Mk2		VIC	GEELONG AMOSC	AMOSC
PDCA117	Skimmer Disc Komara 12K Mk2		VIC	GEELONG AMOSC	AMOSC
MOFA312	Oiled Fauna Kits		VIC	GEELONG AMOSC	AMOSC
MOSA313	Sorbent Boom "3M Oilsorb"	1200m	VIC	GEELONG AMOSC	AMOSC
MOSA314	Sorbent Pads "3M 450x450"	72 packs	VIC	GEELONG AMOSC	AMOSC
PAKA001	Cleaner Industrial - Electric/Steam Gen on trailer	1	VIC	GEELONG AMOSC	AMOSC
PAKA002	Cleaner Industrial - Electric/Steam Gen on trailer	1	VIC	GEELONG AMOSC	AMOSC
PAKA003	Cleaner Industrial - Electric/Steam Gen on trailer	1	VIC	GEELONG AMOSC	AMOSC
PAKA004	Cleaner Industrial - Electric/Steam Gen on trailer	1	VIC	GEELONG AMOSC	AMOSC
PALA005	Pump - Dispersant Transfer diesel powered		VIC	GEELONG AMOSC	AMOSC
PALA006	Pump - Dispersant Transfer diesel powered		VIC	GEELONG AMOSC	AMOSC
PALA007	Pump - GP Transfer diesel powered		VIC	GEELONG AMOSC	AMOSC
PALA008	Pump - GP Transfer diesel powered		VIC	GEELONG AMOSC	AMOSC
PALA009	Pump - GP Transfer diesel powered		VIC	GEELONG AMOSC	AMOSC
PALA010	Spray Unit Vessel Mounted Vikospray		VIC	GEELONG AMOSC	AMOSC
PALA014	Spray Unit Vessel Mounted Vikospray		VIC	GEELONG AMOSC	AMOSC
PDCA126	Skimmer - Disc "Komara 12K Mk3"		VIC	GEELONG AMOSC	AMOSC
PDDA132	Skimmer - Rope Mop "OM 240 DP" on trailer		VIC	GEELONG AMOSC	AMOSC
PDDA133	Skimmer - Rope Mop "OM 240 DP" on trailer		VIC	GEELONG AMOSC	AMOSC

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
PDHA177	Boom Self Inflating "Versatech Zooom"	3350 m	VIC	GEELONG AMOSC	AMOSC
PDIA194	Boom Beach "Beach Guardian"	2000 m	VIC	GEELONG AMOSC	AMOSC
PDIA195	Boom Accessory "Beach Guardian Deployment Kit"		VIC	GEELONG AMOSC	AMOSC
PDIA196	Boom Accessory "Beach Guardian Deployment Kit"		VIC	GEELONG AMOSC	AMOSC
PDIA197	Boom Accessory "Beach Guardian Deployment Kit"		VIC	GEELONG AMOSC	AMOSC
PDIA198	Boom Accessory "Beach Guardian Deployment Kit"		VIC	GEELONG AMOSC	AMOSC
PDKA215	Spray Bucket Dispersant Helicopter "Simplex 6810"		VIC	GEELONG AMOSC	AMOSC
PDKA216	Spray Bucket Dispersant Helicopter "Simplex 6810"		VIC	GEELONG AMOSC	AMOSC
PALA023	Spray Unit Vessel Mounted Vikospray		VIC	GEELONG AMOSC	AMOSC
PBDA037	Tank - Oil "Fastank" 9000LT		VIC	GEELONG AMOSC	AMOSC
PBDA038	Tank - Oil "Fastank" 9000LT		VIC	GEELONG AMOSC	AMOSC
PBDA039	Tank - Oil "Fastank" 9000LT		VIC	GEELONG AMOSC	AMOSC
PBDA040	Tank - Oil "Fastank" 9000lt		VIC	GEELONG AMOSC	AMOSC
PBDA041	Tank - Oil "Fastank" 9000 lt		VIC	GEELONG AMOSC	AMOSC
PBDA042	Tank - Oil "Fastank" 9000 lt		VIC	GEELONG AMOSC	AMOSC
PBDA043	Tank - Oil "Vikotank" 13000 lt		VIC	GEELONG AMOSC	AMOSC
PBDA044	Tank - Oil "Vikotank" 13000 lt		VIC	GEELONG AMOSC	AMOSC
PDAA082	Skimmer - Weir "Desmi 250"		VIC	GEELONG AMOSC	AMOSC
PDAA083	Skimmer - Weir GT 185		VIC	GEELONG AMOSC	AMOSC
PDAA084	Skimmer - Weir GT 185		VIC	GEELONG AMOSC	AMOSC
PDAA085	Skimmer - Weir "Ro-Skim"		VIC	GEELONG AMOSC	AMOSC
PDAA086	Skimmer - Weir "Ro-Skim"		VIC	GEELONG AMOSC	AMOSC
WCEA300	Barge - Storage "Lancer"	25t	VIC	GEELONG AMOSC	AMOSC
PALA031	Spray Unit Vessel Mounted Vikospray		VIC	GEELONG AMOSC	SHELLGEE
PDCA129	Skimmer - Disc "Komara 12K"		VIC	GEELONG AMOSC	SHELLGEE
PDHA186	Boom Self Inflating "Versatech Zooom"	150 m	VIC	GEELONG AMOSC	SHELLGEE
VCA5001	TRAILER BOX TANDEM		VIC	LAKES	VIC01

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
	AXLE			ENTRANCE	
VCAA261	Trailer - Oil Spill		VIC	LONG ISLAND	ESSOBBMT
PDBA106	Skimmer - Suction "Ro-Vac"		VIC	LONG ISLAND	ESSOBBMT
PBDA051	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOBBMT
PBDA049	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOBBMT
PBDA048	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOBBMT
PBDA050	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOBBMT
PBDA052	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOBBMT
PDGA168	Boom Inflatable "Ro-Trawl" 72m		VIC	LONG ISLAND	ESSOBBMT
PDGA169	Boom Inflatable "Sea Sentinel"	1000 m	VIC	LONG ISLAND	ESSOBBMT
PBDA053	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOLIP
PBDA054	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOLIP
PBDA055	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOLIP
PBDA056	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOLIP
PBDA057	Tank - Oil "Fastank" 9000 lt		VIC	LONG ISLAND	ESSOLIP
PDAA088	Skimmer - Weir GT 185		VIC	LONG ISLAND	ESSOLIP
PDAA091	Skimmer - Weir GT185		VIC	LONG ISLAND	ESSOLIP
PDAA092	Skimmer - Weir "Ro-Skim"		VIC	LONG ISLAND	ESSOLIP
PDBA102	Skimmer - Suction "Ro-Vac"		VIC	LONG ISLAND	ESSOLIP
PDBA103	Skimmer - Suction "Ro-Vac"		VIC	LONG ISLAND	ESSOLIP
PDBA104	Skimmer Suction Ro-Vac		VIC	LONG ISLAND	ESSOLIP
PDBA105	Skimmer - Suction "Ro-Vac"		VIC	LONG ISLAND	ESSOLIP
MOSA351	Sorbent Boom	1500 m	VIC	LONG ISLAND	ESSOLIP
PALA020	Spray Unit Vessel Mounted Vikospray		VIC	LONG ISLAND	ESSOLIP
PDGA170	Boom Inflatable "Sea Sentinel"	1000 m	VIC	LONG ISLAND	ESSOLIP
PDHA184	Boom Self Inflating "Expandi"	500 m	VIC	LONG ISLAND	ESSOLIP
PDIA202	Boom Beach "Shore Guardian"	500 m	VIC	LONG ISLAND	ESSOLIP
PDIA203	Boom Beach "Shore Guardian"	500 m	VIC	LONG ISLAND	ESSOLIP
PDKA219	Spray Bucket Dispersant Helicopter "Simplex 6810"		VIC	LONG ISLAND	ESSOLIP
VCAA263	Trailer - Oil Spill		VIC	LONG ISLAND	ESSOLIP
VCAA264	Trailer - Oil Spill		VIC	LONG ISLAND	ESSOLIP
WCAA289	Boat - Boom/sledge deployment "Sentinel"		VIC	LONG ISLAND	ESSOLIP
WCEA305	Barge - Oil Recovery "Gippsland 003"	800t	VIC	LONG ISLAND	ESSOLIP
PDKA221	Spray Bucket Dispersant Helicopter "Simplex 6810"		VIC	LONGFORD	ESSOLONG
PDKA220	Spray Bucket Dispersant Helicopter "Simplex 6810"		VIC	LONGFORD	ESSOLONG
PDB10776	SKIMMER SUCTION VIKOMA SHOREVAC		VIC	MELBOURNE	AMSA
PDO10966	ANCHOR KIT LARGE 100KG SET OF 4		VIC	MELBOURNE	AMSA

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
PAL4410	PUMP DISPERSANT SYSTEM LOMBARDINI		VIC	MELBOURNE	AMSA
WCB4892	DINGHY SEMI RIGID ZODIAC PRO 5.3M		VIC	MELBOURNE	AMSA
PDD4962	SKIMMER ROPE MOP MOPPIT		VIC	MELBOURNE	AMSA
PAM10976	PUMP SALVAGE ELASTEC S3E		VIC	MELBOURNE	AMSA
PDJ11636	BOOM BEACH STRUCTURFLEX LAND SEA	100m	VIC	MELBOURNE	AMSA
PDN4254	LOCKER - EQUIPMENT - ALUMINIUM		VIC	MELBOURNE	AMSA
PAL12209E	PUMP DISPERSANT TRANSFER FIXED WING		VIC	MELBOURNE	AMSA
PBD105406	TANK RECOVERED OIL TOWABLE CANFLEX 10T		VIC	MELBOURNE	AMSA
IP111779	STIHL BR420 BACKPACK BLOWER	1	VIC	MELBOURNE	AMSA
IP111780	STIHL BR420 BACKPACK BLOWER	1	VIC	MELBOURNE	AMSA
BP111795	ONGA WATER PUMP WITH HONDA ENGINE	1	VIC	MELBOURNE	AMSA
BP111796	ONGA WATER PUMP WITH HONDA ENGINE	1	VIC	MELBOURNE	AMSA
PAO4427	TOWER FLOODLIGHTS CLARK 12M		VIC	MELBOURNE	AMSA
PBD4989	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	MELBOURNE	AMSA
PBD4990	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	MELBOURNE	AMSA
PBD4991	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	MELBOURNE	AMSA
PBD4992	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	MELBOURNE	AMSA
PDB4963	SKIMMER SUCTION VIKOMA VIKOVAC		VIC	MELBOURNE	AMSA
PDD4958	SKIMMER ROPE MOP OMI 140		VIC	MELBOURNE	AMSA
PDD4960	SKIMMER ROPE MOP OMI 140		VIC	MELBOURNE	AMSA
PDD4961	SKIMMER ROPE MOP OMI 140		VIC	MELBOURNE	AMSA
PBD4407	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	MELBOURNE	AMSA
PBD4415	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	MELBOURNE	AMSA
PDC4413	SKIMMER DISC VIKOMA		VIC	MELBOURNE	AMSA

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
PDD4452	KOMARA 12K MK3 SKIMMER ROPE MOP ORI BARRACUDA 2000		VIC	MELBOURNE	AMSA
PDH4457	BOOM SELF INFLATING EXPANDI 3000	300 m	VIC	MELBOURNE	AMSA
PDA4942	SKIMMER WEIR DOUGLAS SKIMPAK		VIC	MELBOURNE	AMSA
PAH4284	PUMP GENERAL PURPOSE HONDA WD 20X		VIC	MELBOURNE	AMSA
PAH4286	PUMP GENERAL PURPOSE HONDA WD 20X		VIC	MELBOURNE	AMSA
PAH4290	PUMP GENERAL PURPOSE HONDA WD 20X		VIC	MELBOURNE	AMSA
PEA4373	GENERATOR SET PORTABLE 3 KVA		VIC	MELBOURNE	AMSA
PFA4949	RADIO TRANSCEIVER VHF AIR ICOM ICA20		VIC	MELBOURNE	AMSA
PFA4950	RADIO TRANSCEIVER VHF AIR ICOM ICA20		VIC	MELBOURNE	AMSA
PFA4956	RADIO TRANSCEIVER MOTORLA FLEXAIR		VIC	MELBOURNE	AMSA
PFA4957	RADIO TRANSCEIVER UHF MOTOROLA MAXAR		VIC	MELBOURNE	AMSA
VCA4970	TRAILER TANDEM AXLE MARCO		VIC	MELBOURNE	AMSA
WCB4365	DINGHY SEMI RIGID ZODIAC PRO 5.3M		VIC	MELBOURNE	AMSA
WCF4969	VESSEL OIL RECOVERY MARCO CHARLIE		VIC	MELBOURNE	AMSA
PBD5114	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	MELBOURNE	AMSA
PP10776	SKIMMER POWER PACK SUCTION VIKOMA SHOREVAC	1	VIC	MELBOURNE	AMSA
HP10776	SKIMMER HOPPER SUCTION VIKOMA SHOREVAC	1	VIC	MELBOURNE	AMSA
PP4963	SKIMMER POWER PACK SUCTION VIKOMA VIKOVAC	1	VIC	MELBOURNE	AMSA
HP4963	SKIMMER SUCTION VIKOMA VIKOVAC	1	VIC	MELBOURNE	AMSA
VCA4458	TRAILER BOX TANDEM AXLE		VIC	MELBOURNE	AMSA
VCA4965	TRAILER BOX TANDEM AXLE		VIC	MELBOURNE	AMSA
VCA110559	TRAILER BOX TANDEM AXLE		VIC	MELBOURNE	AMSA
VCA4456	Trailer Box Tandem Axle		VIC	MELBOURNE	AMSA
PDN4244	LOCKER - EQUIPMENT - ALUMINIUM		VIC	MELBOURNE	AMSA

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
SH109417	SKIMMER HEAD WEIR FOILEX		VIC	MELBOURNE	AMSA
SH5470	SKIMMER HEAD - WEIR - DESMI 250	1	VIC	MELBOURNE	AMSA
PP5470	SKIMMER POWER PACK WEIR DESMI 250	1	VIC	MELBOURNE	AMSA
HR5470	SKIMMER HOSE REEL WEIR DESMI 250	1	VIC	MELBOURNE	AMSA
VCA4980	TRAILER BOAT SINGLE AXLE		VIC	MELBOURNE	AMSA
PAN4377	MOTOR OUTBOARD JOHNSON 70HP		VIC	MELBOURNE	AMSA
PAN4893	MOTOR OUTBOARD YAMAHA 70 HP		VIC	MELBOURNE	AMSA
VCA4361	TRAILER BOAT		VIC	MELBOURNE	AMSA
PBD110560	TANK RECOVERED OIL 7500 LITRE		VIC	MELBOURNE	AMSA
PAN12625	MOTOR OUTBOARD HONDA 90 HP	1	VIC	MELBOURNE	AMSA
PAN12626	MOTOR OUTBOARD HONDA 90 HP	1	VIC	MELBOURNE	AMSA
PEA4357	GENERATOR SET PORTABLE 3 KVA		VIC	MELBOURNE	AMSA
PAL5009	PUMP DISPERSANT SYSTEM WSL		VIC	MELBOURNE	AMSA
PAL5012	PUMP DISPERSANT SYSTEM WSL		VIC	MELBOURNE	AMSA
PAL5104	PUMP DISPERSANT SYSTEM WSL		VIC	MELBOURNE	AMSA
PDA5470	SKIMMER WEIR DESMI 250		VIC	MELBOURNE	AMSA
PDH4279	BOOM SELF INFLATING VERSATECH ZOOM 12/18	300 m	VIC	MELBOURNE	AMSA
PDJ4280	BOOM SWEEP SELF BUOYANT GIANT TROILBOOM		VIC	MELBOURNE	AMSA
PDK4257	SPRAY BUCKET DISPERSANT HELICOPTER SIMPLEX		VIC	MELBOURNE	AMSA
WCE4263	BARGE RECOVERED OIL ALUMINIUM MALEA 9T		VIC	MELBOURNE	AMSA
PAH4292	PUMP GENERAL PURPOSE HONDA WD 20X		VIC	MELBOURNE	AMSA
PAH4973	PUMP GENERAL PURPOSE HONDA WD 20X		VIC	MELBOURNE	AMSA
PAK4994	CLEANER HIGH PRESSURE WATER SILVAN 100MX		VIC	MELBOURNE	AMSA
PAL5010	PUMP DISPERSANT SYSTEM WSL		VIC	MELBOURNE	AMSA
PAL5011	PUMP DISPERSANT SYSTEM WSL		VIC	MELBOURNE	AMSA
PAL5013	PUMP DISPERSANT SYSTEM WSL		VIC	MELBOURNE	AMSA

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
PAL5014	PUMP DISPERSANT SYSTEM WSL		VIC	MELBOURNE	AMSA
PAO4423	TOWER FLOODLIGHTS CLARK 12M		VIC	MELBOURNE	AMSA
PDD4964	SKIMMER ROPE MOP OMI 260		VIC	MELBOURNE	AMSA
PDE4429	SKIMMER BELT SHARK SERIES 5000		VIC	MELBOURNE	AMSA
PDF4978	BOOM SELF BUOYANT AUST POL D2	100m	VIC	MELBOURNE	AMSA
PDI4974	BOOM INFLATABLE SKIMMEX CURTAIN 310MM	38.5m	VIC	MELBOURNE	AMSA
PDI4976	BOOM INFLATABLE SKIMMEX CURTAIN 370MM	90 m	VIC	MELBOURNE	AMSA
PDH4847	BOOM SELF INFLATING VERSATECH ZOOM 12/18	325 m	VIC	MELBOURNE	AMSA
PDI12494	BOOM BEACH STRUCTURFLEX LAND SEA	140m	VIC	MELBOURNE	AMSA
PDG4265	BOOM INFLATABLE VIKOMA HIGH INTEG 1500	600 m	VIC	MELBOURNE	AMSA
PAF4489	WINCH BOOM RECOVERY MARCO POWER BLOCK		VIC	MELBOURNE	AMSA
PDG4975	BOOM INFLATABLE SKIMMEX CURTAIN 650MM	90 m	VIC	MELBOURNE	AMSA
PFA4985	RADIO TRANSCEIVER VHF GME		VIC	MELBOURNE	AMSA
PAF5115	REELS BOOM STORAGE & RECOVERY	2	VIC	MELBOURNE	AMSA
PAF4215	WINCH BOOM RECOVERY MARCO POWER BLOCK		VIC	MELBOURNE	AMSA
PDI4977	BOOM BEACH SKIMMEX SHORELINE	450 m	VIC	MELBOURNE	AMSA
PDN4214	LOCKER - EQUIPMENT - ALUMINIUM		VIC	MELBOURNE	AMSA
PDN4228	LOCKER - EQUIPMENT - ALUMINIUM		VIC	MELBOURNE	AMSA
PDFA111134	BOOM SELF BUOYANT PACIFIC GP 500	300m	VIC	MELBOURNE	VIC01
PDA109415	SKIMMER WEIR FOILEX		VIC	MELBOURNE	VIC01
PDCA108381	Skimmer disc Komara 9k		VIC	MELBOURNE	VIC01
PDBA108385	Skimmer suction Manta Ray		VIC	MELBOURNE	VIC01
PDCA108386	Skimmer brush Aquaguard		VIC	MELBOURNE	VIC01
PAKA108380	Decontamination station		VIC	MELBOURNE	VIC01
PBD10732	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	MELBOURNE	VIC01
VCDA443	Caravan - Incident Support Unit		VIC	MELBOURNE	VIC01
VCA4231	TRAILER BOX TANDEM AXLE		VIC	MELBOURNE	VIC01
VCA4238	TRAILER BOX SINGLE AXLE		VIC	MELBOURNE	VIC01
VCA4966	TRAILER BOX SINGLE		VIC	MELBOURNE	VIC01

EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
VCA4967	AXLE TRAILER BOX SINGLE AXLE		VIC	MELBOURNE	VIC01
WCA4986	PUNT ALUMINIUM QUINTREX SLOGGER 4.5M		VIC	MELBOURNE	VIC01
VCA4418	TRAILER BOX TANDEM AXLE		VIC	MELBOURNE	VIC01
PDF5153	BOOM SELF BUOYANT PACIFIC GP 500	300m	VIC	MELBOURNE	VIC01
PDCA444	Skimmer Disc Komara 12K Mk2		VIC	MELBOURNE	VIC01
PDDA446	Skimmer - Rope Mop "Omi MkII-9"		VIC	MELBOURNE	VIC01
PAL109416	PUMP SKIMMER SYSTEM SPATE		VIC	MELBOURNE	VIC01
VCA4374	TRAILER BOATSINGLE AXLE		VIC	MELBOURNE	VIC01
PAN4987	MOTOR OUTBOARD EVINRUDE 25HP		VIC	MELBOURNE	VIC01
PBD10731	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	MELBOURNE	VIC01
PDO10786	ANCHOR KIT SMALL 15KG SET OF 5		VIC	MELBOURNE	VIC01
VCAA252	Trailer - Oil Spill		VIC	NEWPORT	AMPNEWP
VCA5000	TRAILER BOX TANDEM AXLE		VIC	PAYNESVILLE	VIC01
VCA5076	TRAILER BOX SINGLE AXLE		VIC	PORT FAIRY	VIC01
PBD5077	STORAGE CONTAINER - ALUMINIUM		VIC	PORT FAIRY	VIC01
VCA4999	TRAILER BOX TANDEM AXLE		VIC	PORT WELSHPOOL	VIC01
PM11037	PUMP SKIMMER WEIR FOILEX	1	VIC	PORTLAND	AMSA
SH11037	SKIMMER HEAD WEIR FOILEX	1	VIC	PORTLAND	AMSA
PBD5113	TANK RECOVERED OIL COLLAPSIBLE TRANSPAC 2.6T		VIC	PORTLAND	AMSA
PDF107777	BOOM SELF BUOYANT STRUCTURFLEX GP	90m	VIC	PORTLAND	AMSA
PDFA111135	BOOM SELF BUOYANT STRUCTURFLEX GP	105m	VIC	PORTLAND	VIC01
PDF106020	BOOM SELF BUOYANT STRUCTURFLEX GP	195 m	VIC	PORTLAND	VIC01
VCA5118	TRAILER BOX TANDEM AXLE		VIC	PORTLAND	VIC01
PAN106261	MOTOR OUTBOARD HONDA 25HP		VIC	PORTLAND	VIC01
VCA5117	TRAILER BOX TANDEM AXLE		VIC	PORTLAND	VIC01
WCA4259	PUNT ALUMINIUM QUINTREX SLOGGER 4.5M		VIC	PORTLAND	VIC01

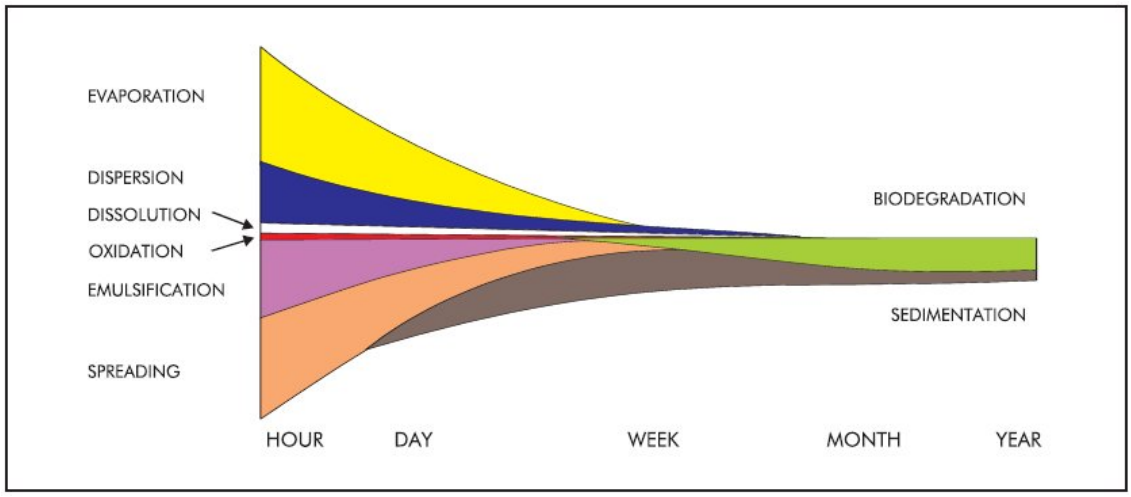
EQ NUM	DESCRIPTION	QTY	STATE	LOCATION	VENDOR
PBD11968	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	PORTLAND	VIC07
PDA11037	SKIMMER WEIR FOILEX		VIC	PORTLAND	VIC07
PDO11646	ANCHOR KIT SMALL 15KG SET OF 5		VIC	PORTLAND	VIC07
PBD11967	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	PORTLAND	VIC07
PAL5008	PUMP DISPERSANT SYSTEM WSL		VIC	WESTERNPORT	AMSA
PDG6083	BOOM INFLATABLE VIKOMA HIGH SPRINT	250 m	VIC	WESTERNPORT	AMSA
PFA4455	RADIO TRANSCEIVER VHF ICOM ICM11		VIC	WESTERNPORT	AMSA
WCE5147	BARGE LANDING TROCHUS 15M		VIC	WESTERNPORT	AMSA
PAL4982	PUMP DISPERSANT SYSTEM SILVAN		VIC	WESTERNPORT	AMSA
PBD110561	TANK RECOVERED OIL 7500 LITRE		VIC	WESTERNPORT	AMSA
PDJA111131	BOOM BEACH STRUCTURFLEX LAND SEA	60m	VIC	WESTERNPORT	VIC01
PDA109418	SKIMMER WEIR FOILEX		VIC	WESTERNPORT	VIC01
PBD105338	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	WESTERNPORT	VIC01
PDO105361	ANCHOR KIT SMALL 15KG SET OF 5		VIC	WESTERNPORT	VIC01
PDCA445	Skimmer - Disc "Komara 12K Mk1"		VIC	WESTERNPORT	VIC01
VCA4256	TRAILER BOAT TANDEM AXLE		VIC	WESTERNPORT	VIC01
PAL109419	PUMP SKIMMER SYSTEM SPATE		VIC	WESTERNPORT	VIC01
SH109420	SKIMMER HEAD WEIR FOILEX		VIC	WESTERNPORT	VIC01
WCA4266	PUNT ALUMINIUM KAYFA 5.2M		VIC	WESTERNPORT	VIC01
PDGA448	Boom - Vikoma "Hi-Sprint"	250 m	VIC	WESTERNPORT	VIC01
PBD105337	TANK RECOVERED OIL FLEXIDAM 10000LT		VIC	WESTERNPORT	VIC01
WCEA108379	Trailer box tandem axle		VIC	WESTERNPORT	VIC01
PDFA111130	BOOM SELF BUOYANT SLICKBAR MK32E	300m	VIC	WESTERNPORT	VIC01
VCAA260	Trailer - Oil Spill		VIC	YARRAVILLE	BPYARR
WCAA291	Boat - Aluminium with skimmer		VIC	YARRAVILLE	MOBYARR
VCAA269	Trailer - Oil Spill		VIC	YARRAVILLE	MOBYARR

Appendix 5: Oil Behaviour and Characteristics

Appendix 5: Oil Behaviour and Characteristics

5.1 Potential Hydrocarbons and Characteristics

The physical and chemical changes that spilled oil undergoes are collectively known as weathering. These processes, shown schematically in Figure 1, may act simultaneously but their relative importance varies with time. Spreading, evaporation, dispersion, emulsification and dissolution are most important during the early stages of a spill while the other processes occur over the longer term.



Weathering processes affecting the fate of oils [Source: ITOPF Tech Paper].

Predictions of the potential changes in oil characteristics with time allow an assessment to be made of the likely persistence of the oil. There is usually a distinction made between non-persistent oils (high volatility and low viscosity) which disappear rapidly from the sea-surface and persistent oils, which dissipate slowly. Quantitative predictions of persistence can be made by using empirical relationships based on oil type. Accordingly, oils can be broadly classified into four main groups, essentially related to their specific gravity (Table 1).

In an oil spill response the physical and chemical characteristics of the spilt oil as well as an understanding of its weathering properties and amenability to dispersants should be taken into account. The information below is a summary based on studies commissioned by Nexus/ UP on the types of oil handled in its operations.

Table 1. Summary of General Oil Types

Oil Type	Characteristics	Specific Gravity
Type 1 Very Light Oils Jet Fuels Gasoline	Highly volatile (should evaporate within 1-2 days). High concentrations of toxic (soluble) compounds. Localized, severe impacts to water column and intertidal resources. No cleanup possible	< 0.8
Type 2 Light Oils Diesel No. 2 Fuel Oil Light Crudes	Highly volatile (should evaporate within 1-2 days). High concentrations of toxic (soluble) compounds Localized, severe impacts to water column and intertidal resources No cleanup possible.	0.8 – 0.85
Type 3 Medium Oils Most Crude Oils	About one-third will evaporate within 24 hours. Oil contamination of intertidal areas can be severe and long-term. Oil impacts to waterfowl and fur-bearing mammals can be severe. Cleanup most effective if conducted quickly.	0.85 - 0.95
Type 4 Heavy Oils Heavy Crude Oils No. 6 Fuel Oil Bunker C	Heavy oils with little or no evaporation or dissolution. Heavy contamination of intertidal areas likely. Severe impacts to waterfowl and fur-bearing mammals (coating and ingestion). Long-term contamination of sediments possible. Weathers very slowly. Shoreline cleanup difficult under all conditions.	> 0.95

5.2 Possible Oils to be encountered

Possible oils to be encountered on this drilling campaign include those designated in Table 2.

Table 2: Properties of Oils

Oil	Specific Gravity	API Gravity	Pour Point	Wax Content	Viscosity (@20°C)	Oil Group*
Light Bass Strait Crude	0.743	58.9	-	Low	1.29	I
Marine diesel fuel oil (MDO)	0.84-0.88	55	-50°C max	Low to Moderate	2.5 – 4.5 @ 40°C	II-III
Hydraulic oil	0.85-0.9	50	-100°C max	Low	Low	III
Lubricating oil	0.86-0.88	50	-100°C max	Low	30-240	III
Heavy fuel oil	Variable>0.9	10-15	High	Variable Low	High (>1,000)	IV

*Classified according to International Tanker Owners Pollution Federation (ITOPF)/US Coast Guard.

5.2.1 Light Crude Oil

Light crude oil is normally fairly volatile. Spreading rates of light crude indicate that such oils usually diffuse quickly on the sea surface. Residual oil will continue to weather through evaporation, dissolution into the water column and physical dispersion over a period of days. In the long term, weathering will continue through sedimentation, biodegradation and photo-oxidation. In winter residual oil is likely to form into a gel with implications for dispersant treatment.
Spikey Beach-1 and Pee Jay-1 are exploration wells and therefore, the exact nature of the crude has not yet been characterised. As such, the physical and chemical nature of the crude from the Gippsland region was used as a proxy. Gippsland crude is an oil blend with an API of 51.0, with a density and kinematic viscosity of 775.1 kg/m^3 and 1.47 cP respectively.

5.2.2 Condensate

Condensate is expected to be produced as part of the Bernoulli and Fermat development. Since Bernoulli and Fermat are exploration wells, the exact nature of the gas condensate to be extracted is not yet defined. As such, the physical and chemical nature of the condensate from a nearby well was used as proxy. The condensate is an ultra-light crude with an API of 58.9, a low viscosity (1.29 cP @ 25oC) and high volatility rate (90% evaporated by 350°C).

5.2.3 Diesel

Diesel fuel is light petroleum distillate with a density usually ranging between 0.84–0.88 gm/cm^3. Diesel is generally light although it varies in its pour point and hence, volatility. Diesel spreads rapidly at sea and so, although classed as 'persistent oil', any slick tends to break up quickly. During evaporative weathering, low molecular weight aliphatic and aromatic hydrocarbons and phenols are lost from the oil, leaving higher concentrations of less volatile, higher molecular weight hydrocarbons. Diesel does not form stable oil in water emulsion and is amenable to dispersants.

The key source of diesel spills is via fuel handling mishaps. Causes include hose rupture, coupling failures, and tank overflow. Detailed analysis of the risks posed by marine diesel has also been conducted as part of the GEMS Oil Spill Modelling.

5.2.4 Hydraulic Oils

These are light-medium, rapidly spreading oils. These characteristics along with the small volumes that could be spilled should result in slicks that rapidly dissipate.

5.2.5 Heavy Fuel Oil

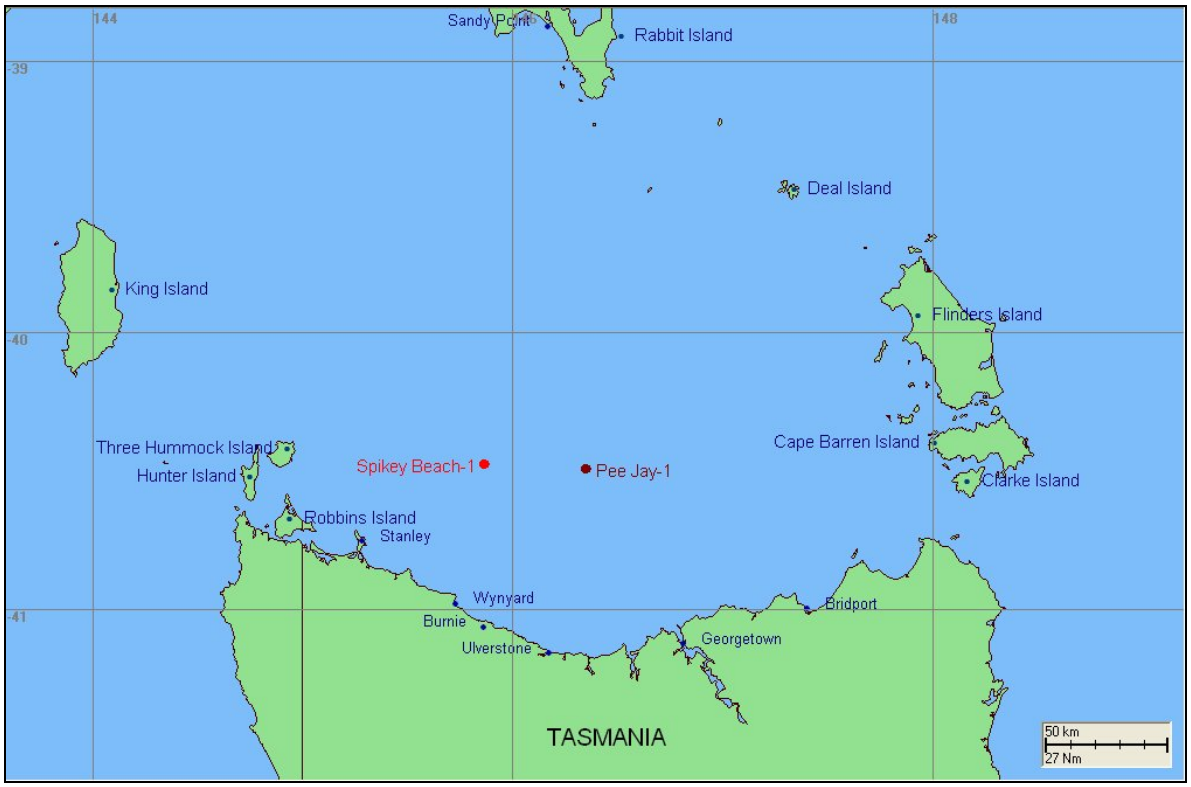
Heavy Fuel Oil is viscous oil with a specific gravity of 0.98 g/cm^3, and an API gravity of 10. Fresh bunker oil has a flash point of 80°C and a pour point of 24°C. This fuel spreads very slowly and loses very little volume through evaporation. Bunker oils have a tendency to form emulsions with seawater and may form a stable “mousse” under some conditions. Although heavy bunker oils are amongst the most persistent oils, slicks will often weather at sea. Spreading and evaporation rates in heavy fuel oils and crude oils cannot be quantified in advance of a spill. However, fuel oils are more viscous than diesel and crude and hence spreading and evaporation is less.

5.2.6 Lubricating Oil

Lubricating oils spread rapidly, and tend to emulsify at sea resulting in an increased slick volume. Emulsions may become viscous if weathered and this may reduce the effectiveness of skimmers.

Appendix 6: Spill Trajectory Modelling

QUANTITATIVE OIL SPILL EXPOSURE ASSESSMENT FOR THE BASS BASIN DRILLING PROGRAM



November 2007

Produced for:

Coffey Natural Systems and Australian Drilling Associates

Asia - Pacific Applied Science Associates

Marine and Freshwater Environmental Modelling

ABN 79 097 553 734

Unit 2B, Shafto Lane, 872 Hay St,
Perth, WA, 6000
Phone: (08) 9226 2911

Suite 3a, Level 1, 142 Bundall Rd,
Bundall, QLD, 4217
Phone: (07) 5574 1112

Document control form

Document draft	**Originated by**	**Edit & review**	**Authorised for release by**	**Date**
Draft 1 for internal review	*Dr Sasha Zigic*	*Dr Sasha Zigic*		*31st October 2007*
Draft release to client			*Dr Sasha Zigic*	*1st November 2007*
Final release to client			*Dr Sasha Zigic*	*22nd November 2007*
Final release to client (minor changes)			*Dr Sasha Zigic*	*27th November 2007*

APASA PROJECT NUMBER: Q027
APASA PROJECT LEADER: Dr Sasha Zigic
DOCUMENT FILE NAME: Coffey NS_ADA_Bass oil spills_final.doc

DISCLAIMER: This document contains confidential information that is intended only for use by the client and is not for public circulation or publication or for the use of any third party without the approval of Asia-Pacific ASA Pty Ltd.

While this report is based on source information Asia-Pacific ASA Pty Ltd considers reliable, its accuracy and completeness cannot be guaranteed. Therefore, Asia-Pacific ASA Pty Ltd and its directors and employees accept no liability for the result of any action taken or not taken on the basis of information in this report, or for any negligent misstatements, errors, or omissions. This report is complied with consideration for the specified client's objectives, situation, or needs. Those acting upon such information without first consulting Asia-Pacific ASA Pty Ltd do so entirely at their own risk. We strongly recommend that any person who wishes to act upon this report first consult an Asia-Pacific ASA Pty Ltd advisor.

TABLE OF CONTENTS

1 Executive summary 5
2 Introduction 6
3 Methodology 7
4 Hydrodynamic Model - HYDROMAP 7
4.1 HYDROMAP Model Setup 8
5 Oil Spill Surface Model - OILMAP 12
5.1 Stochastic Modelling 12
6 Environmental Data 14
7 Model settings and Oil properties 15
8 Results 18
9 References 24

LIST OF FIGURES

Figure 1: Map showing the two exploration wells as part of the Bass Basin drilling program. Note the red icon shows the location for the hypothetical oil spill release site. 7
Figure 2: Extent of the hydrodynamic grid set up with the varying grid resolution applied around the coastline. 9
Figure 3: Bathymetric grid used to define the hydrodynamic model domain. Note the yellow icon denotes the location of the National Tidal Facility tide station. 10
Figure 4: Comparison between the predicted (blue line) and observed (pink line) surface elevation variations at Burnie, between the 1st – 31st October 2007. 10
Figure 5: Zoomed in view of a sample predicted flood tide (top) and ebb tide (bottom) adjacent to the hypothetical release sites. Note the density of the tidal vectors vary with the grid resolution, particularly along the coastline. 11
Figure 6: A sample of four single oil spill trajectories (to silvery sheen – 0.0001mm) for a hypothetical diesel spill from the Spikey Beach-1 exploration well. Each spill was simulated over a 7-day period using randomly selected time series of wind and hydrodynamic data. 13
Figure 7: Location of the NCEP wind stations (denoted by the blue icons) in relation to the release site. 14
Figure 8: Monthly and yearly wind roses for the nearby wind station (1997-2006). 15
Figure 9: Weathering and fates graph for a surface release of 80 m^3 of diesel (over 6 hours) at Spikey Beach-1, under varying wind and currents and a sea temperature of 12^oC. 16
Figure 10: Weathering and fates graph for a surface release of 600 m^3 of crude (over 6 hours) at Spikey Beach-1, under varying wind and currents and a sea temperature of 12^oC. 17
Figure 11: Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil at Spikey Beach-1 for an annualised assessment. 20

Figure 12: Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil during at Spikey Beach-1 for an annualised assessment. 20
Figure 13: Predicted annualised probability of surface exposure (to silvery sheen) due to a 600 m^3 spill of crude at Spikey Beach-1 for an annualised assessment. 21
Figure 14: Predicted minimum time before exposure (to silvery sheen) due to a 600 m^3 spill of crude at Spikey Beach-1 for an annualised assessment. 21
Figure 15: Predicted path and shoreline contact for the 80 m^3 diesel single trajectory (at 7-day) at Spikey Beach-1, which had yielded the average volume of diesel oil on shore. 22
Figure 16: Predicted path and shoreline contact for the 600 m^3 crude single trajectory (at 10-day) at Spikey Beach-1, which had yielded the maximum amount of crude on shore. 22
Figure 17: Weathering and fates graph for the 80 m^3 diesel single trajectory at Spikey Beach-1, which had yielded the average volume of diesel oil on shore. 23
Figure 18: Weathering and fates graph for the 600 m^3 crude single trajectory at Spikey Beach-1, which had yielded the average volume of crude on shore. 23

LIST OF TABLES

Table 1: Hypothetical oil spill location for the exploration well selected as part of the Bass Basin risk assessment. 6
Table 2: Summary of model settings used for spill modelling 17
Table 3: Summary of the annualised stochastic modelling results for the diesel and crude surface releases at Spikey Beach-1. 19

1 EXECUTIVE SUMMARY

Australian Drilling Associates (ADA) is proposing to drill two exploration wells (Spikey Beach-1 and Pee Jay-1) in the Bass Basin, on behalf of Beach Petroleum (Beach). The following report assists in quantifying the risk of exposure to surrounding shorelines and environmental resources in the unlikely event of a hydrocarbon spill. As part of the assessment, two ”worst case” hypothetical spill scenarios applicable to exploration activities, were examined from the exploration well closest to shore (Spikey Beach-1):

a) A 80 m^3 surface spill of diesel oil, representing a storage tank rupture from a supply vessel, at the Spikey Beach-1 well; and
b) A 600 m^3 surface spill of crude oil, representing an accidental oil well blowout, at the Spikey Beach-1 well.

The ASA oil spill trajectory and fates model (OILMAP) was used to simulate the drift and spread of oil from the chosen exploration well to surrounding locations under the influence of the ambient winds and tides. All trajectory and weathering simulations were based on local environmental conditions (winds, tides and water temperature) and the chemical and physical characteristics of the representative hydrocarbons. The 200 hypothetical single spill trajectories used to generate the probability results were sampled from local wind data spanning 10 years (1997-2006).

The stochastic modelling showed that slicks from the Spikey Beach-1 exploration well predominately drifted east from the release site due to the prevalent westerly winds

The stochastic modelling indicated that in the unlikely event of a diesel spill or crude spill, there was a 4 % and 2 % probability respectively, of shoreline contact (for a silvery sheen and thicker, threshold thickness of ≥0.1 µm). The average time for shoreline contact was 96 hours for a diesel spill and 76 hours for the crude spill. The predicted volume of diesel and crude spill to reach shore was 7 m^3 and 23 m^3, respectively, which is 9 % and 4 % of the initial volume.

2 INTRODUCTION

Australian Drilling Associates (ADA) is proposing to drill two exploration wells in the Bass Basin, on behalf of Beach Petroleum (Beach). Figure 1 shows the location of the two exploration wells as part of the drilling program. It is anticipated that crude oil will be identified at the two Beach wells.

As part of the due diligence process of understanding and managing environmental risks, Coffey Natural Systems on behalf of ADA, had commissioned Asia-Pacific Applied Science Associates (APASA) to quantify the risk of exposure to surrounding environmental resources in the event of a spill. As part of the assessment, the exploration well closest to shore (Spikey Beach-1) was selected to represent the highest risk to nearby shorelines. Table 1 shows the location of the exploration well.

The assessment examined two hypothetical worst case scenarios applicable to the exploration activities:

a) A 80 m^3 surface spill of diesel oil, representing a storage tank rupture from a supply vessel, at the Spikey Beach-1 well; and
b) A 600 m^3 surface spill of crude oil, representing an accidental oil well blowout, at the Spikey Beach-1 well.

The risk assessment used ASA's surface oil spill trajectory and fates model (OILMAP), to simulate the drift, spread and weathering of oil from the exploration wells to surrounding locations under the influence of the ambient winds and currents. An annualised (annual data spread) risk assessment was carried out to help identify which surrounding regions would be at risk from an oil spill under the varying environmental conditions. The investigation will assist ADA assess the associated spill risks and to develop appropriate oil spill contingency plans.

Table 1: Hypothetical oil spill location for the exploration well selected as part of the Bass Basin risk assessment.

Well Name	Permit Area	Well Type	Longitude	Latitude
Spikey Beach-1	T/38P	Oil	145° 52' 23.552" E	40° 28' 55.326" S

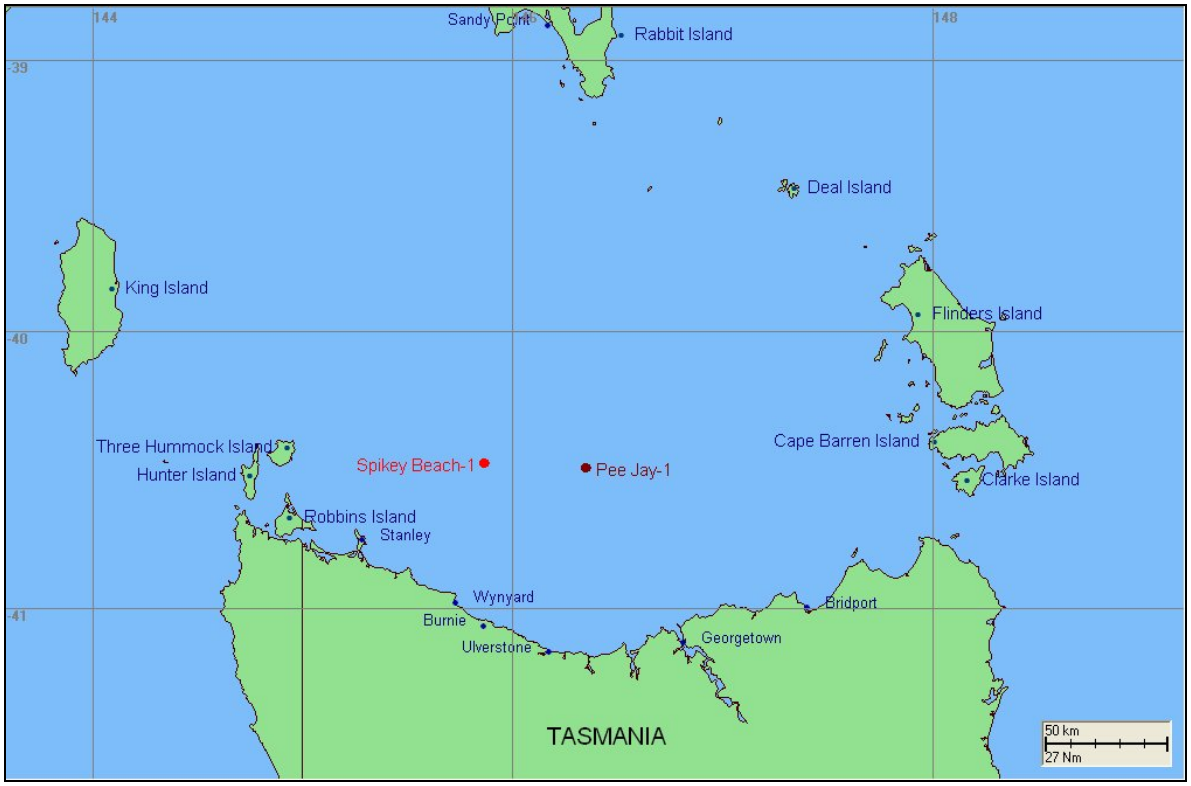


Figure 1: Map showing the two exploration wells as part of the Bass Basin drilling program. Note the red icon shows the location for the hypothetical oil spill release site.

3 METHODOLOGY

The oil spill modelling study was carried out as two independent, yet integrated stages. Firstly, the tidal currents were generated for the study area using an ocean/coastal circulation model HYDROMAP. Secondly, OILMAP was used to determine the expected movement and weathering of any hydrocarbons spills under the influence of winds and the tidal currents. An overview of each model is described in the following sections.

4 HYDRODYNAMIC MODEL - HYDROMAP

The tidal currents for the study were simulated using an ocean/coastal circulation model, HYDOMAP, which has been successfully applied to many regions around the world (Isaji et al., 2001, Zigic et al., 2003). HYDROMAP forms part of the Australian national oil spill emergency response system operated by AMSA (Australian Maritime Safety Authority).

The HYDROMAP is an ocean/coastal circulation model that simulates the flow of ocean currents within a model region due to forcing by astronomical tides, wind stress and bottom friction for

any location on the globe. HYDROMAP employs a nested-gridding strategy, supporting up to six levels of spatial resolution. This allows for increased resolution of current within areas of greater bathymetric complexity, or of particular interest to a study. To simulate ocean-circulation over any area of interest, the model must be provided with the following basic data:

(1) Measured bathymetry for the area, which defined the shape of the seafloor; and

(2) The amplitude and phase of tidal constituents, which were used to calculate sea heights over time at the open boundaries of the model. Changes in sea heights were used, in turn, to calculate the propagation of tidal currents through the model region.

The numerical solution methodology follows that of Davies (1977 a, b) with further developments for model efficiency by Owen (1980) and Gordon (1982). A more detailed presentation of the model can be found in Isaji and Spaulding (1984).

4.1 HYDROMAP Model Setup

The HYDROMAP hydrodynamic grid was set up over a domain that extended over the entire Bass Strait region. The grid was set up with a resolution ranging from 10 km at the outer regions of the model grid to 1.25 km around the coastline (Figure 2). The finer resolution was used to resolve complex coastal circulation patterns. Figure 2 shows the extent of the hydrodynamic grid.

Bathymetric data used to define the three-dimensional shape of the study domain was a combination of the 9-arc-second Australian national database (Source: Geoscience Australia), which has a resolution of approximately 250 m in this region (see Figure 3).

Forcing by astronomical tides was defined at the open boundaries and were calculated for real times using the latest Topex Poseidon global tidal set (TPX062; source: NOAA), which is a gridded set of tidal constituents derived from satellite altimetry. Tidal elevations at all open boundary cells were calculated at each time step in the model using the 8 largest and most significant tidal constituents for the area (K2, Q1, O1, K1, N2, M2 and S2). The model then calculated sea heights and resulting tidal currents for locations within the region by propagation of constant water mass over the three-dimensional shape of the region.

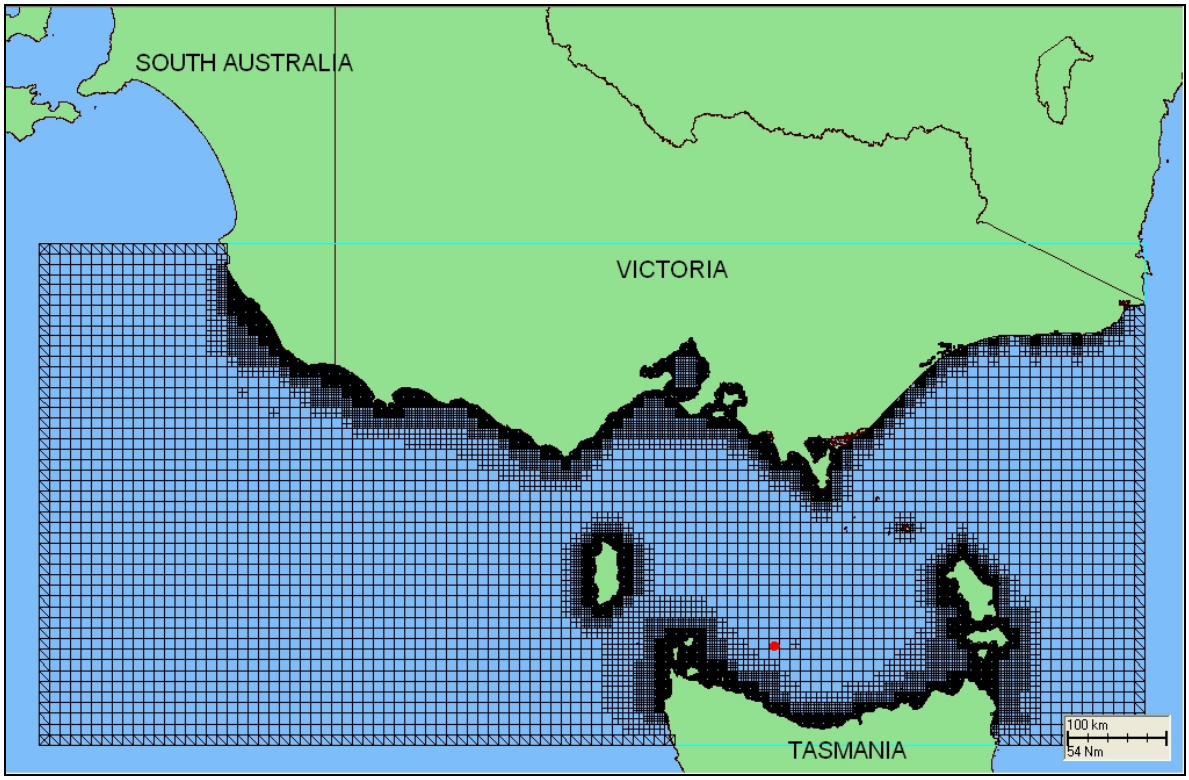


Figure 2: Extent of the hydrodynamic grid set up with the varying grid resolution applied around the coastline.

For the purposes of verification, the model predictions were compared against observed tides at Burnie (see Figure 3 for the location) by the National Tidal Facility (NTF). As can be seen in Figure 4 the HYDROMAP predictions compared very well to reported tidal data, clearly demonstrating the reliability and accuracy of the model for predicting the propagation of tidal currents over the three-dimensional bathymetric grid for the operational area.

Figure 5 shows examples of predicted tidal current vectors around the proposed release site during sample flood and ebb tides. Note only every 2nd tidal vector is shown to ensure clarity.

The major axis of the tides at Spikey Beach-1, run approximately north-west and south-east and the maximum tidal speed reached 0.2 m/s during spring tides.

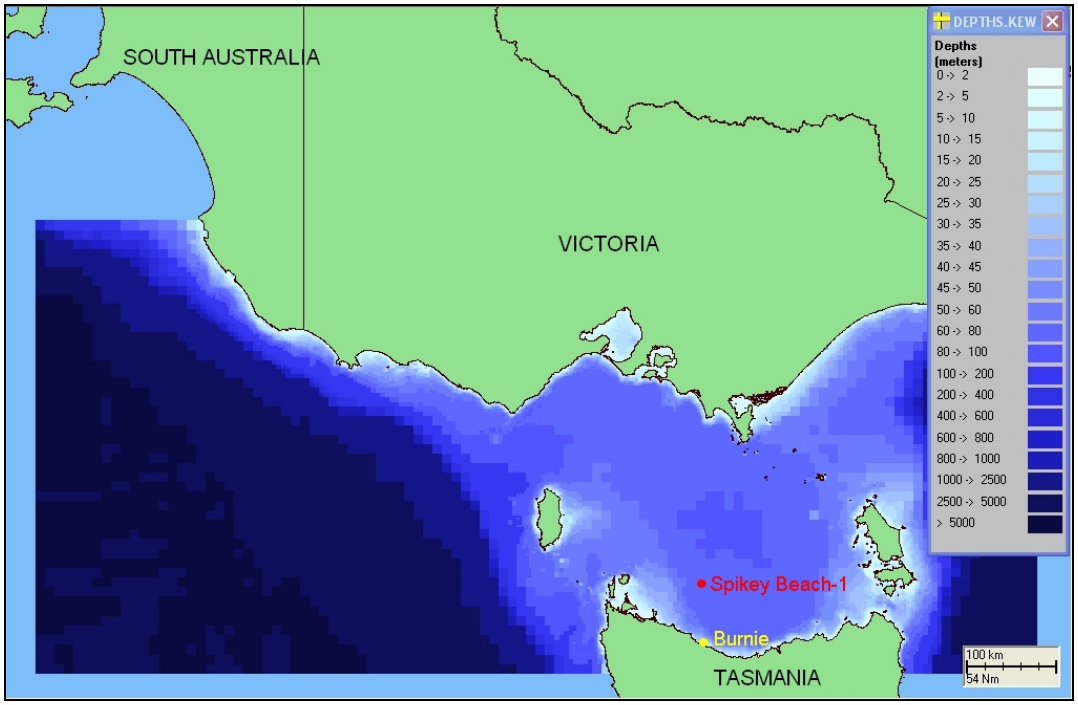


Figure 3: Bathymetric grid used to define the hydrodynamic model domain. Note the yellow icon denotes the location of the National Tidal Facility tide station.

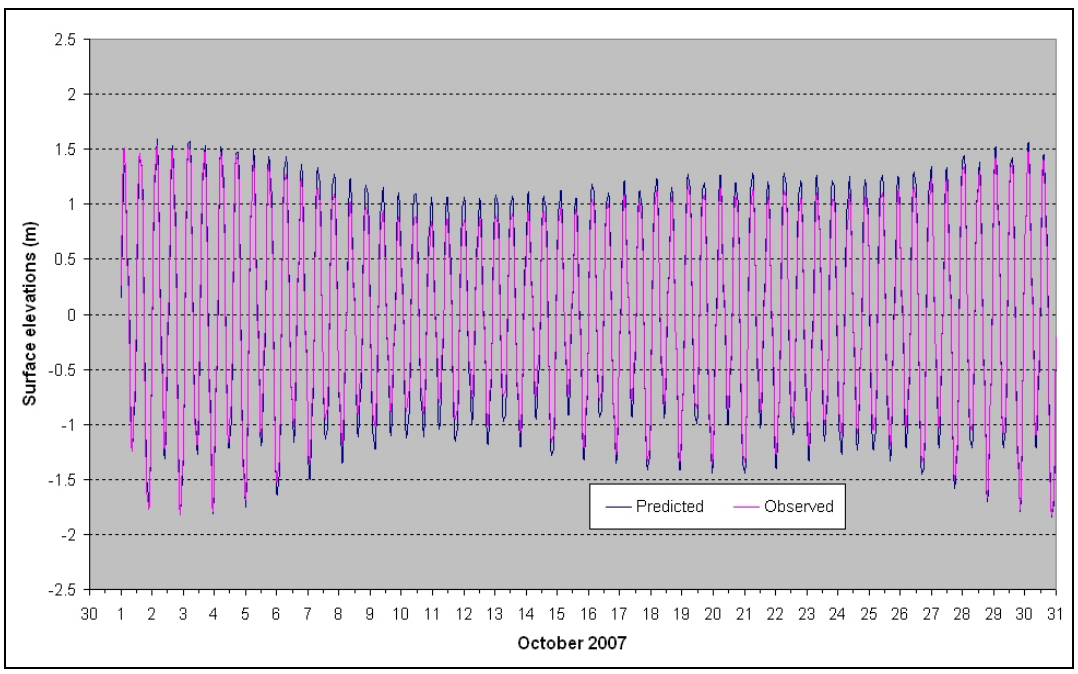


Figure 4: Comparison between the predicted (blue line) and observed (pink line) surface elevation variations at Burnie, between the 1st – 31st October 2007.

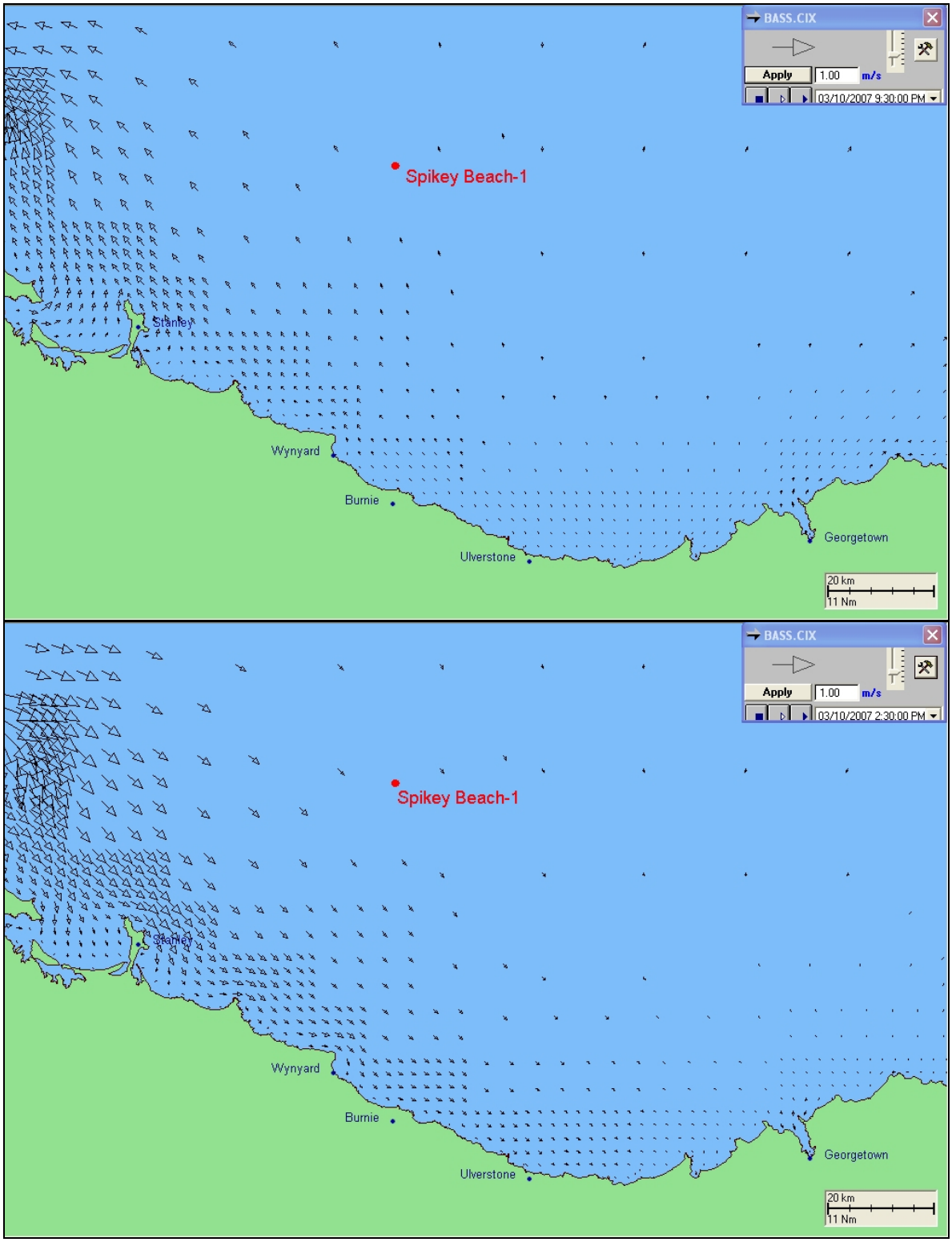


Figure 5: Zoomed in view of a sample predicted flood tide (top) and ebb tide (bottom) adjacent to the hypothetical release sites. Note the density of the tidal vectors vary with the grid resolution, particularly along the coastline.

5 OIL SPILL SURFACE MODEL - OILMAP

Surface spill modelling was carried out using ASA's two-dimensional oil spill model, OILMAP. OILMAP is a computerised modelling system for predicting the physical and chemical fates and effects of hydrocarbon spills on the ocean. OILMAP incorporates a geographic information system (GIS) for defining the location and nature of natural resources, and a suite of models that predict the movement and weathering of hydrocarbon slicks on the sea surface.

The OILMAP model simulates the transport of the hydrocarbon slicks within a model domain using time- and space-varying data for the speed and direction of water currents and winds. The distribution and mass balance of particular hydrocarbon types are predicted over time based on the chemical characteristics of the specific oil type and the prevailing wind and tidal conditions. For this latter purpose, OILMAP includes algorithms that account for hydrocarbon spreading, evaporation, emulsification, entrainment, and shoreline interactions. If hydrocarbon strands on shorelines (as defined by the OILMAP GIS), details are recorded on the quantity, time to contact and resources at the strand location.

Predictions of the OILMAP model have been validated worldwide (Spaulding *et. al.* 1992, 1994) and in Australia (King *et. al.* 1999) by field observations and by hind-casting past hydrocarbon spills.

5.1 Stochastic Modelling

OILMAP can be used to predict the fate of a single spill under defined conditions, or of multiple spills that occur under a random selection of prevailing conditions (also known as stochastic modelling). The stochastic model performs a large number of simulations for a given spill site, randomly varying the spill time, so that the transport and weathering of each slick are subject to a different set of prevailing wind and current conditions. During each simulation, the model records the grid cells that were contacted by oil particles, as well as the amount of time that had elapsed prior to the contact or exposure.

Once the stochastic modelling is complete, the results are compiled from each of the sample trajectories to provide a statistical weighting to the likelihood of exposure. Results can be summarised as:

1. The probability or risk that a grid cell may be exposed to oil slicks; and
2. The minimum time before exposure could occur.

The first estimate is calculated from the frequency of exposures during all simulations, while the latter estimate is the worst-case for any of the sample trajectories (French *et al.*, 1999). The stochastic modelling approach provides an objective measure of the possible outcomes of a spill, as well as the means of quantifying the likelihood of a given outcome. The most commonly occurring conditions would be selected most often while conditions that are more unusual can also be represented.

Figure 6 shows an example of four individual trajectories simulated in stochastic mode. Note how the path and area exposed varies among the simulations. **Two hundred** individual trajectories were simulated for each scenario and season. For this study a threshold concentration of **0.0001 mm (0.1 µm)** was specified. This thickness is equivalent to 0.1 g/m^2 and appears as a silvery sheen.

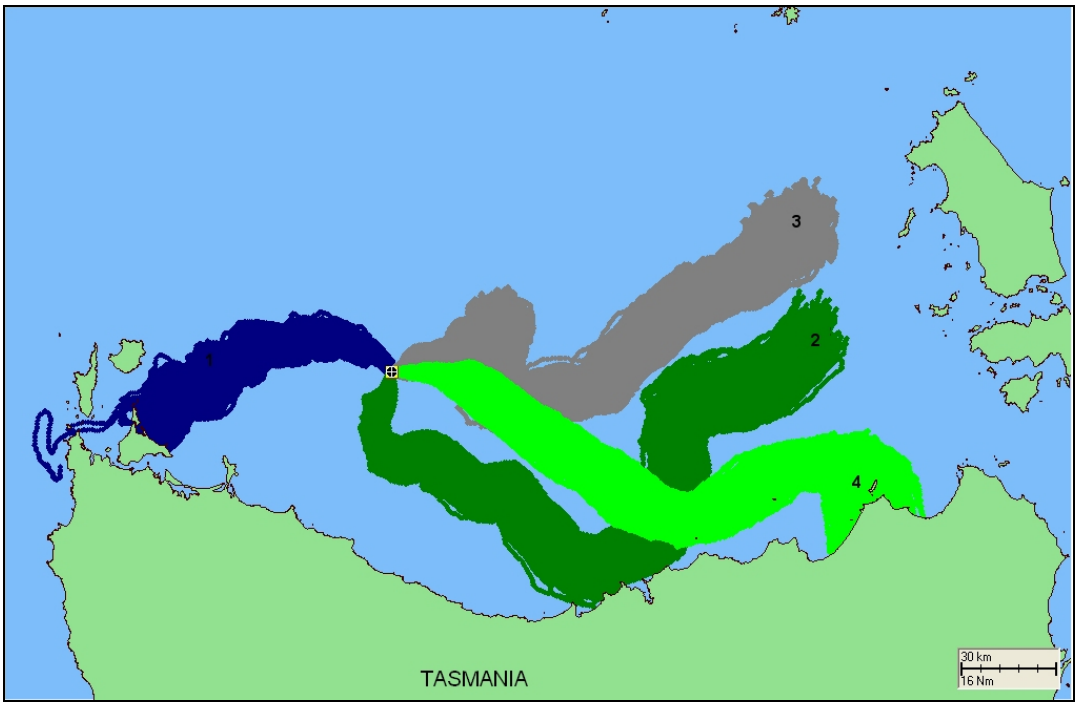


Figure 6: A sample of four single oil spill trajectories (to silvery sheen – 0.0001mm) for a hypothetical diesel spill from the Spikey Beach-1 exploration well. Each spill was simulated over a 7-day period using randomly selected time series of wind and hydrodynamic data.

6 ENVIRONMENTAL DATA

To account for the wind influence, local wind data was derived from the output of a numerical atmospheric model (the NCEP model reanalysis) provided by the NOAA-CIRES Climate Diagnostics Center in Boulder, Colorado, from their Web site at *http://www.cdc.noaa.gov*. Wind data at the three nearest stations (see Figure 7) for the years 1997 through 2006 (inclusive), were extracted from this archive for use as a representative sample of the wind conditions over the study area for future years.

Figures 8 shows an example of the monthly wind roses summarising the distribution of wind speeds and directions according to the NCEP wind station 7244. Note that the atmospheric convention for defining wind direction, that is, the direction the wind blows **from**, is used to reference wind direction throughout this report. Each branch of the rose represents wind coming from that direction, with north to the top of the diagram. Eight directions are used. The branches are divided into segments of different thickness, which represent wind speed ranges from that direction. Speed ranges of 5 knots are used in these wind roses. The width of each segment within a branch is proportional to the frequency of winds blowing within the corresponding range of speeds from that direction.

On an annual basis the data indicated that the winds are variable, although with a higher frequency of winds from the western sector. The winds for the region are strong with an annual average and maximum wind speed of 16.7 knots and 46 knots, respectively.

As part of this study, the sea surface temperature was set to 12°C.

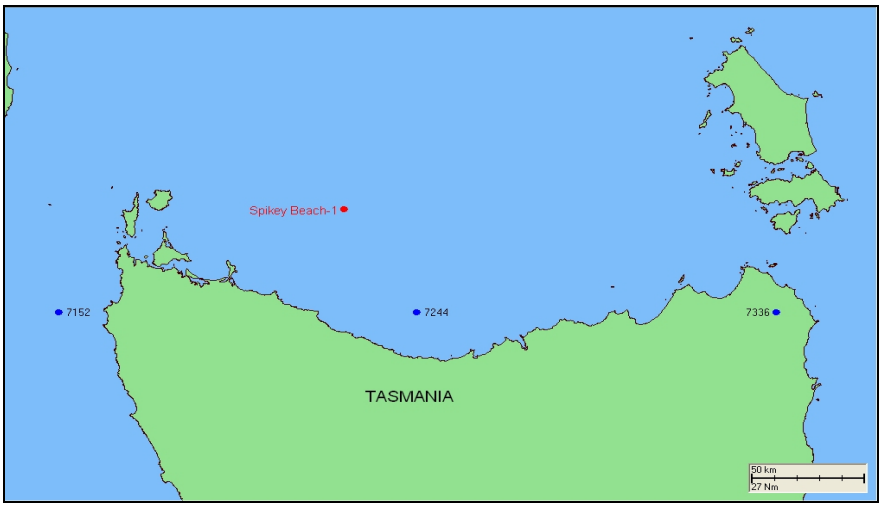


Figure 7: Location of the NCEP wind stations (denoted by the blue icons) in relation to the release site.

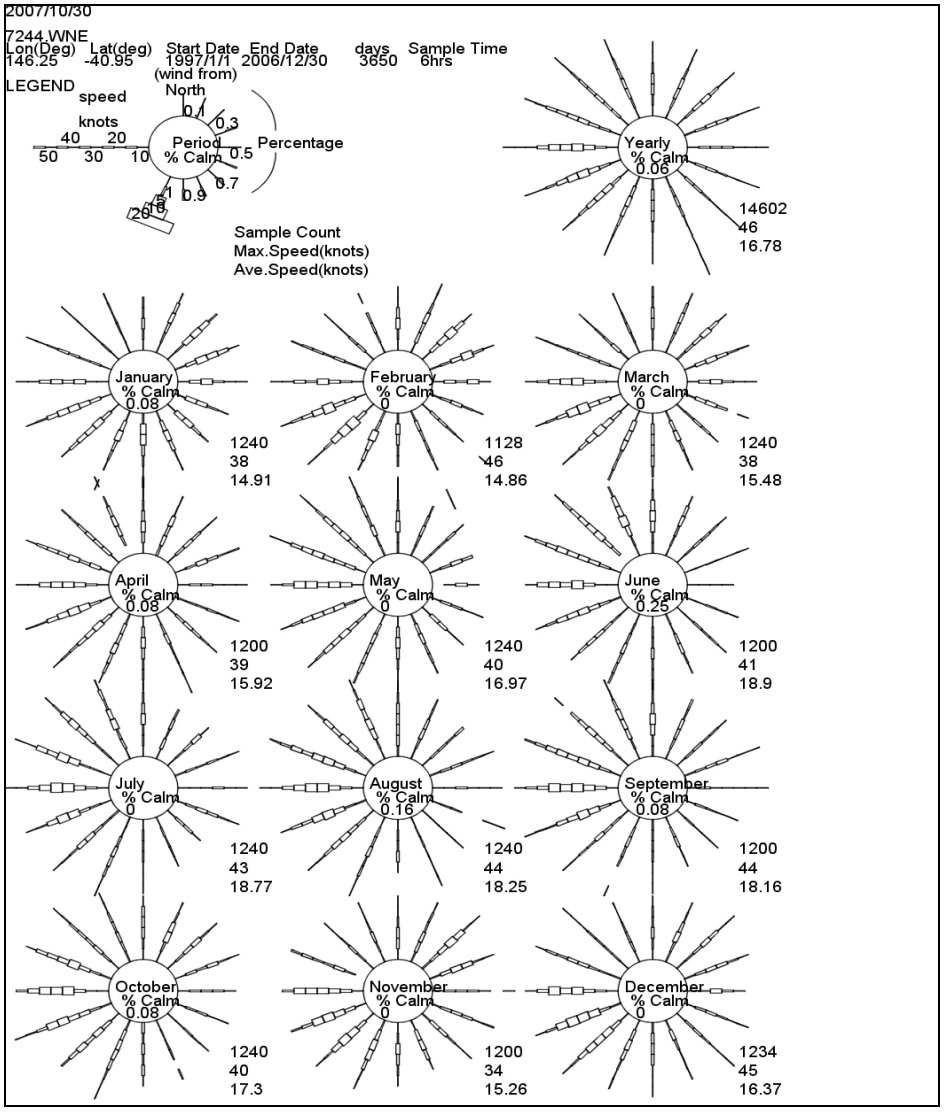


Figure 8: Monthly and yearly wind roses for the nearby wind station (1997-2006).

7 MODEL SETTINGS AND OIL PROPERTIES

OILMAP was used to examine two hypothetical spills scenarios, which would be applicable to the ADA's drilling activities:

1. The loss of 80 m^3 of diesel at the surface over 6 hours (tracked for 7-days), representing a refuelling accident at the Spikey Beach-1 exploration well; and

2. The loss of 600 m^3 of crude oil at the surface over 6 hours (tracked for 7-days), representing an accidental oil well blowout, at the Spikey Beach-1 well.

The crude well blowout scenarios were modelled as surface releases, since each of the wells are located in shallow environments and the oil droplets expected to rise rapidly to the surface (seconds to minutes) just above the release site, hence the prevailing currents would a minimal influence. Further, by simulating the well blowouts as a surface release it would constitute a "worst case" in terms of shoreline impact.

Characteristics for the diesel oil was based on data available from the ADIOS world-wide oil database for a diesel oil formulated for a similar operational temperature. Since Spikey Beach-1 is an exploration well, the exact nature of the crude oil is not known. Therefore Gippsland crude was used as an analogous proxy for the likely crude oil characteristics. Gippsland crude is an oil blend (51.0 API) with an initial density and kinematic viscosity of 775.1 kg/m^3 and 1.47 cP respectively.

Figures 9 and 10 show the weathering of the two different oil types based on variable wind conditions. With diesel (see Figure 9) being a mixture of volatile and persistent hydrocarbons, approximately 50% of the mass was predicted to evaporate over the first 24 hour. The heavier components of diesel have a strong tendency to entrain into the upper water column due to wind waves, but can refloat to the surface if wind waves abate. The interchange between the in-water and surface volumes is clearly seen in the weathering graph. The weathering of the crude (refer to Figure 10) indicated that more than 50% would have evaporated within the first day due to the high volatility, with the remainder of the crude evaporating more steadily over time.

Table 2 shows a table of model setting used as part of the oil spill modelling.

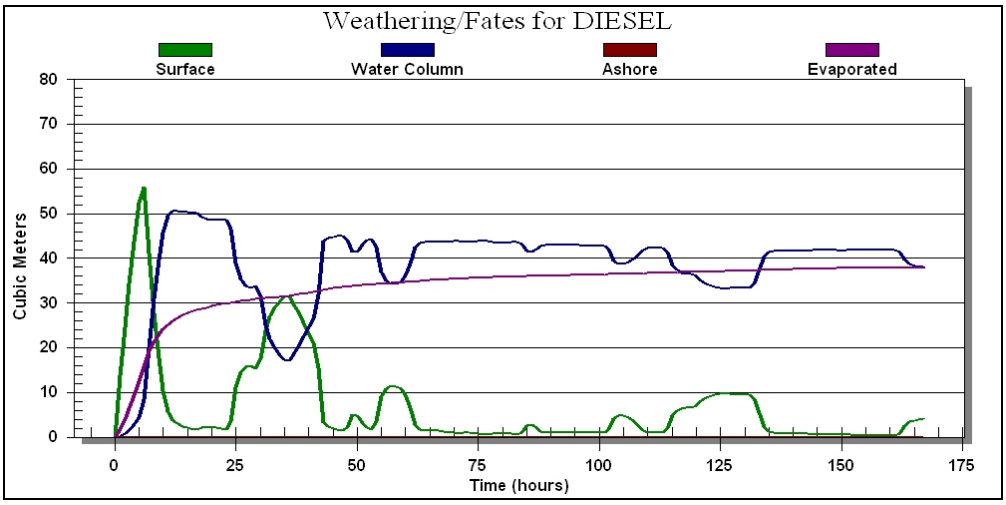


Figure 9: Weathering and fates graph for a surface release of 80 m^3 of diesel (over 6 hours) at Spikey Beach-1, under varying wind and currents and a sea temperature of 12°C.

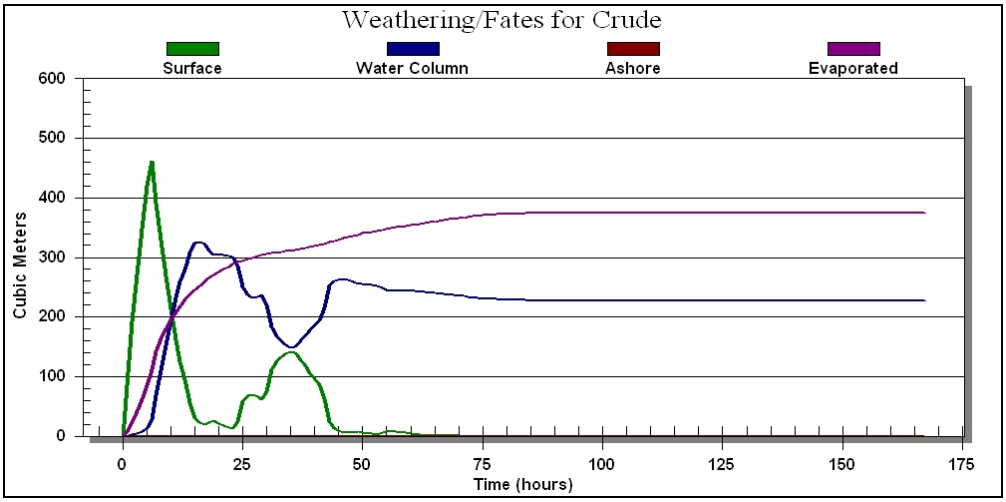


Figure 10: Weathering and fates graph for a surface release of 600 m^3 of crude (over 6 hours) at Spikey Beach-1, under varying wind and currents and a sea temperature of 12°C.

Table 2: Summary of model settings used for spill modelling

Dimensions	(Latitude, longitude)			
Number of randomly selected spill start times per site per scenario	200			
Release Sites	Longitude Latitude			
Spikey Beach-1	40° 28' 55.326" S, 145° 52' 23.552" E			
Water temperature (°C)	12			
Spill scenario	Exploration well	Volume (m^3)	Duration (hours)	Simulation period for each spill (days)
1. Diesel refuelling accident	Spikey Beach-1	80	6	7
2. Accidental crude oil well blowout	Spikey Beach-1	600	6	7

8 RESULTS

Two hypothetical scenarios were simulated from the Spikey Beach-1 exploration well as part of an annualised assessment. The first being an 80 m^3 diesel spill, released over 6 hours and tracked for 7-days. The second scenario was a 600 m^3 spill of crude, released over 6 hours and tracked for 7-days. The probabilities of water surface oiling and minimum travel time calculated by the stochastic modelling for each scenario are shown in Figures 11 – 14.

Note that these probability contours summarise the results of 200 independently selected and modelled spills as a colour coding for the likely exposure of each grid cell. For example, the grid cells coded as 0-10% probability were exposed up to 10% of the total number of simulated spills. Locations with higher probability ratings were exposed by a greater number of spill simulations, indicating that the combination of the prevailing wind and tide conditions had occurred more frequently. The areas outside of the 0-100% contour indicate that exposure will be unlikely under the range of prevailing conditions for this region.

It should be noted that the estimators (probability and time) are calculated independently for each surface location in the grid and that the coverage of the contours <u>do not</u> represent the extent of any one spill event, which will be significantly smaller.

The model results showed that from the 200 single trajectories simulated for each scenario, 4% of diesel spills and 2 % of crude spills would have resulted in shoreline contact (above silvery sheen). The average time for shoreline contact was 96 hours for a diesel spill and 76 hours for the crude spill. The average predicted volume of diesel and crude to reach shore was 7 m^3 and 23 m^3, respectively. Hence, the diesel and crude oil spills lose an average 91 % and 96 % respectively of their volumes before making shoreline contact. It is important to note that the disconnected diesel probability segments represent portion of diesel slicks forced sub-surface, due to strong wind events (<12 knots), and then re-emerged as the winds eased.

Results of the shoreline stranding are summarised in Table 3.

Table 3: Summary of the annualised stochastic modelling results for the diesel and crude surface releases at Spikey Beach-1.

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline Contact (hours)	Average time before shoreline Contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	4	29	96	7	9
Crude spill	2	20	76	23	4

The predicted path and shoreline contact for the single diesel and crude spill simulations (average landfall volume) are shown in Figures 15 & 16, respectively. Three types of particles are represented in the map-based figures. Surface oil is shown as black particles (with no black particles if oil is no longer at the surface). The grey "trail" represents the predicted sea surface areas that have been swept by oil. Shoreline areas that are predicted to be oiled are red.

The corresponding weathering and fates graphs are shown in Figures 17 and 18.

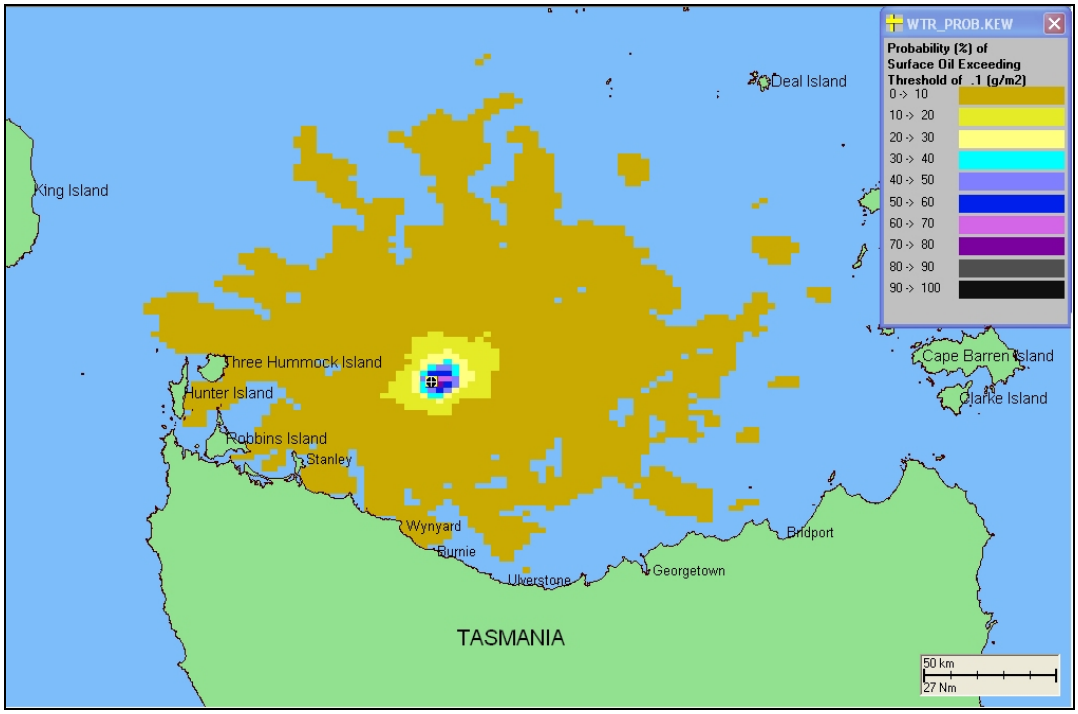


Figure 11: Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil at Spikey Beach-1 for an annualised assessment.

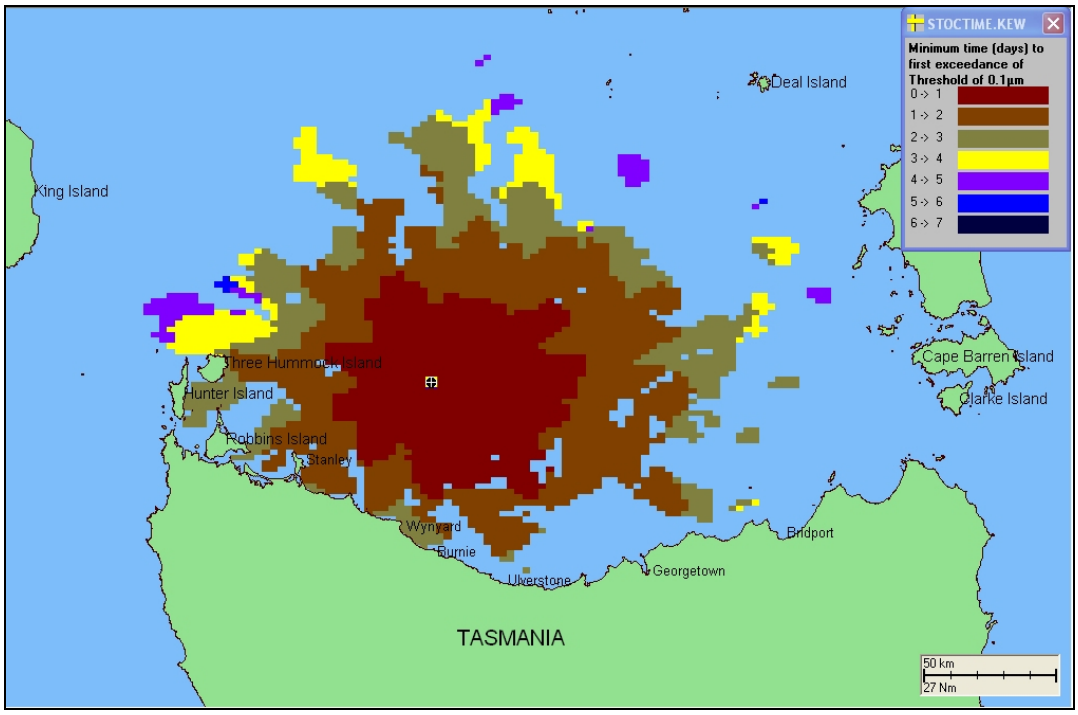


Figure 12: Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil during at Spikey Beach-1 for an annualised assessment.

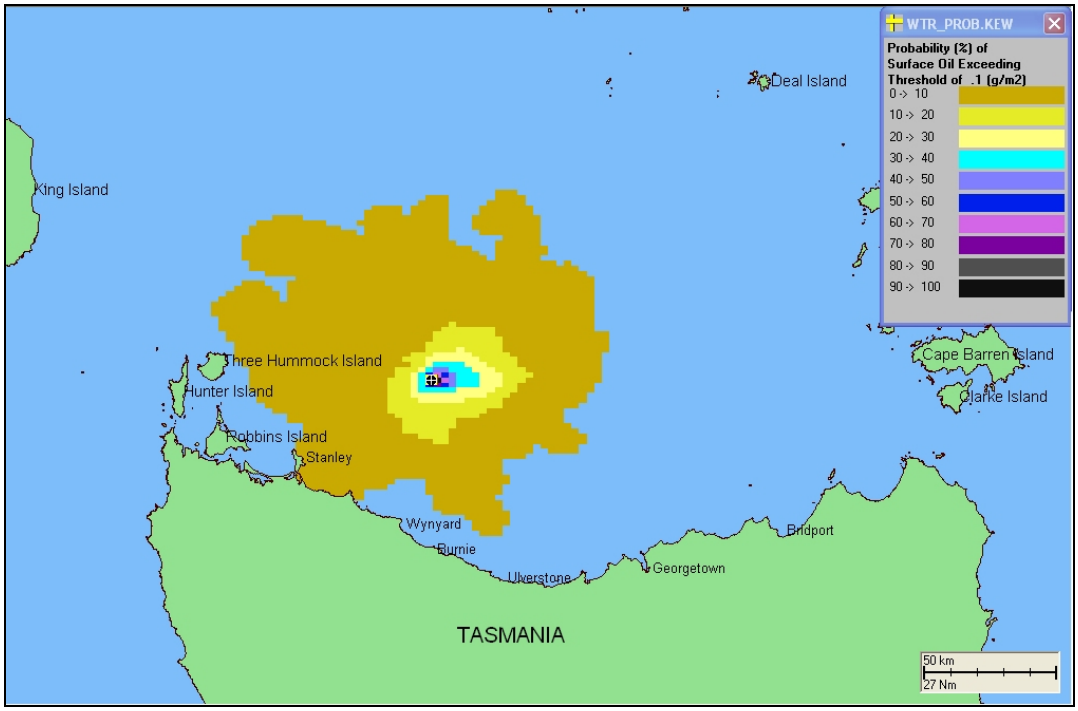


Figure 13: Predicted annualised probability of surface exposure (to silvery sheen) due to a 600 m^3 spill of crude at Spikey Beach-1 for an annualised assessment.

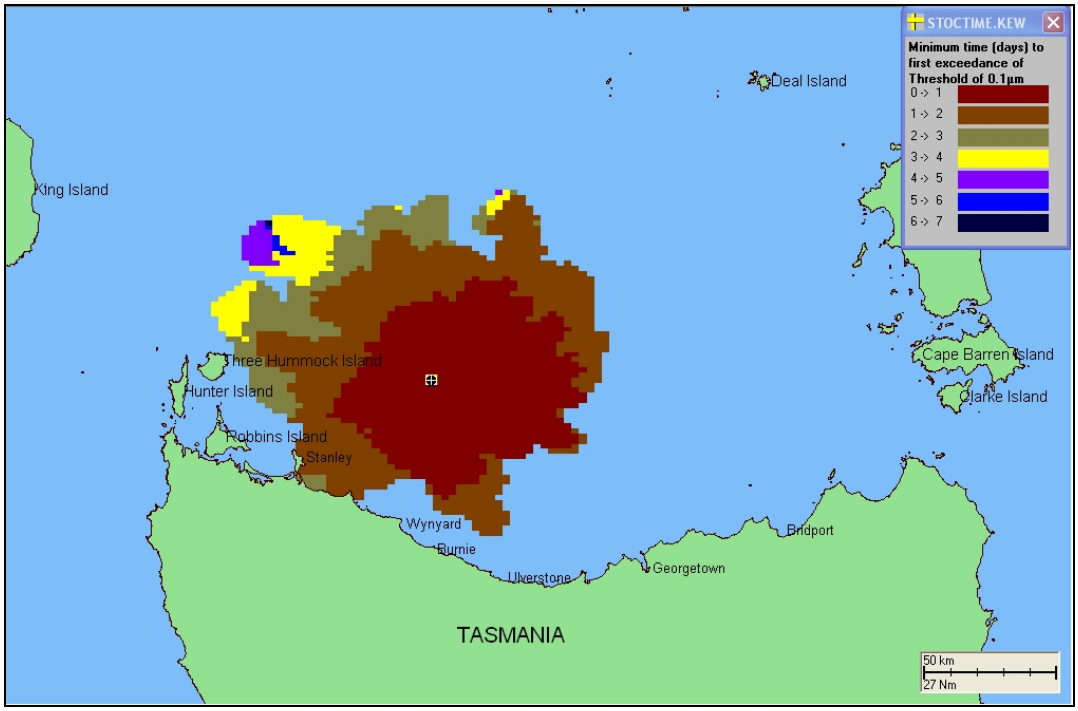


Figure 14: Predicted minimum time before exposure (to silvery sheen) due to a 600 m^3 spill of crude at Spikey Beach-1 for an annualised assessment.

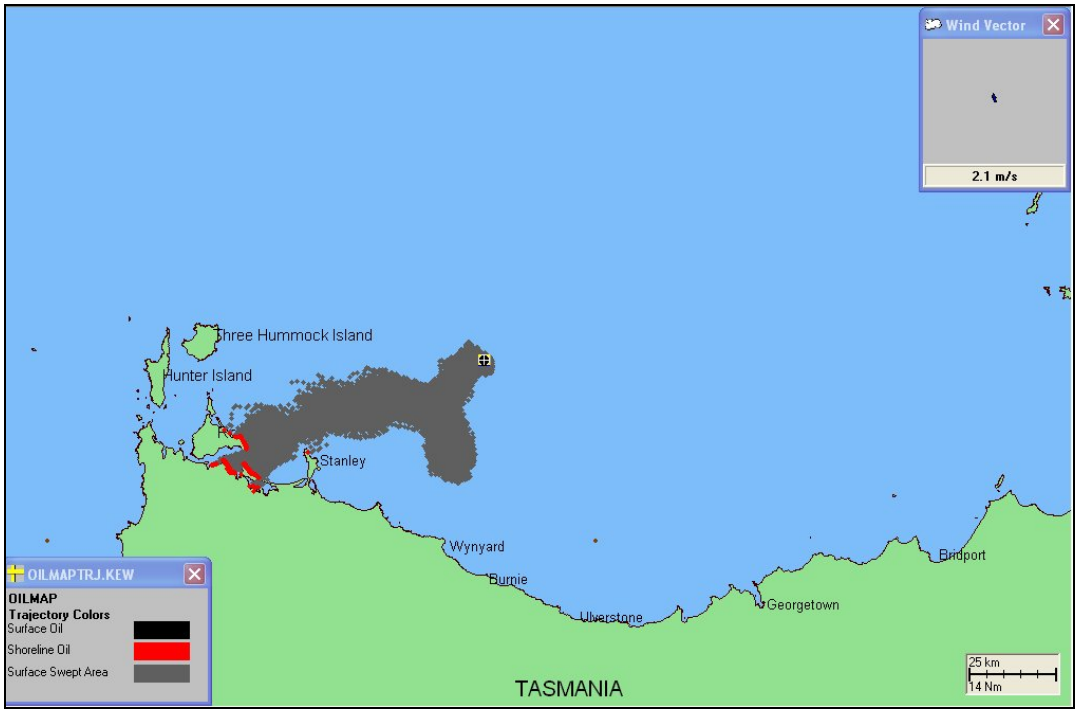


Figure 15: Predicted path and shoreline contact for the 80 m^3 diesel single trajectory (at 7-day) at Spikey Beach-1, which had yielded the average volume of diesel oil on shore.

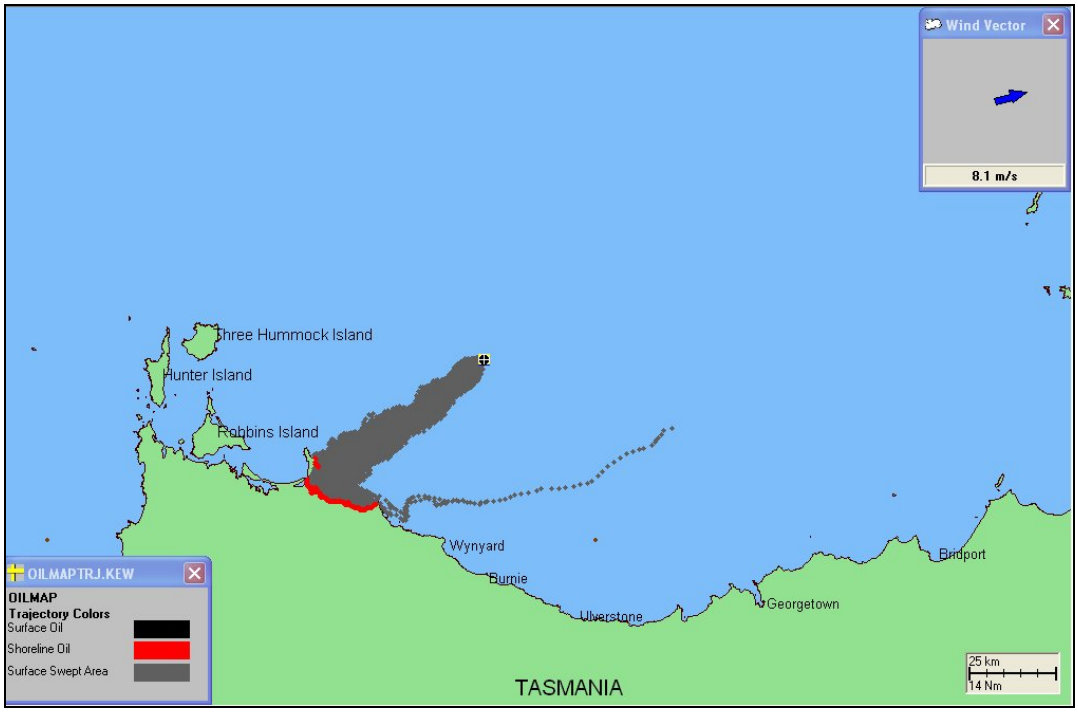


Figure 16: Predicted path and shoreline contact for the 600 m^3 crude single trajectory (at 10-day) at Spikey Beach-1, which had yielded the maximum amount of crude on shore.

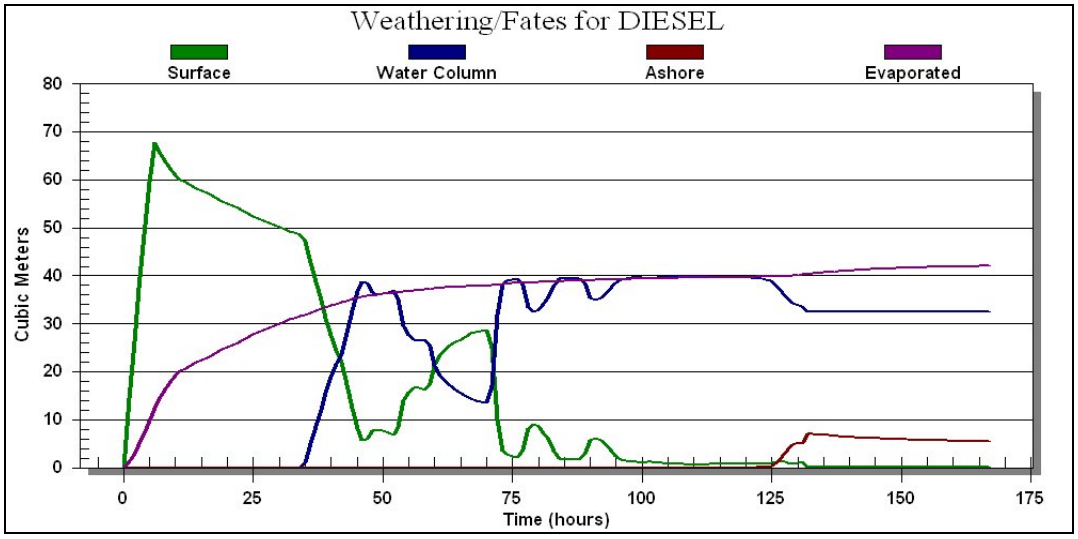


Figure 17: Weathering and fates graph for the 80 m^3 diesel single trajectory at Spikey Beach-1, which had yielded the average volume of diesel oil on shore.

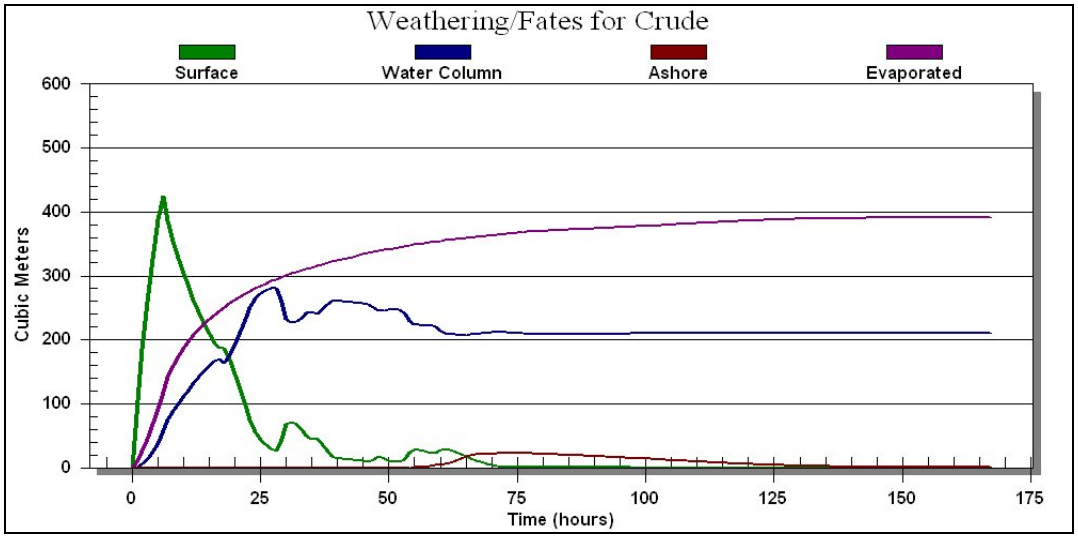


Figure 18: Weathering and fates graph for the 600 m^3 crude single trajectory at Spikey Beach-1, which had yielded the average volume of crude on shore.

9 REFERENCES

Isaji, T. and M. Spaulding, 1984. Notes and Correspondence. A Model of the Tidally Induced Residual Circulation in the Gulf of Maine and Georges Bank, published in: Journal of Phys. Ocean. June. pp. 1119-1126.

King B., F.McAllister, G. Hubbert (1999). "Data requirements for calibration and validation of the spill model OILMAP". In, Marine Meteorology and Related Oceanographic Activities. WMO Report No. 44. MARPOLSER 98 Proceedings Volume 1 – Research Papers. WMO/TD – No. 959. Pages 35-52.

Owen, A., (1980). "A three-dimensional model of the Bristol Channel". *J. Phys. Oceanography*., 10, 1290-1302.

Spaulding, M.L., E. Howlett, E. Anderson and K. Jayko (1992). "OILMAP: A global approach to spill modeling". 15th Annual Arctic and marine Oilspill Program, Technical Seminar, Edmonton, Alberta, Canada, June 9-11, 1992.

Spaulding, M.L., V.S. Kolluru, E. Anderson and E. Howlett (1994). "Application of three-dimensional oil spill model (WOSM/OILMAP) to hindcast the Braer Spill". Spill Science & Technology Bulletin, Volume 1, No. 1, pp. 23

Spaulding M.L., P.R. Bishnoi, E. Anderson, and T. Isaji, (2000), "An integrated model for prediction of oil transport from a deep water blowout" submitted to the *Arctic and Marine Oil Spill Program (AMOP) Technical Seminar*, Calgary, Alberta, Canada.

Zigic, S., M. Zapata., T. Isaji., B. King and C. Lemckert (2003). "Modelling of Moreton Bay using an ocean/coastal circulation model." Coast and Ports Australiasian Conference, 9 -12 September Auckland, New Zealand, paper 170.

QUANTITATIVE SPILL EXPOSURE ASSESSMENT FOR THE OTWAY BASIN DRILLING PROGRAM

November 2007

Produced for:

Coffey Natural Systems and Australian Drilling Associates

Asia - Pacific Applied Science Associates
Marine and Freshwater Environmental Modelling
ABN 79 097 553 734
Unit 2B, Shafto Lane, 872 Hay St, Perth, WA, 6000
Phone: (08) 9226 2911
Suite 3a, Level 1, 142 Bundall Rd, Bundall, QLD, 4217
Phone: (07) 5574 1112

Document control form

Document draft	**Originated by**	**Edit & review**	**Authorised for release by**	**Date**
Draft 1 for internal review	*Dr Sasha Zigic*	*Dr Sasha Zigic* *Nathan Benfer*		
Draft release to client			*Dr Sasha Zigic*	*13th October 2007*
Final release to client			*Dr Sasha Zigic*	*22nd November 2007*
Final release to client (minor changes)			*Dr Sasha Zigic*	*26th November 2007*

APASA PROJECT NUMBER: Q027
APASA PROJECT LEADER: Dr Sasha Zigic
DOCUMENT FILE NAME: Coffey NS_ADA_Otway spills_Final.doc

DISCLAIMER: This document contains confidential information that is intended only for use by the client and is not for public circulation or publication or for the use of any third party without the approval of Asia-Pacific ASA Pty Ltd.

While this report is based on source information Asia-Pacific ASA Pty Ltd considers reliable, its accuracy and completeness cannot be guaranteed. Therefore, Asia-Pacific ASA Pty Ltd and its directors and employees accept no liability for the result of any action taken or not taken on the basis of information in this report, or for any negligent misstatements, errors, or omissions. This report is complied with consideration for the specified client's objectives, situation, or needs. Those acting upon such information without first consulting Asia-Pacific ASA Pty Ltd do so entirely at their own risk. We strongly recommend that any person who wishes to act upon this report first consult an Asia-Pacific ASA Pty Ltd advisor.

TABLE OF CONTENTS

1 Executive summary 5
2 Introduction 7
3 Methodology 8
4 Hydrodynamic Model - HYDROMAP 8
4.1 HYDROMAP Model Setup 9
5 Oil Spill Surface Model - OILMAP 13
5.1 Stochastic Modelling 13
6 Environmental Data 15
7 Model settings and Oil properties 17
8 Results 20
8.1 Bernoulli exploration well 21
8.2 Fermat exploration well 26
9 References 29

LIST OF FIGURES

Figure 1: Map showing the two exploration wells as part of the Otway Basin drilling program. 8
Figure 2: Extent of the hydrodynamic grid set up with the varying grid resolution applied around the coastline. 10
Figure 3: Bathymetric grid used to define the hydrodynamic model domain. Note the yellow icon denotes the location of the National Tidal Facility tide station. 11
Figure 4: Comparison between the predicted (blue line) and observed (red line) surface elevation variations at Port MacDonnell, between the 1st – 31st October 2007. 11
Figure 5: Zoomed in view of a sample predicted flood tide (top) and ebb tide (bottom) adjacent to the hypothetical release sites. Note the density of the tidal vectors vary with the grid resolution, particularly along the coastline. 12
Figure 6: A sample of four single spill trajectories (to silvery sheen – 0.0001mm) for a hypothetical diesel spill from the Bernoulli exploration well. Each spill was simulated over a 7-day period using randomly selected time series of wind and hydrodynamic data. 14
Figure 7: Location of the three NCEP wind stations in relation to the release sites. 16
Figure 8: Monthly and yearly wind roses for the nearby wind data (1997-2006). 16
Figure 9: Weathering and fates graph for a surface release of 80 m^3 of diesel (over 6 hours) at Bernoulli, under varying wind and currents and a sea temperature of 14°C. 18
Figure 10: Weathering and fates graph for a surface release of 448 m^3 of condensate (over 7 days) at Bernoulli, under varying wind and currents and a sea temperature of 14°C. 18
Figure 11: Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil at Bernoulli for an annualised assessment. 22

Figure 12: Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil during at Bernoulli for an annualised assessment. 22
Figure 13: Predicted annualised probability of surface exposure (to silvery sheen) due to a 448 m^3 spill of condensate at Bernoulli for an annualised assessment. 23
Figure 14: Predicted minimum time before exposure (to silvery sheen) due to a 448 m^3 spill of condensate at Bernoulli for an annualised assessment. 23
Figure 15: Predicted path and shoreline contact for the 80 m^3 diesel single trajectory (at 7-day) at Bernoulli, which had yielded the average volume of diesel oil on shore. 24
Figure 16: Predicted path and shoreline contact for the 448 m^3 condensate single trajectory (at 10-day) at Bernoulli, which had yielded the average amount of condensate on shore. 24
Figure 17: Weathering and fates graph for the 80 m^3 diesel single trajectory at Bernoulli, which had yielded the average volume of diesel oil on shore. 25
Figure 18: Weathering and fates graph for the 448 m^3 condensate single trajectory at Bernoulli, which had yielded the average volume of condensate on shore. 25
Figure 19: Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel at Fermat for an annualised assessment. 27
Figure 20: Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel during at Fermat for an annualised assessment. 27
Figure 21: Predicted path and shoreline contact for the 80 m^3 single trajectory (at 7-day) simulation at Fermat, which had yielded the average volume of diesel oil on shore. 28
Figure 22: Weathering and fates graph for the 80 m^3 single trajectory simulation at Fermat, which had yielded the average volume of diesel oil on shore. 28

LIST OF TABLES

Table 1: Hypothetical spill locations for the two exploration wells. 7
Table 2: Summary of model settings used for spill modelling 20
Table 3: Summary of the annualised stochastic modelling results for the diesel and condensate surface releases at Bernoulli. 21
Table 4: Summary of the annualised stochastic modelling results for the diesel oil surface release at Fermat. 26

1 EXECUTIVE SUMMARY

Australian Drilling Associates (ADA) is proposing to drill one exploration well in the Otway Basin, on behalf of Beach Petroleum (Beach). The following report assists in quantifying the risk of exposure to surrounding shorelines and environmental resources in the unlikely event of a hydrocarbon spill occurring from the two exploration wells. The assessment examined three hypothetical spill scenarios that are applicable to drilling activities:

a) A 80 m^3 surface spill of diesel oil, representing a storage tank rupture from a supply vessel, at the Bernoulli and Fermat wells; and
b) A 448 m^3 surface spill of gas condensate, representing an accidental gas well blowout, at the Bernoulli well.

The ASA oil spill trajectory and fates model (OILMAP) was used to simulate the drift and spread of diesel oil and condensate from the two exploration wells (Bernoulli and Fermat) to surrounding locations under the influence of the ambient winds and tides. All trajectory and weathering simulations were based on local environmental conditions (winds, tides and water temperature) and the chemical and physical characteristics of the representative hydrocarbons. The 200 hypothetical single spill trajectories used to generate the probability results were sampled from local wind data spanning 10 years (1997-2006).

The stochastic modelling showed that slicks from the Bernoulli exploration well to predominately drift towards the north-east due to the influence of the prevalent southwest winds and longshore northward currents. While the slicks from the Fermat well were more likely to spread in the south-east direction due to the influence of the winds and the longshore currents.

For the Bernoulli scenarios, the stochastic modelling indicated that in the unlikely event of a diesel spill or condensate spill, there was a 15 % and 42 % probability respectively, of shoreline contact (for a silvery sheen and thicker, threshold thickness of ≥0.1 µm). The average time for shoreline contact was 62 hours for a diesel spill and 73 for the condensate spill. The predicted average volume of diesel and condensate to reach shore was 25 m^3 and 18 m^3, respectively, which is 31 % and 4 % of the initial volume.

Further, due to the close proximity of the Fermat exploration well to the coastline, the estimated probability that a diesel spill would reach the shoreline was higher than Bernoulli,

being 26 %. While the average time to shore 39 hours. The average predicted volume of diesel oil to reach landfall was 23 m^3, which is 29 % of the initial spill.

2 INTRODUCTION

Australian Drilling Associates (ADA) is proposing to drill one exploration well in the Otway Basin (see Figure 1 and Table 1), on behalf of Beach Petroleum (Beach). It is anticipated that gas and condensate will be produced from the two Beach wells.

As part of the due diligence process of understanding and managing environmental risks, Coffey Natural Systems on behalf of ADA, had commissioned Asia-Pacific Applied Science Associates (APASA) to quantify the risk of exposure to surrounding environmental resources in the event of a spill from the two exploration wells.

The assessment examined three hypothetical worst case scenarios for exploration activities:

a) A 80 m^3 surface spill of diesel oil, representing a storage tank rupture from a supply vessel, at the Bernoulli and Fermat wells; and
b) A 448 m^3 surface spill of gas condensate, representing an accidental gas well blowout, at the Bernoulli well.

The risk assessment used ASA's surface oil spill trajectory and fates model (OILMAP), to simulate the drift, spread and weathering of diesel oil and condensate from the exploration wells to surrounding locations under the influence of the ambient winds and currents. An annualised (annual data spread) risk assessment was carried out to help identify which surrounding regions would be at risk from a diesel oil or condensate spill under the varying environmental conditions. The investigation will assist Coffey Natural Systems project managers to assess the associated spill risks and to develop appropriate spill contingency plans.

Table 1: Hypothetical spill locations for the two exploration wells.

Well Name	Permit Area	Well Type	Longitude	Latitude
Bernoullli	Vic/P46	Gas	141° 3' 36.42" E	38° 22' 17.84" S
Fermat	Vic/P46	Gas	141° 3' 12.954" E	38° 11' 43.196"S

Figure 1: Map showing the two exploration wells as part of the Otway Basin drilling program.

3 METHODOLOGY

The spill modelling study was carried out as two independent, yet integrated stages. Firstly, the tidal currents were generated for the study area using an ocean/coastal circulation model HYDROMAP. Secondly, OILMAP was used to determine the expected movement and weathering of any hydrocarbons spills under the influence of winds and the tidal currents. An overview of each model is described in the following sections.

4 HYDRODYNAMIC MODEL - HYDROMAP

The tidal currents for the study were simulated using an ocean/coastal circulation model, HYDOMAP, which has been successfully applied to many regions around the world (Isaji et al., 2001, Zigic et al., 2003). HYDROMAP forms part of the Australian national oil spill emergency response system operated by AMSA (Australian Maritime Safety Authority).

The HYDROMAP is an ocean/coastal circulation model that simulates the flow of ocean currents within a model region due to forcing by astronomical tides, wind stress and bottom friction for any location on the globe. HYDROMAP employs a nested-gridding strategy,

supporting up to six levels of spatial resolution. This allows for increased resolution of current within areas of greater bathymetric complexity, or of particular interest to a study. To simulate ocean-circulation over any area of interest, the model must be provided with the following basic data:

(1) Measured bathymetry for the area, which defined the shape of the seafloor; and

(2) The amplitude and phase of tidal constituents, which were used to calculate sea heights over time at the open boundaries of the model. Changes in sea heights were used, in turn, to calculate the propagation of tidal currents through the model region.

The numerical solution methodology follows that of Davies (1977 a, b) with further developments for model efficiency by Owen (1980) and Gordon (1982). A more detailed presentation of the model can be found in Isaji and Spaulding (1984).

4.1 HYDROMAP Model Setup

The HYDROMAP hydrodynamic grid was set up over a domain that extended over the entire Bass Strait region. The grid was set up with a resolution ranging from 10 km at the outer regions of the model grid to 1.25 km around the coastline (Figure 2). The finer resolution was used to resolve complex coastal circulation patterns. Figure 2 shows the extent of the hydrodynamic grid.

Bathymetric data used to define the three-dimensional shape of the study domain was a combination of the 9-arc-second Australian national database (Source: Geoscience Australia), which has a resolution of approximately 250 m in this region (see Figure 3).

Forcing by astronomical tides was defined at the open boundaries and were calculated for real times using the latest Topex Poseidon global tidal set (TPX062; source: NOAA), which is a gridded set of tidal constituents derived from satellite altimetry. Tidal elevations at all open boundary cells were calculated at each time step in the model using the 8 largest and most significant tidal constituents for the area (K2, Q1, O1, K1, N2, M2 and S2). The model then calculated sea heights and resulting tidal currents for locations within the region by propagation of constant water mass over the three-dimensional shape of the region.

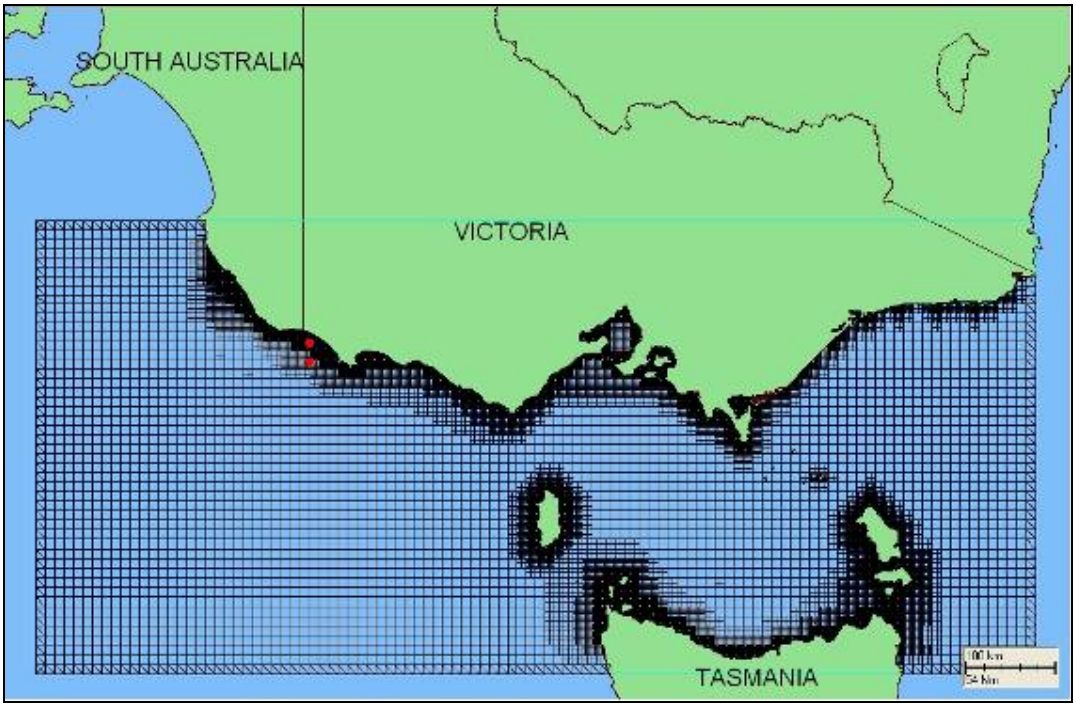


Figure 2: Extent of the hydrodynamic grid set up with the varying grid resolution applied around the coastline.

For the purposes of verification, the model predictions were compared against observed tides at Port MacDonnell (see Figure 3 for the location) by the National Tidal Facility (NTF). As can be seen in Figure 4 the HYDROMAP predictions compared very well to reported tidal data, clearly demonstrating the reliability and accuracy of the model for predicting the propagation of tidal currents over the three-dimensional bathymetric grid for the operational area.

Figure 5 shows examples of predicted tidal current vectors around the proposed release sites during sample flood and ebb tides. The major axis of the tides at Fermat, run approximately north-west and south-east due to the orientation of the coastline and the maximum tidal speed below 0.1 m/s during spring tides. While the maximum tidal speed at Bernoulli was also below 0.1 m/s, although, the currents run north to south-east and are oscillatory in nature.

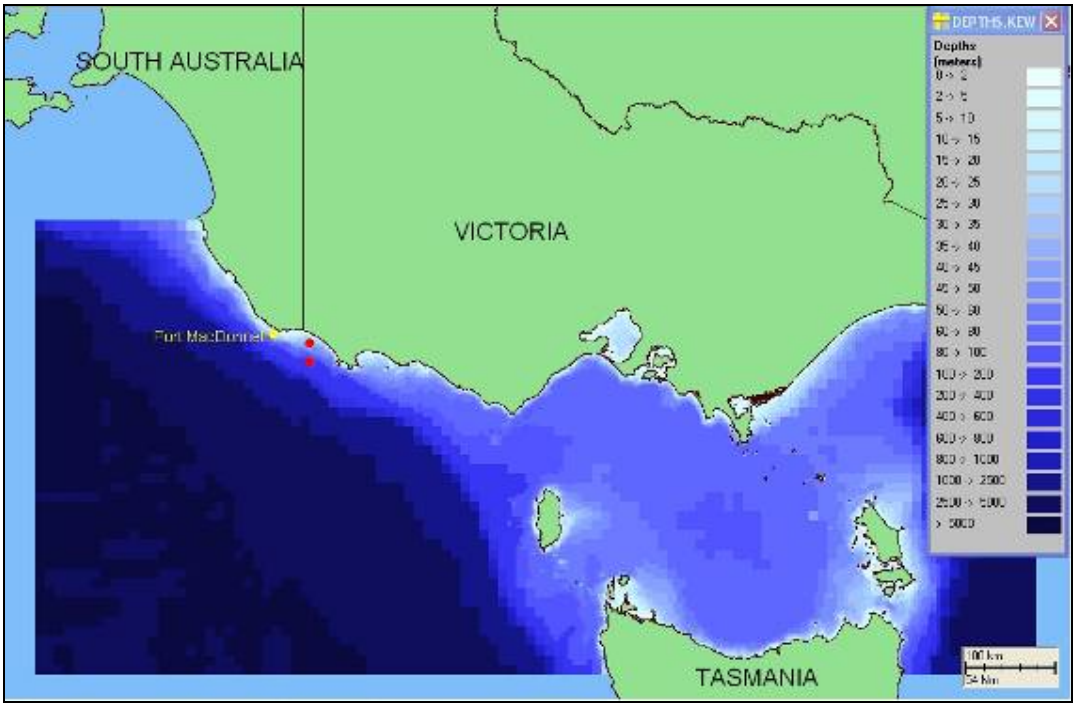


Figure 3: Bathymetric grid used to define the hydrodynamic model domain. Note the yellow icon denotes the location of the National Tidal Facility tide station.

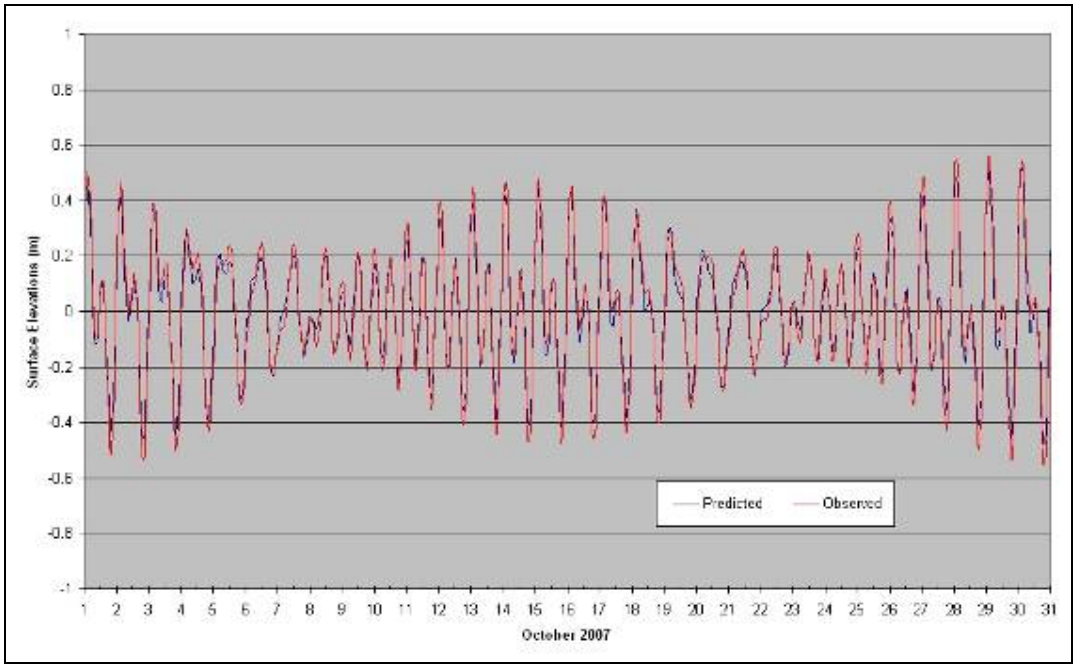


Figure 4: Comparison between the predicted (blue line) and observed (red line) surface elevation variations at Port MacDonnell, between the 1st – 31st October 2007.

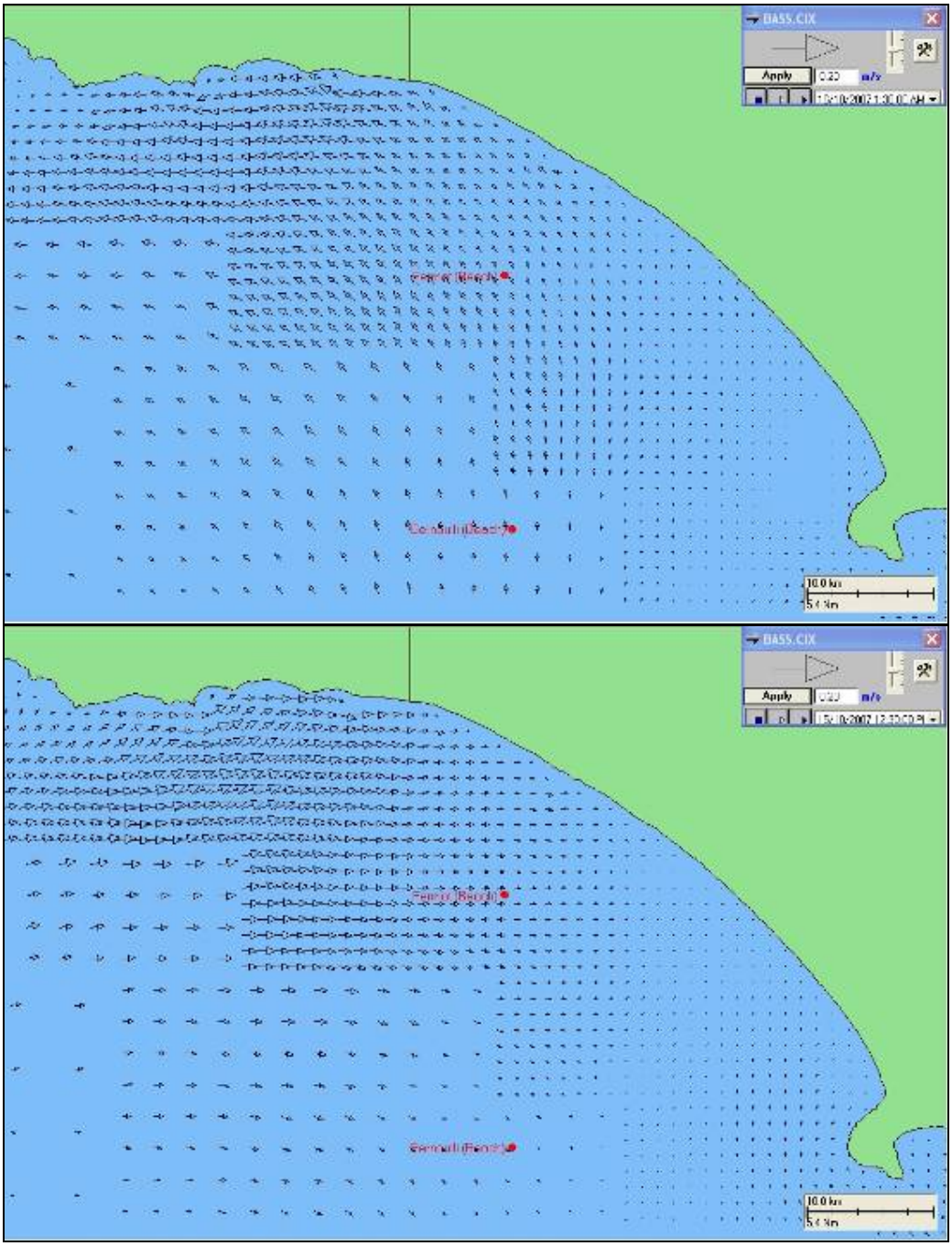


Figure 5: Zoomed in view of a sample predicted flood tide (top) and ebb tide (bottom) adjacent to the hypothetical release sites. Note the density of the tidal vectors vary with the grid resolution, particularly along the coastline.

5 OIL SPILL SURFACE MODEL - OILMAP

Surface spill modelling was carried out using ASA's two-dimensional oil spill model, OILMAP. OILMAP is a computerised modelling system for predicting the physical and chemical fates and effects of hydrocarbon spills on the ocean. OILMAP incorporates a geographic information system (GIS) for defining the location and nature of natural resources, and a suite of models that predict the movement and weathering of hydrocarbon slicks on the sea surface.

The OILMAP model simulates the transport of the hydrocarbon slicks within a model domain using time- and space-varying data for the speed and direction of water currents and winds. The distribution and mass balance of particular hydrocarbon types are predicted over time based on the chemical characteristics of the specific oil type and the prevailing wind and tidal conditions. For this latter purpose, OILMAP includes algorithms that account for hydrocarbon spreading, evaporation, emulsification, entrainment, and shoreline interactions. If hydrocarbon strands on shorelines (as defined by the OILMAP GIS), details are recorded on the quantity, time to contact and resources at the strand location.

Predictions of the OILMAP model have been validated worldwide (Spaulding *et. al.* 1992, 1994) and in Australia (King *et. al.* 1999) by field observations and by hind-casting past hydrocarbon spills.

5.1 Stochastic Modelling

OILMAP can be used to predict the fate of a single spill under defined conditions, or of multiple spills that occur under a random selection of prevailing conditions (also known as stochastic modelling). The stochastic model performs a large number of simulations for a given spill site, randomly varying the spill time, so that the transport and weathering of each slick are subject to a different set of prevailing wind and current conditions. During each simulation, the model records the grid cells that were contacted by oil particles, as well as the amount of time that had elapsed prior to the contact or exposure.

Once the stochastic modelling is complete, the results are compiled from each of the sample trajectories to provide a statistical weighting to the likelihood of exposure. Results can be summarised as:

1. The probability or risk that a grid cell may be exposed to oil slicks; and

2. The minimum time before exposure could occur.

The first estimate is calculated from the frequency of exposures during all simulations, while the latter estimate is the worst-case for any of the sample trajectories (French *et al.*, 1999). The stochastic modelling approach provides an objective measure of the possible outcomes of a spill, as well as the means of quantifying the likelihood of a given outcome. The most commonly occurring conditions would be selected most often while conditions that are more unusual can also be represented.

Figure 6 shows an example of four individual trajectories simulated in stochastic mode. Note how the path and area exposed varies among the simulations. **Two hundred** individual trajectories were simulated for each scenario and season. For this study a threshold concentration of **0.0001 mm (0.1 µm)** was specified. This thickness is equivalent to 0.1 g/m^2 and appears as a silvery sheen.

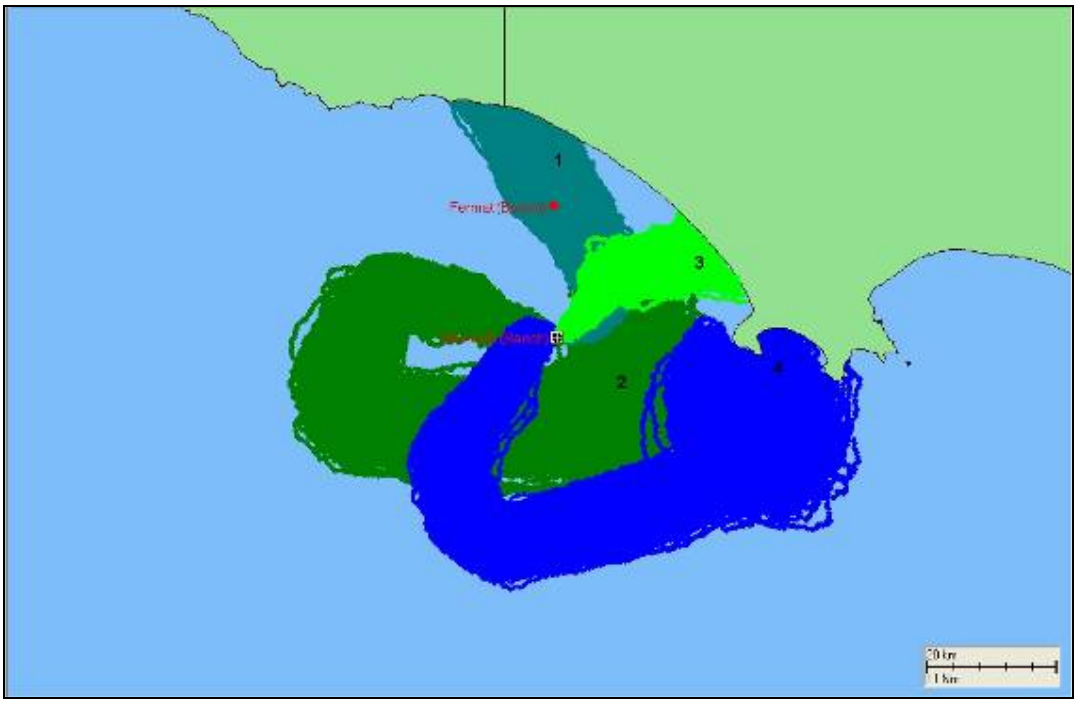


Figure 6: A sample of four single spill trajectories (to silvery sheen – 0.0001mm) for a hypothetical diesel spill from the Bernoulli exploration well. Each spill was simulated over a 7-day period using randomly selected time series of wind and hydrodynamic data.

6 ENVIRONMENTAL DATA

To account for the wind influence, local wind data was derived from the output of a numerical atmospheric model (the NCEP model reanalysis) provided by the NOAA-CIRES Climate Diagnostics Center in Boulder, Colorado, from their Web site at *http://www.cdc.noaa.gov*. Wind data at the three nearest stations (see Figure 7) for the years 1997 through 2006 (inclusive), were extracted from this archive for use as a representative sample of the wind conditions over the study area for future years.

Figures 8 shows an example of the monthly wind roses summarising the distribution of wind speeds and directions according to the NCEP wind station 6967. Note that the atmospheric convention for defining wind direction, that is, the direction the wind blows **from**, is used to reference wind direction throughout this report. Each branch of the rose represents wind coming from that direction, with north to the top of the diagram. Eight directions are used. The branches are divided into segments of different thickness, which represent wind speed ranges from that direction. Speed ranges of 5 knots are used in these wind roses. The width of each segment within a branch is proportional to the frequency of winds blowing within the corresponding range of speeds from that direction.

On an annual basis the data indicated that the winds are highly variable and from all directions. However, during the summer months (November to February) the winds are from the southern sector and predominately from the south-east. While the winds during winter are from the northern sector and more frequently from the north-west. The winds for the region are relatively strong with an annual average and maximum wind speed of 13.8 knots and 40 knots, respectively.

As part of this study, the sea surface temperature was set to 14°C.

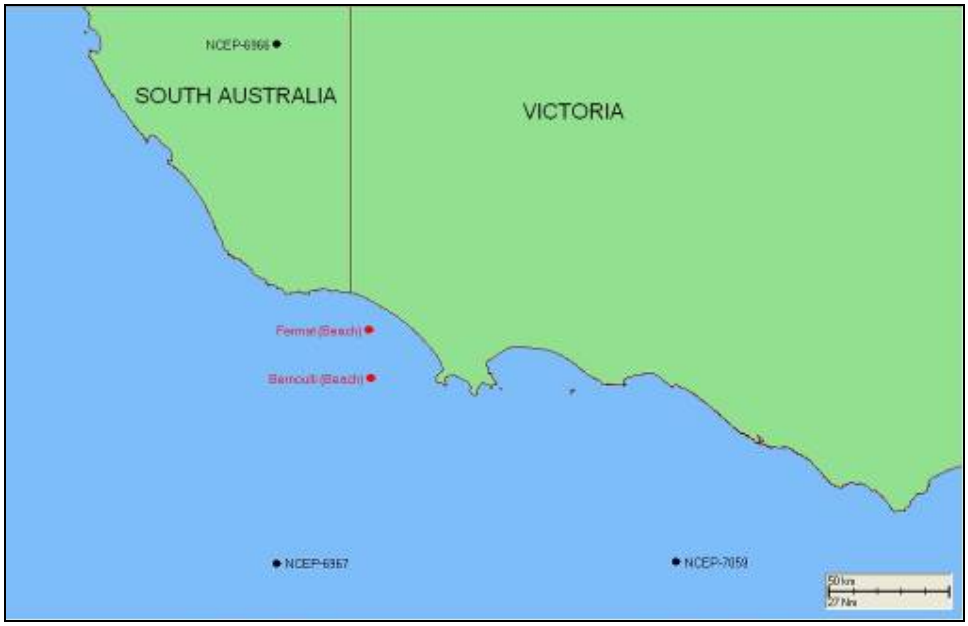


Figure 7: Location of the three NCEP wind stations in relation to the release sites.

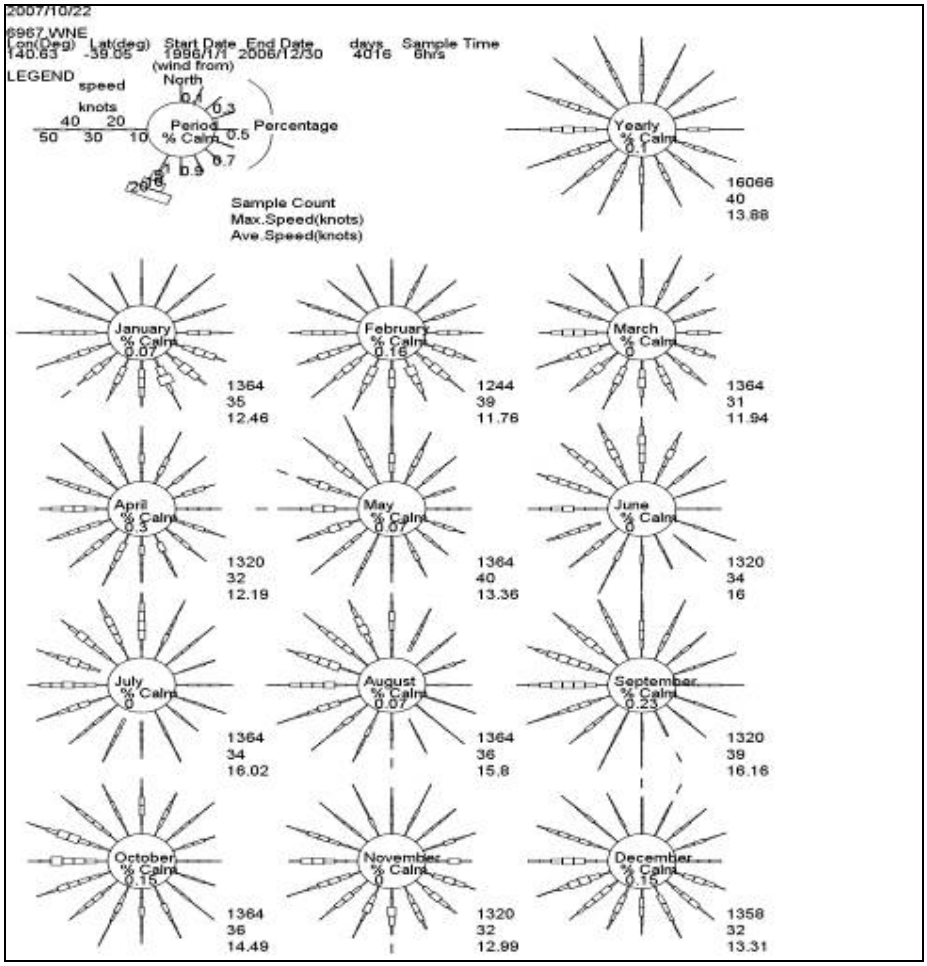


Figure 8: Monthly and yearly wind roses for the nearby wind data (1997-2006).

7 MODEL SETTINGS AND OIL PROPERTIES

OILMAP was used to examine three hypothetical spills scenarios, which would be applicable to the ADA's drilling activities:

1. The loss of 80 m^3 of diesel at the surface over 6 hours (tracked for 7-days), representing a refuelling accident at the Bernoulli and Fermat exploration wells; and

2. The loss of 448 m^3 of gas condensate at the surface over 7-days (tracked for 10-days), representing an accidental gas well blowout, at the Bernoulli well.

The gas condensate volume is based on estimates from nearby gas wells which have a flow rate of 80 MMscf/day in the unlikely event of a blow-out and 0.80 m^3 of condensate per 1 MMscf of gas. Given that a blow-out situation should not take more than 7 days to control, a 'worst-case' estimate of the potential volumes of condensate which may be released during a blow-out situation over a 7 day period was modelled as follows:

Worst-case blow-out volume = flow rate * max condensate content * no. spill days

$$448\ m^3 = 80\ \text{MMscf/day} * 0.8\ m^3/\text{MMscf} * 7\ \text{days}$$

The well blowout scenarios were modelled as surface releases, since each of the wells are located in shallow environments and gas condensate droplets expected to rise rapidly to the surface (seconds to minutes) just above the release site, hence the prevailing currents would a minimal influence. Further, by simulating the well blowouts as a surface release it would constitute a "worst case" in terms of shoreline impact.

Characteristics for the diesel oil was based on data available from the ADIOS world-wide oil database for a diesel oil formulated for a similar operational temperature. Since Bernoulli and Fermat are exploration wells the exact nature of the condensate is not known. Therefore, the physical and chemical nature a condensate from a nearby well was used as proxy. The condensate is an ultra-light crude with a API of 58.9, it has a low viscosity (1.29 cP @ 25°C) and high volatility (90% evaporated by 350° C).

Figures 9 and 10 show the weathering of the two different oil types based on variable wind conditions. With diesel (see Figure 9) being a mixture of volatile and persistent hydrocarbons, approximately 50% of the mass was predicted to evaporate over the first two days. The

heavier components of diesel have a strong tendency to entrain into the upper water column due to wind waves, but can refloat to the surface if wind waves abate. The interchange between the in-water and surface volumes is clearly seen in the weathering graph. Figure 10 shows the weathering and fates graph for a surface release of 448 m^3 of condensate under varying wind and currents and a sea temperature of 14°C. The model predictions showed that the condensate is highly volatile and only a small volume (<10 %) would remain on the water surface after seven days.

Table 2 shows a table of model setting used as part of the spill modelling.

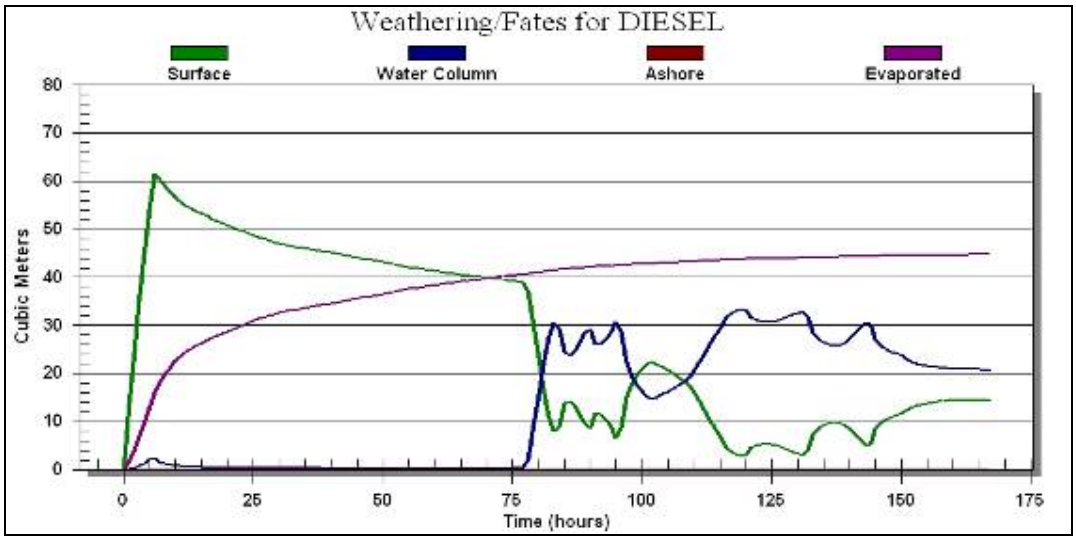


Figure 9: Weathering and fates graph for a surface release of 80 m^3 of diesel (over 6 hours) at Bernoulli, under varying wind and currents and a sea temperature of 14°C.

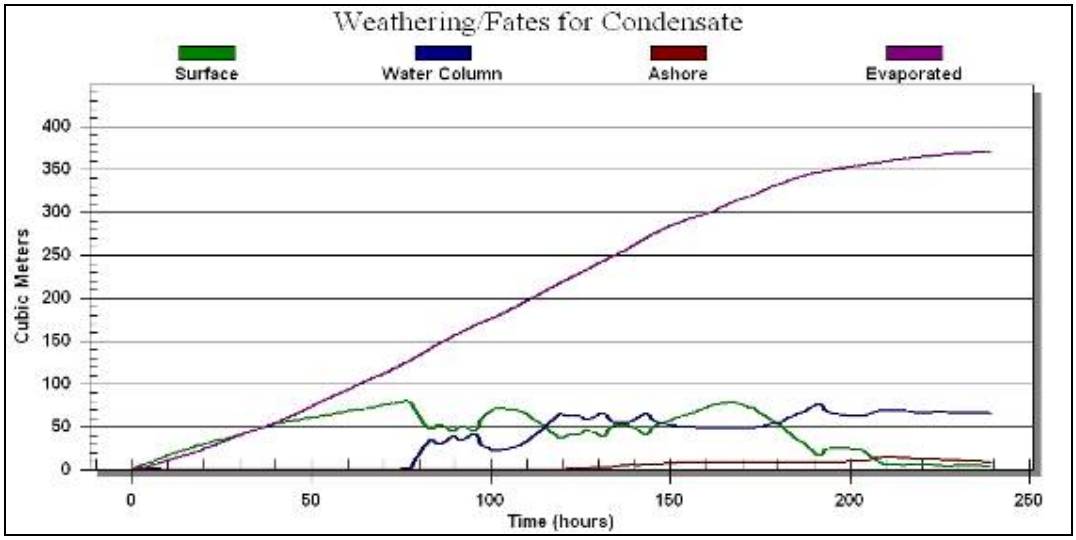


Figure 10: Weathering and fates graph for a surface release of 448 m^3 of condensate (over 7 days) at Bernoulli, under varying wind and currents and a sea temperature of 14°C.

Table 2: Summary of model settings used for spill modelling

Dimensions	(Latitude, longitude)			
Number of randomly selected spill start times per site per scenario	200			
Release Sites	Longitude Latitude			
Bernoulli	38° 22' 17.84" S, 141° 3' 36.42" E			
Fermat	38° 11' 43.196"S, 141° 3' 12.954" E			
Water temperature (°C)	14			
Spill scenario	Exploration well	Volume (m^3)	Duration (hours)	Simulation period for each spill (days)
1. Diesel refuelling accident	Bernoulli & Fermat	80	6	7
2. Accidental gas condensate well blowout	Bernoulli	448	168	10

8 RESULTS

Predictions for the probability of surface exposure and minimum time for each of the two exploration wells are presented as contour plots in Sections 8.1 to 8.2. Note that these probability contours summarises the results of 200 independently selected and modelled spills as a colour coding for the likely exposure of each grid cell. For example, the grid cells coded as 0-10% probability were exposed up to 10% of the total number of simulated spills. Locations with higher probability ratings were exposed by a greater number of spill simulations, indicating that the combination of the prevailing wind and tide conditions had occurred more frequently. The areas outside of the 0-100% contour indicate that exposure will be unlikely under the range of prevailing conditions for this region.

It should be noted that the estimators (probability and time) are calculated independently for each surface location in the grid and that the coverage of the contours do not represent the extent of any one spill event, which will be significantly smaller.

8.1 Bernoulli exploration well

Two hypothetical scenarios were simulated from the Bernoulli exploration well as part of an annualised assessment. The first being an 80 m^3 diesel spill, released over 6 hours and tracked for 7-days. The second scenario was a 448 m^3 spill of condensate, released over 7-days and tracked for 10-days. The probabilities of water surface oiling and minimum travel time calculated by the stochastic modelling for each scenario is shown in Figures 11 – 14.

The model results showed that from the 200 single trajectories simulated for each scenario, 15 % of diesel spills and 42 % of condensate spills would have resulted in shoreline contact (above silvery sheen). The average time for shoreline contact was 62 hours for a diesel spill and 73 hours for the condensate spill. The average predicted volume of diesel and condensate to reach shore was 25 m^3 and 18 m^3, respectively. Hence, the diesel and condensate spills lose an average 69 % and 96 % respectively of their volumes before making shoreline contact. It is important to note that the disconnected diesel probability segments represent portion of diesel slicks forced sub-surface, due to strong wind events (<12 knots), and then re-emerged as the winds eased. Results of the shoreline stranding are summarised in Table 3.

Table 3: Summary of the annualised stochastic modelling results for the diesel and condensate surface releases at Bernoulli.

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline Contact (hours)	Average time before shoreline Contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	15	13	62	25	31
Condensate spill	42	15	73	18	4

The predicted path and shoreline contact for the single diesel and condensate spill simulations (average landfall volume) are shown in Figures 15 & 16, respectively. Three types of particles are represented in the map-based figures. Surface contact is shown as black particles (with no black particles if diesel oil or condensate is no longer at the surface). The grey “trail” represents the predicted sea surface areas that have been swept by diesel oil or condensate. Shoreline areas that are predicted to be contacted are red. The corresponding weathering and fates graphs are shown in Figures 17 and 18.

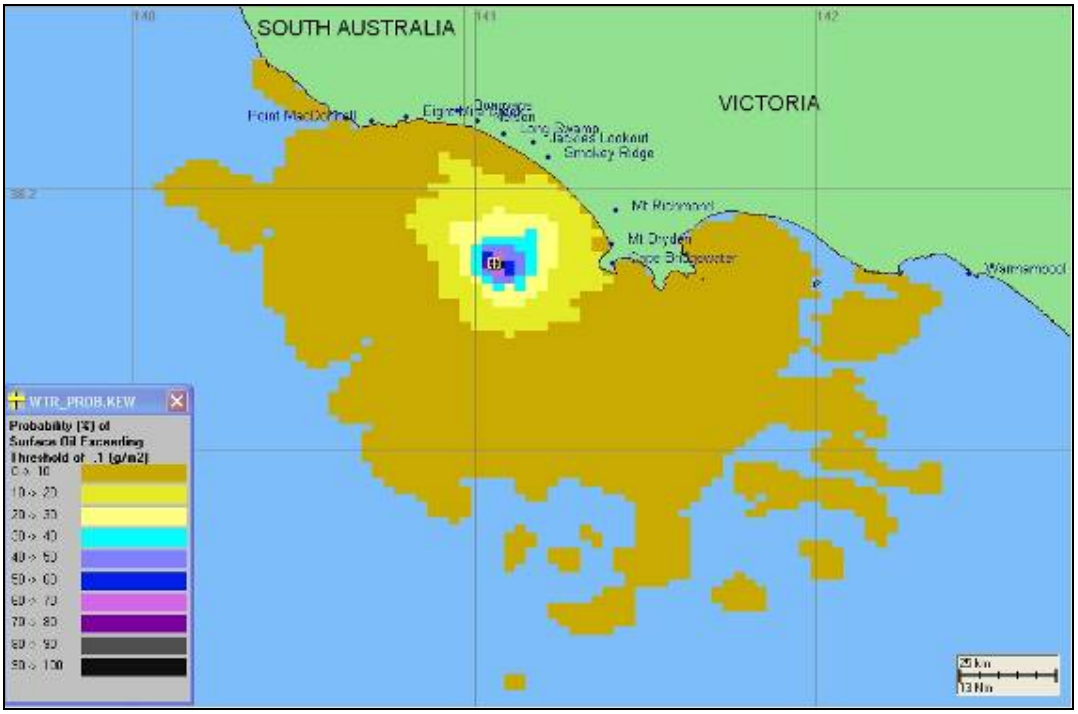


Figure 11: Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil at Bernoulli for an annualised assessment.

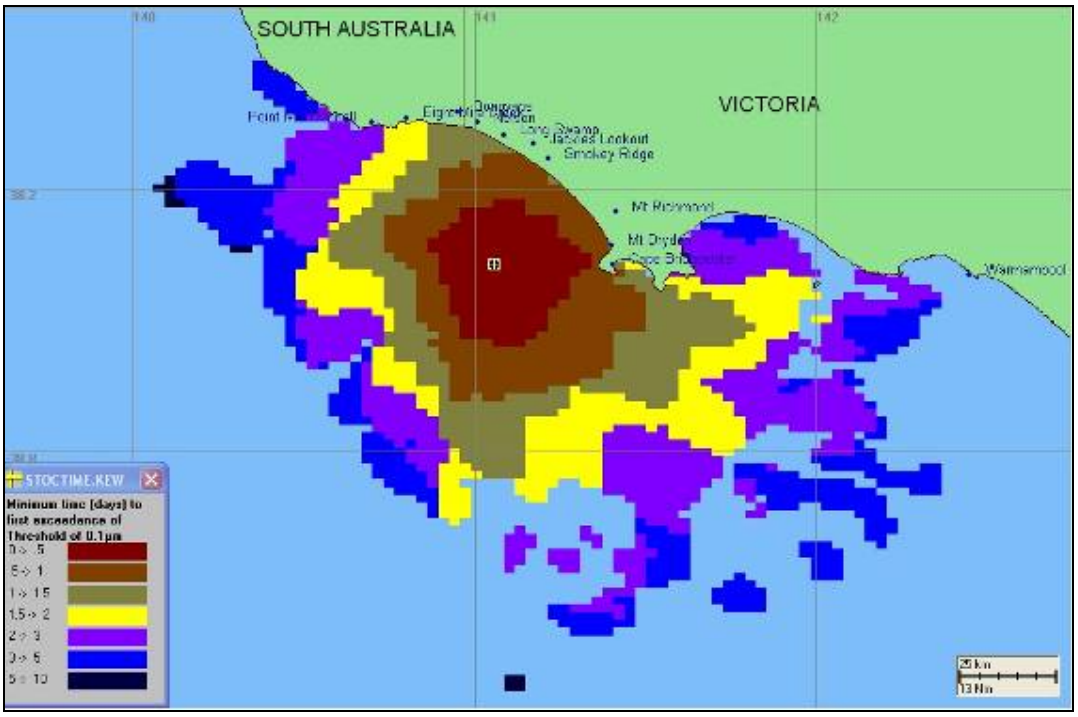


Figure 12: Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil during at Bernoulli for an annualised assessment.

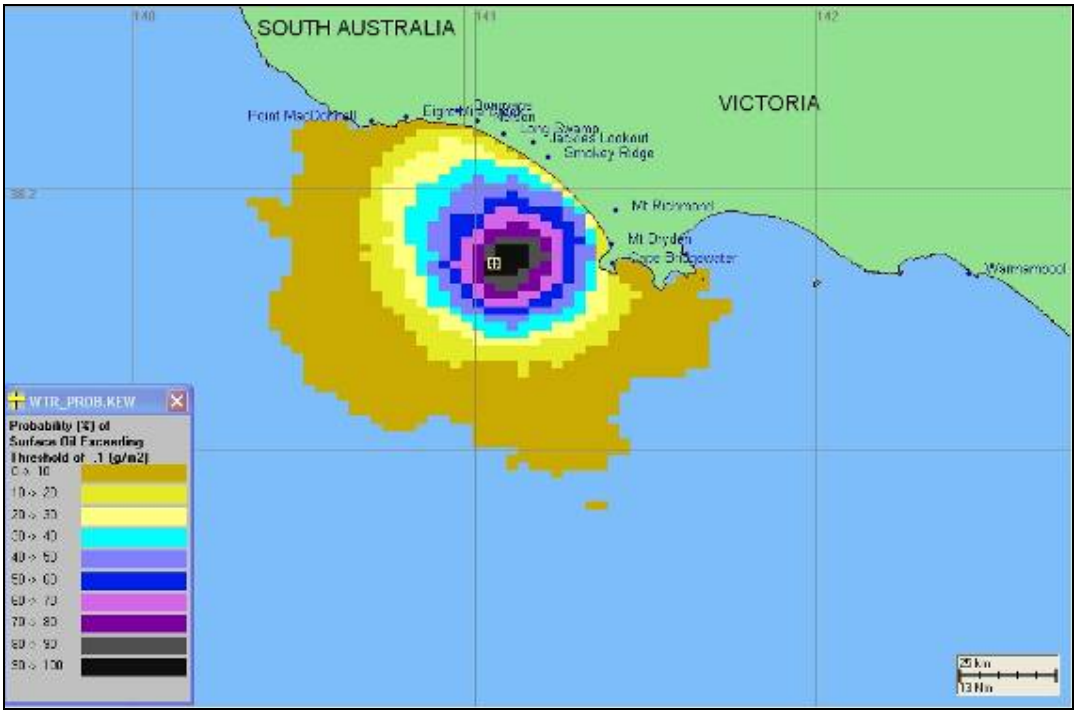


Figure 13: Predicted annualised probability of surface exposure (to silvery sheen) due to a 448 m^3 spill of condensate at Bernoulli for an annualised assessment.

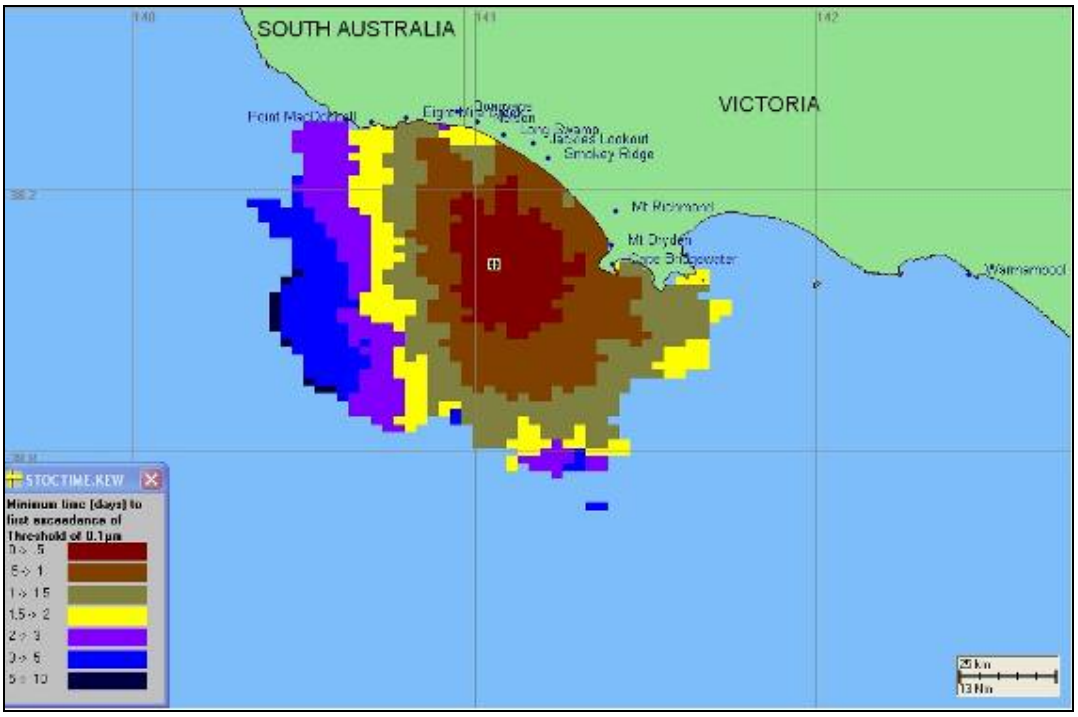


Figure 14: Predicted minimum time before exposure (to silvery sheen) due to a 448 m^3 spill of condensate at Bernoulli for an annualised assessment.

Figure 15: Predicted path and shoreline contact for the 80 m^3 diesel single trajectory (at 7-day) at Bernoulli, which had yielded the average volume of diesel oil on shore.

Figure 16: Predicted path and shoreline contact for the 448 m^3 condensate single trajectory (at 10-day) at Bernoulli, which had yielded the average amount of condensate on shore.

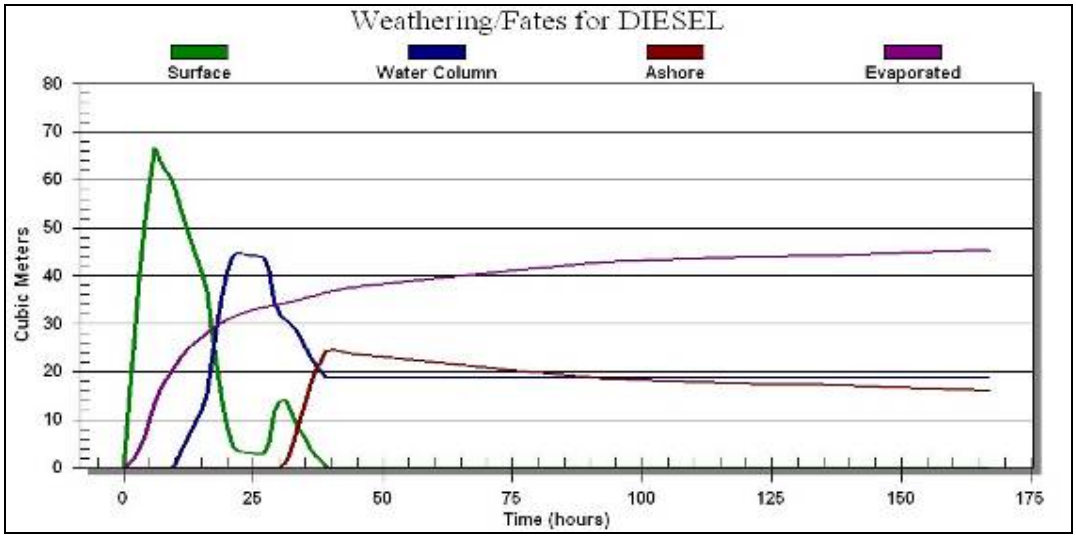


Figure 17: Weathering and fates graph for the 80 m^3 diesel single trajectory at Bernoulli, which had yielded the average volume of diesel oil on shore.

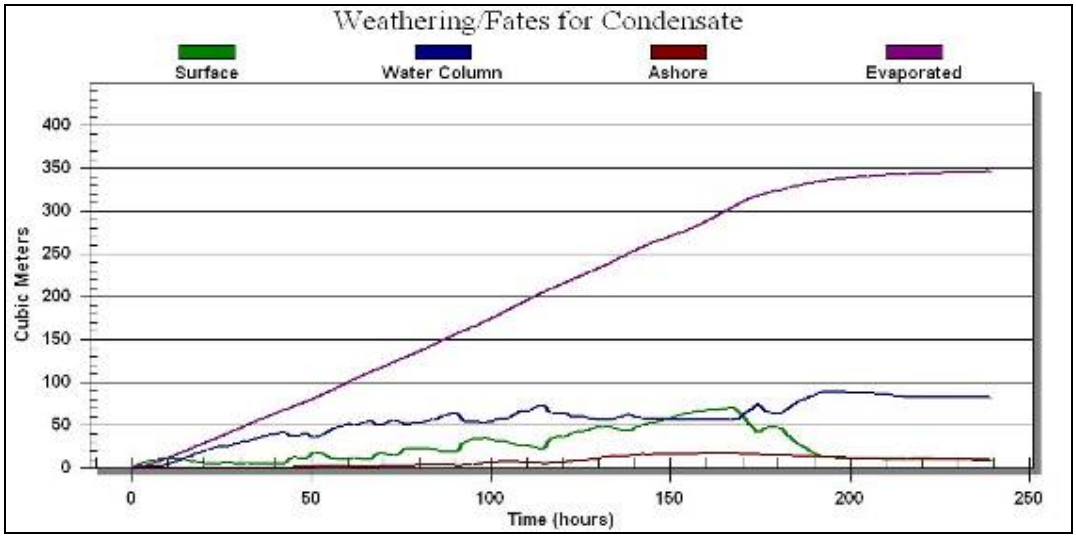


Figure 18: Weathering and fates graph for the 448 m^3 condensate single trajectory at Bernoulli, which had yielded the average volume of condensate on shore.

8.2 Fermat exploration well

An 80 m^3 hypothetical diesel spill, released over 6 hours and tracked for 7-days was simulated from the Fermat exploration well. Figures 19 and 20 show the probability of surface exposure and minimum time travelled calculated from the stochastic modelling.

Due to the close proximity of the exploration well to the coastline, the estimated probability that diesel spills would reach the shoreline (above silvery sheen) was higher than Bernoulli, being 26%. The predicted average time reach shore was 39 hours. Finally, the percentage of the diesel spill to reach shore was estimated at 29 % of the initial spill. Results relative to shoreline stranding are summarised in Table 4.

Figure 21 shows the predicted path and shoreline contact for the diesel oil single trajectory, yielding average volume on shore. Figure 22 is the corresponding weathering and fates graphs.

Table 4: Summary of the annualised stochastic modelling results for the diesel oil surface release at Fermat.

Scenario	Probability of Exposure	Minimum time before exposure (hours)	Average time before exposure (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill	26	7	39	23	29

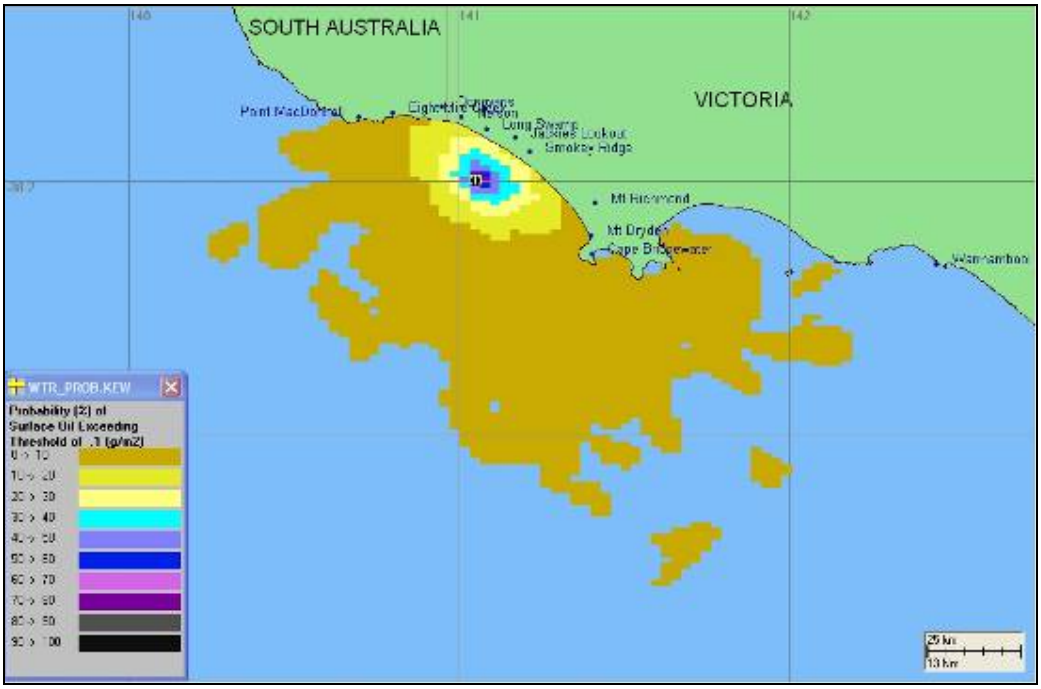


Figure 19: Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel at Fermat for an annualised assessment.

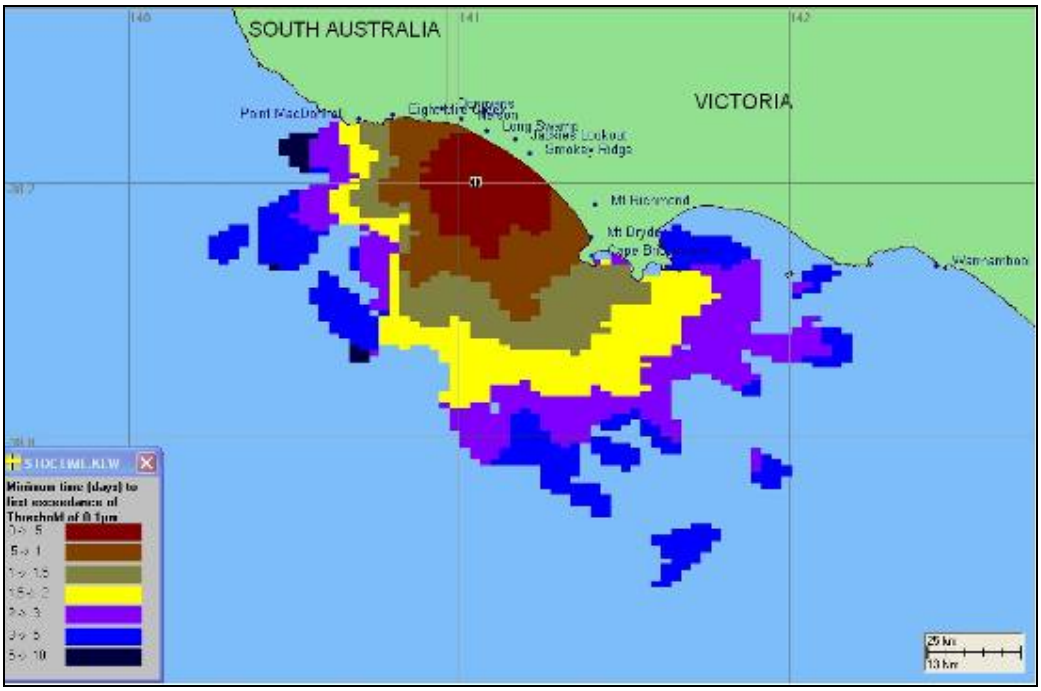


Figure 20: Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel during at Fermat for an annualised assessment.

Figure 21: Predicted path and shoreline contact for the 80 m^3 single trajectory (at 7-day) simulation at Fermat, which had yielded the average volume of diesel oil on shore.

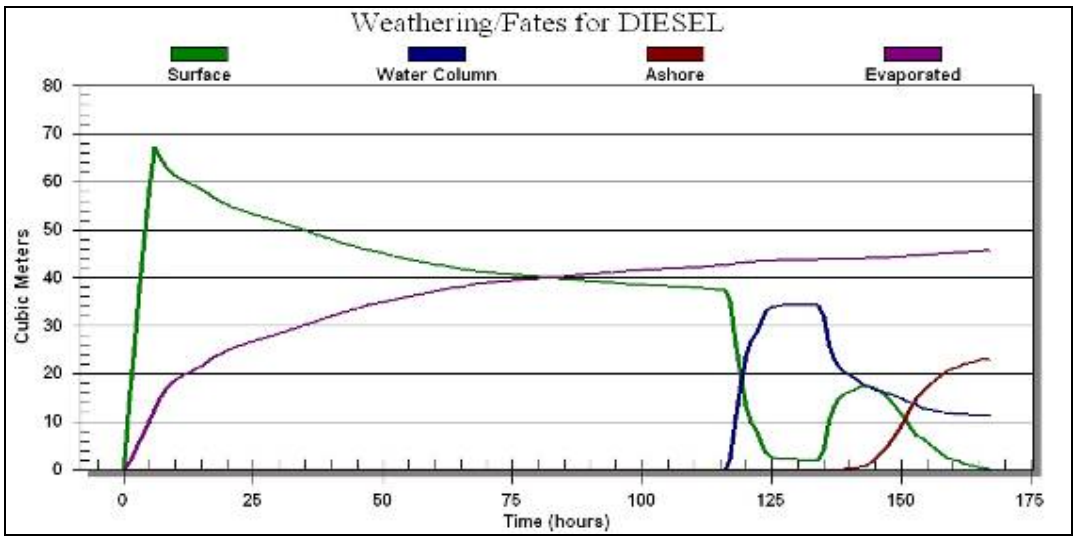


Figure 22: Weathering and fates graph for the 80 m^3 single trajectory simulation at Fermat, which had yielded the average volume of diesel oil on shore.

9 REFERENCES

Isaji, T. and M. Spaulding, 1984. Notes and Correspondence. A Model of the Tidally Induced Residual Circulation in the Gulf of Maine and Georges Bank, published in: Journal of Phys. Ocean. June. pp. 1119-1126.

King B., F.McAllister, G. Hubbert (1999). "Data requirements for calibration and validation of the spill model OILMAP". In, Marine Meteorology and Related Oceanographic Activities. WMO Report No. 44. MARPOLSER 98 Proceedings Volume 1 – Research Papers. WMO/TD – No. 959. Pages 35-52.

Owen, A., (1980). "A three-dimensional model of the Bristol Channel". *J. Phys. Oceanography*., 10, 1290-1302.

Spaulding, M.L., E. Howlett, E. Anderson and K. Jayko (1992). "OILMAP: A global approach to spill modeling". 15th Annual Arctic and marine Oilspill Program, Technical Seminar, Edmonton, Alberta, Canada, June 9-11, 1992.

Spaulding, M.L., V.S. Kolluru, E. Anderson and E. Howlett (1994). "Application of three-dimensional oil spill model (WOSM/OILMAP) to hindcast the Braer Spill". Spill Science & Technology Bulletin, Volume 1, No. 1, pp. 23

Spaulding M.L., P.R. Bishnoi, E. Anderson, and T. Isaji, (2000), "An integrated model for prediction of oil transport from a deep water blowout" submitted to the *Arctic and Marine Oil Spill Program (AMOP) Technical Seminar*, Calgary, Alberta, Canada.

Zigic, S., M. Zapata., T. Isaji., B. King and C. Lemckert (2003). "Modelling of Moreton Bay using an ocean/coastal circulation model." Coast and Ports Australiasian Conference, 9 -12 September Auckland, New Zealand, paper 170.

Appendix 7: Rig And Vessel Specifications

West Triton

For further information contact::

Simon Johnson, Marketing Manager
Tel: +65 6411 5074 Fax: +65 6222 4578
Email: simon.johnson@seadrill.com

Ole F. Gaarden, Marketing Manager
Tel: +65 6411 5075 Fax: +65 6222 4578
Email: ole.gaarden@seadrill.com

www.seadrill.com

GENERAL	
Delivery	01-Jan 2008
Hull ID	P2011
Major Upgrades	-
Design	Baker Marine-375 Pacific Class
Previous Names	Seadrill 2
Flag	Singapore
Classification Agency	ABS-CDS ✠ Self Elevating Unit
Dimensions	236' x 224' x 27.9'
Operating Draft	18.8 Ft
Transit draft	19.5 Ft
Target VDL - Operating	7,496 kips
Target VDL - Survival	6,500 kips
Target VDL - Transit	6,000 kips
Outfitted Max WD	375 Ft
Min WD	30 Ft
Leg Length	506' (incl spudcan tip)
- usable below hull	435 (incl spudcan tip)
Leg Spacing	155.2' transverse
	145.3' longitudinal
Usable Deck Space	32,722 Ft 2
Spudcan Diameter	55.446ft
Max Drilling Depth	30,000'
Cantilever Envelope	70' aft 30' transverse
Max Combined Load	2599 kips at 70' aft
Quarters	115
Helideck Size	75.5' diameter
Helideck Capacity	S61N or 20,500 lbs
Helideck Certification	CAP437
DRILLING PACKAGE	
Derrick (SHL)	1,500 kips
Racking Capacity	30,000' x 5.5" dp
Drawworks	NOV-D3000UE- 3450HP AC
Rotary Table	NOV-D 495 –API 7K
Top Drive	Hydralift Power Swivel HPS750
- continuous torque	64,175 ft lbs @ 94 rpm
Pipehandling	Hydra Tong MPT-200
MUD SYSTEM	
Pressure Rating	7.5M
Pumps	3 x NOV 14-P-220 triplex
Solids Control	1 x dual gumbo box
	4 x VSM 300

CAPACITIES	
Diesel	3900bls
Drillwater	4850-bbls
Potable Water	3,556 bbls
Bulk Product	11,654 cu ft
Sack Storage	5,000 sacks
Base Oil	1,274 bbls
Brine	1310
Liquid Mud	4,727 bbls
Mudpits (excl slug/mix)	8
WELL CONTROL	
Diverter	49.5" KFDJ -500psi
Annular Preventer	1 x Hydril GX 18 ¾" 10M
High pressure BOP	2 x Hydril 18 ¾" 15M double
C&K Manifold	3 1/16" I.D.- 15M
CRANES	
Pedestal Cranes	3 ea Baker Marine
	(900 / 1600 / 2250)
API SWL-Short Tons	7.8ST@100' / 25.0ST@20'
	8.7ST@100' / 44.9ST@25'
	17.0ST@120' / 55ST@25'
BOP Crane	2 x 50MT
POWER	
Main Engines	5 x CAT3516HD
Total Power	10,750 hp
Main Generators	5 x Baylor SR4
Emergency Power	1 x CAT3508
OTHER	
Mooring System	4 x Baker/Series 70
Conductor Tensioner	500 kips vertical
TUBULARS	
Drillpipe	15750' x 5.5" x S-135
	XT-57 tooljoints, Arnco 300XT
FEATURES	Helo refuelling system
	Single stage preload
	Coring Caisson

Date of Update: 21 Jun 07

M/V Pacific Battler

12,240 BHP Anchor Handling Tug Supply Vessel 2,100 Tonnes Cargo Deadweight

Revision : 13 / 26 Sep, 2007

VESSEL INFORMATION

Built

Ulstein Verft AS, September 1997

Flag

Singapore

Call Sign

9V5944

IMO No.

9155664

Classification

DNV + 1A1 Tug, Supply Vessel, SF, E0, FiFi 1

DIMENSIONS

Length, overall :	66.0 meters
Length, BP :	56.4 meters
Breadth, moulded :	14.6 meters
Depth, main deck :	7.4 meters
Design draft :	5.2 meters
Maximum draft midship :	6.3 meters
GRT :	1,974 Tonnes
NRT :	716 Tonnes

CAPACITIES

Deadweight (maximum) :	2,100 tonnes
Clear Deck Area :	34 m x 11.8 m = 401.2 square metres
Deck Loading :	General deck - 5 tonnes / square metre Aft A/H deck - 10 tonnes / square metre
Deck Cargo :	750 tonnes
Fuel :	880 cubic metres
Potable Water :	460 cubic metres
Ballast Water / Drill Water :	825 cubic metres
Brine / DMA / Glycol / Liquid Mud :	275 cubic metres
Liquid Mud :	270 cubic metres, (in 4 tanks with agitators)
Bulk :	240 cubic metres (8475 cubic feet) (in 5 tanks)
Ship's Stores :	Freezer: 8.4 cubic metres Cooler: 8.6 cubic metres Dry: 10.5 cubic metres

MACHINERY

Main Engines :	2 x 6,120 BHP = Total 12,240 BHP Wartsila Vasa 12V32D engines
Propulsion :	2 x Ulstein CPP propellers in Kort nozzles 2 x Ulstein High Lift flap rudders 2 x independent Ulstein Tenfjord electric-hydraulic steering gears
Bow Thrusters :	2 x 885 BHP, each developing 10 tonnes thrust (total 20 tonnes)
Stern Thrusters :	1 x 885 BHP, developing 10 tonnes thrust
Shaft Generators :	2 x 2,250 kVA, 450 V, 60 Hz, each
Auxiliary Generators :	2 x 450 kVA, 450 V / 230 V, 3-phase, 60 Hz 1 x 120 kVA, 450 V / 230 V, 3-phase, 60 Hz

TOWING AND ANCHOR HANDLING

Bollard Pull :	152 metric tonnes, continuous
Rig Chain Locker :	2 x chain lockers, each 78 cubic metres, total 156 cubic metres
Winch :	Ulstein Brattvaag, 300 tonnes, 3 drums (all declutchable)
Load Capacity :	Brake holding on 1st layer - 400 tonnes
Brake Capacity :	Brake holding on 1st layer - 430 tonnes
Tow Drum Wire Capacity :	1 x 1500 m x 76 mm wire capacity, declutchable
Work Drum Capacity :	2 x 1200 m x 76 mm wire capacity, declutchable
Chain Gypsy Cable Lifter :	2 x non-declutchable cable lifters, one for 3 1/4" (84 mm) chain port and one for 3 1/4" (84 mm) starboard, fitted outside of the anchor-handling drums, plus 1 spare of 3 3/4"
Spare Reel Capacity :	2 x pennant wire drums, 15 tonnes, each Capacity - 1500 m x 76 mm diameter wire each 1 x spare tow wire drum, 15 tonnes Capacity - 1400 m x 77 mm diameter wire
Stern Roller :	5 m x 3 m diameter, 350 tonnes SWL
Tow Pins / Guide Pins :	2 sets (total 4) Karmoy hydraulic, retractable, 240 tonnes SWL, remotely controlled from wheelhouse and on aft deck
Wire Chain Stopper :	2 x Karm Fork, retractable, 440 tonnes SWL. Remote control from wheelhouse and on aft deck

DECK MACHINERY

Tuggers :	2 x 12 tonnes each, hydraulic
Capstans :	2 x 10 tonnes each, main deck, aft
Windlass :	1 x 15 tonnes, hydraulic
Crane :	1 x 5 tonnes, 7 - 11 m outreach, hinged arm

ELECTRONICS

Main Radar :	Furuno FAR / FR-2805, S-band (10 cm), ARPA, 28 ins display
Auxiliary Radar :	Furuno FAR / FR-2805, X-band (3 cm), 28 ins display
Auto Pilot :	Anschutz Digital Pilotstar D
Gyro Compass :	Anschutz, with repeaters in wheelhouse, bridge wings, chart table, steering gear room
Magnetic Compass :	Bergen Nautik, BN-35
Echo Sounder :	Marimatech, E-Sea Sound 206
DGPS :	Furuno
Anemometer :	Aanderaa Instruments
Speed Log :	Skipper Electro-magnetic EML 224
Communications :	(G.M.D.S.S.) Global Maritime Distress & Safety System 2 x SSB 2 x VHF 2 x Inmarsat C (435136410 / 435136420) 3 x VHF (portable) 2 x SART 1 x EPIRB 1 x Navtex
Weather Fax :	Furuno, Fax-208 MKII

DISCHARGE PUMPS

Potable Water :	150 cubic metres/hr - 9.0 bar

The Vessel specifications are reviewed and new brochures printed at regular intervals. Every endeavour has been made to provide accurate information on this brochure; however, the vessel owners do not accept any liability for errors, omissions or misprints published. Clients are strongly recommended to visit www.swire.com.sg and download or view the latest Vessel Specifications. ?
Copyright 1977-2005 Swire Pacific Offshore Ltd

M/V Pacific Battler

12,240 BHP Anchor Handling Tug Supply Vessel 2,100 Tonnes Cargo Deadweight

Revision : 13 / 26 Sep, 2007

Drill Water :	205 cubic metres/hr - 9.0 bar
Fuel Oil :	150 cubic metres/hr - 9.0 bar
Liquid Mud :	75 cubic metres/hr - 18.0 bar
Brine / Mud :	75 cubic metres/hr - 18.0 bar
Dry Bulk :	80 cubic metres/hr - 5.6 bar, 80 psi, 2 compressors

PERFORMANCE

Speed / Fuel Consumption :	15 knots running free / 34.0 tonnes per day 12 knots running free / 15.7 tonnes per day 10 knots running free / 9.6 tonnes per day At 100% MCR (12,240 BHP) / 41.3 tonnes per day

DYNAMIC POSITIONING

Type :	Cegelec Type DPS 901 Simplex DP
Reference Systems :	Sercel, NR108 DGPS Fan Beam laser Sonadyne HPR System
Joystick :	Poscon - electronic control system joystick, integrated to main propellers, main engines, rudders, side-thrusters and interfaced to gyro compass

EXTERNAL FIRE FIGHTING

Capacity :	3,000 cubic metres per hour, with external drenching system, to DNV FiFi ONE requirements
Monitors :	2 x 1,200 cubic metres / hr = 2,400 cubic metres / hr, controlled from inside wheelhouse
Throw Length :	120 m
Throw Height :	50 m

STANDBY RESCUE EQUIPMENT

1 :	MOB - boat with inboard diesel engine and water jet propulsion, Norsafe as, Magnum 230 HP waterjet, 25 knots with boat davit for quick launch / recovery
2 :	Rescue Zones on both Port and Starboard side, main deck, with scrambling net

ACCOMMODATION

Berths :	7 x 1 (single) berths 3 x 2 (double) berths 3 x 4 (four) berths 25 berths Total 1 x Ship's office 1 x hospital 1 x mess / day room 1 x galley

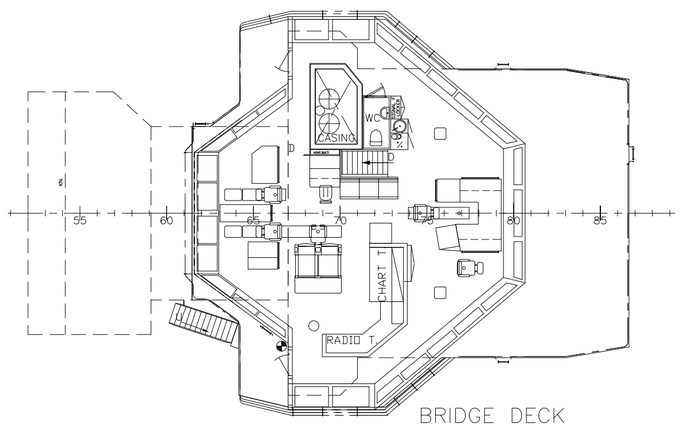
MISCELLANEOUS

1 :	Design complies to latest rules and regulations from SOLAS 74, with amendments in force and IMO 469 (XII) "Guidelines for the design and construction of offshore supply vessel"
2 :	Fitted with a passive roll reducing tank below main deck
3 :	All cargo systems are controlled by a tanktender system with discharge printers
4 :	Fitted with 5 remote cameras on deck and in winch-house for anchor-handling / towing operations with 2 TV monitors in wheelhouse
5 :	Pneumatic bulk handling system, capable of discharging 2 types of dry bulk simultaneously through 2 separate discharge lines with emergency stop fitted in wheelhouse
6 :	Hose connections: Fuel - 4 inches (Avery Hardol) Potable Water - 4 inches (Weco) Drill Water - 4 inches (Weco) Liquid Mud - 4 inches (Weco) Dry Bulk - 5 inches (Weco) Adapters 6"-5" (2 sets - Weco), 5"-4" (2 sets - Weco), 4"-4" (Camlock - male-to-male), 3"-3" (Camlock - male-to-male), 4" Weco - 4" Camlock (female-to-female) and 4" Weco - 3" Camlock (female-to-female)
7 :	Fitted with 2 Halogen searchlights, each 2,000 W, on wheelhouse top and operated from inside wheelhouse
8 :	Fitted with 4 x 400 W flood-lights, for cargo deck area
9 :	Wood sheathed main deck except for aft area which is steel plated for anchor-handling
10 :	Welding / cutting machine complete with attachments
11 :	Dispersant system designed to use either neat or diluted dispersant
12 :	14 inch diameter hull penetration fitted for survey equipment
13 :	Statutory life-rafts, life buoys, life jackets, pyrotechnics
14 :	P.A. System
15 :	TV and video

ANTI-POLLUTION

Dispersant Tank :	8.7 cubic metres
Spray booms :	2 x 6 m

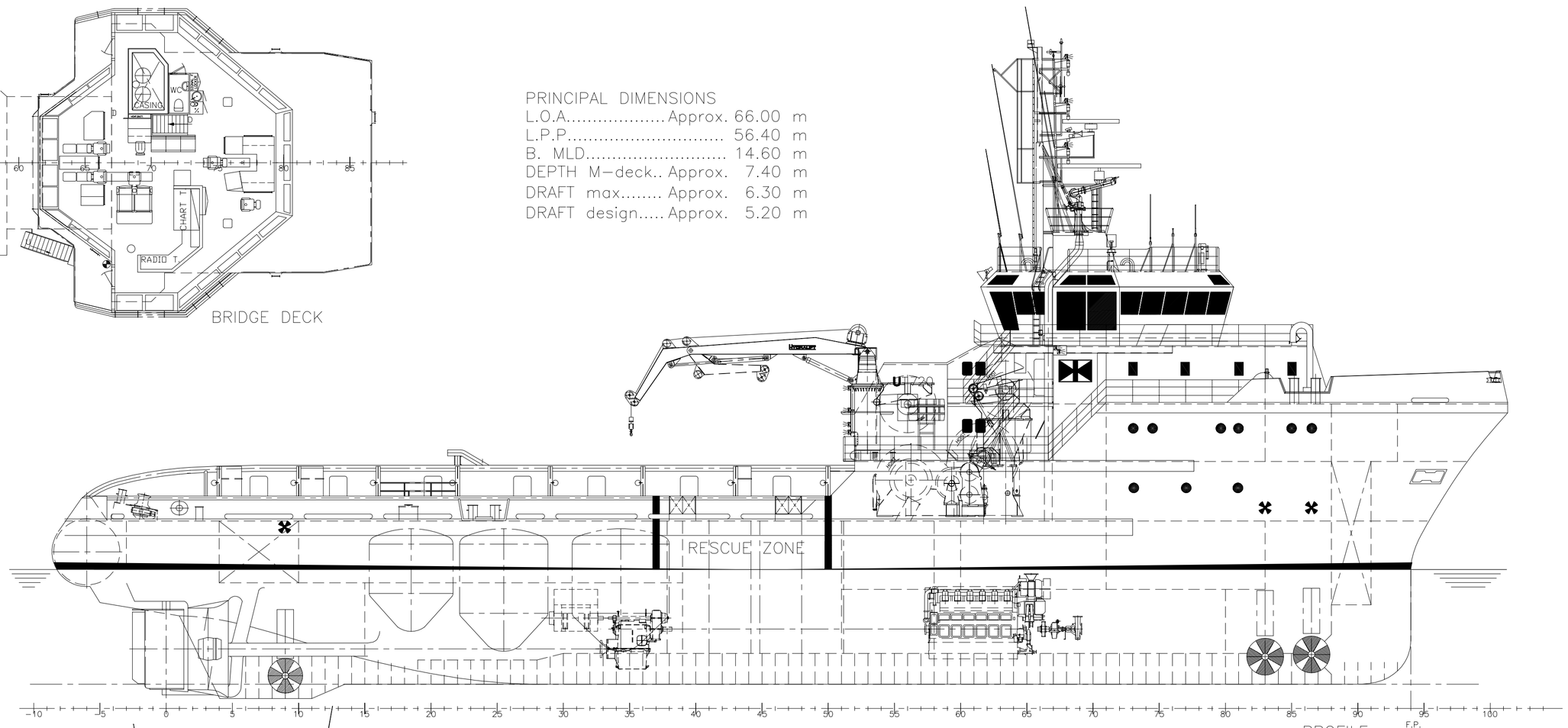
The Vessel specifications are reviewed and new brochures printed at regular intervals. Every endeavour has been made to provide accurate information on this brochure; however, the vessel owners do not accept any liability for errors, omissions or misprints published. Clients are strongly recommended to visit www.swire.com.sg and download or view the latest Vessel Specifications. ?
Copyright 1977-2005 Swire Pacific Offshore Ltd



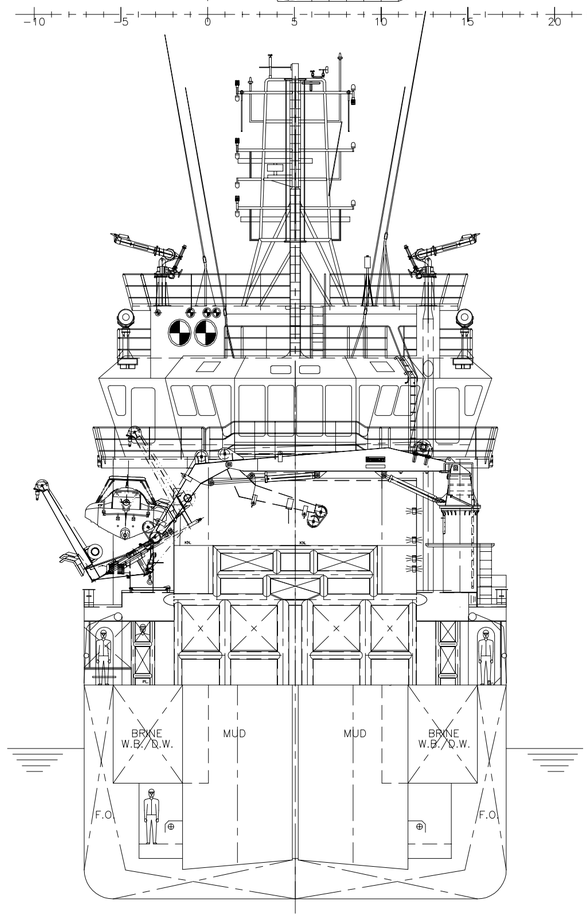
BRIDGE DECK

PRINCIPAL DIMENSIONS

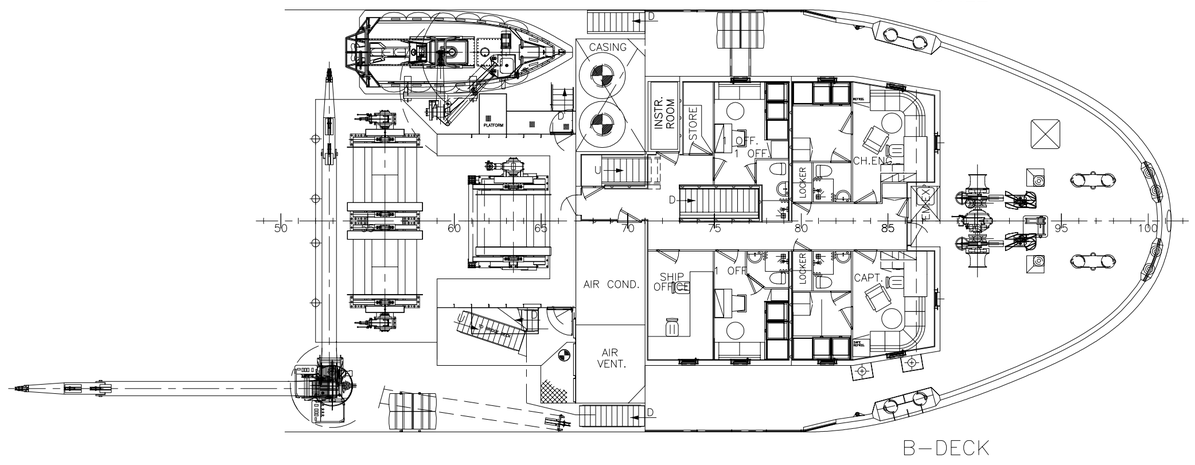
L.O.A.	Approx. 66.00	m
L.P.P.	56.40	m
B. MLD.	14.60	m
DEPTH M-deck	Approx. 7.40	m
DRAFT max.	Approx. 6.30	m
DRAFT design	Approx. 5.20	m



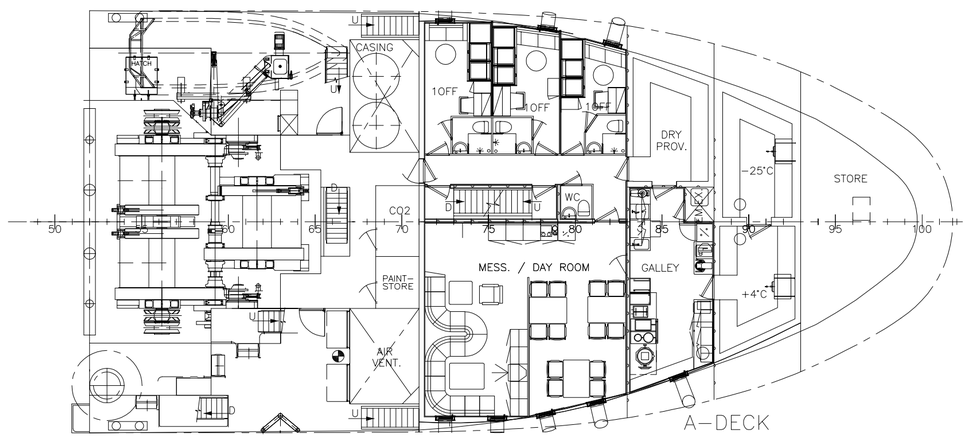
PROFILE



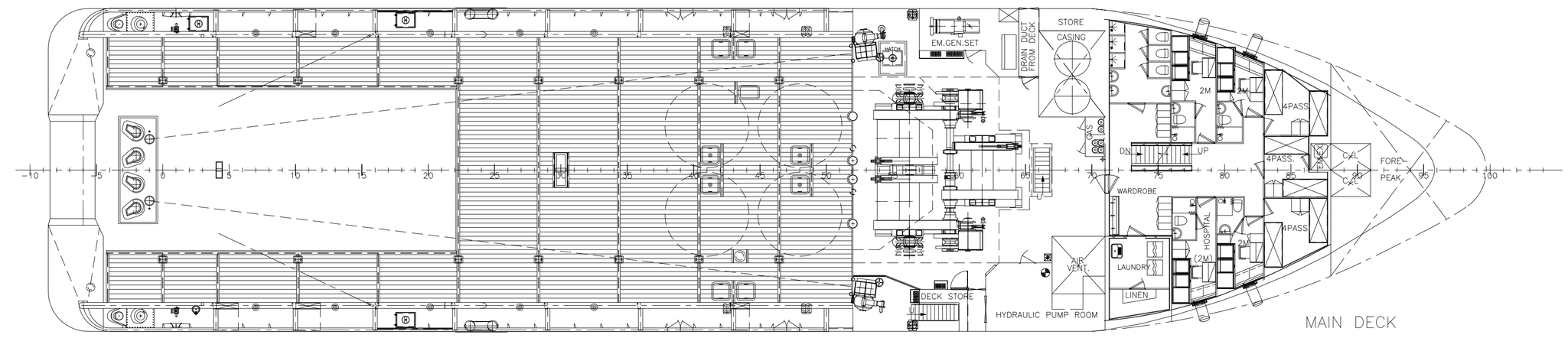
SEEN FROM AFT.



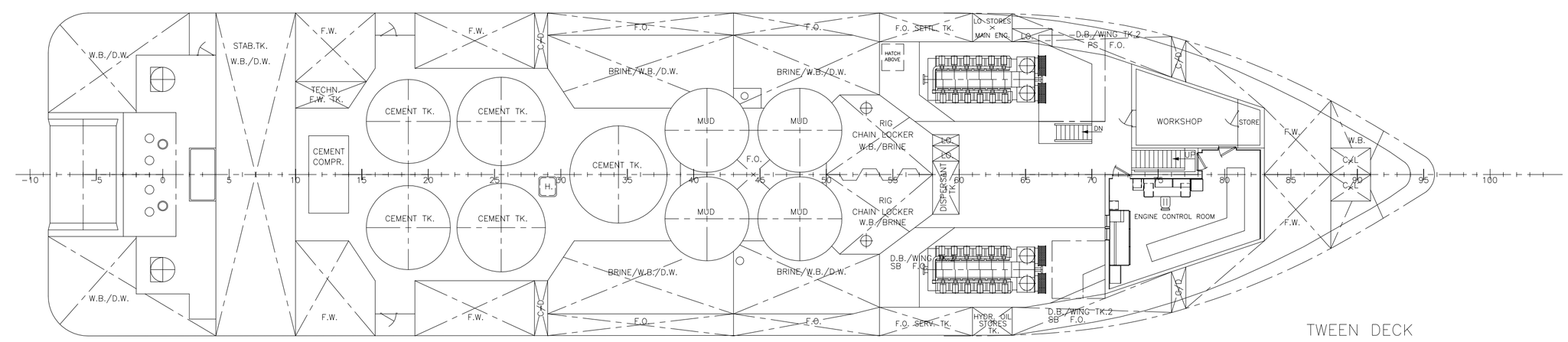
B-DECK



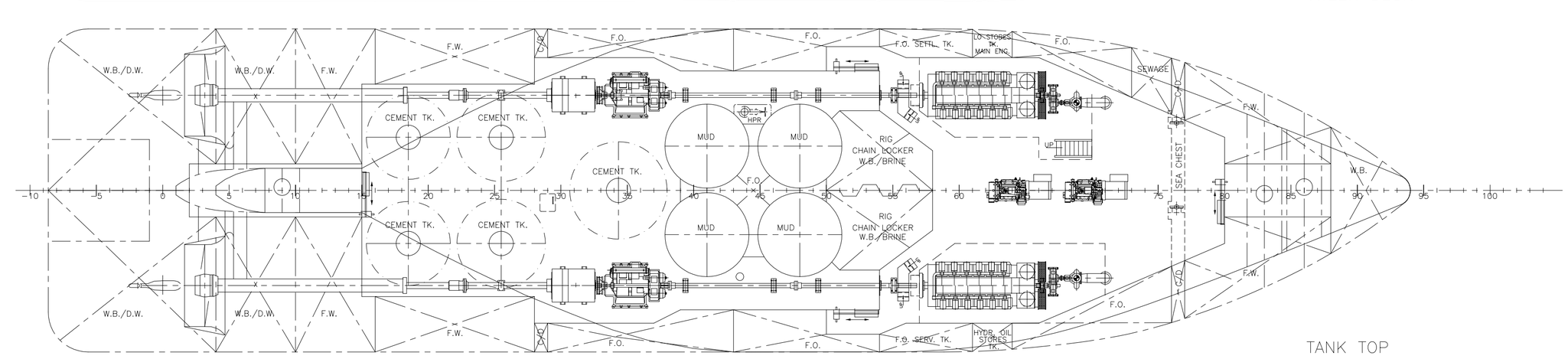
A-DECK



MAIN DECK



TWEEN DECK



TANK TOP

This drawing / specification is the property of ULSTEIN INDUSTRIER AS, and must not be copied or the contents thereof or any information therein be imported to any unauthorised third party, it must not be used for any other project than for which it is intended, or otherwise than according to the conditions mentioned herein are accepted.

ULSTEIN INDUSTRIER AS
N-6065 ULSTEINVIK
NORWAY

NO.		DATE	APPR.
	AS BUILT	17.04.97	KNM
	UPDATE	02.01.97	ROL
	ALTERATIONS		

B
A

CUSTOMER

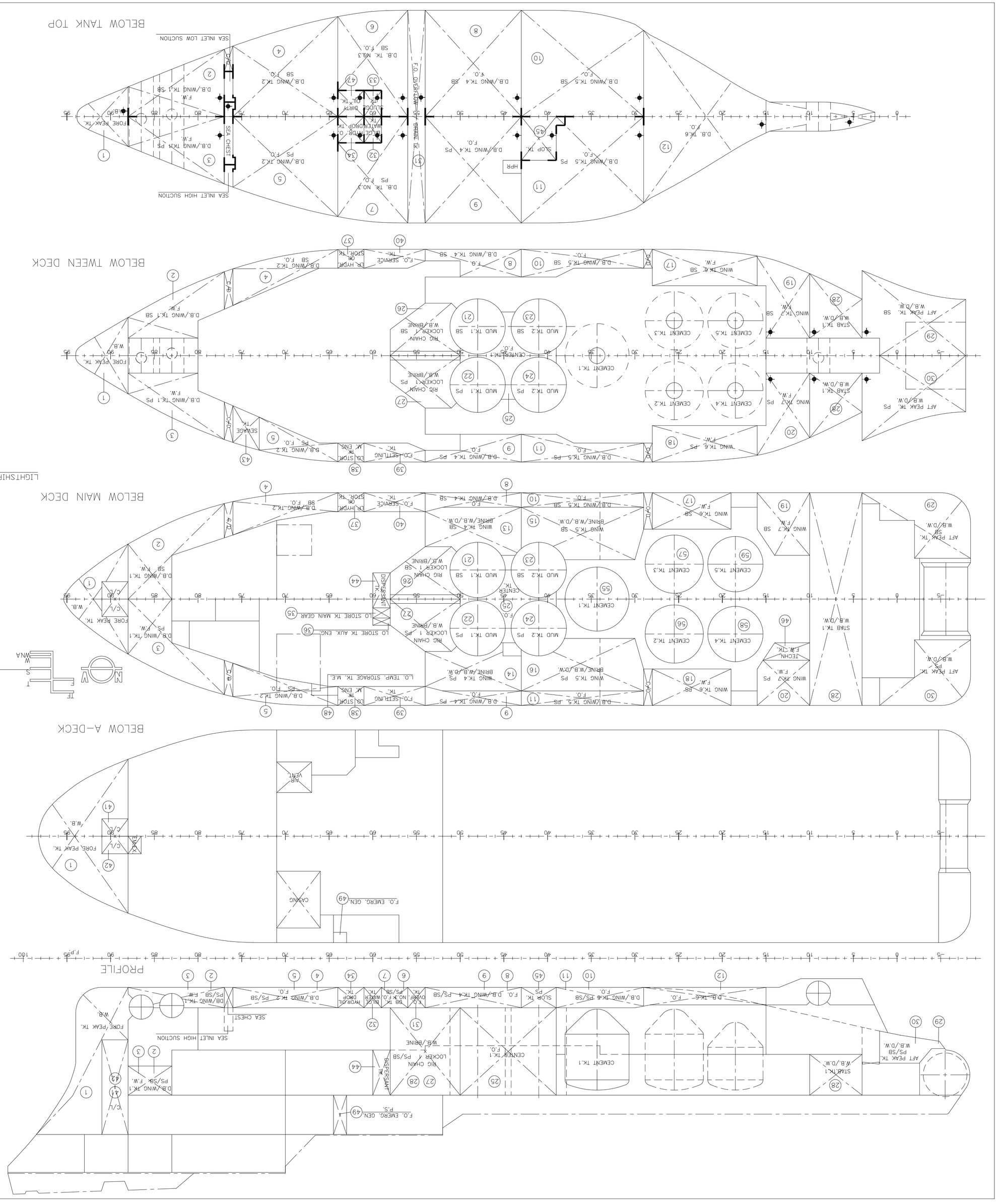
TITLE

GENERAL ARRANGEMENT

ULSTEIN INDUSTRIER AS
Dept. Ulstein International - Design

P.O.Box 160, N-6065 Ulsteinvik, Norway
Switchboard +47 70 01 40 00. Telefax +47 70 01 40 13.
Enterprise number NO 936464610

YARD NO.	251	252	253
SCALE	1:100	DRAWN	01.11.95 KNL/eg
CHECKED			
APPROVED			
PROJECT NO.	95/7152		
DRAWING NO.	P-0-3346		
	S-04464 B		
SFI NR 101-810			



NO.	ALTERATIONS	DATE	APPR.
D	DRAIN PLUGS ADDED	08.07.96	BJH
E	DIFF. MODIFICATIONS	16.06.96	KVM
F	DIFF. MODIFICATIONS	28.06.96	KVM
G	DIFF. MODIFICATIONS	09.10.96	EB
H	VOLUMES CORRECTED, AS BUILT 251, ADDED TK.49	07.06.97	BOL
I	CEMENT TANKS ADDED AND TABLE MODIFIED	13.06.97	POL

Vessel Name:- Pacific Battler

VARD NO.	251	252	253
SCALE	254	255	256

TITLE: Tank Capacity Plan

SCALE 1:150 — DRAWN BR / SI — CHECKED CH / SION — APPROVED

PROJECT NO.

DRAWING NO. P-0-3397

ULSTEIN INDUSTRIER AS
Dept. Teknisk Informasjonsl. – Design
Sykehusveien 27 N 60 00 Tlefaks +47 70 01 60 23
Telefon 100 N-6065 Ulsteinvik Norway
Telephone number N0 90465610

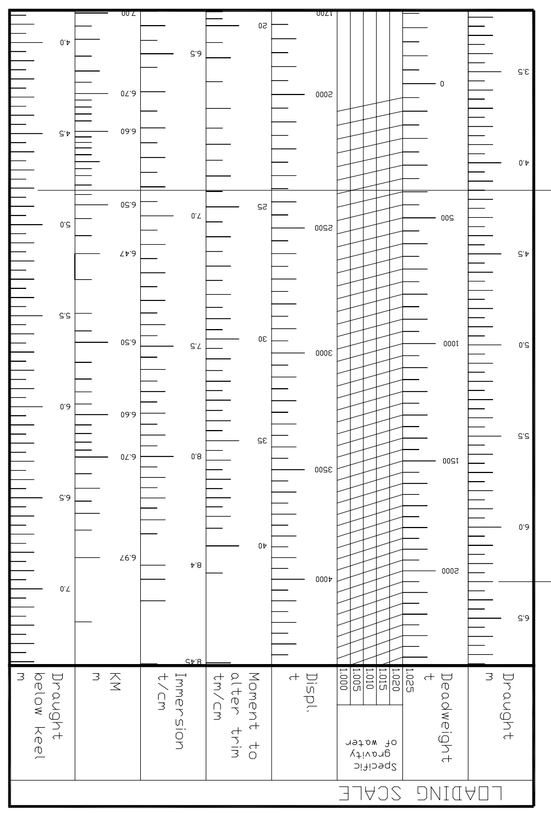
ULSTEIN INDUSTRIER AS
N-6065 ULSTEINVIK
NORWAY

This drawing / specification is the property of ULSTEIN INDUSTRIER AS, and must not be copied or the contents thereof or any information received in conjunction therewith must not be imported to any unauthorised third party,it must not be used for any other project than for which it was originally ordered.the receipt of the drawing / specification implies that the conditions mentioned herein are accepted.

NOTE: PLUGS NS 2573 M42x2 MARKED WITH NO./CONTENTS STAINLESS STEEL W/M; BILGE WELL

NOTE: WHERE POSSIBLE, PLUGS TO BE MOUNTED MINIMUM 1300 MM OFF SHIPS CENTER LINE.

NO.	TANK AIR PIPE HEIGHTS ABOVE B.	TANK FRAME	DENS	STILLAT.	CONT.	VOLUM M³	F.D.	F.W.	MUD	BRINE	W.B.	D.W.	LUB.O.	CSM	VCG FROM FRAME M	LCG FROM AP M	TCG CL	IT M³	WET SURF. COATING M²
1	13150 FORE PEAK TK	1025	08-STKM	V.B	1324						157.7				5.462	6.40	0.00	231.0	
2	13150 D.B/WING TK1 SB	1025	77-BB	F.W	1070										4.840	4.10	2.77	63.1	
3	13150 D.B/WING TK1 PS	1025	77-BB	F.W	1070										4.840	4.10	-2.77	63.1	
4	9400 D.B/WING TK2 SB	0.9	63-KL	F.O	1117	1052									42.29	7.96	-4.71	138.8	
5	9400 D.B/WING TK2 PS	0.9	66-KL	F.O	1101.6	912									41.94	7.74	-4.71	129.3	
6	9400 D.B.TK NO.3 PS	0.9	56-64	F.O	350	315									35.76	0.69	3.92	98.3	
7	9400 D.B.TK NO.3 SB	0.9	56-64	F.O	350	315									35.76	0.69	-3.92	98.3	
8	9400 D/B/WING TK4 SB	0.9	43-54	F.O	1088	979									29.00	7.18	4.93	219.0	
9	9400 D/B/WING TK4 PS	0.9	43-54	F.O	1081	973									29.00	7.18	-4.94	219.0	
10	9400 D/B/WING TK5 SB	0.9	29-43	F.O	1128	1060									21.93	2.43	4.84	214.1	
11	9400 D/B/WING TK5 PS	0.9	29-43	F.O	1084	978									21.71	2.58	-5.13	182.3	
12	9400 DB TK NO 6	0.9	15-29	F.O	407	366									14.40	0.69	-0.02	211.1	
13	8160 VOID TK4 SB	22M3/1	43-54	WB/W/M	59.0				147.5	60.5	59.0				29.02	5.70	4.87	12.3	
14	8160 VOID TK4 PS	22M3/1	43-54	WB/W/M	58.8				147	60.5	58.8				29.17	5.70	-4.85	12.3	
15	8160 VOID TK3 SB	22M3/1	29-43	WB/W/M	80.1				200.3	82.1	80.1				21.92	5.84	4.68	26.0	
16	8160 VOID TK3 PS	22M3/1	29-43	WB/W/M	80.1				200.3	82.1	80.1				21.92	5.84	-4.68	26.0	
17	8160 VOID TK2 SB	10	15-28	F.W	66.5				166.5	68.3	66.5				14.21	4.87	5.92	8.2	
18	8160 VOID TK2 PS	10	15-28	F.W	66.5				166.5	68.3	66.5				14.21	4.87	-5.92	8.2	
19	8160 VOID TK1 SB	10	10-15	F.W	59.2				59.2						7.75	9.07	4.37	3.6	
20	8160 VOID TK1 PS	10	10-15	F.W	49.9				49.9						7.81	9.00	-4.52	3.4	
21	8160 MID TK1 SB	25	45-51	MLD	68.3				170.7						28.80	4.29	2.01	10.2	
22	8160 MID TK1 PS	25	45-51	MLD	68.3				170.7						28.80	4.29	-2.01	10.2	
23	8160 MID TK2 SB	25	38-44	MLD	68.3				170.7						24.60	4.29	2.01	10.2	
24	8160 MID TK2 PS	25	38-44	MLD	68.3				170.7						24.60	4.29	-2.01	10.2	
25	9400 CENTER TK1	0.9	39-50	F.O	45.3	40.8									24.70	4.40	0.00	11.4	
26	8160 RIG CHAIN LOCKER 1 SB	22M3/1	50-58	BRINE/W	79.2				195.0	80.0					32.40	4.40	1.68	13.5	
27	8160 RIG CHAIN LOCKER 1 PS	22M3/1	50-58	BRINE/W	79.2				195.0	80.0					32.40	4.40	-1.68	13.5	
28	8160 STAB TK 1	10M3/1	4-10	WB/D/W	165.3				169.2	155.3					4.28	5.74	-0.02	93.6	
29	8160 AFTPEAK TK SB	10M3/1	51EM-4	WB/D/W	51.5				54.8	51.5					-1.36	5.82	3.97	30.4	
30	8160 AFTPEAK TK PS	10M3/1	51EM-4	WB/D/W	51.7				53.0	51.7					-1.46	5.79	-3.88	30.4	
31	9400 F.O OVERFLOW/BRAIN TK	0.9	54-56	F.O	23.5										33.00	0.27	0.00	311.7	
32	8160 BLGE VAVLE		59-61		2.9										36.00	0.70	-0.90	0.6	
33	8160 BLGE VAVLE		59-61		2.9										36.00	0.70	0.90	0.6	
34	8160 HYDR COL DRIP TK		61-64	HYDR.O	4.4										37.00	0.70	-0.90	0.9	
35	8160 L.O STORE TK AUX ENG	0924	59-63	L.O	1.8				1.7						35.40	5.85	-1.55	0.0	
36	8160 L.O STORE TK MAIN GEAR	0924	59-63	L.O	2.5				2.3						35.40	5.85	-0.95	0.0	
37	8160 L.P. HYDR OL STORE TK	0924	61-64	HYDR.O	1.2				1.2						37.49	4.47	-6.83	0.3	
38	8160 L.O STORE TK MAIN ENG	0924	64-66	L.O	1.2				1.2						37.49	4.47	6.83	0.3	
39	9400 F.O. SETL. TK	0.9	54-61	F.O	307.7	274.6									34.24	4.47	-6.66	0.8	
40	9400 F.O. SERV. TK	0.9	54-61	F.O	307.7	274.6									34.24	4.47	6.66	0.8	
41	13150 CHAIN LOCKER SB		88-91																
42	13150 CHAIN LOCKER PS		88-91																
43	8160 SEMAE TK		73-76		9.5										44.72	2.97	-4.77	2.1	
44	8160 SLOP TK		59-60		8.7										35.40	5.85	0.60	1.4	
45	8160 TECHN. F W TK		10-15	F.W	9.0										7.40	6.01	-3.62	0.4	
46	8160 DRTY OIL TK		61-64	L.O	4.4										37.00	0.70	0.90	0.9	
47	8160 L.O TUBE STORAGE TK ME	0924	64-67	L.O	3.6										38.15	5.85	-6.37	0.0	
48	8160 L.O STORE TK		29-33		9.1										24.22	0.62	-1.38	5.9	
49	8160 F.O. EMERG. GEN.	0.9	63-65	F.O	1.7	1.5									38.15	8.75	-6.95	0.0	
59	8160 CEMENT TK. No. 5 SB	0.5	15-22	CEM	37.8										94.5	11.10	4.98	2.40	10.2
58	8160 CEMENT TK. No. 4 PS	0.5	15-22	CEM	37.8										94.5	11.10	4.98	-2.40	10.2
57	8160 CEMENT TK. No. 3 SB	0.5	22-29	CEM	51.8										129.5	15.90	4.43	2.40	12.5
56	8160 CEMENT TK. No. 2 PS	0.5	22-29	CEM	51.8										129.5	15.90	4.43	-2.40	12.5
55	8160 CEMENT TK. No. 1	0.5	21-36	CEM	60.0										150.0	20.60	4.64	0.00	18.3
69	8160 F.O. EMERG. GEN.	0.9	63-65	F.O	1.7	1.5									38.15	8.75	-6.95	0.0	
59	8160 CEMENT TK. No. 5 SB	0.5	15-22	CEM	37.8										94.5	11.10	4.98	2.40	10.2
58	8160 CEMENT TK. No. 4 PS	0.5	15-22	CEM	37.8										94.5	11.10	4.98	-2.40	10.2
57	8160 CEMENT TK. No. 3 SB	0.5	22-29	CEM	51.8										129.5	15.90	4.43	2.40	12.5
56	8160 CEMENT TK. No. 2 PS	0.5	22-29	CEM	51.8										129.5	15.90	4.43	-2.40	12.5
55	8160 CEMENT TK. No. 1	0.5	21-36	CEM	60.0										150.0	20.60	4.64	0.00	18.3
TOTAL CAPACITY IN TONNES						7928	4464	4628	1074.9	644.6	555.5	31.7	598.9						
CONTENTS						F.O.	F.W.	MUD	BRINE	W.B.	D.W.	LUB O.	CSM						
TOTAL CAPACITY IN M³						8276.7	4564	2721	431.0	824.0	535.0	34.3	2392						



M/V Pacific Valkyrie

8,810 BHP Anchor Handling Tug Supply Vessel 2,500 Tonnes Cargo Deadweight

Revision : 36 / 01 Oct, 2007

VESSEL INFORMATION

Built	Flag
Under construction - Labroy shipyard (Batam), November 2007	Singapore
Call Sign	**IMO No.**
9V6791	9361653
Classification	ABS 1A1 (E) Offshore Support Vessel & Towing Vessel, +AMS, +ACCU

DIMENSIONS

Length, overall :	66.0 meters
Length, BP :	57.0 meters
Breadth, moulded :	16.0 meters
Depth, main deck :	7.3 meters
Maximum draft midship :	6.2 meters
GRT :	2,277 Tonnes
NRT :	774 Tonnes

CAPACITIES

Deadweight (maximum) :	approximately 2,500 tonnes @ 6.2 m draft
Clear Deck Area :	33 m x 12.8 m = 425 square metres
Deck Cargo :	870 tonnes
Fuel :	827 cubic metres (dedicated) 1,615 cubic metres (including the combined use Mud / Brine tanks and the combined use Rig Chain locker)
Potable Water :	468 cubic metres
Ballast Water / Drill Water :	911 cubic metres
Brine / DMA / Glycol /	128 cubic metres (in 2 dedicated tanks)
Liquid Mud :	593 cubic metres (including the combined use Mud tanks - s.g. of 2.5)
Liquid Mud :	465 cubic metres (in 6 dedicated tanks) 593 cubic metres (including the combined use Brine tanks - s.g. of 2.5)
Bulk :	185 cubic metres (approximately 6,600 cubic feet) total capacity in 4 tanks
Ship's Stores :	Freezer (-25 degrees Celsius) - approximately 12 cubic metres Cooler (+4 degrees Celsius) - approximately 12 cubic metres Dry Stores - approximately 26 cubic metres

MACHINERY

Main Engines :	2 x 4,405 BHP = 8,810 BHP
Propulsion :	2 x MAN B&W Alpha CPP Propellers in MAN AHT Kort nozzles
Bow Thrusters :	2 x 600 kW (805 BHP) Brunvoll Tunnel Thrusters, approximately 9.0 tonnes thrust each
Stern Thrusters :	1 x 600 kW (805 BHP) Brunvoll Tunnel Thrusters, approximately 9.0 tonnes thrust
Shaft Generators :	2 x Leroy Somer shaft generators, 1300 kW, 1600 kVA each, 440 V, 60 Hz
Auxiliary Generators :	1 x Caterpillar 3406 Diesel Generator, 270 kW, 440 V, 60 Hz
Emergency Generators :	1 x air cooled Caterpillar 3406 Diesel Generator, 270 kW, 440 V, 60 Hz

TOWING AND ANCHOR HANDLING

Bollard Pull :	120 tonnes (minimum)
Rig Chain Locker :	195 cubic metres chain capacity
Winch :	1 x Hydrakraft 250 tonne variable pressure waterfall winch
Load Capacity :	Tow Drum - Pulling force: 1st layer - 255 tonnes mid layer - 165 tonnes outer layer - 122 tonnes (low speed) Tow Drum - Pulling speed: 1st layer - 11.4 m/min mid layer - 17.6 m/min outer layer - 23.8 m/min (low speed) A/H Drum - Pulling force: 1st layer - 127 tonnes mid layer - 82 tonnes outer layer - 61 tonnes (high speed) A/H Drum - Pulling speed: 1st layer - 22.8 m/min mid layer - 35.2 m/min outer layer - 47.6 m/min (high speed)
Brake Capacity :	Brake Force: 1st layer - 320 tonnes mid layer - 207 tonnes outer layer - 153 tonnes
Tow Drum Wire Capacity :	1500 m x 71 mm diameter
Work Drum Capacity :	1500 m x 71 mm diameter
Chain Gypsy Cable Lifter :	1 x 76 mm, 1 x 84 mm mounted on each side of anchor handling drum
Spare Reel Capacity :	1 x Hydrakraft variable pressure, 20 tonnes pull on 1st layer, 1400 m x 71 mm diameter
Stern Roller :	Rolls Royce, SWL 350 tonnes, 5.5 m x 2.0 m diameter
Tow Pins / Guide Pins :	1 pair of retractable Karmoy guide pins with horizontal locking tops
Wire Chain Stopper :	2 x retractable Karm forks, SWL 300 tonnes for wire/chain up to 102 mm
Pennant Storage Reels :	2 x Hydrakraft variable pressure, 20 tonnes pull on 1st layer, 1000 m x 76 mm diameter

DECK MACHINERY

Tuggers :	2 x 10 tonnes Hydrakraft
Capstans :	2 x 16 tonne (warping head) / 10 tonne (wire drum) Hydrakraft
Windlass :	1 x 10 tonne Hydrakraft, 2100 kg anchors with 440 m x 36 mm chain each side, plus 1 spare anchor
Bow Mooring :	2 x mooring drums, capacity of 200 m x 56 mm rope each
Smit Towing Bracket :	1 x 200 tonnes SWL located on the Forecastle
Crane :	TTS, 5 tonnes at 13 m radius

ELECTRONICS

Main Radar :	1 x Furuno FAR-2117 X Band ARPA Radar with 21" LCD display
Auxiliary Radar :	1 x Furuno FAR-2137S S Band ARPA Radar with 21" LCD display
Auto Pilot :	1 x Tokimec PR 6000 Series
Gyro Compass :	1 x Tokimec TG8000 with repeaters in wheelhouse and steering gear room
Magnetic Compass :	1 x Cassen & Plath REFLECTA 1

The Vessel specifications are reviewed and new brochures printed at regular intervals. Every endeavour has been made to provide accurate information on this brochure; however, the vessel owners do not accept any liability for errors, omissions or misprints published. Clients are strongly recommended to visit www.swire.com.sg and download or view the latest Vessel Specifications. ?
Copyright 1977-2005 Swire Pacific Offshore Ltd

M/V Pacific Valkyrie

8,810 BHP Anchor Handling Tug Supply Vessel 2,500 Tonnes Cargo Deadweight

Revision : 36 / 01 Oct, 2007

Echo Sounder :	**1 x Skipper GDS102, Dual Frequency, 1500 m water depth**
DGPS :	**1 x Furuno GP-90, IMO approved for navigation** **2 x Trimble GSM 132L for DP System**
Anemometer :	**1 x Gill ultrasonic unit**
Speed Log :	**1 x Furuno DS-80 Doppler Speed log**
Communications :	**1 x Furuno G.M.D.S.S. (Global Maritime Distress & Safety System) Area A3 set** **1 x Furuno FS-2570 (250 W) MH/HF Radio** **1 x Furuno FM-8800S (25 W) VHF DSC** **1 x Furuno FM-8800D (25 W) VHF DSC** **1 x Furuno FELCOM-15 Inmarsat-C** **1 x Furuno FELCOM-15 Inmarsat-C/SSAS** **1 x Furuno NX-700B Navtex Receiver** **3 x McMurdo Portable GMDSS VHF Radios** **1 x McMurdo EPIRB** **2 x McMurdo SART**
Weather Fax :	**1 x Furuno**
AIS :	**1 x Furuno FA-100**

DISCHARGE PUMPS

Potable Water :	**1 x 150 cubic metres/hr - 7.0 bar**
Drill Water :	**1 x 150 cubic metres/hr - 7.0 bar**
Fuel Oil :	**1 x 100 cubic metres/hr - 7.0 bar**
Liquid Mud :	**1 x 75 cubic metres/hr - 18.0 bar**
Brine / Mud :	**1 x 75 cubic metres/hr - 18.0 bar**
Dirty Oil :	**1 x 10 cubic metres/hr - 2.0 bar**
Cargo Flow Meters :	**Fuel Oil and Potable Water**

PERFORMANCE

Speed / Fuel Consumption :	**At 100% MCR, approximate consumption is 34 tonnes / day** **Economical speed 10-12 knots, approximate consumption is 12 tonnes / day** **Idle at sea: approximate consumption 4 tonnes / day** **Idle in port: approximate consumption 0.8 tonnes / day**

DYNAMIC POSITIONING

Type :	**Alstom ADP 01 Combined DP/Joystick System**
Reference Systems :	**1 x Cyscan laser complete with 3 reflectors, 2 x Trimble DSM 132L DGPS**
Control Modes :	**Joystick manual heading, Joystick auto heading, Dynamic Positioning, Model Control (dead reckoning), DP minimum power, Ship follow, Auto track, Auto Pilot, Auto Sail, ROV follow, Simulation (for training purposes)**

EXTERNAL FIRE FIGHTING

Capacity :	**2 x 1,500 cubic metres/hr = 3,000 cubic metres/hr**
Monitors :	**2 x 1,200 cubic metres/hr, Kvaerner, each fitted on wheelhouse top and remotely controlled from within the wheelhouse**
Throw Length :	**120 m**
Throw Height :	**50 m**

STANDBY RESCUE EQUIPMENT

1 :	**Rescue Boat - MP Springer 660 self righting with inboard 250 hp Yanmar diesel engine and Hamilton water jet propulsion. Capacity for 10 people. 33 to 35 knots top speed with 2 people on board**
2 :	**Rescue Zones on both Port and Starboard side of main deck, with scramble nets and personnel transfer swing ropes**

ENVIRONMENTAL FEATURES

1 :	**Mud tank of free flowing design with external stiffening, sloped floors and dedicated recirculation**
2 :	**Low residue design bulk tanks**
3 :	**1 x oily water separator with 15 ppm monitor. Compliant with IMO - Resolution MEPC 107(49)**
4 :	**1 x sewage treatment plant**
5 :	**Galley macerator**
6 :	**Cargo load/discharge station with save all to inboard tank**

ACCOMMODATION

Berths :	**8 x single cabins** **4 x 2 man cabins (including hospital)** **4 x 4 man cabins** **1 x Library** **1 x Messroom** **1 Lounge**

MISCELLANEOUS

1 :	**Design complies to latest rules and regulations from SOLAS 74, with amendments in force and IMO 469 (XII) "Guidelines for the design and construction of offshore supply vessel"**
2 :	**All cargo systems are controlled by a Terasaki cargo control system with remote valve operation and tank soundings**
3 :	**Hose connections:** **Fuel - 4 inches (Camlock)** **Potable Water - 4 inches (Camlock)** **Drill Water - 4 inches (Camlock)** **Mud - 5 inches (Camlock)** **Brine - 5 inches (Camlock)** **Dry Bulk - 5 inches (Camlock)** **Adapters 5" to 4" reducer, 4" to 3" reducer**
4 :	**Fitted with 2 x Halogen searchlights, each 2,000 W, fitted on the wheelhouse top and remotely controlled from inside the wheelhouse**
5 :	**Fitted with 6 x 1,000 W high pressure sodium lights for the aft deck cargo area and 2 x 1,000 W high pressure sodium lights in the crash rails to illuminate Anchor Handling area**
6 :	**Removable section of crash rail, 6 m long, on Port and Starboard side forward to allow for fitting of ROV spread, etc**
7 :	**Wood sheathed main deck except for the aft area, which is steel plated for Anchor Handling**
8 :	**Welding and cutting equipment and lathe in workshop**
9 :	**Fresh water ultra violet steriliser**
10 :	**Flume passive roll damping system**
11 :	**Fire detection system fitted to the accommodation, all store rooms and machinery spaces throughout the vessel**
12 :	**CO2 fixed fire extinguishing system for Machinery Space, Emergency Generator Room, Paint Locker and Hydraulic Pump Room**
13 :	**Local water spray Fire Fighting system according to SOLAS regulations**
14 :	**Statutory liferafts, life-jackets and pyrotechnics**
15 :	**Deck power supplies for ROV equipment / Charterer's equipment: 2 x 500 A, 440 V, 3 ph; 1 x 63 A, 440 V, 3 ph; 1 x 32 A, 440 V, 3 ph**

The Vessel specifications are reviewed and new brochures printed at regular intervals. Every endeavour has been made to provide accurate information on this brochure; however, the vessel owners do not accept any liability for errors, omissions or misprints published. Clients are strongly recommended to visit www.swire.com.sg and download or view the latest Vessel Specifications. ?
Copyright 1977-2005 Swire Pacific Offshore Ltd

16 :	**Deck power supplies for Refrigerated containers: 6 x 440 V, 63 A, 3 ph**

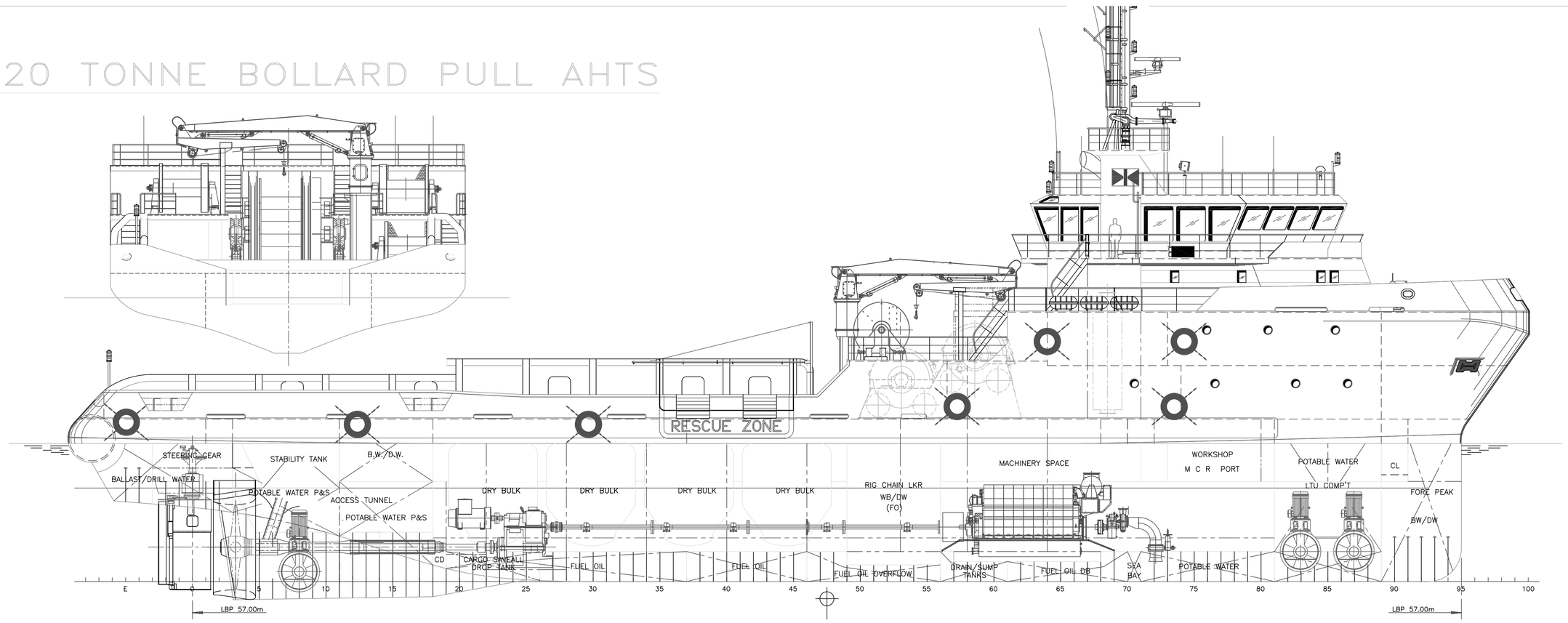
ANTI-POLLUTION

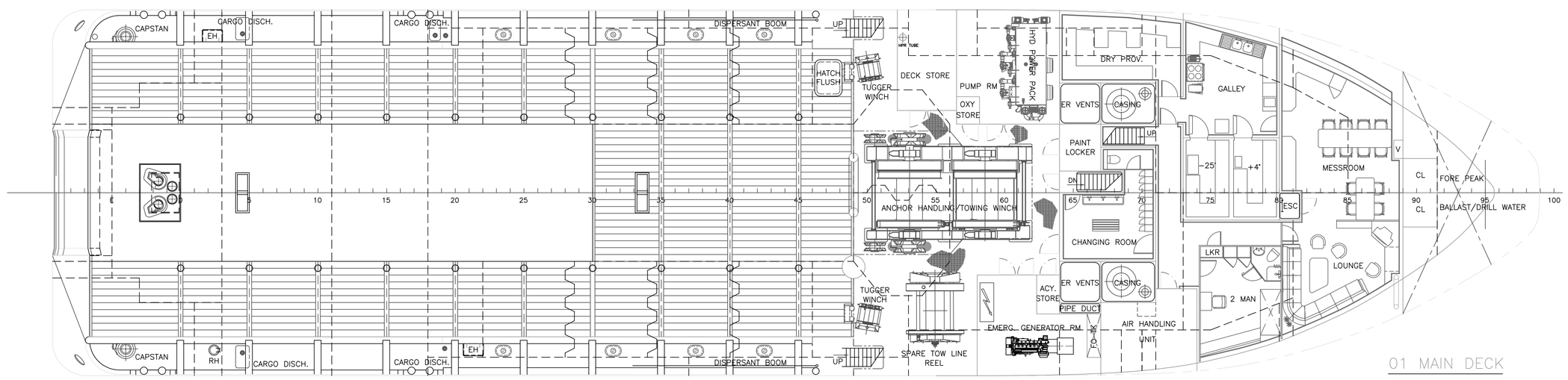
Dispersant Tank :	**9.4 cubic metres**
Spray booms :	**2 x Booms with nozzles for both diluted and neat operation fitted**

The Vessel specifications are reviewed and new brochures printed at regular intervals. Every endeavour has been made to provide accurate information on this brochure; however, the vessel owners do not accept any liability for errors, omissions or misprints published. Clients are strongly recommended to visit www.swire.com.sg and download or view the latest Vessel Specifications. ?
Copyright 1977-2005 Swire Pacific Offshore Ltd

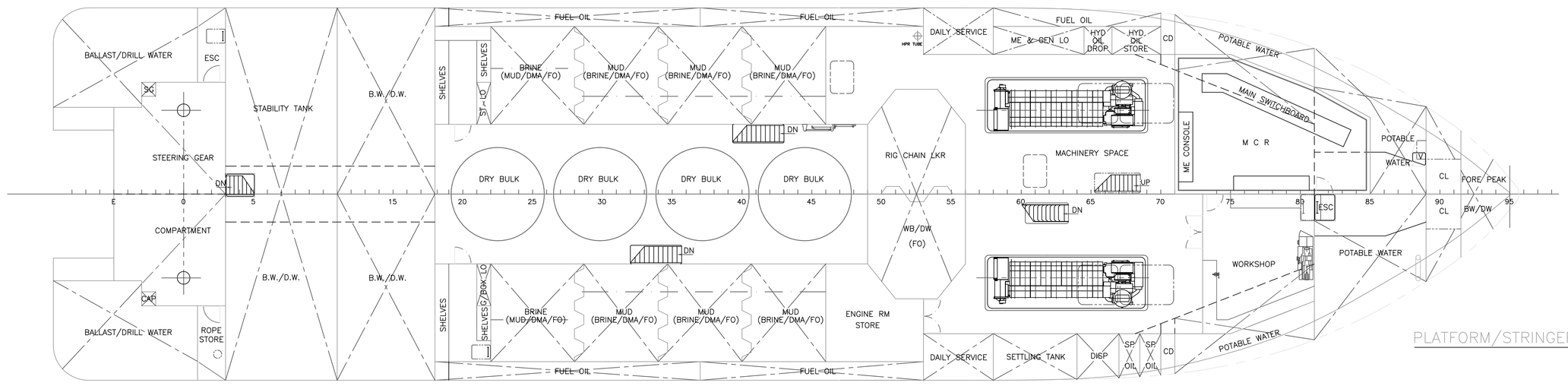
120 TONNE BOLLARD PULL AHTS

SWIRE PACIFIC OFFSHORE

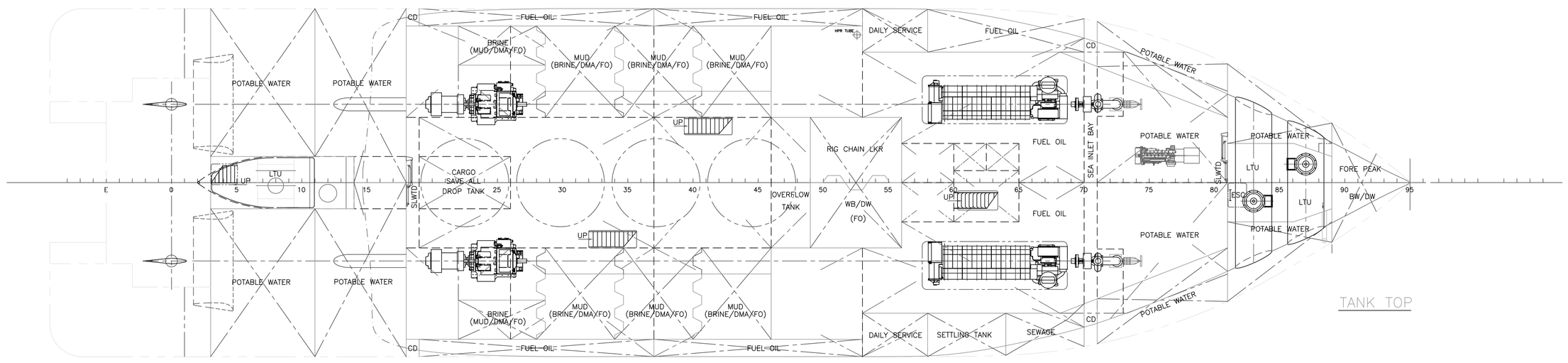




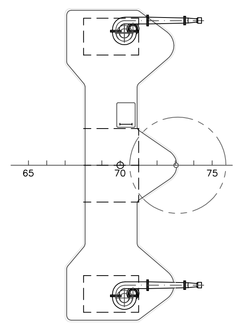
01 MAIN DECK



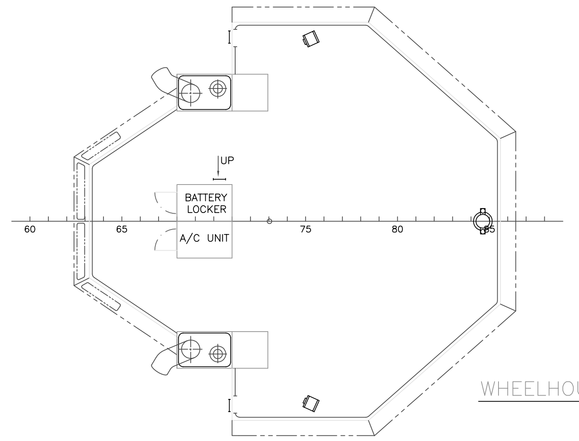
PLATFORM/STRINGER DECK



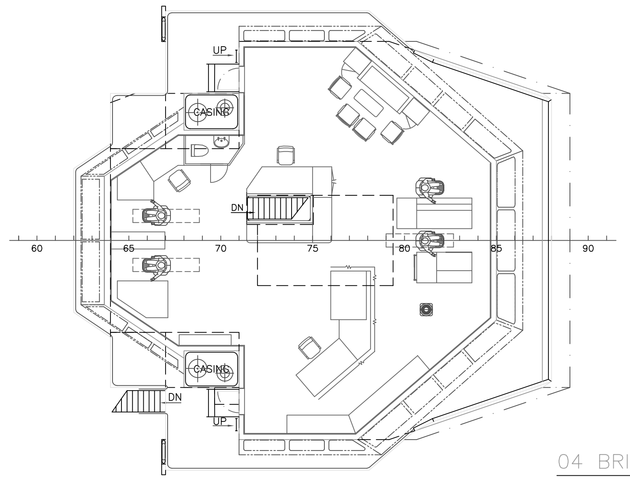
TANK TOP



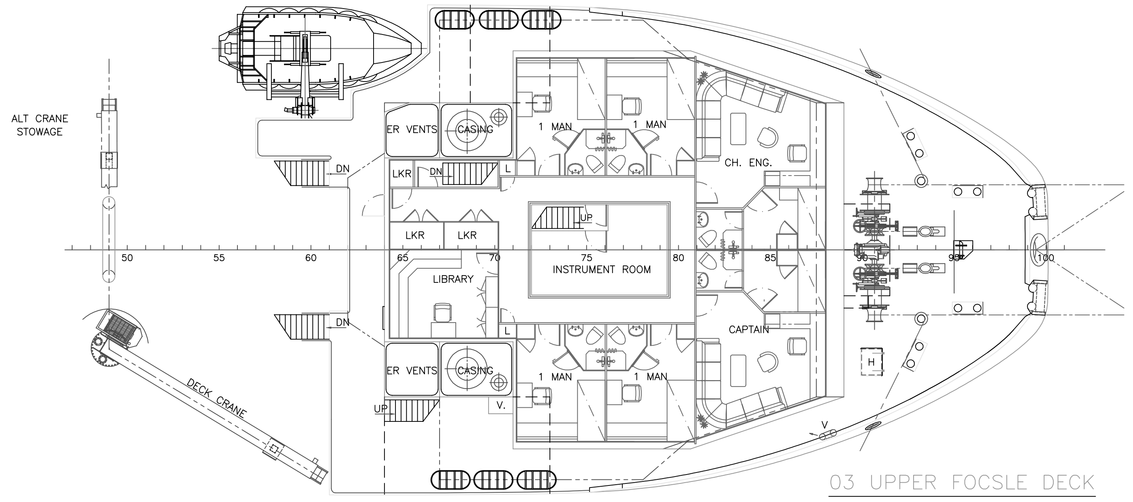
MONITOR PLATFORM



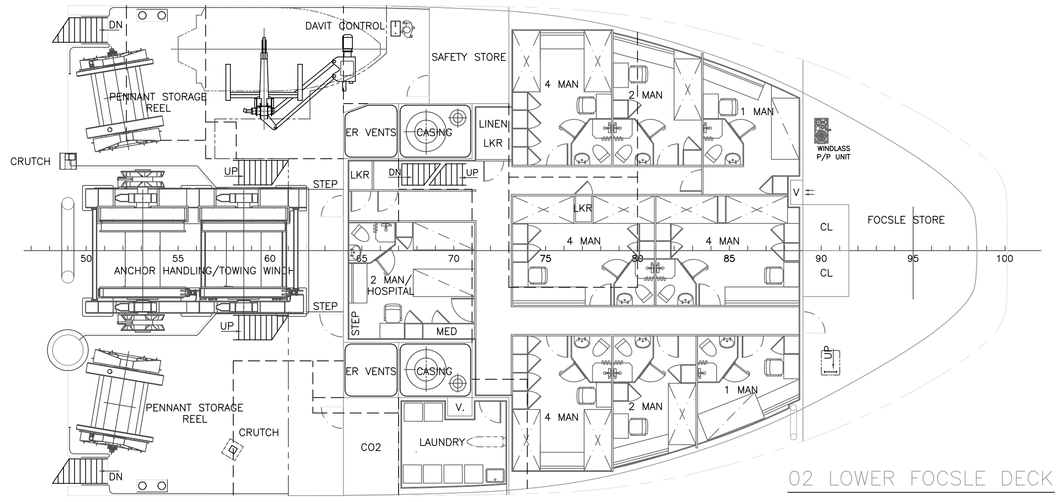
WHEELHOUSE TOP



04 BRIDGE DECK



03 UPPER FOCSLE DECK

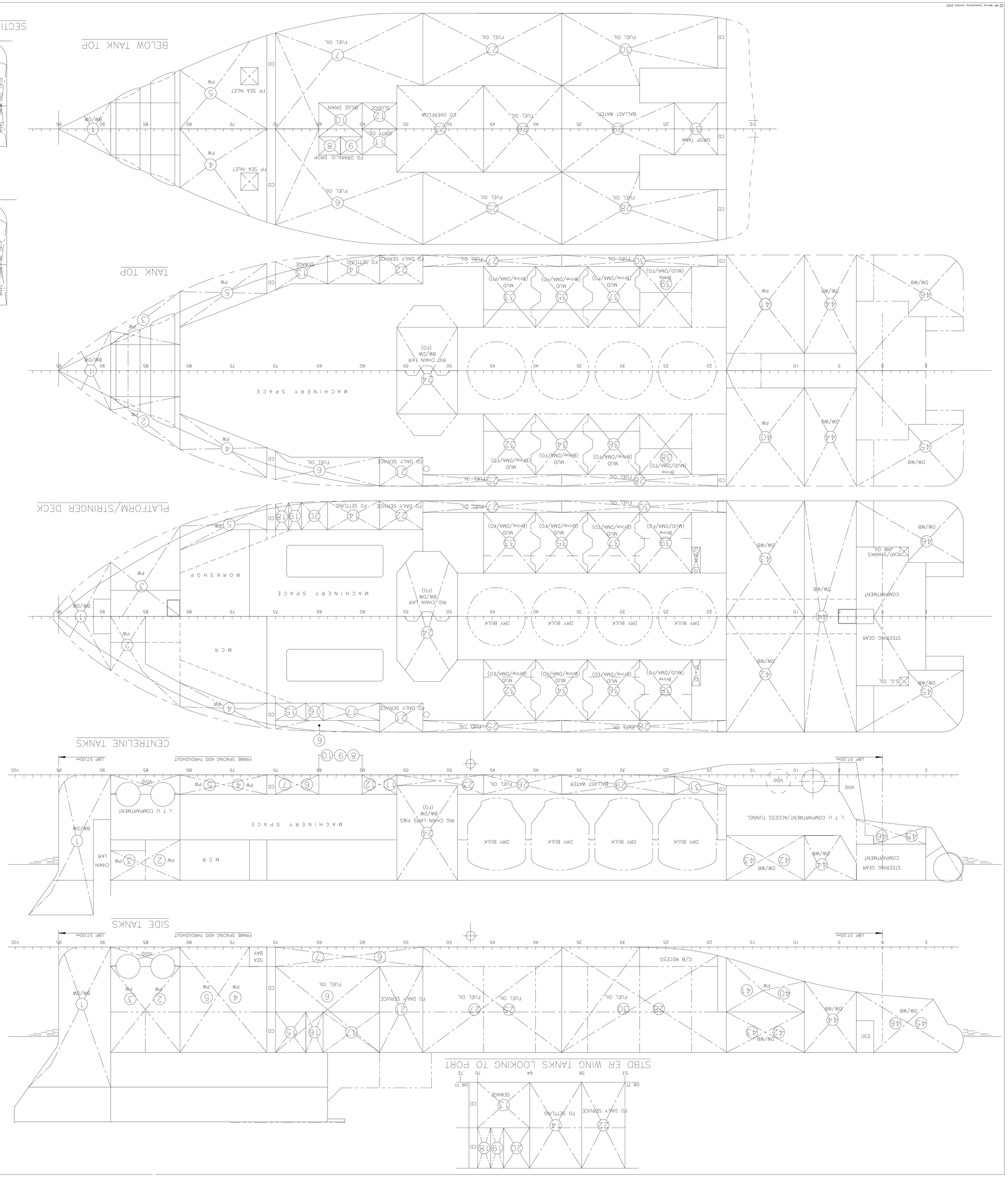


02 LOWER FOCSLE DECK

GENERAL PARTICULARS:–

LENGTH O.A.	66.00m
LENGTH B.P.	57.00m
BREADTH MLD.	16.00m
DEPTH MLD. (MAIN DECK)	7.30m
DESIGN DRAUGHT (AS SHOWN)	6.20m
SPEED (@ 5.00m DRAUGHT)	14.50kts
DEADWEIGHT MINIMUM (6.00m)	2100T

CLIENT: SWIRE PACIFIC OFFSHORE	DRAWN / DATE
PROJECT: 120T BOLLARD PULL AHTS	CHK'D / DATE
TITLE: GENERAL ARRANGEMENT	APPR'D / DATE
	AUTH'D / DATE
	APP'D / DATE
BUILDER: LABINDY SHIPBUILDING & ENGINEERING Pte Ltd — DWG No. 9162-1167	SCALE 1:100 (@A0)
DWG REFERENCE NUMBER — PROJECT — DWG No. — SHT No. — REV — SHEET 1 OF 1	



TANK No.	FRAMES	DESCRIPTION	CAPACITY	FUEL OIL	POTABLE WATER	DRILL/ BALLAST WATER	MUD	BRINE	DMA	LCG	VCG
1	89–STEM	FORE PEAK	115.15			115.15				55.19	6.55
2	81–89	DB/WING TK 1 (P)	54.98		54.98					51.01	4.88
3	81–89	DB/WING TK 1 (S)	78.05		78.05					50.66	5.18
4	71–81	DB/WING TK 2 (P)	86.56		86.56					45.57	2.95
5	71–81	DB/WING TK 2 (S)	86.56		86.56					45.57	2.95
6	53–70	DB/WING TK 3 (P)	128.53		128.53					37.57	1.99
7	53–70	DB TK 3 (S)	74.72	74.72						37.11	0.70
8	62.5–66	DB TK – LUBE OIL DROP	2.48							38.25	0.68
9	60–62.5	DB TK – FO DRAIN	2.48							36.75	0.68
10	60–65	DB TK – BILGE DRAIN	9.33							37.50	0.68
11	56–60	DB TK – DIRTY OIL	5.71							34.80	0.68
12	56–60	DB TK – SLUDGE	5.71							34.80	0.68
13	64–70	WING TK (S) – SEWAGE	17.91							40.15	3.04
14	58–64	WING TK (S) – FO SETTLING	41.02	41.02						36.58	4.37
15	66.5–70	WING TK (P) – HYD OIL STORAGE	6.91							40.95	5.90
16	64.5–66.5	WING TK (P) – HYD OIL DROP TANK	3.95							39.30	5.90
17	58–64.5	WING TK (P) – ME & GEN LUBE OIL	12.84							36.75	5.90
18	68.5–70	WING TK (S) – THRUSTER L.O. STOR.	4.37							41.54	5.93
19	67–68.5	WING TK (S) – SPARE OIL	4.61							40.65	5.91
20	64–67	WING TK (S) – DISPERSANT	9.64							39.30	5.90
21	53–58	WING TK (P) – FO DAILY SERVICE	34.95	34.95						33.30	4.33
22	53–58	WING TK (S) – FO DAILY SERVICE	34.95	34.95						33.30	4.33
23	46–56	DB TK (C) – FO OVERFLOW	32.81	32.81						30.19	0.51
24	49–56	RIG CHAIN LOCKER (P&S)	195.54	(195.54)		195.54				31.50	4.25
25	37–53	DB/WING TK 4 (P)	106.62	106.62						26.96	2.23
26	37–46	DB TK 4 (C)	42.86	42.86						24.90	0.68
27	37–53	DB/WING TK 4 (S)	106.62	106.62						26.96	2.23
28	19–37	DB/WING TK 5 (P)	111.98	111.98						17.04	2.43
29	24–37	DB TK 5 (C)	54.27			54.27				18.68	0.67
30	19–37	DB/WING TK 5 (S)	111.98	111.98						17.04	2.43
31	19–24	DB TK – DROP	12.52							12.99	0.75
32	40–46	MUD TK 1 (P)	77.44	(77.44)			77.44	(77.44)	(77.44)	25.80	4.59
33	40–46	MUD TK 1 (S)	77.44	(77.44)			77.44	(77.44)	(77.44)	25.80	4.59
34	34–40	MUD TK 2 (P)	77.44	(77.44)			77.44	(77.44)	(77.44)	22.20	4.59
35	34–40	MUD TK 2 (S)	77.44	(77.44)			77.44	(77.44)	(77.44)	22.20	4.59
36	28–34	MUD TK 3 (P)	77.44	(77.44)			77.44	(77.44)	(77.44)	18.60	4.59
37	28–34	MUD TK 3 (S)	77.44	(77.44)			77.44	(77.44)	(77.44)	18.60	4.59
38	22–28	BRINE TK 1 (P)	63.80	(63.80)			(63.80)	63.80	(63.80)	15.00	4.96
39	22–28	BRINE TK 1 (S)	63.80	(63.80)			(63.80)	63.80	(63.80)	15.00	4.96
40	9–18	LOWER DEEP TK 6 (P)	81.04		81.04					8.66	2.91
41	9–18	LOWER DEEP TK 6 (S)	81.04		81.04					8.66	2.91
42	9–18	UPPER DEEP TK 6 (P)	131.22			131.22				8.10	5.75
43	9–18	UPPER DEEP TK 6 (S)	131.22			131.22				8.10	5.75
44	3–9	STAB TK 1	173.34			173.34				3.73	5.63
45	Tr–3	AFT PEAK (P)	54.99			54.99				–1.94	5.83
46	Tr–3	AFT PEAK (P)	54.99			54.99				–1.94	5.83
		TOTAL VOLUMES		827.05	468.23	910.72	464.64	127.60			
		TOTAL VOLUMES (INCLUDING OPTIONAL TANKS)		(1614.82)			(592.24)	(592.24)			(592.24)

PROVISIONAL TANK CAPACITIES (CUBIC METRES)

FOUR DRY BULK CARGO TANKS TOTALLING 185 CUBIC METRES

© IMT Marine Consultants Limited 2005

IMT MARINE CONSULTANTS LTD.
Naval Architects and Marine Engineers
BANK OFFICE: NORTHGATE, SCOTLAND, KEALAND.
T: 01924 788004 F: 01924 788010
e: info@imtmarine.co.uk
BANO OFFICE: SUNTIGER BRIDGE
T: 01999 9 01874 878962
e: info@imtmarine.co.uk

REV	MODIFICATION	BY	DATE
A	INITIAL ISSUE	LJP	18/01/05
B	REDRAWN TO NEW MODEL DESIGN	PCL	04/04/05
C	REDRAWN TO NEW MODEL DESIGN	PCL	14/04/05
D	REDRAWN TO NEW MODEL DESIGN	PCL	22/04/05
E	UPDATED TO NEW TANK LAYOUT	BIP	31/05/05
F	DIMENSIONS MODIFIED TO TANKS	DWR	14/06/05
G	DIMENSIONS MODIFIED TO TANKS	PCL	31/05/05
H	MUD & BRINE TANK CAPACITIES CORRECTED	SIR	22/11/05

CLIENT	SWIRE PACIFIC OFFSHORE
PROJECT	120T BOLLARD PULL AHTS
TITLE	TANK & CAPACITY PLAN
BUILDER	LABROY SHIPBUILDING & ENGINEERING Pte Ltd.
YARD No.	1162–1167
DRAWN	JAN G. JOHNSON 04/04/05
CHK'D	MP 06/04/05
APPR'D	–
APPR'D	–
APPR'D	–
SCALE	1:100 (@A0)

CAD REFERENCE NUMBER	PROJECT	DRG No.	SHT No.	REV	SHEET
	04098	– 106	– 1	– H	1 of 1

Appendix 8: Permit Specific Spill Response

Appendix 8: Beach (Vic/P46, T/38P, T/39P) Specific Spill Response

TABLE OF CONTENTS

APPENDIX 8: BEACH (VIC/P46, T/38P, T/39P) SPECIFIC SPILL RESPONSE 1
1. BEACH PETROLEUM SPECIFIC OIL SPILL RESPONSE 3
1.1 Critical Data Summary 4
2. OILMAP MODEL SETTINGS AND PROPERTIES 10
3. BEACH WELLS 12
3.1 Bass Basin Wells 12
3.2 Otway Basin Wells 15
3.3 Wind Roses Relevant to Beach Wells 20
APPENDIX 1: RIG OIL SPILL EQUIPMENT 22

1. Beach Petroleum Specific Oil Spill Response

This Section refers specifically to the Beach Petroleum (Beach) permit areas and well activities. It outlines the measures required for the appropriate management of any marine oil spill that may occur in the Beach Vic/P46, T/38P and T/39P permit areas as a result of the drilling campaign or associated activities. Detailed environmental support and spill trajectory data are provided in the:

1. Otway Basin Environment Plan;
2. Bass Basin Environment Plan;
3. Quantitative Spill Exposure Assessments for the Otway Basin Drilling Program;
4. Quantitative Oil Spill Exposure Assessments for the Bass Basin Drilling Program

The information also assists Beach/ADA in quantifying the risk of exposure to surrounding shorelines and environmental resources in the unlikely event of a hydrocarbon spill occurring from the Beach drilling program.

The ASA oil spill trajectory and fates model (OILMAP) was used to simulate the drift and spread of oil from the Beach wells to surrounding locations under the influence of the ambient winds and tides. All trajectory and weathering simulations were based on local environmental conditions (winds, tides and water temperature) and the chemical and physical characteristics of the representative hydrocarbons.

The stochastic modelling showed that slicks from the Spikey Beach-1 well in the Bass Basin predominantly drifted east from the release site due to the prevalent westerly winds. In the unlikely event of a diesel or crude spill there was a 4% and 2% probability respectively of shoreline contact (for a silvery sheen and thicker, threshold thickness of ≥0.1µm). The average time for shoreline contact was 96 hours for a diesel spill and 76 hours for the crude spill. The average percentage of diesel and crude making shoreline contact was 9% and 4% of the initial volume.

The stochastic modelling for wells in the Otway Basin showed that slicks from the Bernoulli well to predominately drift towards the north-east due to the influence of the prevalent south-west winds and longshore northward currents. While slicks from the Fermat well, were more likely to spread to the south-east due to the influence of the winds and the longshore currents.

For the Bernoulli well, in the unlikely event of a diesel or condensate spill there was a 15% and 42% probability respectively of shoreline contact (silvery sheen and thicker, threshold of ≥0.1µm). The average time for shoreline contact was 62 hours for a diesel spill and 73 hours for the condensate spill. The predicted average volume of diesel and condensate to reach shore was 31% and 4% of the initial volume. Further, due to the close proximity of the Fermat well to the coastline, the estimated probability that a diesel spill would reach the shoreline (above silvery sheen) was higher than Bernoulli, being 26%. The average time for shoreline contact was 39 hours and the average predicted volume of diesel to reach the coastline was 29% of the initial spill volume.

1.1 Critical Data Summary

This section provides a critical data summary of the Beach Vic/P46, T/38P and T/39P drilling program.

Table 1: Summary of Beach Drilling Program Detail

Summary of Beach Drilling Program Detail			
Rig Specifications			
Spill Equipment Onboard Rig	Refer to Appendix 1 of this document		
Integrated OSCP	**West Triton Shipboard Oil Pollution Emergency Plan (SOPEP) November 2007**		
Anchor Handling Tug Specifications (Vessel 1)			
Vessel Name	**Pacific Battler**		
Fuel held onboard	**880m^3**		
Integrated OSCP	**Pacific Battler SOPEP**		
Anchor Handling Tug Specifications (Vessel 2)			
Vessel Name	**Pacific Valkyrie**		
Fuel held onboard	**827m^3**		
Integrated OSCP	**Pacific Valkyrie SOPEP**		
Well Surface Locations and Permit Areas			
Location Name	**Permit Area**	**Latitude**	**Longitude**
Bernoulli	Vic/P46	38° 22 17.84” S	141° 03 36.42” E
Fermat	Vic/P46	38° 11 43.196” S	141° 03 12.954” E
Spikey Beach-1	T/38P	40° 28 55.326”S	145° 52 23.552” E
Pee Jay-1	T/39P	40° 29 47.994” S	146° 21 35.276”E

The Beach/ADA emergency management structure and the Beach/ADA oils spill response management flowchart are detailed in Figures 1 and 2 respectively.

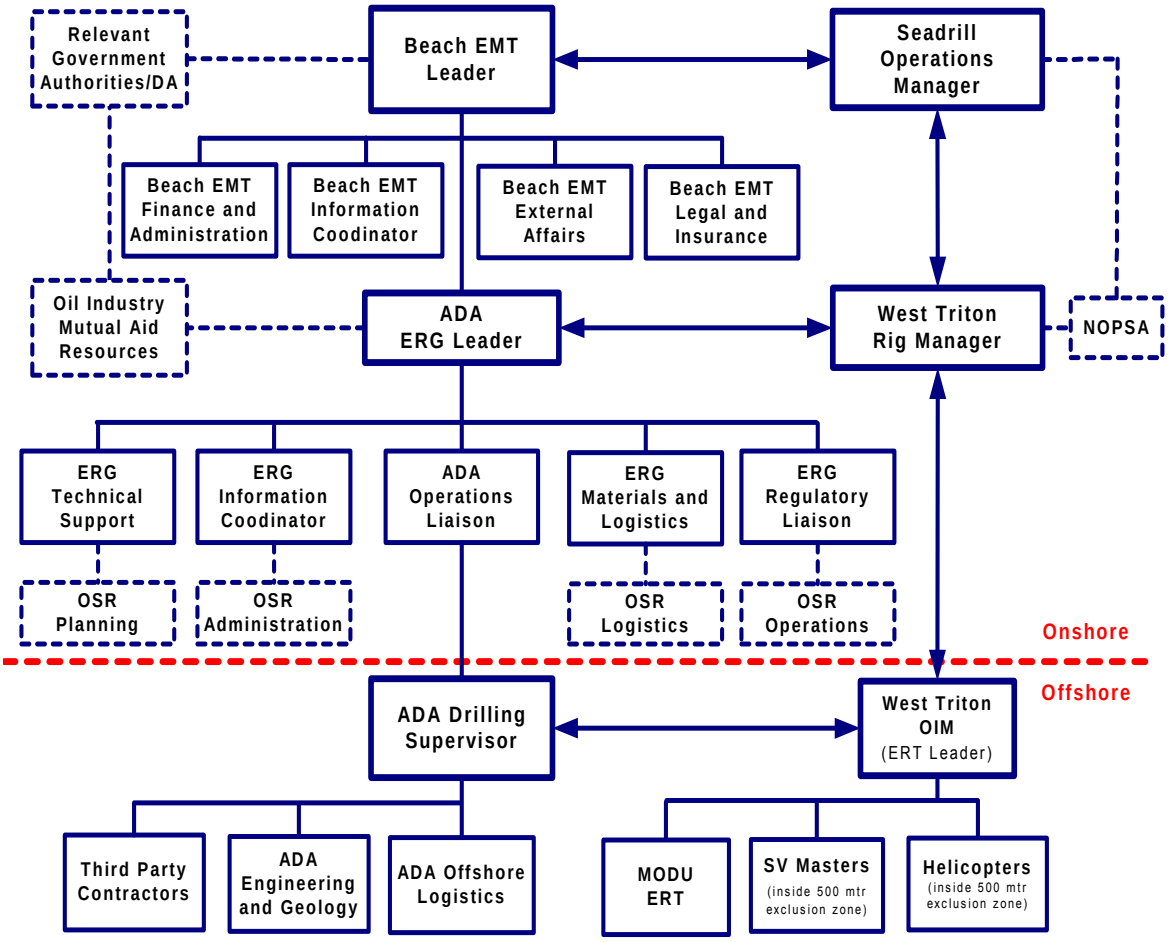


Figure 1: *Beach/ADA Emergency Management Organisation Structure*

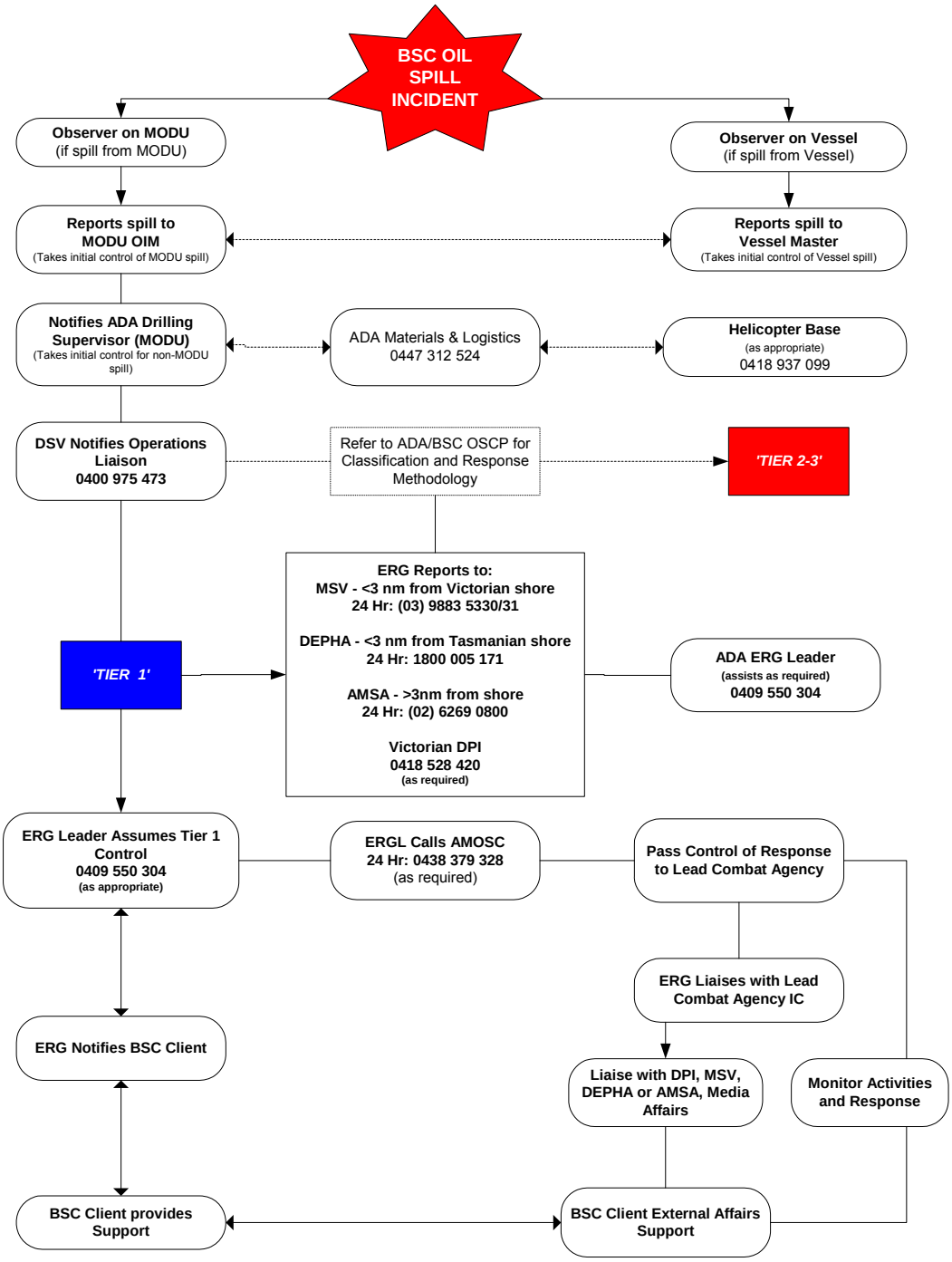


Figure 2: *Beach/ADA Tier 1 Spill Response Management*

The Bass Basin well locations are shown in Figure 3. Spikey Beach-1 was used as the hypothetical release site for spill modelling scenarios. A summary of the annualised stochastic modelling results for the diesel and crude oil surface releases at the Spikey Beach-1 well location in the Bass Basin is presented in Table 3.The OILMAP model and settings are described in the section 2.

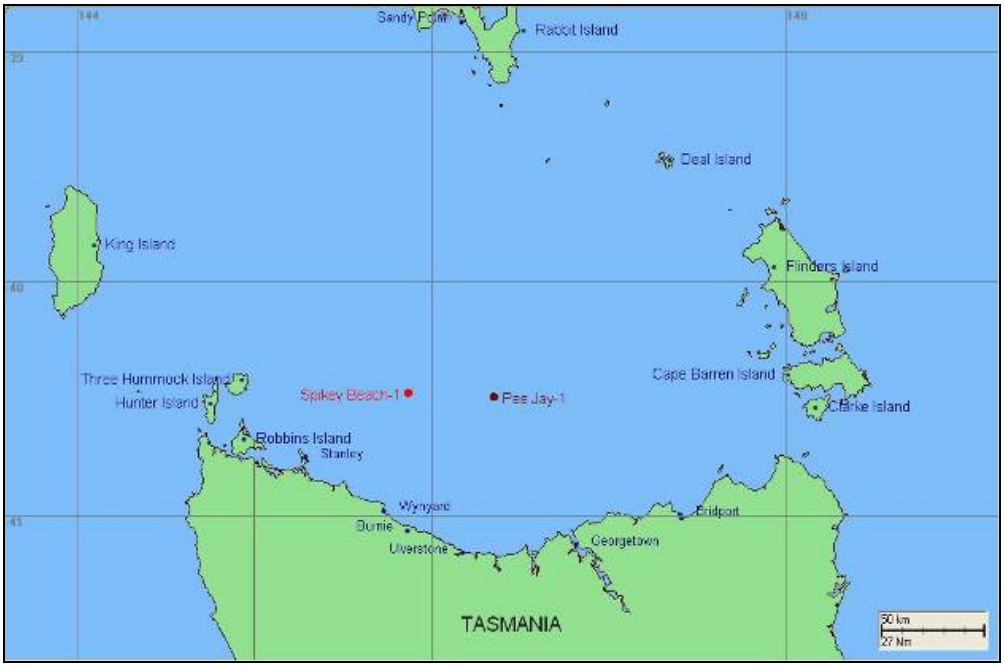


Figure 3: *Map showing the Beach exploration wells as part of the Bass Basin drilling Program. Note the red icon for Spikey Beach-1 is the hypothetical release sites.*

Table 2: Summary of the annualised stochastic modelling results for the diesel and crude surface releases at Spikey Beach-1.

Scenario	**Probability of shoreline contact** (%)	**Minimum time before shoreline Contact** (hours)	**Average time before shoreline Contact** (hours)	**Average volume on any shorelines (m^3)**	**Percentage of initial spill (%)**
Diesel spill	4	29	96	7	9
Crude spill	2	20	76	23	4

Figure 4 shows an example of predicted tidal current vectors around the proposed release site during sample flood and ebb tides, major axis of the tides at Spikey Beach-1 well, run approximately north-west and south-east and the maximum tidal speed reached above 0.2 m/s during spring tides.

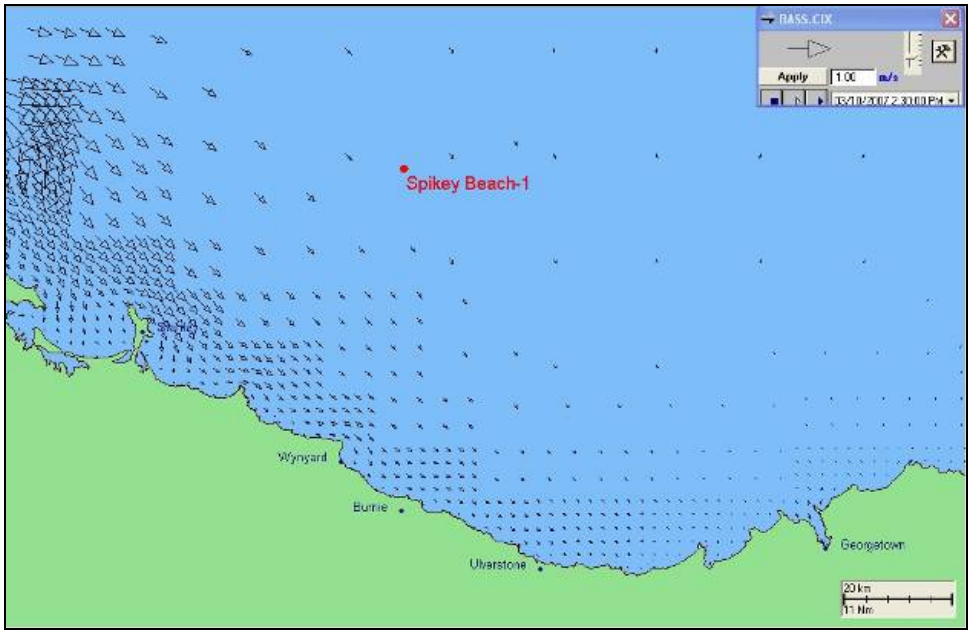


Figure 4: *Zoomed in view of a sample predicted flood tide (top) and ebb tide (bottom) adjacent to the hypothetical release sites (Spikey Beach-1)*
Note the density of the tidal vectors vary with the grid resolution, particularly along the coastline.

The Otway Basin well locations are shown in Figure 5. Bernoulli-1 and Femat-1 were both used as release sites for spill modelling scenarios. A summary of the annualised stochastic modelling results for the diesel and crude oil surface releases at the Bernoulli[1] and Fermat[2] location in the Otway Basin are presented in Table 2.The OILMAP model and settings are described in the section 2.

Figure 5*: Otway Basin Campaign Area*

Table 3: Summary of the annualised stochastic modelling results for the diesel and crude oil surface releases at the Bernoulli[1] and Fermat[2] location in the Otway Basin.

Scenario	Probability of shoreline contact (%)	Minimum time before shoreline contact (hours)	Average time before shoreline contact (hours)	Average volume on any shorelines (m^3)	Percentage of initial spill (%)
Diesel spill[1]	15	13	62	25	31
Condensate spill[1]	42	15	73	18	4
Diesel spill[2]	26	7	39	23	29

Figure 6 shows an example of predicted tidal current vectors around the proposed release sites during sample flood and ebb tides. The major axis of the tides, at Fermat run approximately north-west and south-west due to the orientation of the coastline and the maximum tidal speed below 0.1 m/s during spring tides. The maximum tidal speed at Bernoulli was also below 0.1 m/s although, the currents run north to south-east and are oscillatory in nature.

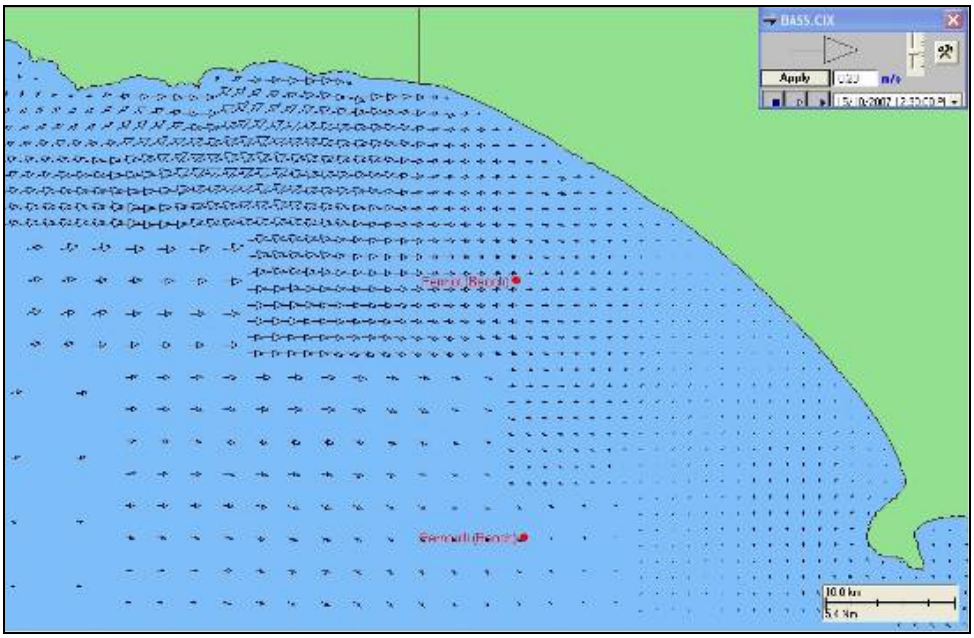


Figure 6: *Zoomed in view of a sample predicted flood tide (top) and ebb tide (bottom) adjacent to the hypothetical release sites (Bernoulli and Fermat).*

2. OILMAP MODEL SETTINGS AND PROPERTIES

Table 4 shows a table of model settings used as part of the oil spill modelling. OILMAP examined hypothetical spill scenarios, which could be applicable to the Bass Basin Beach/ADA's drilling activities:

1. Loss of 80 m^3 of diesel at surface over 6 hours (tracked for 7-days), representing a refuelling accident at the Spikey Beach-1, well;
2. The loss of 600 m^3 of crude oil at the surface over 6 hours (tracked for 7-days), representing an accidental oil well blow out, on Gippsland Crude (51.0 API) at the Spikey Beach-1 well.

Table 4: Summary of model settings used for spill modelling – Bass Basin

Dimensions	(Latitude, longitude)			
Number of randomly selected spill start times per site per scenario	200			
Release Sites	Longitude	Latitude		
Spikey Beach-1	145° 52 23.552" E	40° 28 55.326"S		
Water temperature (°C)	12			
Spill scenario	Exploration well	Volume (m^3)	Duration (hours)	Simulation period for each spill (days)
1. Diesel refuelling accident	Spikey Beach-1	80	6	7
2. Accidental crude oil well blow out	Spikey Beach-1	600	6	7

Table 5 shows a of model setting used as part of the oil spill modelling. OILMAP examined hypothetical spill scenarios, which could be applicable to the Otway Basin Beach/ADA's drilling activities:

1. Loss of 80 m^3 of diesel at surface over 6 hours (tracked for 7-days), representing a refuelling accident at Bernoulli and Fermat wells;
2. The loss of 448 m^3 of gas condensate at the surface over 7-days (tracked for 10-days), representing an accidental gas well blow out, at the Bernoulli well.

Table 5 Summary of Model Settings used for Oil Spill Modelling – Otway Basin

Dimensions	(Latitude, longitude)			
Number of randomly selected spill start times per site per scenario	200			
Release Sites	Longitude Latitude			
Bernoulli	141° 03 36.42" E 38° 22 17.84" S			
Fermat	141° 03 12.954" E 38° 11 43.196" S			
Water temperature (oC)	14			
Spill scenario	Exploration well	Volume (m^3)	Duration (hours)	Simulation period for each spill (days)
1. Diesel refuelling accident	Bernoulli & Fermat	80	6	7
2. Accidental condensate well blow out	Bernoulli	448	168	10

3. BEACH WELLS

3.1 Bass Basin Wells

Slicks from the Spikey Beach-1 well in the Bass Basin were predicted to drift towards the east due to the influence of the prevalent westerly winds. Figures 7 – 10 show the probability of surface exposure and minimum time travelled calculated from the stochastic modelling for each scenario for the Spikey Beach-1 well.

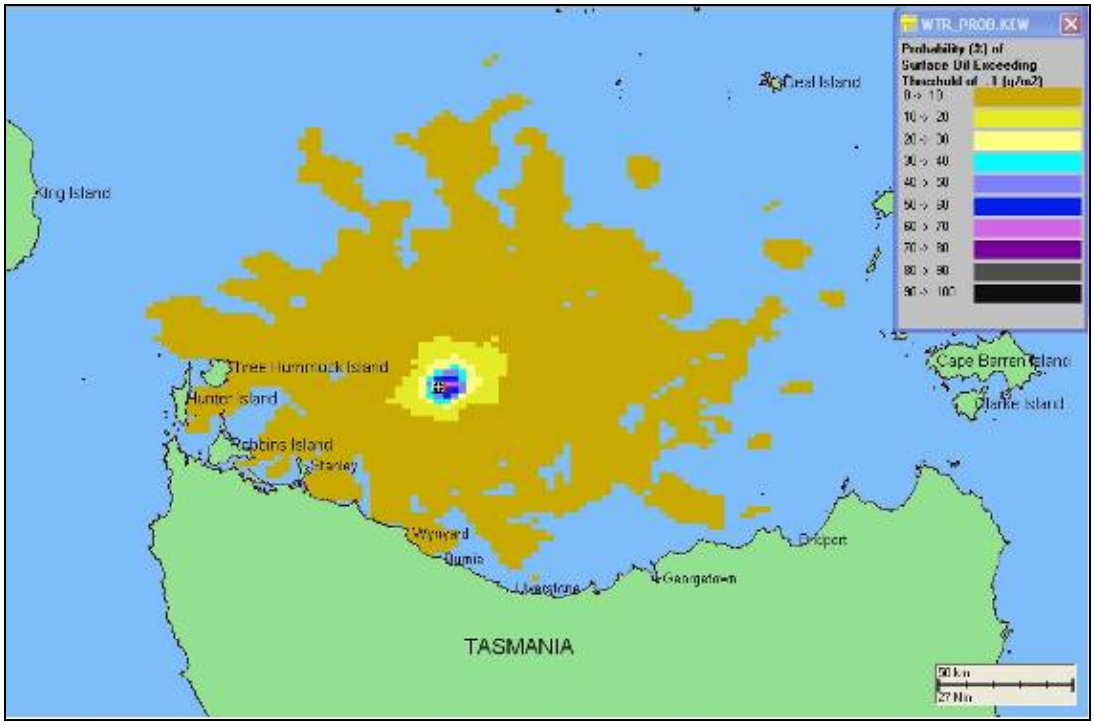


Figure 7: *Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil at Spikey Beach-1 well for an annualised assessment.*

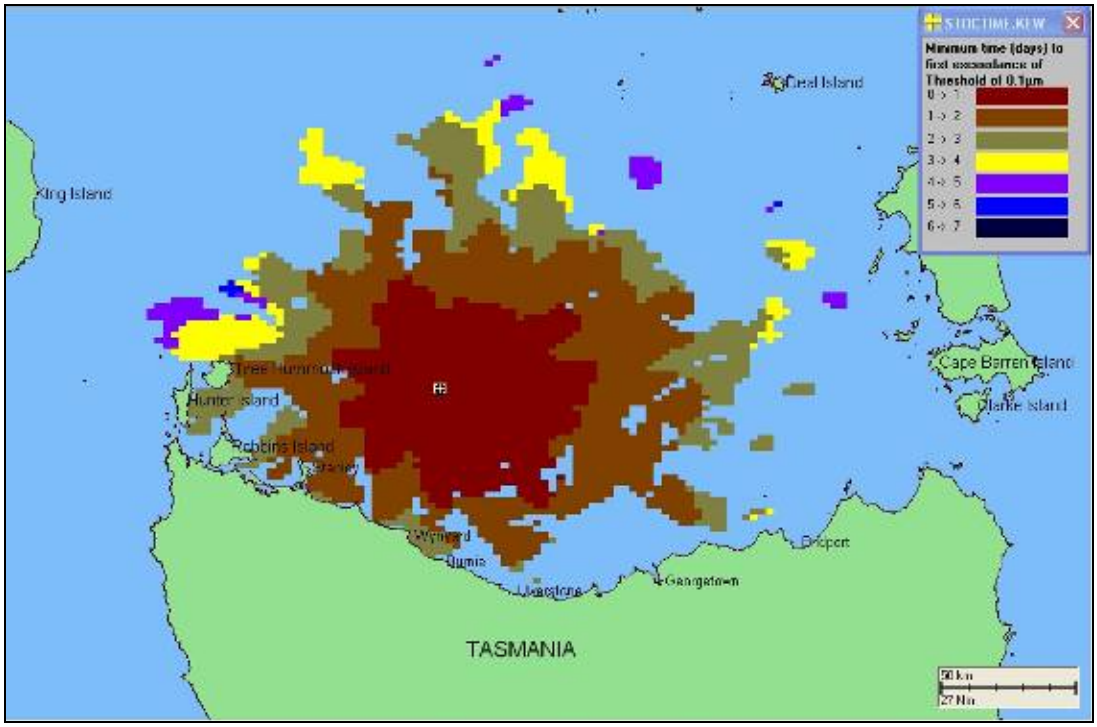


Figure 8: *Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel oil at the Spikey Beach-1 well for an annualised assessment.*

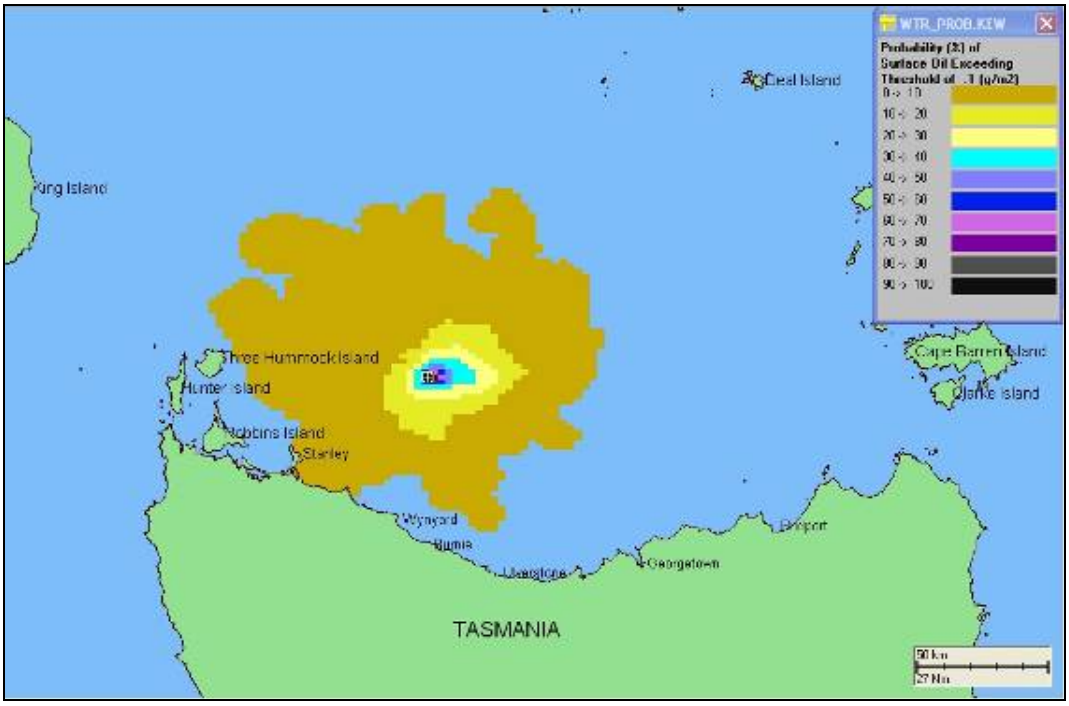


Figure 9: *Predicted probability of surface exposure (to silvery sheen) due to a 600 m^3 spill of crude oil at Spikey Beach-1 well for an annualised assessment.*

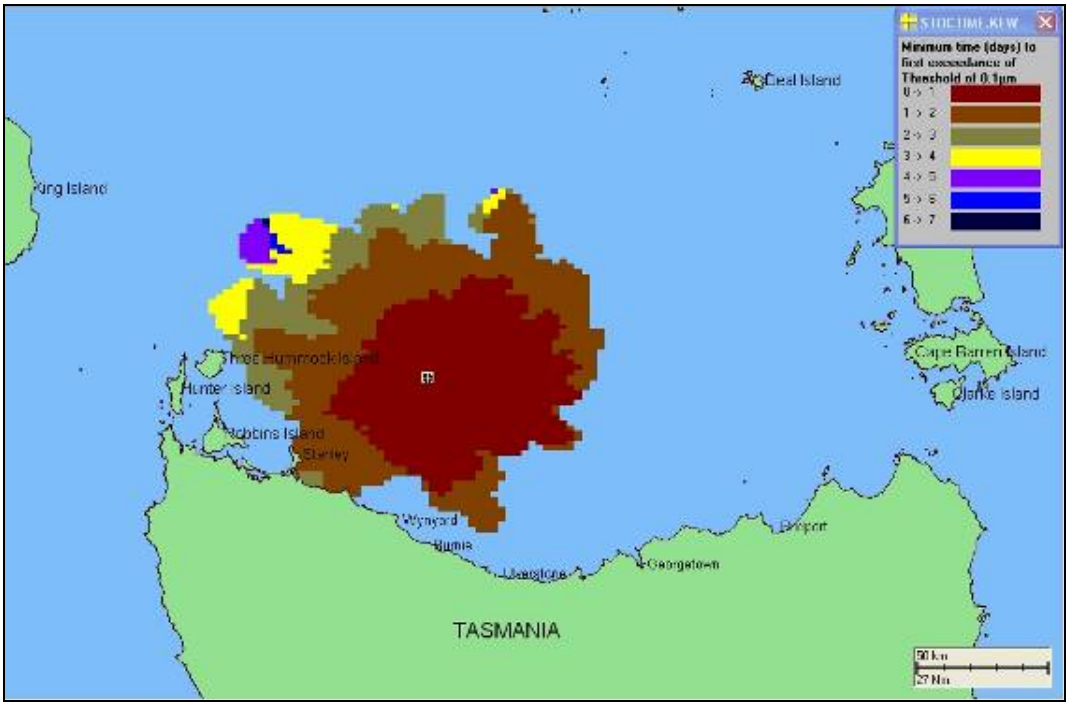


Figure 10: *Predicted minimum time before exposure (to silvery sheen) due to a 600 m^3 spill of crude oil at Spikey Beach-1 well for an annualised assessment.*

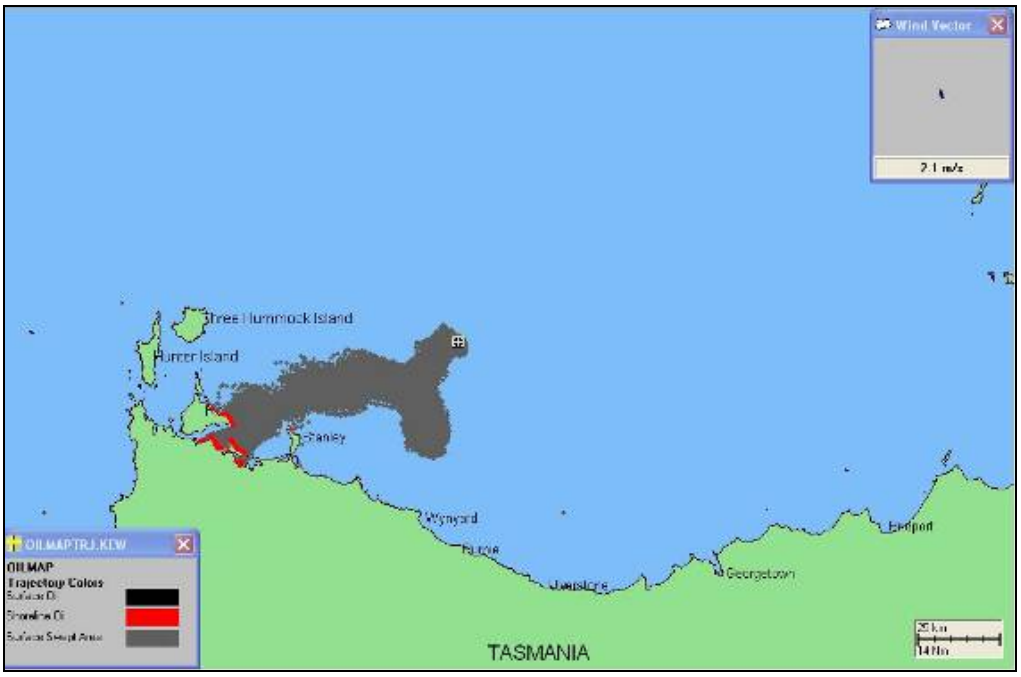


Figure 11: *Predicted path and shoreline contact for the 80 m^3 single trajectory (at 7-day) simulation for Spikey Beach-1 well, which had yielded the average volume of diesel oil on shore.*

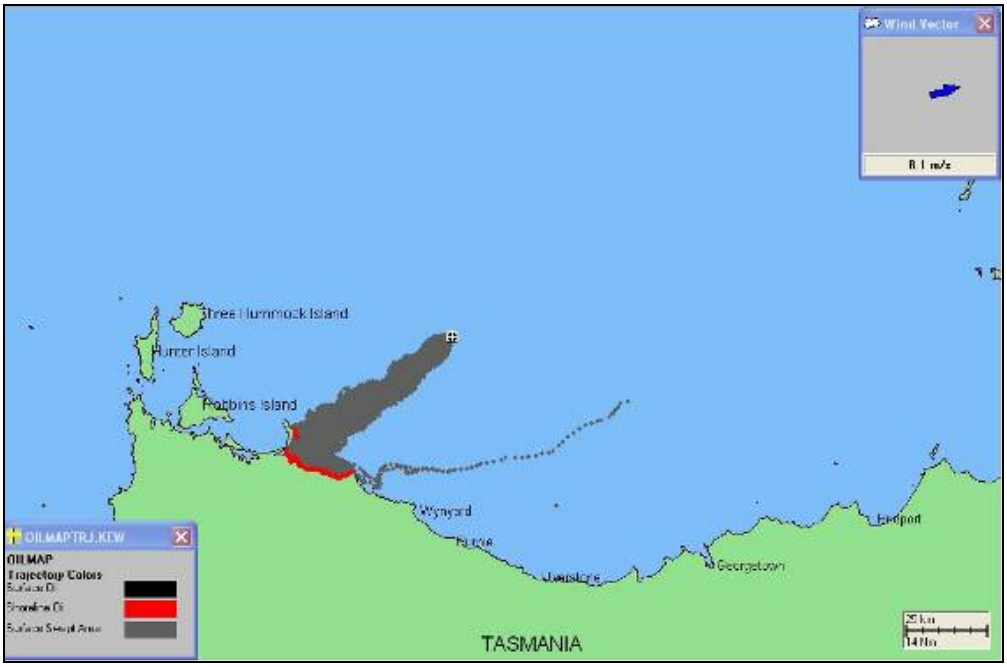


Figure 12: *Predicted path and shoreline contact for the 600 m^3 single trajectory (at 10-day) simulation for Spikey Beach-1 well, which had yielded the maximun volume of crude oil on shore.*

3.2 Otway Basin Wells

Figures 13 – 18 show the probability of surface exposure and minimum time travelled calculated from the stochastic modelling for each scenario for the Otway Basin wells.

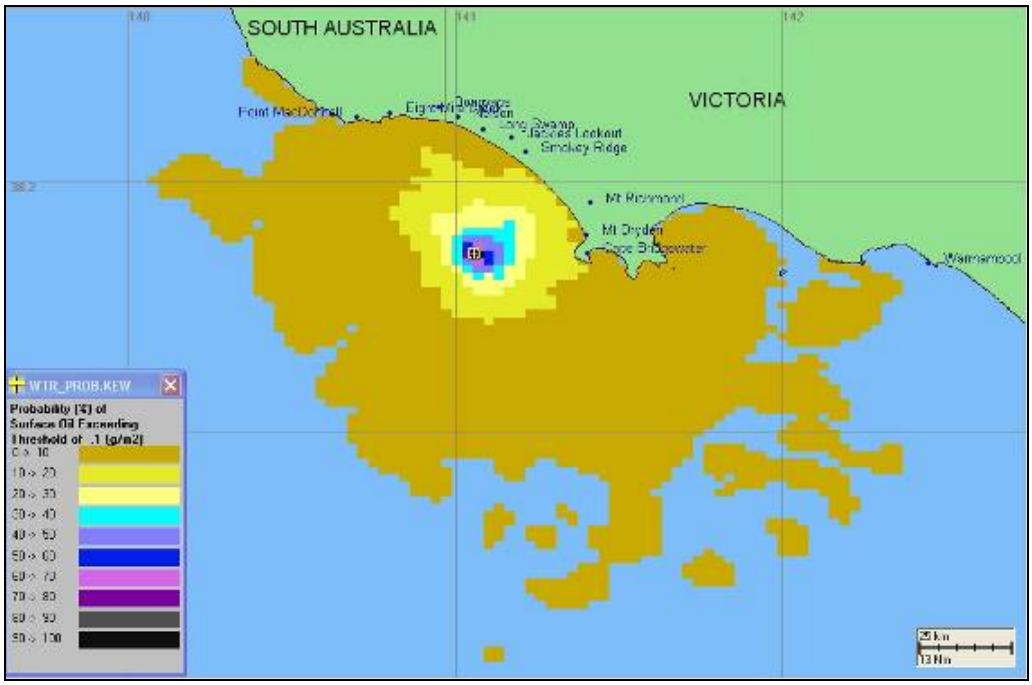


Figure 13 Predicted probability of surface exposure (to silvery sheen) due to an 80 m^3 spill of diesel at Bernoulli for an annualised assessment.

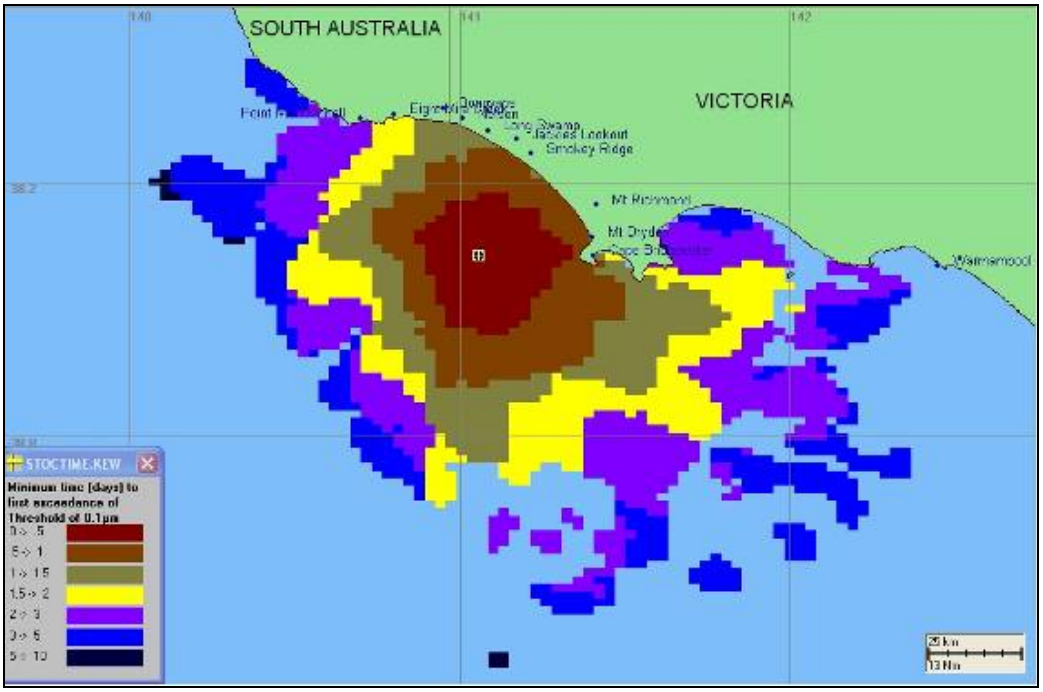


Figure 14. Predicted minimum time before exposure (to silvery sheen) du to an 80 m3 spill of diesel oil at Bernoulli for an annualised assessment.

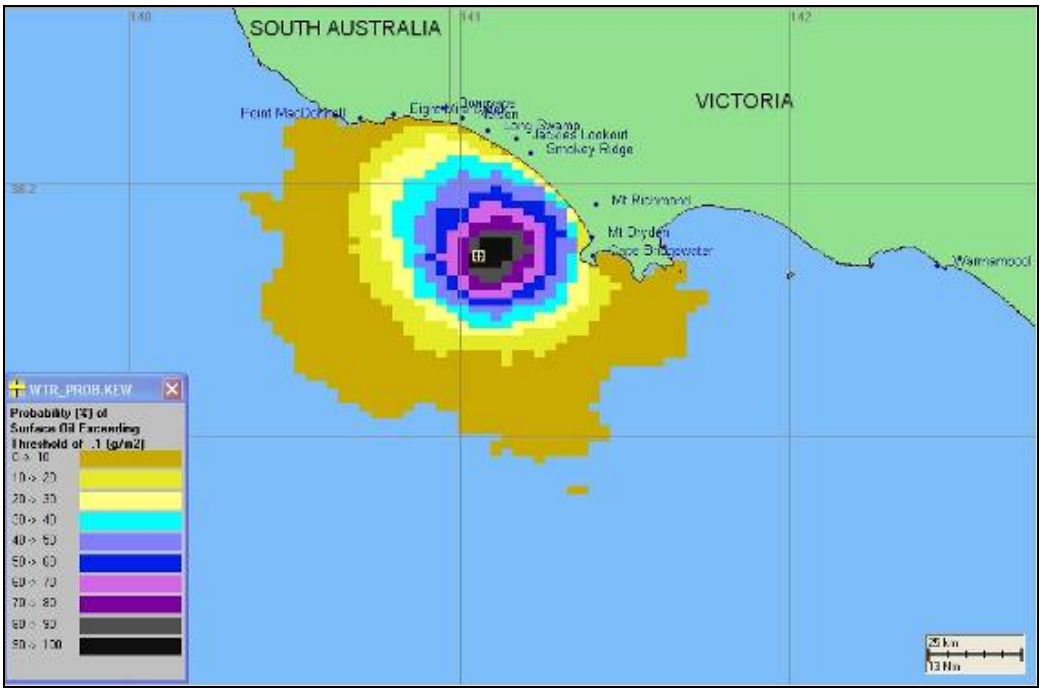


Figure 15 Predicted annualised probability of surface exposure (to silvery sheen) due to 448 m^3 spill of condensate at Bernoulli for an annualised assessment.

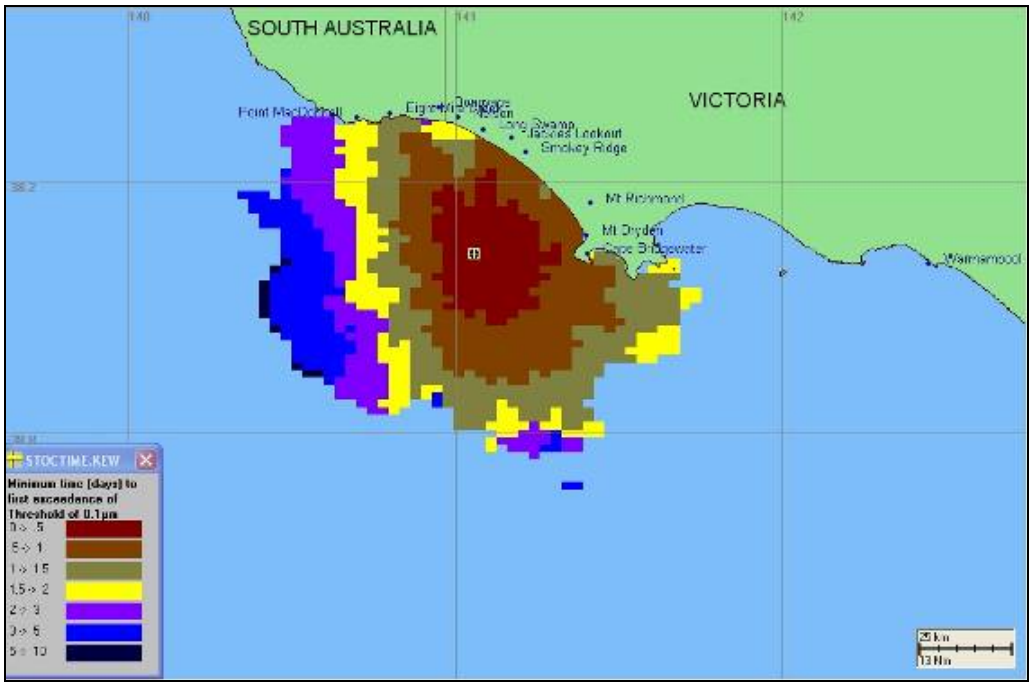


Figure 16 Predicted minimum time before exposure (to silvery sheen) due to 448 m^3 spill of condensate at Bernoulli for an annualised assessment.

Figure 17 Predicted path and shoreline contact for the 80 m3 diesel single trajectory (at 7-day) at Bernoulli, which has yielded the average volume of diesel oil on shore.

Figure 18 Predicted path and shoreline contact for the 448 m3 condensate single trajectory (at 10-day) at Bernoulli, which yielded the average amount of condensate on shore.

Figures 19 to 21 show the probability of surface exposure, predicted minimum time before exposure and predicted path and shore line contact due to an 80m^3 spill of diesel at Fermat.

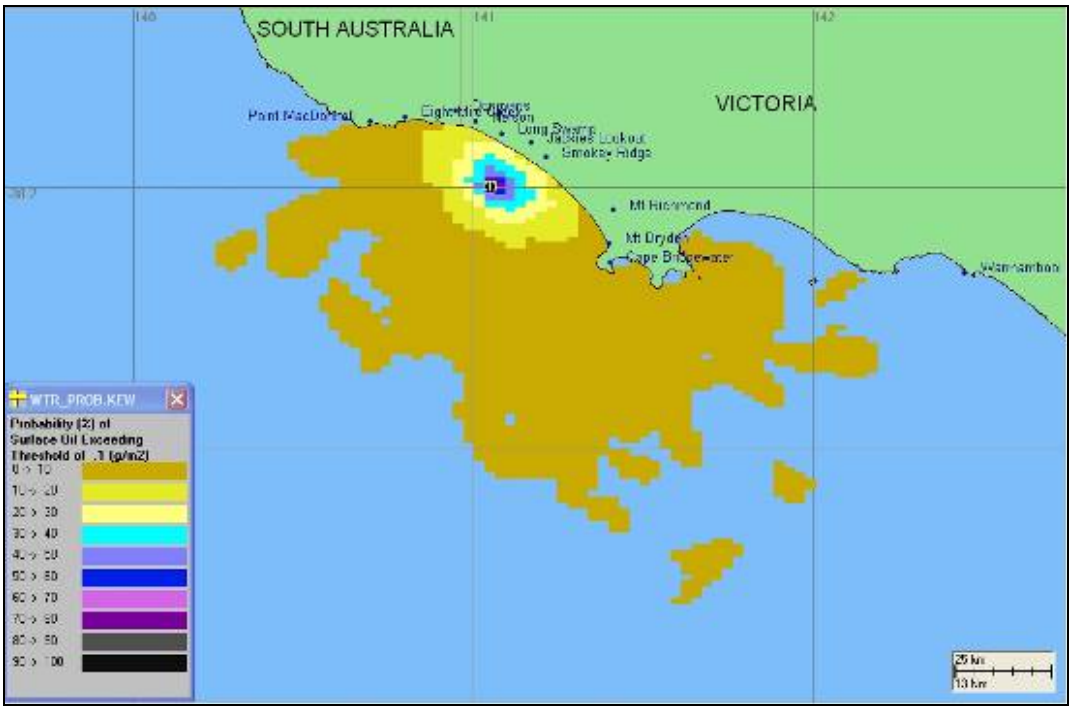


Figure 19 Predicted probability of surface exposure (to silvery sheen) due to an 80 m3 spill of diesel at Fermat for an annualised assessment.

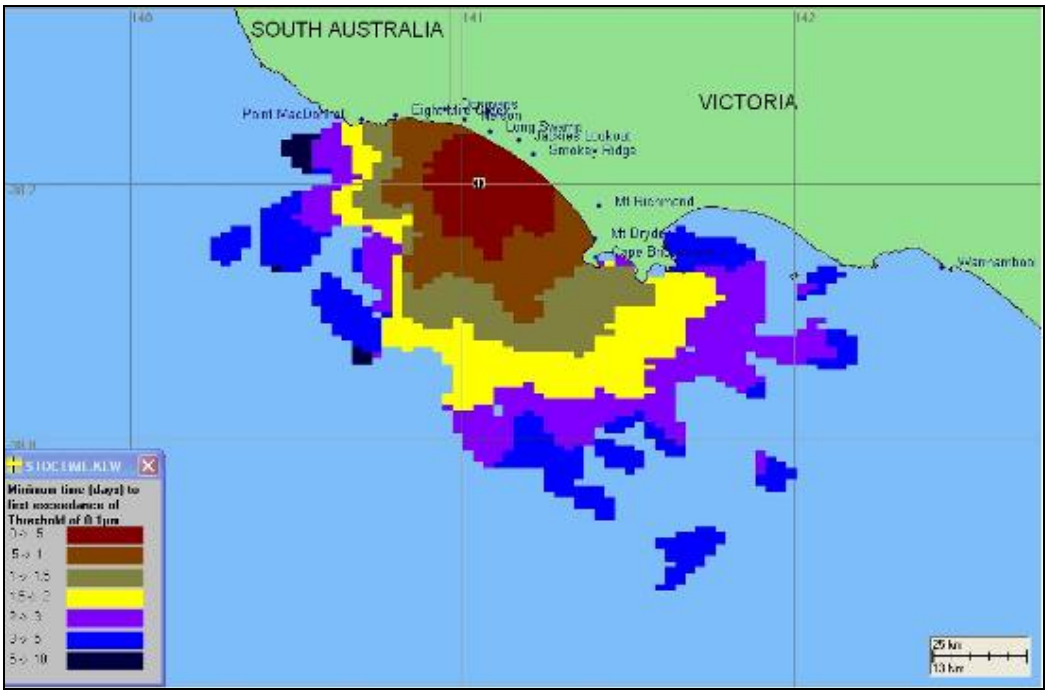


Figure 20: Predicted minimum time before exposure (to silvery sheen) due to an 80 m^3 spill of diesel during at Fermat for an annualised assessment.

Figure 21: Predicted path and shoreline contact for the 80 m3 single trajectory (at 7-day) simulation at Fermat, which had yielded the average volume of diesel oil on shore.

3.3 Wind Roses Relevant to Beach Wells

Figures 19a and 19b show examples of the monthly wind roses summarising the distribution of wind speeds and directions according to the localised wind station 6967 and 7244 for the Otway and Bass Basins respectively. Speed ranges of 5 knots are used in these wind roses.

For wind station 6967 (Otway Basin). the wind data indicated that it is highly variable and from all directions. However, during the summer months (November to February) the winds are from the southern sector and predominantly from the south-east. While winds during the winter are from the northern sector and more frequently from the north-west. The winds for region are relatively strong with an annual average and maximum wind speeds of 13.8 knots and 40 knots, respectively. As part of this study, the sea surface temperature was set to 14°C.

Wind station 7244 (Bass Basin) indicated that the winds are variable although with a higher frequency of winds from the western sector. The winds for the region are strong with an annual average and maximum wind speed of 16.7 knots and 46 knots respectively. As part of this study the sea surface temperature was set to 12'C.

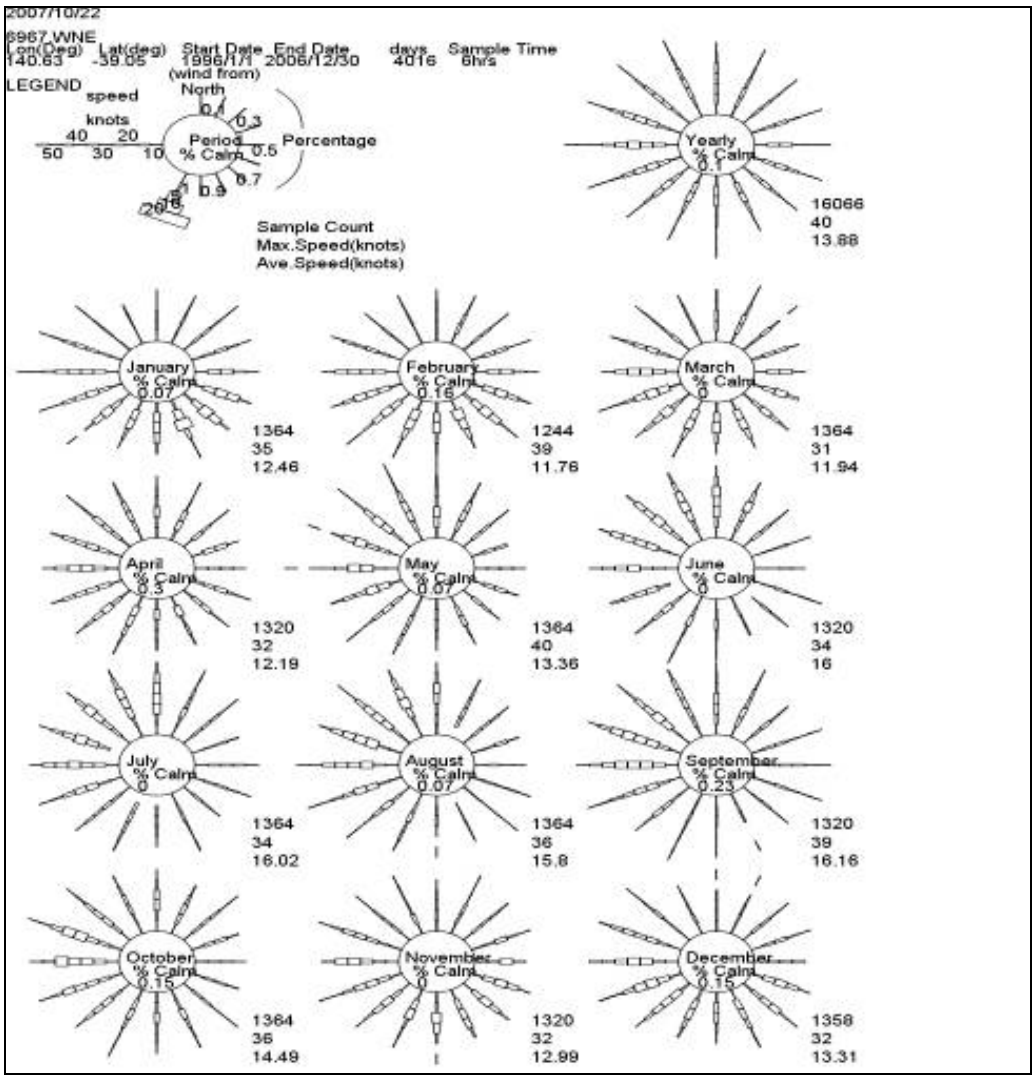


Figure 19a: Monthly and yearly wind roses for the nearby wind data (1997-2006) station 6967.

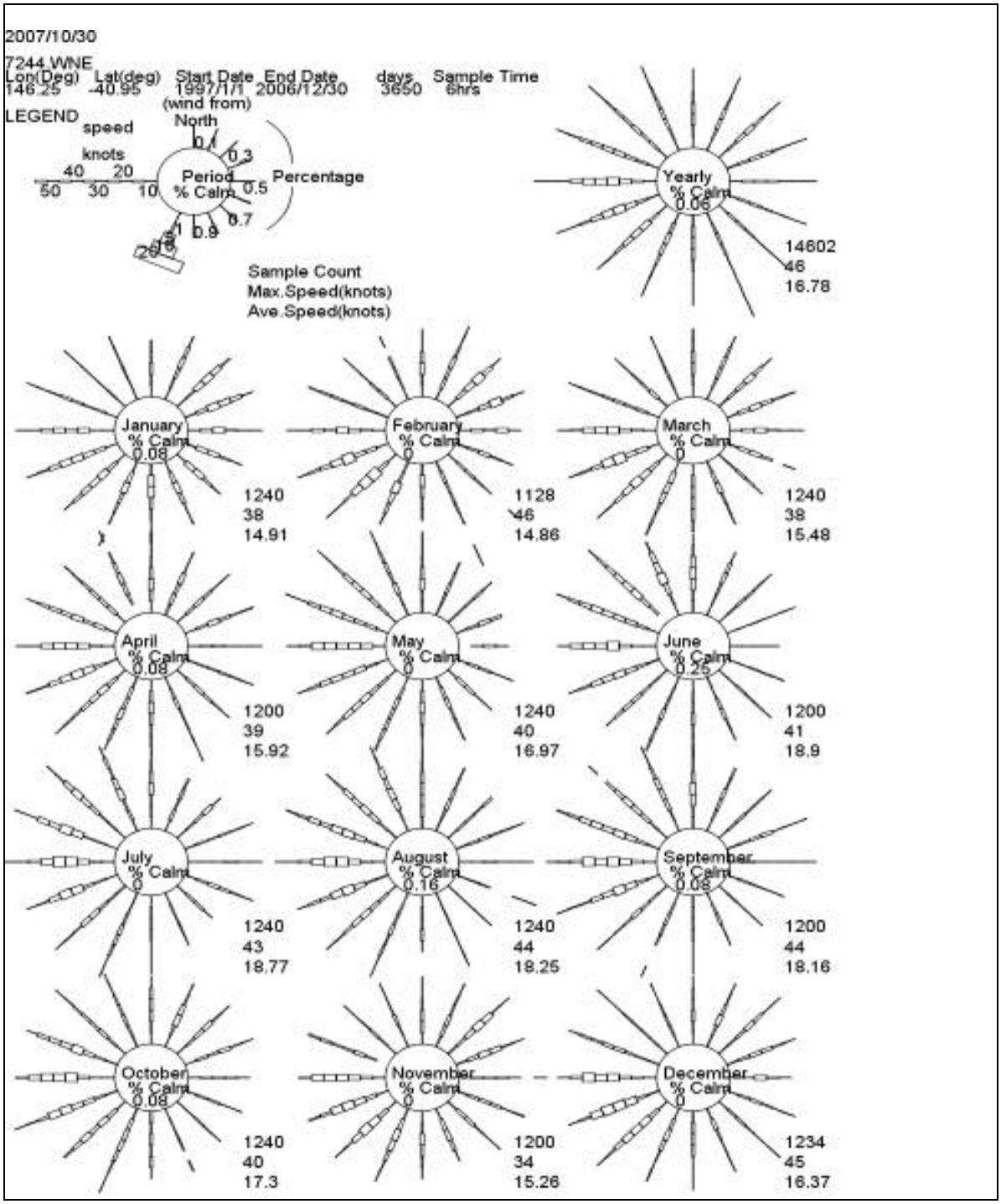


Figure 19b: Monthly and yearly wind roses for the nearby wind data (1997-2006) station 7244

Appendix 1: Rig Oil Spill Equipment

Shipboard Oil Pollution Emergency Plan

APPENDIX 7

LIST OF OIL SPILL RESPONSE EQUIPMENT CARRIED ON BOARD AND MAINTENANCE SCHEDULE

ITEM	DESCRIPTION / LOCATION	NUMBER
SKO-20	Oil Spill Kit / Starboard Crane	1 Kit
SKO-20	Oil Spill Kit / Port Crane	1 Kit
SKH-55	Chemical Spill Kit / Mud Pumps	1 Kit
SKO-20	Oil Spill Kit / Engine Room	1 Kit
SKO-240	Oil Spill Kit / Mixing Hopper	1 Kit
SKO-240	Oil Spill Kit / Mixing Hopper	1 Kit

Appendix 9: Material Safety Data Sheets

Appendix 9: Material Safety Data Sheets (MSDS)

- **Diesel Fuel**
- **Corexit 9500 (Oil Spill Dispersant)**
- **Shell VDC (Oil Spill Dispersant)**
- **ACCOLADE System MSDS**
- **ACCOLADE Base MSDS**

DIESEL FUEL

SYNONYMS: Diesel Fuel, BP, BP Diesoleum

Un#:	NCAD	CLASS:C1	SUB RISK:	HAZCHEM CODE:
ERG:		PACKAGING GROUP		POISON SCHEDULE

Uses: Fuel for diesel engines

PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colourless to brown, ,mobile liquid with a mild, hydrocarbon odour

Flash Point: >61 deg C **Solubility (Water)**: Insoluble

Explosion: LEL:0.7% UEL:5.0%

INGREDIENTS

Chemical Name	**CAS Number**	**Proportion**
*Diesel exhaust fumes	Diesel exhaust	
Hydrocarbon blend predominantly C9-C20,	68334-30-5	
may contain significant level of polycyclic aromatics		

HEALTH HAZARD INFORMATION

INGESTION

Unlikely to cause harm if swallowed in small does, though larger quantities may cause nausea and diarrhoea.

EYE

Irritant, may cause transient stinging or redness.

SKIN

Mildly irritating. Contact with the product may defat and irritate the skin and contribute to dermatitis.

INHALATION

Product has low volatility so inhalation of hazardous quantities of vapour is unlikely to occur during normal use. However, if inhaled, vapours have anaesthetic properties and may cause headache, nausea and dizziness. Higher concentrations may cause unconsciousness and coma.

FIRST AID PROCEDURE

INGESTION

NEVER GIVE AN UNCONSCIOUS PERSON ANYTHING TO DRINK NOR ATTEMPT TO INDUCE VOMITING. If person is conscious, rinse mouth out with water ensuring that mouth wash is not swallowed. Give about 250ml (2 glasses) of water to drink. DO NOT attempt to induce vomiting. Seek medical attention.

EYE

Hold eyelids open and rinse the eye continuously with a gentle stream of clean running water for at least fifteen minutes. Seek medical attention.

SKIN

Remove contaminated clothing and wash thoroughly with soap and water. Use water alone, if soap is unavailable. Apply a moisturising hand cream, if available. Seek attention if any soreness or inflammation of the skin persists or develops. Launder affected clothing before re-use.

INHALATION

Remove to fresh air. Keep warm and at rest. If breathing is laboured, hold in a half upright position (this assists respiration). Apply artificial respiration if breathing has stopped. Seek medical attention.

PRECAUTIONS FOR USE

ENGINEERING CONTROL

Areas where the product is dispensed must be well ventilated

FLAMMABILITY

Combustible. Vapour can form flammable mixtures with air on heating. May evolve toxic fumes if heated strongly or burned. Product soaked rags, paper or material used to absorb spillage's, represent a fire hazard and should not be allowed to accumulate. Dispose safely after use. The product may react with strong oxidising agents such as liquid or powdered chlorine.

PERSONAL PROTECTION

If the operation is such that splashing or repeated skin contact might reasonably be anticipated then safety goggles or face shield, overalls and PVC or natural rubber gloves should be worn. DO NOT enter storage tanks without air supplied breathing apparatus unless the tank has been well ventilated and atmospheric testing has shown that the atmosphere contains less than 1% of the lower flammable limit and 20% oxygen.

SAFE HANDLING PROCEDURE

Store out of direct sunlight ion a cool well ventilation area below 25 degrees Celsius. Higher temperatures may cause pressure build up inside containers. Avoid all sources of ignition and segregate from oxidising agents. Protect containers against physical damage.

COREXIT 9500

TECHNICAL PRODUCT BULLETIN #D-4 USEPA, OIL PROGRAM CENTER

ORIGINAL LISTING DATE: APRIL 13, 1994
REVISED LISTING DATE: DECEMBER 18, 1995

"COREXIT 9500"

I.NAME, BRAND, OR TRADEMARK

COREXIT 9500 (EC9500A)
T
Type of Product: Dispersant

II.NAME, ADDRESS, AND TELEPHONE NUMBER OF MANUFACTURER/CONTACT

Nalco/Exxon Energy Chemicals, LP

P.O. Box 87
Sugar Land, TX 77487-0087
Phone: (281) 263-7879 (Mr. Marty Utterback)
Phone: (281) 263-7265 (Ms. Marge Walsh)

24-hour Emergency Number: ABASCO at (800) B4 A SPIL
or Nalco Exxon at (281) 263-7200
Fax: (281) 263-7955

III.NAME, ADDRESS, AND TELEPHONE NUMBER OF PRIMARY DISTRIBUTORS

ABASCO
363 W. Camino Road
Houston, TX 77238-8573
Phone: (281) 931-4400

Nalco/Exxon Energy Chemicals, L.P. P.O. Box 87 Sugar Land, TX 77487-0087
Phone: (800) 333-3714

Nalco/Exxon Energy Chemicals, L.P.
P.O. Box 220
Long Beach, CA 90801
Phone: (310) 639-1553

Nalco/Exxon Energy Chemical, L.P.
701 E. Tudor St., #290
Anchorage, AK 99503
Phone: (907) 563-9866

IV.SPECIAL HANDLING AND WORKER PRECAUTIONS FOR STORAGE AND FIELD APPLICATION

1.Flammability:
IMO - Non-flammable; DOT - Non-hazardous.
2.Ventilation:
Use with ventilation equal to unobstructed outdoors in moderate breeze.
3.Skin and eye contact; protective clothing; treatment in case of contact:
Avoid eye contact. In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention. Avoid contact with skin and clothing. In case of skin contact, immediately flush with large amounts of water, and soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention. For open systems where contact is likely, wear long sleeve shirt, chemical resistant gloves, and chemical protective goggles.
4.a.Maximum storage temperature: 170F
4.b.Minimum storage temperature: -30F
4.c.Optimum storage temperature range: 40F to 100F
4.d.Temperatures of phase separations and chemical changes: None

V.SHELF LIFE

The shelf life of unopened drums of COREXIT 9500 is unlimited. Containers should always be capped when not in use to prevent contamination and evaporation of solvents.

VI.RECOMMENDED APPLICATION PROCEDURE

1.Application Method:

COREXIT 9500 is a high performance, biodegradable oil spill dispersant concentrate that is effective on a wide range of oils. COREXIT 9500 contains the same surfactants present in COREXIT 9527 and a new improved oleophilic solvent delivery system.
Aerial Spraying - Aircraft provide the most rapid method of applying dispersants to an oil spill and a variety of aircraft can be used for spraying. For aerial spraying, COREXIT 9500 is applied undiluted. Typical application altitudes of 30 to 50 feet have been used, although higher altitudes may be effective under certain conditions. Actual effective altitudes will depend on the application equipment, weather and aircraft. Careful selection of spray nozzles is critical to achieve desired dose levels, since droplet size must be controlled. Many nozzles used for agricultural spraying are of low capacity and produce too fine a spray. A quarter-inch open pipe may be all that is necessary if the aircraft travels at 120 mph (104 knots) or more, since the air shear at these speeds will be sufficient to break the dispersant into the proper sized droplets. Boat Spraying - COREXIT 9500 may also be applied by workboats equipped with spray booms mounted ahead of the bow wake or as far forward as possible. The preferred and most effective method of application from a workboat is to use a low-volume, low-pressure pump so the chemical can be applied undiluted. Spray equipment designed to provide a five to ten percent diluted dispersant solution to the spray booms can also be used. COREXIT 9500 should be applied as droplets, not fogged or atomized. Natural wave or boat wake action usually provides adequate mixing energy to disperse the oil. Recent tests have indicated that a fire monitor modified with a screen cap for droplet size control may also be useful for applying COREXIT 9500. Due to the increased volume output and the greater reach of the fire monitor, significantly more area can be covered in a shorter period of time.
System Calibration - Spray systems should be calibrated at temperatures anticipated to insure successful application and dosage control. Application at sub-freezing temperatures may require

larger nozzle, supply lines and orifices due to higher product viscosity. Refer to Nalco/Exxon Energy Chemical's TECHNIFAX® TX-116 charts for calibration information.

2.Concentration/Application Rate:

A treatment rate of about 2 to 10 U.S. gallons per acre, or a dispersant to oil ratio of 1:50 to 1:10 is recommended. This rate varies depending on the type of oil, degree of weathering, temperature, and thickness of the slick.

3.Conditions for Use:

As with all dispersants, timely application ensures the highest degree of success. Early treatment with COREXIT 9500, even at reduced treat rates, can also counter the "mousse" forming tendencies of the spilled oil. Thus, with the enhanced penetration capability and emulsion fighting properties, the "window of opportunity" to successfully treat the spill is increased with COREXIT 9500. COREXIT 9500 is useful on oil spills in salt water.

VII. TOXICITY

Material Tested	SPECIES	LC50 (ppm)
COREXIT 9500	Menidia beryllina	25.20 96-hr
	Mysidopsis bahia	32.23 48-hr
No. 2 Fuel Oil	Menidia beryllina	10.72 96-hr
	Mysidopsis bahia	16.12 48-hr
COREXIT 9500 & No. 2 Fuel Oil (1:10)	Menidia beryllina	2.61 96-hr
	Mysidopsis bahia	3.4 48-hr
Reference Toxicant (SDS)	Menidia beryllina	7.07 96-hr
	Mysidopsis bahia	9.82 48-hr

NOTE: This toxicity data was derived using the concentrated product. See Section VI of this bulletin for information regarding the manufacturer's recommendations for concentrations and application rates for field use.

1. Effectiveness*

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OILS

VENDOR LAB REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	45.3%
South Louisiana Crude	54.7%
Average of Prudhoe Bay and South Louisiana Crudes	50.0 %

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

Oil	Effectiveness, %
Prudhoe Bay Crude	49.4%

South Louisiana Crude	45.4%
Average of Prudhoe Bay and South Louisiana Crudes	47.4%

EPA is reporting these numbers as an additional reference for On-Scene Coordinators (OSCs). EPA recognizes that large discrepancies may exist between lab results. EPA is currently working on revising the Swirling Flask Dispersant Effectiveness Test to facilitate more consistent results between labs and operators.

VIII. PHYSICAL PROPERTIES

1.Flash Point: 176F (SETA closed cup; ASTM D3278)
2.Pour Point: -70F (ASTM D97)
3.Viscosity: 55 cSt (at 68F)
4.Specific Gravity: 0.949 (at 60F, ASTM D1963)
5.pH: 6.4
6.Chemical Name and Percentage by Weight of the Total Formulation: CONFIDENTIAL
7.Surface Active Agents: CONFIDENTIAL
8.Solvents: CONFIDENTIAL
9.Additives: None
10.Solubility: Soluble in fresh water, but dispersable in sea water

IX. ANALYSIS FOR HEAVY METALS, CYANIDE, AND CHLORINATED HYDROCARBONS

COMPOUND	CONCENTRATION (ppm)
Arsenic	0.16
Cadmium	N/D
Chromium	0.03
Copper	0.10
Lead	N/D
Mercury	N/D
Nickel	N/D
Zinc	N/D
Cyanide	N/D
Chlorinated Hydrocarbons	N/D

N/D = Not detected

SHELL VDC

Manufacturer Details: Shell Chemical (Australia) Pty Ltd, 22 Bracks Street, North Fremantle WA 6169 TEL: 08 94321222 FAX: 08 94321234

SYNONYMS: None

UN: NCA **CLASS:** None **SUB RISK:** **HAZCHEM CODE:**

EPG: **PACKAGING GROUP:** **POISON SCHEDULE:** 6

USES: Dispersal of oil at sea.

PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Pale straw liquid with a mild odour

BOILING POINT: No data available **MELTING POINT:** No data available

VAPOUR PRESSURE: No data available **VAPOUR DENSITY:** >1

SPECIFIC GRAVITY: 0.99 **SOLUBILITY (WATER):** Soluble

FLASH POINT: 67 deg C **EXPLOSION LIMITS:** No data available

% VOLATILES: 40 **pH:** No data available

INGREDIENTS

Chemical Name		CAS Number Proportion
Biodegradable anionic and nonionic surfactants		>60%
Ethylene glycol monobutyl ether	111-76-2	<40%

HEALTH HAZARD INFORMATION

INGESTION:

Irritating to upper gastrointestinal mucosa and toxic due to ethylene glycol monobutyl ether component.

EYE:

Irritant. May cause injury to eye tissue if not promptly removed.

SKIN:

Irritating. Contact with the product may irritate sensitive skin and contribute to dermatitis. Ethylene glycol monobutyl ether may be absorbed through intact skin.

INHALATION:

Product contains ethylene glycol monobutyl ether (<40%) but it has very low volatility and would not be expected to create a vapour hazard in normal use. Inhalation of high vapour concentrations cause irritation and may produce light-headedness and disorientation. May act as an anaesthetic.

CHRONIC

Ethylene glycol monobutyl ether

TDLo (oral, woman): 600mg/Kg

TCLo (inhaled, human): 195ppm/8H

LD50 (oral, rat): 470mg/Kg

LC50(inhaled, rat): 450ppm/4H

LD50 (skin, rabbit): 220mg/Kg

This compound was the subject of an NH&MRC alert re reproductive hazards. (October 1982). Inhalation of mist, ingestion and skin contact are the routes of entry into the body. The product defats the skin and prolonged or repeated contact may contribute to dermatitis.

FIRST AID PROCEDURES

INGESTION:

NEVER GIVE AN UNCONSCIOUS PERSON ANYTHING TO DRINK NOR ATTEMPT TO INDUCE VOMITING. If person is conscious, rinse mouth out with water ensuring that mouth wash is not swallowed. If more than 15 minutes from a hospital, induce vomiting, preferably using IPECAC syrup APF. Seek URGENT medical attention.

EYE:

Hold eyelids open and rinse the eye continuously with a gentle stream of clean running water for at least fifteen minutes. Seek medical attention.

SKIN:

Wash off with soap and water. Use water alone, if soap is unavailable. Apply a moisturising hand cream, if available. Seek medical attention if any soreness or inflammation of the skin develops.

INHALATION:

First aid is unlikely to be required as a result of exposures due to normal use. However, if over-exposure does occur, remove from exposure. Keep warm and at rest. Seek medical attention.

PRECAUTIONS FOR USE

ENGINEERING CONTROL:

General (mechanical) ventilation is adequate for normal use. If the product is handled in such a way that high levels of mists or vapours are generated local exhaust ventilation may be required.

FLAMMABILITY:

Combustible. May evolve oxides of carbon if heated to decomposition or burned.

PERSONAL PROTECTION:

Safety goggles, polyvinyl chloride (PVC) gloves, apron and boots. A half face respirator with organic solvent filter may be required if handling large volumes in a poorly ventilated area or if generating mists.

EXPOSURE STANDARD

	E.S.		TWA		STEL	
CHEMICAL NAME	**ppm**	**mg/m3**	**ppm**	**mg/m3**		
Ethylene glycol monobutyl ether	25.00	121.0				Skin

T.L.V.	**TWA**		**STEL**	
CHEMICAL NAME	**ppm**	**mg/m3**	**ppm**	**mg/m3**

Ethylene glycol monobutyl ether	25.0121.00

SAFE HANDLING PROCEDURES

STORAGE TRANSPORT: Transport is not regulated. General storage is adequate. Segregate from strong oxidising agents. Protect containers against physical damage.

SPILLS DISPOSAL:

SPILLS: Eliminate sources of ignition. Stop leak if possible. Contain spill and cover with an absorbent such as earth, sand or a commercial oil absorber. Sweep up and dispose to approved land-fill. If spilled into water, remove from surface by skimming or with suitable absorbents.
DISPOSAL: If possible, return to supplier. Otherwise, dispose to approved land-fill.

FIRE EXPLOSION:

Combustible. May evolve smoke and toxic fumes, such as nitrogen oxides, carbon monoxide, carbon dioxide, if heated to decomposition or burned. Wear self-contained breathing apparatus. Extinguish using whatever is suitable for the primary cause of the fire. Avoid spraying water directly into storage containers due to danger of boilover.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: ACCOLADE® SYSTEM

Revision Date: 02-Aug-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to criteria of WorkSafe

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
53-55 Bannister Road
Canning Vale
WA 6155
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name:	ACCOLADE® SYSTEM
Synonyms:	None
Chemical Family:	Blend
UN Number:	None
Dangerous Goods Class:	None
Subsidiary Risk:	None
Hazchem Code:	None
Poisons Schedule:	None
Application:	Mud System

Prepared By Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	Australia NOHSC	ACGIH TLV-TWA
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.1 mg/m^3	0.025 mg/m^3

2. COMPOSITION/INFORMATION ON INGREDIENTS

Crystalline silica, tridymite	15468-32-3	0 - 1%	0.1 mg/m^3	0.05 mg/m^3
Crystalline silica, quartz	14808-60-7	1 - 5%	0.1 mg/m^3	0.025 mg/m^3
Alkenes		1 - 5%	Not determined	Not applicable
Calcium chloride	10043-52-4	1 - 5%	Not determined	Not applicable
Water	7732-18-5	10 - 30%	Not determined	Not applicable
Barium sulfate	7727-43-7	30 - 60%	10 mg/m^3	10 mg/m^3

Total to 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation. May be harmful if swallowed.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

Hazard Ratings

Flammability:	0
Toxicity:	0
Body Contact:	0
Reactivity:	0
Chronic:	0

Scale: Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Unsuitable Extinguishing Media None known.

Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Store away from oxidizers. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Organic vapor respirator with a dust/mist filter.
Hand Protection	Impervious rubber gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Brown
Odor:	Hydrocarbon
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.2-2.16
Density @ 20 C (kg/l):	Not Determined
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Hydrocarbons. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Inhalation

May cause respiratory irritation.
May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
May cause silicosis, which reduces lung function. The lung damage can lead to heart problems. Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	May produce nervous system effects such as feeling of weakness, unsteady walk, and dilation of blood vessels. May affect the heart and cardiovascular system.
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.
Chronic Effects/Carcinogenicity	Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis. Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2). There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.
Other Information	For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined

Persistence/Degradability	Not applicable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

EPG:	Not determined
IERG:	Not determined
Labels:	None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory	Not Determined
US TSCA Inventory	All components listed on inventory.
EINECS Inventory	This product, and all its components, complies with EINECS
Classification	Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.
Risk Phrases	None
Safety Phrases	None

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS

U.S. Pat. No. 6,887,832

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand Poisons Information System
Deunedin: -(03) 479 1200 (Normal Hours)
-(03) 474 0999 (Emergency)

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: ACCOLADE BASE

Revision Date: 03-Jan-2008

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Not classified as hazardous according to criteria of WorkSafe

Manufacturer/Supplier

Halliburton/Baroid Australia Pty. Ltd.
53-55 Bannister Road
Canning Vale
WA 6155
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
New Zealand: 06-7559274

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: ACCOLADE BASE
Synonyms: None
Chemical Family: Fatty Acid Ester and Olefin Blend
UN Number: None
Dangerous Goods Class: None
Subsidiary Risk: None
Hazchem Code: None
Poisons Schedule: None
Application: Base Fluid

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	Australia NOHSC	ACGIH TLV-TWA
Fatty acid ester		10 - 30%	Not applicable	Not applicable

ACCOLADE BASE
Page 1 of 6

Total to 100%

3. HAZARDS IDENTIFICATION

Hazard Overview	May cause eye, skin, and respiratory irritation. May be harmful if swallowed.
Hazard Ratings	
Flammability:	0
Toxicity:	0
Body Contact:	1
Reactivity:	0
Chronic:	0

Scale: Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician	Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Unsuitable Extinguishing Media	None known.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.
Storage Information	Store away from oxidizers. Keep container closed when not in use. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Not normally needed. But if significant exposures are possible then the following respirator is recommended: Organic vapor respirator.
Hand Protection	Impervious rubber gloves. Nitrile gloves. Viton gloves Polyurethane gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Colorless to Light yellow
Odor:	Mild hydrocarbon
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	0.8-0.82
Density @ 20 C (kg/l):	0.82
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	240
Freezing Point/Range (C):	-30
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	134
Flash Point Method:	COC
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	0
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	1.69 (OECD117)
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.

Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause mild respiratory irritation.
Skin Contact	May cause mild skin irritation.
Eye Contact	May cause mild eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

EPG: Not determined
IERG: Not determined
Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory Not Determined
US TSCA Inventory All components listed on inventory.
EINECS Inventory This product, and all its components, complies with EINECS

Classification Xn - Harmful.

Risk Phrases
R53 May cause long-term adverse effects in the aquatic environment.
R65 Harmful: may cause lung damage if swallowed.
R66 Repeated exposure may cause skin dryness or cracking.

Safety Phrases
S56 Do not discharge into drains or the environment. Dispose to an authorized waste collection point.
S57 Use appropriate containment to avoid environmental contamination.
S60 This material and/or its container must be disposed of as hazardous waste.
S61 Avoid release to the environment. Refer to special instructions/Safety data sheets. S62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

ACCOLADE BASE
Page 5 of 6

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand Poisons Information System
Deunedin: -(03) 479 1200 (Normal Hours)
-(03) 474 0999 (Emergency)

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

Appendix 10: Oil Sampling and Handling Procedures

Appendix 10: Oil sampling and Handling Procedures

1. Oil Sampling and Handling Procedures

Sampling of an oil slick is desirable so as to measure the weathering characteristics of the oil, to estimate movement timeframes, or so that the source of the oil can be verified.

It is important too that when samples are taken that possible contamination is minimised and that samples are clearly labelled. Typically it is advisable to request AMSA or MSV to conduct the sampling, the following guidelines should be followed wherever practical:

- Oil samples from the sea surface are to be taken using clean glass or stainless steel instruments where possible;
- Spoons, spatulas or clean jars are suitable and funnels may be used for viscous oils;
- Clean wooden spatulas or spoons may be used; but should only be used once and plastic instruments should be avoided;
- Oil samples are to be placed in glass jars, or bottles if jars are not available:
  - tops to be screw-type and not soft plastic,
  - if teflon or metal lids are not available lids are to be isolated using tin or aluminium foil,
  - unless containers are supplied by a laboratory it may be safer to seal lids with foil as a matter of routine.
- Sample sizes should be at least 100ml but preferably 1 litre of oil should be taken;
- Jars are to be labelled with;
  - time and date,
  - location,
  - name of sample vessel tanker (and witness)
  - brief description of sample (e.g. `brown emulsion from sea surface', or black tar from Beach)
- A "Chain of Custody" label or "Continuity Tag" is to be attached to the jar or bottle neck and signed by the sampler and countersigned by one other person (preferably the "witness" above);
- Lids are to be sealed with two security labels; if available;
- Samples are to be chilled or refrigerated, as soon as possible (4c) for later transported to a recognised laboratory;
- The On-Scene Controller will nominate a laboratory should an analysis of samples be required.

Note: Samples taken by Victorian Authorities or AMSA are likely to be analysed by the Australian Government Analytical Laboratories (AGAL), in Perth.