Atlas Drilling (Seadrill) / Beach Petroleum / ADA

VESSEL SAFETY CASE

REVISION DOCUMENT
for
OTWAY and BASS BASINS
EXPLORATION DRILLING CAMPAIGN

Utilising the

WEST TRITON JACK-UP MODU

(Revision 0 - 2008)

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1. VSCR Document Management

1.1 Document Approvals

The contents of this Vessel Safety Case Revision (VSCR) Document has been reviewed by Seadrill and Beach Petroleum/Australian Drilling Associates (Beach/ADA) to ensure the intent meets the requirements of Part 3, Division 1 of the Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996.

Atlas Drilling (Seadrill) and Beach/ADA agree:

1. All campaign specific hazards have been identified and the associated risks have been eliminated or measures have been taken to control them to ALARP;
2. All campaign specific controls documented in the West Triton VSC FSA [1.3] have been identified and have been/will be put in place;
3. No modifications are required to the West Triton to conduct the Beach Petroleum drilling campaign;
4. By following the requirements stated in this VSCR document for ongoing Hazard Identification and Risk Management, any new or modified risks shall be identified and treated to ALARP;
5. The contents, intent and requirements within this VSCR Document have been, and will continue to be communicated to the West Triton workforce.

This approval provides an assurance that risks are ALARP and operations on the Beach Petroleum Otway and Bass Basin Drilling Campaigns can be conducted within the normal capabilities of the West Triton.

This VSCR Document is approved for the Otway Basin VIC-P46 and Bass Basin T/38P/39P 2008 exploration drilling campaigns.

Atlas Drilling (Seadrill) Approval :

Regional Operations Manager :

(Name, Date and Signature)

West Triton Rig Manager :

(Name, Date and Signature)

Seadrill HSEQ Manager :

(Name, Date and Signature)

Beach Petroleum/ADA Approval :

Beach Petroleum Exploration Manager :

(Name, Date and Signature)

ADA Drilling Manager :

(Name, Date and Signature) : Paul Barrett 24/8/08

ADA HSE Manager :

(Name, Date and Signature) : Kerri Reeks 22/08/08

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Regional Operations Manager :

(Name, Date and Signature)

West Triton Rig Manager :

(Name, Date and Signature)

Seadrill HSEQ Manager :

(Name, Date and Signature)

Beach Petroleum/ADA Approval :

Beach Petroleum Exploration Manager : 14/7/08

(Name, Date and Signature) Neil Gibbins Exploration Manager

ADA Drilling Manager :

(Name, Date and Signature)

ADA HSE Manager :

(Name, Date and Signature)

1.2 Distribution List

ATLAS Drilling (Seadrill)

1.	Atlas Drilling (Seadrill) Regional Operations Manager
2.	West Triton Rig Manager
3.	West Triton OIM
4.	Seadrill HSEQ Manager
5.	West Triton Rig Library

Beach Petroleum/ADA

6.	Beach Petroleum Exploration Manager
7.	Beach Petroleum Geology
8.	Beach Petroleum HSE Coordinator
9.	ADA Operations/Drilling Manager
10.	ADA Drilling Superintendent
11.	ADA Senior Drilling Engineer
12.	ADA Drilling Supervisor
13.	ADA Materials and Logistics Superintendent
14.	ADA HSE Manager
15.	ADA Library

Swire Pacific Australia (Supply Vessel Operator)

16.	Operations Manager
17.	Pacific Valkyrie – Master
18.	Pacific Battler – Master

Bristow Helicopters (Aviation Provider)

19.	Bristow Operations Manager
20.	Bristow's Chief Pilot (Essendon)

Designated Authorities

21.	NOPSA
22.	Vic DPI
23.	DIER Tasmania

1.3 Document Control

This Safety Case Revision Document (Bridging Document) is a "*Controlled Document*". Should the recipient (user) become aware of any changes or corrections that are required please photocopy this page and the relevant page(s) to be changed, note the corrections and deliver them to:

Atlas Drilling (Seadrill Management (S) Pte Ltd)

West Triton Rig Manager

Atlas Drilling (S) Pte Ltd
1/274 Salmon Street
Port Melbourne
Victoria 3207, Australia

1.3.1 Document Revisions

The Seadrill West Triton Rig Manager, ADA Drilling Manager and/or Beach Petroleum General Manager are jointly responsible for approving any update or revision to this VSCR Document, any updates and/or any revisions to this Document. Responsibility for managing change within the project is detailed in the West Triton Vessel Safety Case [1].

1.3.2 Change Request Form

Name:

Position:

Document Issue Number:

Tel: Fax:

Please note the following requested / recommended changes to the following page(s):

Section: ..... Pages: .....

Section: ..... Pages: .....

Requested Changes:

DOCUMENT REVISION RECORD				
Version	**Section Number(s)**	**Page Numbers**	**Date of Latest Revision**	**Approved (Seadrill/Beach/ADA)**
0	*All*	*All*	*July 2008*	
C	*All*	*All*	*July 2008*	
B	*All*	*All*	*June 2008*	
A	*All*	*All*	*June 2008*	

For un-issued versions, the letters A, B, C etc. to be used;
For original issued versions, the numbers 0, 1, 2 etc. to be used;

To determine if an individual page has been revised or updated, identify the page number in the Revision Record above and confirm if the latest revision number listed, is the same as the revision number listed on the page footer. If they match, the page is fully updated.

1.4 Glossary

Acronym	Description
ADA	Australian Drilling Associates
AHTS	Anchor Handling, Towing and Support Vessel
ALARP	As Low As Reasonably Practicable
AMSA	Australian Maritime Safety Authority
Application for Permission to Drill	Application made to the Designated Authority for 'Approval to Drill' Information contained therein includes the well location, permit information, well targets, geology, logging and sampling programme. Drilling operation details are contained in the Drilling Program
ARPA	Automatic Radar Plotting Aid
Atlas Drilling	Atlas Drilling Singapore Pty. Ltd, the Nominated Operator of the West Triton, referred to in this document as Seadrill
Beach	Beach Petroleum Limited
BOSIET	Basic Offshore Safety Induction and Emergency Training
BSC	Bass Strait Consortium
Campaign	The well operations conducted by the West Triton within a designated geographical area and time period as described in the VSCR
CASA	(Australian) Civil Aviation Safety Authority
CFST	Crew Familiarization and Systems Testing
Designated Authority (DA)	Victorian Department of Primary Industries (DPI) For Tasmanian permit areas the DA is the Department of Infrastructure, Energy and Resources (DIER), Director of Mines
Drilling Program	An approved document that describes the procedures and limitations under which an Operation must be conducted. It describes, where applicable, the engineering principles behind the design of these items. The programme is approved prior to commencement of operations in accordance with Beach Petroleum Drilling and Completions Process Manual [14]
Drilling Superintendent	Person who represents ADA onboard the Rig, and who is responsible for ensuring that the objectives of the Drilling, Completions, Testing or Abandonment/Suspension Programme are reached, by directing and supervising the work of the Drilling Contractor, Third Party Contractors onboard the West Triton and the Support Contractors.
EL	Elevation
ER	Emergency Response
ERM	(West Triton) Emergency Response Manual
ERP	Emergency Response Plan (Well Specific)
ESD	Emergency Shutdown
FSA	Formal Safety Assessment
Good Oil-field Practice	All those things that are generally accepted as good and safe in the carrying on of exploration for petroleum, or in Operations for the recovery of petroleum, as the case may be.
H_2S	Hydrogen Sulphide
HAZID	Hazard Identification and Risk Assessment Workshop

Acronym	Description
HSE	Health Safety and Environment
HSE MS	ADA Health, Safety and Environment Management System
ISPS	International Ship and Port Facility Security Code
JSA	Job Safety Analysis
MAE	Major Accident Event
MedEvac	Medical Evacuation
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit (the Rig)
MOPO	Matrix of Permitted Operations
MSDS	Material Data Safety Sheets
MTOFSA	(Australian) Maritime Transport and Offshore Facility Security Act
NOPSA	National Offshore Petroleum Safety Authority
OHS	Occupation Health and Safety
OIM	Offshore Installation Manager
OPA	Offshore Petroleum Act 2006
PPE	Personal Protective Equipment
PTW	Permit to Work (Seadrill)
SIMOPS	Simultaneous Operations
SMS	Safety Management System (Seadrill)
SOP	Standard Operating Procedures
Support Contractor	Primary Contractor contracted by ADA to supply helicopters and AHTS Vessels in support to the Rig
SV	Support Vessel
Third Party Contractors	Third parties contracted by ADA to provide services on the West Triton
Title Holder	Titleholder under the Offshore Petroleum Act 2006. In the case of Exploration Permit – The Permittee Retention Lease – The Lessee Production License – The Licensee
VSC	Vessel Safety Case, being the safety case in respect of the Rig as a facility for the purposes of the Petroleum (Submerged Lands) Act 1967 (Cth)
VSCR	Vessel Safety Case Revision, (this document) being the campaign specific revision of the Vessel Safety Case in respect of the specific location, permit holder and campaign
WOMP	(Beach/ADA) Well Operations Management Plan

2. Introduction

Beach Petroleum Limited (Beach) intends to contract the Seadrill West Triton Jack-Up Mobile Offshore Drilling Unit (MODU) to conduct up to a one well drilling campaign offshore in the Otway Basin of Victoria in permit area VIC-P46 in Q3 2008 and a two well drilling campaign offshore in the Bass Basin of Tasmania in permit area T/38P and T/39P. Australian Drilling Associates (ADA) Pty Ltd has been appointed by Beach Petroleum as the Drilling Campaign Project Manager. ADA has extensive drilling experience in this area and established management systems which will be utilised by Beach in this drilling program.

The West Triton has a National Offshore Petroleum Safety Authority (NOPSA) accepted Vessel Safety Case (VSC) [1] approved 21 December 2007 (Ref:T3: R000065 Id. A11296). This document represents a review of the Vessel Safety Case Revision (VSCR) as it applies to the Beach Offshore Otway and Bass Basin Drilling Campaigns[1] for the Bernoulli-1 OR Fermat-1 in Vic P46 and Spikey Beach-1 and Pee Jay1 exploration wells in 2008.

It is intended that all drilling activities conducted on the West Triton will be undertaken under the Seadrill Safety Management System (SMS) [1.2], unless otherwise stated this document.

2.1 Nominated Operator

It is acknowledged that Atlas Drilling (S) Pte Ltd (hereinafter referred to as Seadrill) is the Nominated Facility Operator of the West Triton as defined under the P(SL) (Management of Safety on Offshore Facilities) Regulations 1996 [2]. As such, the Rig will be under the day-to-day control and management of the Seadrill Offshore Installation Manager (OIM) as the Seadrill Operator representative.

Seadrill have a legal responsibility as the nominated Facility Operator of the West Triton to ensure that all activities undertaken on the Rig are done so in a safe manner and that the risks associated with the work activity are managed to an acceptable level. In order to achieve this Seadrill have in place a comprehensive SMS and Risk Management process.

Seadrill will ensure that all activities undertaken on the Rig are conducted and managed under the Seadrill SMS and all personnel including third party contractors will be provided with induction training into the SMS system prior to undertaking work on the West Triton. Table 1 defines the responsibility of Seadrill under Schedule 3 (Occupational Health and Safety) of the Offshore Petroleum Act 2006 (OPA 2006) [3].

2.1.1 Interface with Title Holder

Design of the wells and/or management of the contributing services (e.g. cementing, testing, logging, etc.) together with any development of operational procedures relating to the design, has been/will be performed by Beach/ADA and approved by Seadrill prior to use. All activities undertaken on the Rig will be performed under the Seadrill SMS and any well operations procedures developed by Beach/ADA relating to well design in the drilling program will comply with Seadrill SMS requirements.

All Beach/ADA operational procedures will be provided to Seadrill for review and acceptance for use on the West Triton and will be incorporated into the Seadrill SMS for the duration of the Beach Petroleum drilling campaign.

Beach/ADA have a duty of care under their HSE Management System (HSE MS) [4] to ensure personnel contracted by Beach/ADA to work on the West Triton, have been assessed as competent to carry out their work and that the equipment intended for use by contracted personnel is validated as fit for purpose, prior to transiting for the Rig.

[1] Currently excludes the well-testing portion of works which will be submitted as an addendum to this submission

ADA is providing third party pre-qualification for Beach Petroleum third-party equipment, of which the results of the pre-qualifications are provided to Seadrill for review, validation and final approval in accordance with OPA Schedule 3 requirements.

Seadrill, the nominated Facility Operator, shall work closely with Beach/ADA to ensure all activities undertaken on the Rig are carried out in a safe manner and that the risks associated with the work activity are managed to As Low As Reasonably Practicable (ALARP). It is Seadrill's requirement that Beach/ADA will cooperate fully in this activity, as documented, and shall provide information, assistance and appropriate support at all times.

This VSCR is in accordance with Regulation 34 of the Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996.

It is considered by Seadrill and Beach/ADA that potential hazards associated with the 2008 Beach Petroleum Drilling Campaign have been identified, communicated to all relevant personnel and/or organisations, are understood, have been addressed and are controlled to ALARP.

2.2 West Triton Australian Contract Administrator

The West Triton has mobilised to Australia under a management arrangement with ADA, who will provide the contract administrator role for the Beach Petroleum 2008 drilling campaign and will assume the safety, well planning, drilling management, emergency support and project administration roles.

ADA provide the rig, support services and project management under a Bass Strait Consortium (BSC) program for a number of participating operators. The well programs involve Australian-based operating companies and the wells will be drilled in Australia's Bass, Otway and Gippsland Basins.

2.3 West Triton Australian Crewing Contract

Seadrill have contracted Integrated Pty. Ltd. (a marine services company) to provide experienced rig crew personnel for the West Triton. Seadrill have committed to ensuring all rig crew personnel are inducted into the Seadrill SMS [1.2], Vessel Safety Case [1], VSCR and the rig equipment prior to activities commencing in Australia.

2.4 Vessel Safety Case Revision (VSCR) Document Objective

The objective of this VSCR Document is to demonstrate that management of safety for the specific Beach/ADA Otway and Bass Basin drilling activities utilizing the West Triton ensures risks are ALARP.

The final completions and well test program has yet to be defined, consequently this VSCR does not cover detailed completions and well testing activities. A separate submission will be made covering completions and well testing. The completions and well test hazard assessment will form an Appendix to this report.

The safety systems interface between Seadrill (as the registered operator of the West Triton), Beach Petroleum (as title holder), ADA (as the Drilling Project Manager) and 3rd Party Contractor systems, are clearly defined, validated and are designed to provide a safe work environment for all personnel involved.

2.5 Methodology

This VSCR has been prepared jointly by Seadrill and the Beach/ADA Drilling Management Team with input from third party and support contractors. The process for developing this VSCR document involved the following steps:

- Review of the NOPSA Safety Case Guidelines Preparation and Submission Document (September 2004) [5];

- Development of the site / well descriptions;
- Review of the West Triton VSC [1] Facility Description [1.1], Safety Management System (SMS) [1.2] and the Formal Safety Assessment (FSA) [1.3] against the proposed Beach Petroleum drilling campaign program [6];
- Identification of SMS responsibilities and interfaces between Seadrill and Beach/ADA;
- Identification and assessment of specific site and well hazards using the Bernoulli-1, OR Fermat-1 Outline Drilling Program, Spikey Beach-1 and Pee Jay-1 in T/38P and T/39POutline Drilling Programs [7, 8, 9, 10] and the West Triton Hazard Register.

The process for developing the site specific Risk Assessments/HAZID appendices involved the following steps:

- Generic West Triton HAZOP (all relevant parties - Singapore 2007) [11];
- Identification of campaign hazards and risk management methodologies (elimination or reduction to ALARP) (ADA project risk assessment – Australia 2007) [12];
- A drilling HAZOP and risk assessment, with involvement from Seadrill personnel Beach/ADA and contractors to assess and agree the well and site specific hazards, associated risks, barriers and controls, and to agree interfaces for routine and emergency operations;
- Well test HAZID (A separate submission will be made covering completions and well testing);
- Preparation of draft VSCR and assurance of legislative compliance;
- Workforce consultation, communication and review;
- Finalisation, dissemination, implementation and ongoing hazard identification, risk management and change control.

2.6 Document Revision

The Seadrill Operations Manager, ADA Drilling Manager and Beach Exploration Manager are accountable for the currency of this Safety Case Revision Document. In general this document will be reviewed and/or revised under the following circumstances:

- Substantial or significant change in the management systems of Seadrill and/or Beach/ADA, or;
- A significant change in the operating area, or;
- A significant change in the planned drilling campaign and/or program, or;
- A mutually agreed improvement.

2.7 Responsibilities under Offshore Petroleum Act 2006 (OPA)

Under the Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996 [2] Seadrill is recognised as the “facility operator” of the West Triton. Seadrill recognises and accepts that as operator they have a legal responsibility to ensure all activities undertaken on the rig are conducted in a safe manner and that the risks are managed to ALARP.

In order to achieve this, Seadrill have in place a comprehensive SMS and risk management process and will ensure all activities undertaken on the rig are conducted and managed in accordance with the Seadrill SMS [1.2].

All personnel, including third party contractors, will be trained in the Seadrill SMS prior to being permitted to undertake any work on the West Triton. All personnel are required, as part of the induction, to acknowledge that they understand that their acceptance and involvement in SMS programs is an expectation of Seadrill and Beach/ADA.

The responsibilities of both Seadrill and Beach/ADA under Schedule 3 (Occupational Health and Safety) of the Offshore Petroleum Act 2006 [3] are summarised below:

Beach Petroleum as Title Holder is responsible for:

- Design and construction of the wells (through ADA);
- Training and ensuring competence of its employees and contractors (through ADA);
- Day to day direction of work associated with the wells, via written work instructions and work programmes (through ADA);
- Provision of logistics support to the Operator of the rig (through ADA);
- Assurance that Beach/ADA suppliers and/or subcontractors have systems in place to manage risks to ALARP, this will be conducted via nominated roles and responsibilities, selection criteria mechanisms and skills requirements as set out in the Beach/ADA HSE MS Manual [4] Organisation and Resources.

Personnel with relevant competencies and experience have been allocated specific roles in the drilling campaign. Appropriate and experienced personnel (onshore and offshore) with specific experience in managing the principal hazards on the wells (including ocean towing and rig positioning) have been contracted for the campaign.

Safety management of 3rd Party Contractors is an integral part of the Beach/ADA tender selection process. All critical contracts require the 3rd Party Contractor to provide a campaign-specific HSE Management Plan which specifies the competency skills for the personnel involved.

Seadrill as Facility Operator is responsible for:

- Seadrill West Triton MODU;
- Seadrill SMS [1.2] and on-board work control systems including;
  - Competency of personnel,
  - Selection of Personnel,
  - Approval of Contractor Personnel,
  - Competency Assessment and Assurance,
- Training and ensuring competency of its employees;
- "Duty of Care" for all personnel on the West Triton;
- Assurance that Seadrill suppliers/subcontractors have systems in place that are 'fit for purpose' to manage risks to ALARP.

Areas of Cooperation are:

- All personnel arriving on the West Triton are required to comply with the West Triton SMS requirements;
- Personnel contracted by Beach/ADA are assessed and considered competent to carry out their work on the Rig;
- Equipment used by personnel contracted by Beach/ADA is assessed and considered fit for purpose;
- Well-related hazards and associated risk have been identified and will be managed by Beach/ADA to ALARP.

A summary of responsibilities under Schedule 3 of the OPA 2006 is provided in Table 1. It is the responsibility of the OIM to ensure that no activity is undertaken on the Rig that may affect the overall safety of the Rig and/or its personnel including those activities that are under the direction of Beach/ADA.

Furthermore, all activities undertaken on the Rig will be performed under the Seadrill SMS and any well operations procedures developed by Beach/ADA relating to well design, operations and drilling must comply with Seadrill SMS requirements.

2.8 West Triton Contract Primary Authority

Beach Petroleum (as title holder) and Seadrill (as owner and operator of the West Triton), authorise the West Triton OIM, as being responsible for the Rig at all times and under all conditions, including the operation of the drilling equipment and the safe conduct of the drilling campaign activities.

This responsibility includes being accountable for the safety of the rig and all associated personnel during activities within the permit areas, within the safety exclusion zone and activities with, or on the West Triton.

Beach/ADA endorses this authority and acknowledges the West Triton OIM is the single approval authority for all work to be conducted within the safety exclusion zone. A number of primary and 3rd party contracting organisations will be involved at various stages of the project. These organisations will operate under the authority of the West Triton OIM while conducting any operations onboard.

The relevant interfaces between Beach/ADA and West Triton management are identified in Diagram 1: Seadrill Rig Organisation Chart and Diagram 2: Beach/ADA -Seadrill Interface Chart.

Diagram 1: Seadrill Offshore Organisation Chart

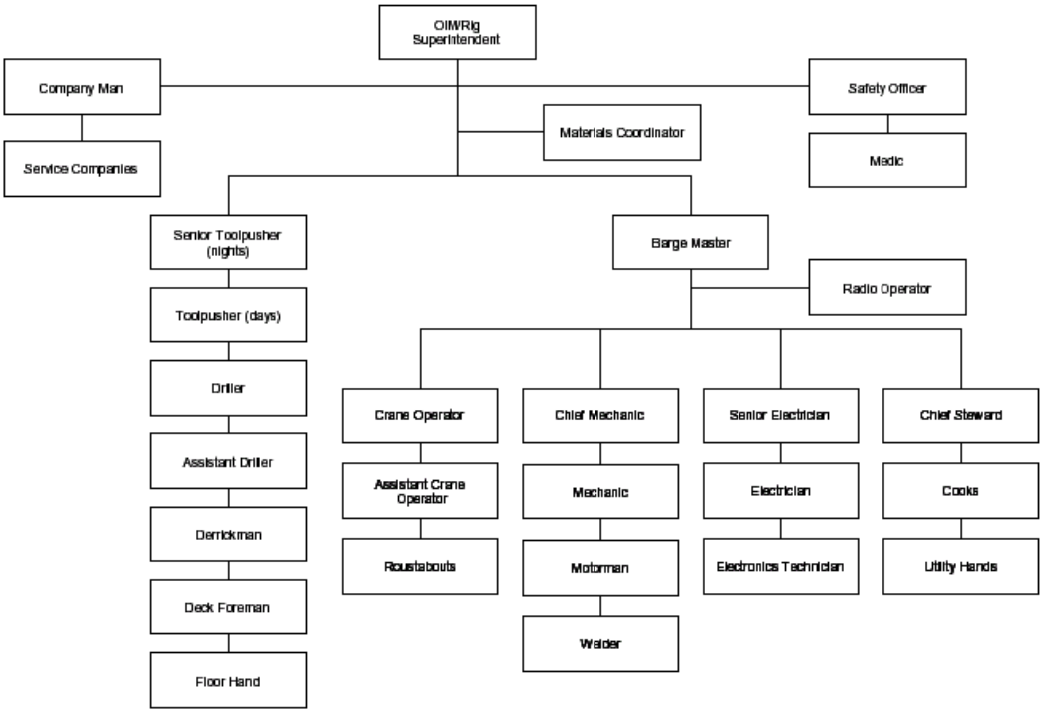


Diagram 2: Beach/ADA - Seadrill Interface Chart

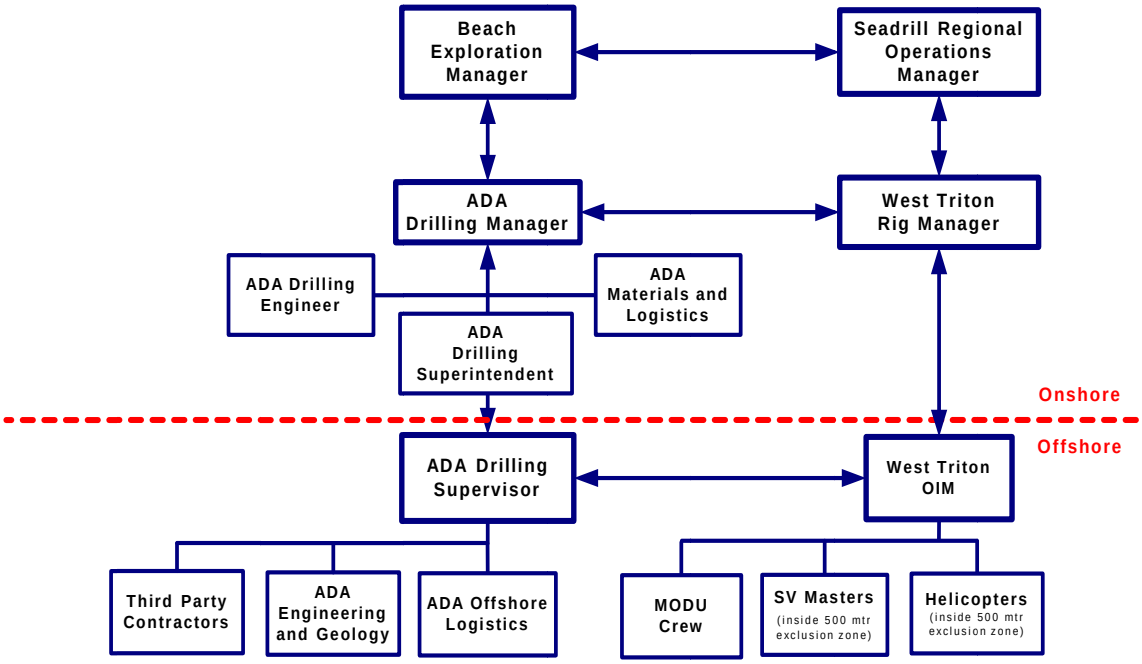


Table 1: Summary of responsibilities under Schedule 3of the OPA

OPA Section	Clause	Responsibility	Comment
Schedule 3 Clause 9	Duties of Operator	Seadrill	- Maintain a policy document relating to safety of Seadrill operations and which is communicated to all employees and third party contractors on the Rig; - Overall responsibility for the safety of all personnel on the West Triton; - Overall management of safety for all West Triton activities including SMS management and control of work activities; - "Duty of care" for all personnel on the West Triton facility; - Assurance that all third party contractors are competent to undertake work assigned to them; - All personnel working on the facility are inducted into the Seadrill SMS; - All third parties are approved by Seadrill for assurance that third party suppliers and sub-contractors have systems in place to manage risk to ALARP.
Schedule 3 Clause 10	Duties of persons in control of parts of facility of particular work	Seadrill	- Ensuring that a safe place of work is provided and maintained for all personnel on the Rig; - Ensuring safe systems of work are provided and followed by all personnel working on or around the Rig; - Ensuring all personnel are inducted into the Seadrill SMS and are assessed as competent to carry out their work; - Ensuring personnel contracted by Beach/ADA who arrive on the Rig are competent to carry out their work; - Equipment used by personnel contracted by Beach/ADA is fit for purpose; - Well related hazards and associated risks have been managed by Beach/ADA to ALARP; - Approval and acceptance of all personnel and equipment as fit for purpose; - Induction training of all third party contractors on the West Triton; - Management systems to ensure all equipment used is certified, validated and fit for purpose; - Training and competence of its employees and contractors; - Management system, procedures and work instructions; - Equipment used by personnel contracted by Beach/ADA is fit for purpose through a formal process of validation.
Schedule 3 Clause 11	Duties of Employers	Seadrill	- Day to day direction of work associated with the well via well programme written work instructions; - Selection and competency verification of Beach/ADA and third party contractors.
Schedule 3 Clause 12	Duties of manufacturers in relation to plant	Seadrill	- Not applicable - Seadrill to not manufacture or import plant or substances.

OPA Section	Clause	Responsibility	Comment
	and substances		
Schedule 3 Clause 13	Duties of suppliers of facilities, plant and substances	Seadrill	- Overall responsibility and control of all equipment used and installed and substances taken onto West Triton; - Seadrill SMS requires audit and evidence of third party verification of equipment prior to the use of equipment on the West Triton.
		Beach/ADA	- Beach/ADA management systems provide pre-qualification audit of all third party equipment engaged by Beach/ADA as fit-for purpose and meets validation certification requirements, validation and final approval to be conducted by Seadrill; - Requirement for pre-qualification review of equipment certification and MSDS of chemicals and hazardous substances, validation and final approval to be conducted by Seadrill.
Schedule 3 Clause 14	Duties of persons erecting facilities or installing plant	Seadrill	- Seadrill SMS provides a means of controlling and ensuring all third party contractors are competent; - Seadrill SMS and procedures ensure all third party contractors are competent to erect/install equipment on the West Triton required for the drill campaign.
Schedule 3 Clause 15	Duties of persons in relation to occupational health and safety	Seadrill	- Participate in induction training for the West Triton; - Adhere to the Seadrill SMS/“Duty of care” for all personnel on the West Triton Rig.
		All Individuals	- Work on the West Triton in accordance with the Seadrill SMS.

3. Rig Safety Case

This document, in conjunction with the VSC, the Seadrill SMS and the Beach/ADA HSE MS provides the complete West Triton Safety Case, detailing the following information:

- MODU Facility Description [1.1];
- Seadrill SMS [1.2] and Beach/ADA HSE MS [4] and the linkages between the systems;
- West Triton Formal Safety Assessment [1.3].

3.1 Management of Safety Overview

All West Triton drilling activities will be conducted and administered under the existing Seadrill SMS and PTW system as identified in the West Triton Operations Manual [13]. Where necessary the drilling activities will be bridged to this West Triton VSCR Document.

The West Triton OIM will assume the role of Work Permit Authority responsible for ensuring all activities requiring a work permit are assessed, understood, approved and endorsed by the appropriate Seadrill Department Supervisor prior to the commencement of work.

3.2 Workforce Involvement

In accordance with Petroleum (Submerged Lands) (Management of Safety on Offshore Facilities) Regulations 1996, Part 3, Division 1 [2] there has been effective consultation with, and participation of, members of the workforce (including personnel from Beach/ADA, Seadrill, Primary Support Contractors and Third Party Contractors) in the preparation of this VSCR. This has been achieved by the following:

- Participation in the drilling HAZID;
- Review of the VSCR by senior Seadrill, Beach/ADA and West Triton personnel and incorporation of their comments (the Senior West Triton personnel are experienced drilling personnel who have been assigned to the final stages of construction and fit out of the Rig and who will work on the Rig during the Beach Petroleum Campaign
- Crew Familiarization and Systems Testing (CFST) program.

In addition, contents of this VSCR Document will be communicated to the Rig workforce prior to the drilling campaign commencing and copies of the VSCR Document will be provided for reference during the Beach Petroleum Campaign.

A summary presentation will be produced and presented to the West Triton crew prior to spud and during Rig inductions.

Seadrill and Beach/ADA are both fully committed to the ongoing involvement of the workforce in the communication and management of safety for the Beach Petroleum campaign. Seadrill and Beach/ADA have reviewed each other's commitment and agree to cooperate fully and encourage joint work force participation in accordance with the West Triton VSC SMS Section 2.4.2.7 [1].

3.3 West Triton Inductions

All personnel involved in the Beach/ADA Drilling Campaign will receive an induction and orientation into the Seadrill West Triton prior to commencing any project work, the induction will include:

- HSE Policies;
- Incident Reporting Requirements;
- Explanation of various safety signs;
- Permit to Work system;
- PPE requirements
- Safety meeting schedule and

location;

- Color coding of piping, lifting gear;
- Introduction to Line Supervisor;
- Cabin and muster station assignments
- On the Job Training;
- Assignment of a Mentor;
- STOP Program
- Emergency alarms, station bill duties, emergency escape routes and muster points, orientation tour of rig layout and life boat stations;

3.4 HSE Demarcation

It is the intention of Seadrill and Beach/ADA to have a clear demarcation of HSE interfaces to ensure there will be no confusion between the roles and responsibilities of personnel, organisations, management of safety, operating procedures and/or reporting structure.

Seadrill as the 'Facility Operator' has ultimate responsibility for HSE on the West Triton, and Beach Petroleum (through ADA) as the 'Title Holder' will comply with all Seadrill/West Triton HSE policies and procedures. Where potential gaps or conflicts exist between Seadrill's and Beach/ADA's policy and procedures, the over-riding procedure is defined and agreed in this document.

Where potential or unexpected gaps or conflict in procedures arises during the course of operations, the Seadrill policy will apply and may be subject to risk assessment of the specific task in question at the time. Should Beach/ADA and Seadrill not agree on the resolution of any conflict onboard, the specific task or operation will cease until an agreement is reached and documented on the safest way to proceed.

3.5 Safety Features and Systems

The philosophy of, and criteria for, the design, constructing, operating and managing the wells shall be in accordance with the following ADA procedures:

- Approved Well Design Procedure;
- Well Operations Management Plan; and
- Formal Well Risk Assessment.

Well design is based on the:

- Formation, fluids and expected pressures and anticipated problems;
- Hole size, casing and well control equipment used to control the expected well bore conditions (the well control which includes the Diverter, BOP and Conductor which are part of the VSC).

The Outline Drilling Program contains a summary of the safety features (e.g. casing, mud and logging programmes, casing, and leak off pressure testing, and well control). ADA will utilise the Seadrill Well Control Manual [1.2] for the Beach Petroleum Otway and Bass Basin drilling campaigns.

4. Safety Management Systems

4.1 Introduction

The Seadrill SMS shall be solely utilised during the entire time the West Triton is in the Beach Petroleum permit areas Vic-P46, T/38P and T/39P. The ADA Drilling Supervisor will be the designated representative on the Rig for Beach/ADA and will have a direct interface with the West Triton OIM.

All activities undertaken on the Rig will be performed under the Seadrill SMS and any well operations procedures developed by ADA related to well design, drilling and evaluation will comply with the SMS requirements and be approved by Seadrill prior to activities commencing.

Design of the wells together with the development of operational procedures relating to the design, have been performed by ADA. Operational procedures will be provided to Seadrill for review and acceptance for use on the West Triton and for incorporation into the Seadrill SMS for the duration of the drilling campaign.

4.2 Seadrill Safety Management System

The Seadrill SMS [1.2] is a comprehensive suite of policies, procedures, directives and pro-forma documentation, the SMS is inclusive of the following:

- Seadrill Emergency Reference Manual;
- Seadrill Well Control Manual;
- Seadrill Qualification and Training Manual;
- Seadrill Waste Management Plan;
- Seadrill Job Description Manual;
- West Triton Marine Operations Manual;
- Personnel Policies and Procedures Manual.

A full description of the Seadrill SMS is provided in the West Triton Vessel Safety Case [1].

4.3 Hazardous Substances Inventory

Hazardous substances transported to/from the West Triton will be documented in accordance with Dangerous Goods regulations. All hazardous substances, quantities and location onboard the Rig will be identified in a hazardous substances register maintained by the OIM and Beach/ADA Logistics, who will maintain records of all hazardous substances shipped to the rig by Beach/ADA and/or 3rd Party Contractors.

Relevant information for all hazardous substances, including Material Safety Data Sheets (MSDS), will be provided to the West Triton Materials Coordinator.

The West Triton OIM and Beach/ADA Drilling Supervisor will receive regular updates of the onboard hazardous substances inventory. Procedures for addressing hazardous substances are provided in Seadrill's Hazardous and Radioactive Substances Procedures [1.2].

4.4 Drawing Set

Relevant drawings for the West Triton and a location map for the wells are contained in the following documents:

- West Triton VSC [1] - Facility Description [1.1];
- ADA/Beach Drilling Programs;

4.5 Emergency Preparedness and Management

In the event of an emergency onboard the West Triton the controlling plan will be as per the West Triton Emergency Response Manual (ERM) [14], and any response shall be carried out in accordance with this manual. The West Triton OIM assumes the responsibility of Emergency Response Team Leader (ERTL) and is responsible for the overall Rig emergency response.

All site specific emergency response requirements are within the West Triton VSC performance standards. The emergency response mechanisms for any major accident events during the Beach Petroleum Vic-P46, Vic T/38P and T/39P campaigns are as per the West Triton VSC, and specific emergency response plans are detailed in the West Triton ERM.

Exceptions to this are for Oil Spills, which are in accordance with the West Triton Shipboard Oil Pollution Emergency Plan (SOPEP) [15] and/or the approved Bass Strait Consortium (BSC) Oil Spill Contingency Plan (OSCP) [16].

In addition to the implementation of the West Triton ERM [14], the Beach/ADA Otway and Bass Basin Drilling ERP [17] shall be implemented for all emergency incidents in order to provide onshore support to the Rig and the offshore emergency response.

4.6 Beach/ADA Emergency Response Plan

This Beach/ADA ERP details the supporting role of Beach/ADA in the event of an emergency on the West Triton. In additional, the Beach/ADA ERP details further responses that may be required for emergency situations which do not directly involve the West Triton (i.e. associated aircraft, vessel and/or logistics base operations).

4.7 Management of Change

Changes to the West Triton, Seadrill SMS and/or operating procedures including those requested by Beach/ADA shall be managed in accordance with the Seadrill SMS (Section 2.5.2 [1.2]. In assessing changes to the planned campaign Beach/ADA applies a management of change (MoC) process according to the Beach/ADA HSE MS [4] procedures for management of change. This process applies risk assessment to the MoC to ensure the risks associated with any proposed changes are kept to ALARP.

Any changes to the drilling program will be updated in the Standing Instructions to Drillers which will then be endorsed by the West Triton OIM. Seadrill and Beach/ADA agree to consult whenever a change may impact safety or operations on the Rig.

4.8 Incident Reporting, Investigation and Follow Up

All Incidents on the West Triton will be investigated in accordance with the Seadrill procedures detailed in the VSC SMS Section 2.6.2. Copies of reports raised shall be forwarded to the Beach/ADA Drilling Superintendent. Third Party Contractors may be required to complete an Incident Report in accordance with their company's procedure; copies will be given to the OIM and Beach/ADA Drilling Supervisor.

The responsibility to formally report incidents on the Rig rests with Seadrill. All reportable incidents will be investigated and analysed by the Beach/ADA Drilling Supervisor joining the Rig investigation team. Beach/ADA may at their discretion lead a joint Seadrill – Beach/ADA investigation of an incident and report the incident separately in accordance with the Beach/ADA HSE MS Hazard Reporting Incident Notification and Investigation Procedure.

4.9 Validating, Monitoring and Auditing

Seadrill and Beach/ADA have formal audit arrangements, which will be applied during the Beach Petroleum campaign. Beach/ADA's audit schedule is included in the annual ADA Safety and Audit Plans and audits are carried out in accordance with these plans which link to the ADA Annual Audit Plan for all operations.

This VSCR provides details of the interfaces between the West Triton SMS and Beach/ADA HSE MS including procedures that ensure barriers and controls are implemented and remain in place and which ensure new or modified risks will be identified as operations progress.

New or modified risks shall be subject to a joint Seadrill, Beach/ADA and Third Party Contractor review which will also include work force involvement.

Seadrill will carry out audits in accordance with the West Triton VSC SMS, Section 2.6.5 [1.2], Seadrill also agrees to support and assist in all audits conducted by Beach/ADA in an atmosphere of openness and mutual cooperation.

4.10 Contractor Management

Management of Third Party Contractors provided by Beach/ADA will be managed in accordance with the Beach/ADA HSE MS Manual [4] element covering Contractor Management. The intent of this standard and the associated procedures is to ensure the contracting of 3rd Party services and the purchase, hire or lease of equipment and materials does not present an increased risk to the health and safety of personnel or to the environment. Additionally, to ensure effective

arrangements are in place to safeguard the health and safety of all personnel (including visitors) involved in the 3rd Party Contractor interface through the Beach campaigns.

In addition to other consideration (e.g. quality, cost, availability, etc.) the criteria for the selection and retention of 3rd Part Contractors includes each contractor demonstrating:

- Their commitment to HSE as identified in their pre-qualification documentation;
- Level of competency of their personnel and their processes for monitoring and maintaining competency;
- Validation of the currency of equipment certification and 'fitness for purpose';
- The ability to carry out their work in a manner that, as far as is reasonably practicable and acceptable to ADA/Beach, does not present risk to themselves, their employees, rig personnel, to the public, property or to the environment;
- Their level of compliance with the relevant HSE Standards.

A core element of contractor acceptance is the Beach/ADA Third Party Audit Program, which is intended to provide a consistent standard of QA across the BSC activities for the life of the various campaigns. The 3rd Party Audit Program includes but is not limited to:

- Beach/ADA Audit and Inspection Protocol [4];
- All contracts have detailed HSE technical specifications for the services being provided referencing established external standards as appropriate.

All 3rd Party personnel involved in the Beach campaigns are required to undergo all relevant inductions, training, safety meetings, emergency drills and risk management practices as required by the OIM and ADA/Beach.

The ADA/Beach onboard Drilling Supervisor is responsible for ensuring that all 3rd Party personnel onboard the Rig are aware of their individual emergency roles and responsibilities.

5. Vic-P46, T-38P and T-39P Location Description

5.1 Exploration Drilling Campaign Description

The 2008 Beach Petroleum Drilling Campaign wells are located within Vic-P46, T/38P and T/39P offshore permit areas. The Drilling Program [7, 8, 9, 10] provides detailed information about the campaign and the specific wells. Well design details are provided in the Well Operations Management Plan (WOMP) [18].

Table 2: Otway Exploration Drilling Campaign Description

Well Bernoulli-1	
Permit Areas:	Vic/P46
Type of Well:	Exploration
Location Details:	Latitude - 38° 22' 17.84" E Longitude - 141° 3' 36.42" S
Rig Heading:	135
Water Depth:	40m to 100m
OR	
Well Fermat-1-1	
Permit Areas:	Vic/P46
Type of Well:	Exploration
Location Details:	Latitude - 38° 11' 43. 196" Longitude - 141° 3' 12.954" S
Rig Heading	135
Water Depth	40m to 100m
Logistics Management	
ADA/Beach Operations Base:	ADA/Beach Head Office (Melbourne)
Seadrill (Operator) Operations Base:	Seadrill Regional Office (Melbourne)

Aviation Base:	Essendon
Helicopter Contractor and Type of aircraft:	Bristow Helicopters / AS 332L
Helicopter flight time from Essendon Airport to rig locations:	1 hour 40 min
Logistics Supply Base	Portland
Support Vessel Contractor:	Swire Pacific Australia
Name of vessels:	Pacific Battler and Pacific Valkyrie
Steaming time from Portland to Rig location:	Approximately 5 hours

Table 3. Bass Basin Exploration Drilling Campaign Description

Spikey Beach-1	
Permit Areas:	T-38P
Type of Well:	Exploration
Location Details:	Latitude 40° 28' 55.326"S Longitude 145° 52' 23.552"E
Rig Heading:	135°
Water Depth:	73.7 m
Pee Jay-1	
Permit Areas:	T-39P
Type of Well:	Exploration
Location Details:	Latitude 40° 29' 47.994"S Longitude 146° 21' 35.276"E
Rig Heading:	135°
Water Depth:	76.5 m
Logistics Management	
ADA/Beach Operations Base:	ADA/Beach Head Office (Melbourne)
Seadrill (Operator) Operations Base:	Seadrill Regional Office (Melbourne)
Aviation Base:	Essendon
Helicopter Contractor and Type of aircraft:	Bristow Helicopters / AS 332L
Helicopter flight time from Essendon Airport to rig locations:	1 hour 30min
Logistics Supply Base	Geelong
Support Vessel Contractor:	Swire Pacific Australia
Name of vessels:	Pacific Battler and Pacific Valkyrie
Steaming time from Geelong to Rig location:	Approximately 12 hours

5.2 Met Ocean Conditions

Full details of the well site locations and their associated Met Ocean environment conditions are contained in the approved Beach/ADA Otway Basin Environment Plan [19], Beach/ADA Bass Basin Environment Plan [20] and the Beach Petroleum Drilling Programs [7, 8, 9, 10].

The weather in the Vic-P46, T/38P and T/39P area of operations is within the safe operating limits of the West Triton (Section 2.2) but a review of VSC FSA bowtie 14.01 was carried out at the Hazid to ensure barriers would avoid escalation in the event of "extreme or heavy weather" event. In addition, the ADA Corporate Drilling ERP [21] and the Beach/ADA Drilling ERP [17] will be activated for the Beach/ADA onshore support response to campaign emergencies.

5.3 Sea Bed Survey

Beach/ADA has contracted a qualified surveyor to undertake seabed surveys of the Otway and Bass Basins to provide the information required by Seadrill in the West Triton VSC SMS (Section 2.5.12 [1], the site surveys included coring and shallow seismic.

5.3.1 ROV Deployment

Although not identified as safety critical equipment, ROV deployment will be used to bubble watch during riser-less drilling and during drilling ROV observation is maintained for early detection of seabed disturbance.

The ROV Contractor has undergone standard 3rd Party Contractor HSE Assessment prior to being awarded the ROV contract (i.e. this entailed reviewing Beach's' pre-qualification assessments of the ROV contractors). ROV operations will only be conducted by an approved ROV Contractor and certified operator(s). A review has also been conducted of the location of the ROV onboard the West Triton.

5.3.2 West Triton Punch Through

Seadrill has reviewed and approved the Vic-P46, T/38P and T/39P sites as being suitable and safe for the placement and operation of the West Triton and has obtained approval for the location from their warranty surveyor, this mitigates the threat of "seabed survey not done correctly" identified in MAE 4.10 barrier.

Copies of the site survey reports and approvals are maintained by the ADA Drilling Manager, West Triton Rig Manager and the OIM on the Rig.

From the information gathered in the Vic-P46 area there appears little risk or no risk of a punch through. With regard to T/38P and T39P the seabed comprises of clay and silt intersected with some shell debris layers. Due to the presence for these layers the spud cans may hang up temporary on top of these layers before further penetration occurs. The pre-load procedures will address this specific hazard.

5.4 Campaign Logistics Support

Operational support will be provided to the West Triton from Seadrill's offices in Melbourne and Beach/ADA will provide operational logistical support from the Beach/ADA head office in Melbourne and the Beach/ADA supply base at Gippsland Maritime Logistics based in Geelong, Victoria. Portland, Victoria will be used for the Otway Basin campaign.

5.4.1 Marine Operations

Two Anchor Handling, Tug and Supply vessels (AHTS) (Pacific Battler and Pacific Valkyrie) supplied by Swire Pacific Offshore, Australia will be used during the campaign to tow the Rig to the well site from the previous campaign location, transfer the Rig between well sites and to move bulk and liquid materials, equipment and containers between the Gippsland Logistics shore base and the West Triton.

The vessels have been inspected by an independent marine surveyor and the details have been reviewed by Seadrill and Beach/ADA to confirm their suitability for operations is support of the West Triton.

One Support Vessel (SV) will generally be on station as a standby vessel, adjacent to the West Triton at all times during drilling operations although the vessel may alternate between the two subject to operational demands. While on location the vessel undertaking the standby role will also perform collision watch duties. The emergency duties of the standby vessels are covered in the Beach/ADA Emergency Response Plan (ERP). SV Standby Duties include:

- Supply operations;
- Fire fighting Support, shielding in a fire emergency, emergency response and rescue;
- Standby vessels during helicopter operations;
- Assisting with shipping monitoring and the separation from shipping;
- Liaison with the local fishing and recreational boating industry;
- Radio and visual watch of rig maintained;

- Maintain portable radios, emergency and first aid equipment in a ready state.

All support/supply vessels have IMS accreditation accepted by AMSA, the designated Authority and NOPSA. The support vessels carry adequate life saving and safety equipment on board to transport personnel from the Rig should the need arise.

5.4.2 Maritime Security

The West Triton will comply with the security requirements detailed by Beach/ADA, and the MTOFSA during all interface operations with the support vessels. This requirement is as detailed by the MTOFSA.

5.5 Crew Changes

5.5.1 Fixed Wing Operations

Commercial fixed wing transport will be utilised during the project for personnel transiting to Melbourne. Commercial flights were not assessed in the West Triton Safety Case Hazard Analysis as commercial flights are operated by a Civil Aircraft Safety Authority (CASA) audited commercial airline. Beach/ADA will not be auditing these services.

5.5.2 Helicopter Operations

Helicopter operations will be performed by Bristow Helicopters in accordance with CASA regulations. Helicopter type, suitability, and performance criteria are contractually controlled, as is minimum flight and engineering crew qualifications and experience levels. A primary helicopter shall be dedicated for crew changes and operational flights.

During the campaign, helicopter operations will be used for:

- Personnel transfers between Essendon Airport and the West Triton;
- Occasional transportation of equipment to/from the West Triton;
- Heavy weather emergency evacuation, search and rescue and day time MedEvac.

During the Beach Petroleum drilling campaign the helicopter contractor will provide MedEvac support for non-urgent MedEvacs during the day time and HEMS Victoria will be used for other MedEvac situations. A primary helicopter shall be available for maintenance back up.

A Super Puma AS332L helicopter will be provided by Bristow Helicopters for the campaign and will be based at Essendon Airport with the alternate airbase being Mount Gambia, Portland and Warrnambool for the Otway Basin and Wynyard and Devonport for the Bass Basin, Average helicopter flight times between shore aviation bases and the West Triton are expected to be 1 hour 40 minutes.

Helicopter refuelling on the West Triton is expected to occur during the Beach campaigns. Facilities and procedures exist for helicopter refuelling on the West triton. These are described in the Vessel Safety Case Part 3 and the Seadrill Aviation and Helicopter Operations procedure. All necessary logistics support is available to carry out this task.

Helicopter movement to/from the West Triton will be managed by Bristow's ground staff under direction of Beach/ADA Logistics, in conjunction with the Beach/ADA Drilling Supervisor and the West Triton Radio Operator.

The West Triton Helicopter Landing Officer (HLO) will be responsible for the conduct of all Helicopter operations onboard the West Triton. The HLO and Helideck crew have been trained in the operation of the Helideck and its associated equipment and specific aircraft operations inductions will be provided by Bristow's prior to the commencement of aviation operations.

All personnel travelling to the West Triton will be BOSIET trained and will have current certification. Exemptions to this requirement will only be approved by the OIM as a one off situation.

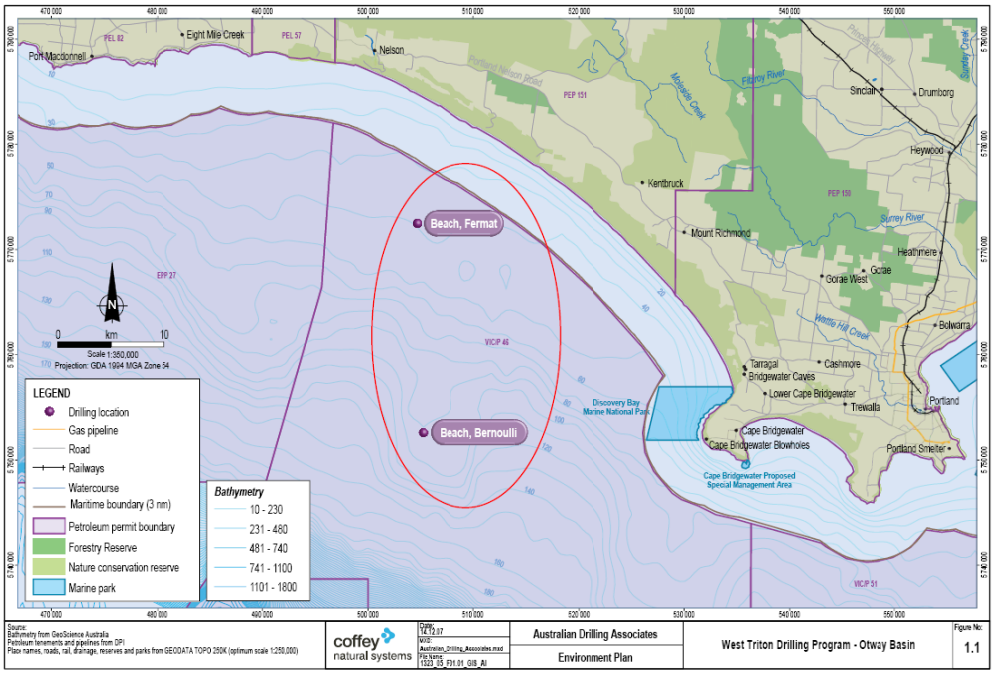
5.5.3 Fatigue Management

Personnel (Seadrill, Beach/ADA or Third Party Contractor) working onboard the West Triton shall not perform duties required of them in excess of those stated in the Seadrill Fatigue Management Plan.

There is potential for fatigue associated with travel to the rig location, particularly for any personnel joining the helicopter flight from international flights. Accordingly, the Fatigue Management Plan will be in place for the drilling campaign and all personnel are required to abide with the requirements of the Plan.

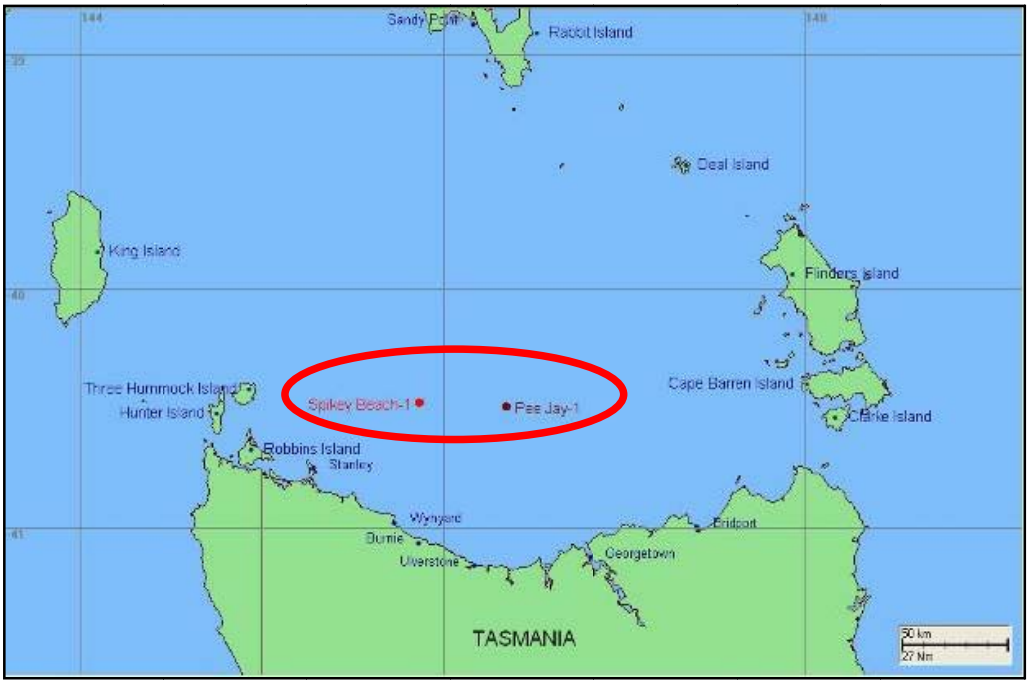
The OIM is responsible for monitoring the working hours of all personnel onboard the West Triton, the Beach/ADA Drilling Supervisor shall assist the OIM by monitoring the working hours of Beach/ADA or Third Party Contractor personnel and advise the OIM of any breaches of this policy or requests for exemption.

Diagram 3: Otway Basin Well Location Map



Note: Only one well will be drilled in permit area Vic/P46. Either Bernoulli-1 or Fermat-1.

Diagram 4. Bass Basin Well Location Map



6. Campaign Formal Safety Assessment and Assurance of ALARP

For the Safety Assessment carried out for the preparation of this SCR, the hazards and associated risks for the Campaign were derived from previous wells drilled in the Otway and Bass Basins. The campaign hazards and associated risks were assessed at the Beach/ADA Drilling HAZID Review in June 2008. The following techniques were employed:

1. Campaign specific hazards and associated risks, barriers and controls were reviewed to assess their possible impact on the 25 MAEs in the West Triton VSC and accepted by NOPSA;
2. A HAZID workshop was conducted to clarify existing and known hazards, to identify new hazards and any variations to existing or known hazards resulting from location specific elements;
3. VSC Barriers and Controls for the MAEs which could be affected by campaign specific hazards and the campaign specific references in the FSA Bowtie Risk Analysis were examined to ensure the barriers and controls will eliminate risks or control them to ALARP, and will be in place before spud. Minor modifications were made to the VSC FSA barriers and controls to ensure ALARP. These modifications are summarised in the table below, with details provided in Appendix 3.

Table 3: FSA Bowtie Risk Analysis

VSC Hazard Register	Bowtie No.	Hazard	Top Event	Campaign Specific Assessment
WT-01.01	1.01	Shallow Gas	Shallow gas release	Probability low. Campaign Specific Risk ALARP
WT-01.02	1.02	Blowout	Uncontrolled Kick	No campaign specific changes
WT-02.02	2.02	Hot Work	Fire & Explosion	No campaign specific changes

VSC Hazard Register	Bowtie No.	Hazard	Top Event	Campaign Specific Assessment
WT-02-05	2.05	Galley/Accommodation	Galley/Accommodation Fire	No campaign specific changes
WT-02.10	2.10	Engine Generator	Fire & Explosion	No campaign specific changes
WT-03.01(a)	3.01(a)	Helicopter	Helicopter crashes into rig	No campaign specific changes
WT-03.01(b)	3.01(b)	Helicopter	Helicopter crashes in transit	No campaign specific changes
WT-03.05	3.05	Supply/Standby vessel	Collision with rig while jacked up	No campaign specific changes
WT-03.06	3.06	Errant Vessel	Collision with rig while jacked up	No campaign specific changes
WT-04.01	4.01	Jacking	Punch Through	Campaign Specific Risk ALARP Refer to Appendix 2
WT-05.01	5.01	Drilling	Blowout	No campaign specific changes
WT-05-04	5.04	Errant Vessel	Collision with rig under tow	Campaign Specific Risk ALARP Refer to Appendix 2
WT-06.02	06.02	Crane	Dropped Load	No campaign specific changes
WT-07.01	07.01	Draw works	Draw works Failure	No campaign specific changes
WT-07.02	07.02	Winch	Winch Failure	No campaign specific changes
WT-07.03	07.03	Crane	Crane failure	No campaign specific changes
WT-08.02	08.02	Drilling	BOP failure	No campaign specific changes
WT-8.04	8.04	Pressure Vessel	Ruptured Pressure Vessel	No campaign specific changes
WT-09.05	09.05	Oil Based Mud	Spillage/Exposure	Not relevant, no OBM in campaign
WT-09.11	09.11	CO_2	CO_2 Release	No campaign specific changes
WT-11.07	11.07	Confined Space	Asphyxiation	No campaign specific changes
WT-11.15	11.15	Manriding	Fall from Height	No campaign specific changes
WT-11.16	11.16	Personnel Transfer	Fall From Height	No campaign specific changes
WT-11.17	11.17	Work basket / Cherry picker	Fall from height	No campaign specific changes
WT-14.01	14.01	Weather	Extreme Weather	Campaign Specific Risk ALARP Refer to Appendix 2

6.1 Campaign Specific Hazard Assessment

6.1.1 Collision with Seismic Survey Vessel

It is currently not known whether there will be any seismic surveys being conducted at the time of the planned Beach Petroleum drilling campaign. As such Beach/ADA will contact the relevant authorities to determine where and when seismic survey vessels may be in the vicinity to ensure that operational impacts or a collision does not eventuate.

All Beach Petroleum campaign support vessels are fitted with the standard array of collision avoidance systems and automatic radar plotting aids (ARPA). Rig transit movements and the well location will be provided to AMSA and gazetted in local notifications to mariners with regular marine communications ensuring that errant vessels do not collide with the rig.

6.1.2 Ship Collision

From an examination of shipping lanes and traffic densities, the Beach Petroleum Otway well site locations are not in a congested location with no immediate proximity to any significant shipping lane. The Bass Basin well site locations are close to direct ferry routes which service Bernie to Port Philip and Tamar to Port Philip. Beach/ADA will communicate with AMSA and the shipping companies who manage the routes, informing them of the drilling operations to manage the risks to ALARP. The hazard and controls associated with ship impact are covered in the VSC and are considered ALARP.

6.1.3 AHTS (Anchor Handling, Towing and Supply) Vessel Collision

The planned AHTS supporting the Rig have significant experience in the industry and in the area. The risk from a collision with these vessels is adequately covered by the VSC. The standby vessel will maintain a 24 hour watch for vessel collision; in addition their ARPA radar is to be fully operational. The standby boat is to notify the West Triton OIM should their ARPA radar become unserviceable or watch keeping is reduced.

6.1.4 Hydrogen Sulphide

At the VSCR HAZID review it was discussed that historically levels of H_2S within the area have been low, this has been confirmed though analysis of offset data.

It was suggested during the HAZID that the H_2S scavengers would be available for use in the mud system should it be required. This would severely reduce the H_2S levels at the rig floor in the event that H_2S is encountered. The hazard from H_2S is considered ALARP.

If the H_2S levels are anticipated to be elevated, then a separate workshop will be convened. This will include representatives from Seadrill, Beach/ADA and the relevant third party contractors.

6.1.5 Well Testing and Completions

The final completions and well test program has yet to be defined, consequently the size and location of the well test equipment (the spread) has currently not been finalised. Initial discussions on the well testing have highlighted that well test equipment will probably be located within 15m of the accommodation block hence; Seadrill will ensure that any windows facing the well test equipment area are appropriately rated and protected.

However, it should be noted that a separate HAZOP of the well test equipment will be conducted together with a separate completions and well test specific risk workshop convened to ensure risks are ALARP.

A separate submission will be made covering completions and well testing.

6.1.6 Well Control

Beach/ADA have reviewed the Seadrill Well Control Manual [13] and it has been accepted as a acceptable guidance document for well control operations onboard the West Triton for the Otway and Bass Basin drilling campaigns. The agreed methodologies are:

- Hard shut-in will be the preferred means of securing the well;
- Periodic BOP function testing frequency shall not be greater than 21 days.
- Well control drills will be conducted in accordance with Section 1.3 of the Seadrill Well Control Manual.

A Mud logging unit is installed on the MODU. The mud logging instrumentation package is continuously monitored as a means of determining the well condition. These are secondary indicators as the West Triton drilling alarms and monitoring systems are the primary indicators of well condition. However, all warnings given by the Mud Loggers must be responded to by the MODU crew.

6.1.7 Simultaneous Operations (SIMOPS)

There are no simultaneous drilling or production operations anticipated during the Beach drilling campaign.

6.1.8 Occupational Hazards and/or Incidents

Occupational hazards are a significant contributor to risk on the West Triton and include:

- Slips, trips, falls;
- Caught by/between equipment hazards and/or crushing hazards;
- Occupational hygiene hazards (i.e. noise, vibration, heat, cold, light etc.);
- Falling overboard, from height etc;
- Manual handling etc.

Extensive risk minimisation measures have been implemented and include safety training, operational procedures, JSA's, PPE, machinery guards and other measures. For activities associated to the Nexus drilling campaign this risk is considered no greater than in the MODU FSA.

6.1.9 Drilling Well on Paper (DWOP)

Beach/ADA will conduct an extensive DWOP session for all three wells to address the requirements of the drilling or completion project facing the team. All key parties and contractors involved in the campaign were included and the team performed an in-depth review and analysis of the drilling and completion procedures and developed detailed operational plans for implementation on the Rig. Elements addressed during the DWOPs included:

- Technical and HSE performance requirements for the project;
- Organizational and reporting structure of the team;
- Expectations of Management and the Project Leadership teams related to:
  - HSE Performance,
  - Time and Cost Performance,
  - Key Performance Indicators (KPIs),
- Detailed procedures for each task in the drilling and completion plan required to safely and efficiently deliver a high level of performance;
- Roles and responsibilities within the team;
- Balance People and Process to ensure all team members are motivated to contribute their best efforts toward high HSE performance and continual improvement.

Table 4: Formal Safety Assessment – Assumptions Comparison

FSA subject	West Triton Vessel Safety Case Assumption	Campaign Conditions and Comments	Within FSA Envelope?
Flight time to rig	The VSC does not quantitatively assess the risk associated with exposure to helicopter flight times.	• Flight time from Essendon Airport to Otway locations (VicP46) is 1 hr 40 minutes and Bass location T39P is 1 hr 30 minutes one way with nil wind. Flying times for a single leg may vary by up to 20 minutes with strong wind.	Yes
Flights / person	The VSC does not quantitatively assess the risk associated with exposure to helicopter flight times per person.	Risk levels during this campaign are unlikely to change significantly based on the personnel transfer rotation: • Beach/ADA personnel will be working on a "2 on, 2 off" rotation; • West Triton personnel typically work a "2 on, 2 off" and "4 on, 4 off" rotation respectively. Personnel working 2 on, 2 off will have slightly higher transport risk, due to more frequent flights; however, the risk is managed by helicopter procedures and controls and is balanced against fatigue risk management strategies.	Yes
Rig manning level	The West Triton is limited to a maximum of 110 POB by bed space.	Maximum manning level during the drilling campaign will not exceed the West Triton maximum POB of 110 personnel	Yes
Ship Collision	Significant Passing Vessel Ship Collision frequency is 1.01E-03 per year based on WOAD data. The VSC discounts Standby Vessel collision on the basis that procedural control on the speed of manoeuvring when in close proximity to the RIG prevents collision with sufficient energy to threaten the integrity of the West Triton.	The West Triton will be on location at VIC-P46 for approximately 5 weeks. Overall passing vessel collision frequency for the campaign estimated to be significantly lower than that assumed in the VSC. Although one of the SV's will be positioned at the West Triton it is not considered to pose a significant collision risk with the Rig on the basis that the SV will operate under permit-to-work authorisation from the Rig and hence will be subject to the same procedural control as any vessel in close proximity. SVs are equipped with an Automatic Identification System (AIS) which will lower the risk of collision; they will monitor transient vessel movement in the area on a continuous basis, will maintain a shipping log and will comply with collision and traffic management SOPs. The West Triton ERM [4] outlines the activities to follow in the event of an unknown vessel approaching the RIG	Yes
Drilling	The VSC assumes 12 exploration wells	Well duration for Beach/ADA campaign is expected to be 19 days per well in	Yes

FSA subject	West Triton Vessel Safety Case Assumption	Campaign Conditions and Comments	Within FSA Envelope?
Blowouts	drilled per year, which implies 30 days per well.	the Bass Basin and 39 days for the Otway Basin well. Pee Jay-1 and Spikey Beach-1 are relatively shallow (TD +/- 2100m) whilst Fermat-1 is considerably deeper with a TD of +/- 4000 mTVD. All wells are predominantly normally pressured. On this basis, a reduction of blowout risk is expected for this drilling campaign compared to the West Triton VSC [3].	
Radioactive sources	West Triton Hazard Risk Register includes controls for this hazard.	No campaign-specific radioactive sources required.	Yes
Dropped Objects	Dropped objects are not considered to contribute to a major accident event.	Dropped object risk during the drilling programme should be similar to those in the West Triton VSC [3] since the number of crane lifts and lifts in the derrick associated with drilling will be similar and not working over live equipment.	Yes
Hydrogen Sulphide	The VSC does not quantitatively assess the risk associated with exposure to Hydrogen Sulphide, (H_2S). Toxic gas detection is installed on the West Triton.	The anticipated level of H_2S will need to be verified, and if necessary, appropriate controls put in place.	Yes
Emergency Response	The VSC details Emergency Response requirements close to the West Triton (i.e. Rescue Boat and Standby Vessel will be available).	For helicopter incidents en-route to the Rig, Emergency Response will be coordinated through Beach/ADA, the Beach/ADA program specific ERP [7] provides details on how this type of incident will be managed.	Yes
Water Depth	VSC identifies the maximum operating water depth of 400ft.	The Beach Petroleum well sites have a water depth range which is within the operating limits for the West Triton.	Yes

FSA subject	West Triton Vessel Safety Case Assumption	Campaign Conditions and Comments	Within FSA Envelope?
Metocean conditions (as per Safety Case Facility Description)	The VSC identifies the rig is designed to the following metocean conditions: Wave Height - 35.75 ft – 10.7 m Current Speed- 1.24 knots – 0.64 m/sec Wind Speed - 70 knots – 36 m/sec	The metocean conditions for the planned locations relevant to time of year are within the defined rig metocean limitations. However, in the advent of adverse weather conditions beyond the drilling design criteria for the West Triton, drilling will be suspended and the well secured. If a heavy frontal storm is forecast, the rig will initiate preparations for heavy weather and potential evacuation.	Yes
Support Vessel	The rig will be supported by a Support Vessel generally on station at the rig at all times during the campaign. SVs will be capable of accommodating all the personnel on board and equipped with adequate first aid facilities for all PoB and a Fast Rescue Craft. Support Vessel will be available for precautionary evacuation using personnel basket transfer.	Contractual arrangements between Beach/ADA and Seadrill provide that a support vessel will generally be on station at the West Triton at all times during the Beach Petroleum campaign. The SVs will have first aid facilities, a fast rescue craft and be capable of accommodating the maximum number of personnel onboard the West Triton. In this context, 'on station' is defined as the SV being in close proximity and at all times within sight of the Rig. However, during helicopter flights and in the event of over the side working, the SV will be called in to the West Triton on close standby to allow rapid response to ditching or man overboard situations.	Yes

7. Campaign Specific Summary

No high or unacceptable risks were identified in the location specific risk assessment, however a number of actions were identified which require closing out prior to the commencement of drilling activities. A total of 21 actions were noted for each of the Bass Basin wells. Actions identified for the Spikey Beach-1 and Pee Jay-1 wells are the same. A total 20 actions were noted for the Otway Basin campaign. The HAZID workshop report is provided in Appendix 3.

All actions raised in the workshop require close out prior to the start of the drilling campaign.

8. ALARP Summary

Seadrill and Beach/ADA have determined that it has adequate and sufficient systems in place to demonstrate that plans and procedures have been developed and implemented to maintain threat barriers, consequence recovery measures and escalation factor controls to the required standards on the West Triton. The outcomes were made through a thorough process or risk management that included participation from Seadrill, Beach, ADA and third party contractor personnel. It is concluded that the threat barriers, consequence recovery measures and escalation factors for the effective management of risk to ALARP are in place and being used by competent personnel.

9. Reference

1. West Triton Safety Case, Revision 1, December 2007;
   - 1.1 West Triton Facility Description,
   - 1.2 Seadrill Safety Management System Manual (SMS),
   - 1.3 West Triton Formal Safety Assessment,
2. P(SL)A (Management of Safety on Offshore Facilities) Regulations 1996;
3. Schedule 3 (Occupational Health and Safety) OPA 2006
4. Beach/ADA HSE MS Manual, Revision 0, October 2005;
5. NOPSA Safety Case Guidelines Preparation and Submission Document (September 2004);
6. Beach/ADA Application to Drill/Drilling Programs (2008);
7. Beach/ADA Outline drilling program, Bernoulli-1 (Revision A);
8. Beach/ADA Outline drilling program, Fermat-1 (Revision A);
9. Beach/ADA Outline drilling program, Spikey Beach-1 (Revision A);
10. Beach/ADA Outline drilling program, Pee Jay-1 (Revision A);
11. Generic West Triton HAZOP (all relevant parties - Singapore 2007)
12. Identification of campaign hazards and risk management methodologies (elimination or reduction to ALARP) (ADA project risk assessment – Australia 2007)
13. West Triton Operations Manual;
14. West Triton Emergency Response Manual (ERM);
15. West Triton Shipboard Oil Pollution Emergency Plan;
16. Bass Strait Consortium OSCP (Revision 1, 2008/09) ;
17. Beach/ADA Otway and Bass Basins Drilling ERP (Revision 0, 2008);
18. Beach/ADA Well Operations Management Plan (Revision 0, 2008);
19. Otway Basin Environment Plan
20. Bass Basin Environment Plan
21. ADA Drilling Emergency Response Plan, (Revision 1, 2008/09)

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WEST TRITON SAFETY CASE REVISION DOCUMENT

APPENDIX 2: CAMPAIGN HAZARD IDENTIFICATION WORKSHOP PARTICIPANTS

Held on 23rd June 2008, Oaks on Collins, 480 Collins St, Melbourne

Name	Company	Position
Trevor Wadham	Beach Petroleum	Petroleum Engineer
Scott Healey	Beach Petroleum	Drilling Engineer
Mark Sales	Beach Petroleum	Reservoir Engineer
Brian Foley	ISRM	HSEQ
Melissa Dawson	Schlumberger	Engineer
Richard De Groot	Schlumberger	QHSE
Tanya Moussa	ADA	QHSE
Paul Barrett	ADA	Drilling Superintendent
Rajiv Tikkoo	ADA	Senior Drilling Engineer
Mark Nasarczyk	ADA	Senior Drilling Engineer
David Parker	ADA	HSE Manager
Paul Basey	Seadrill	Rig Manager
Matt Siegman	ADA	Drilling Engineer
Premkumar Salibendla	Halliburton	CMT Engineer
Graham Wright	Horizon Risk management Solutions	Facilitator
Julie Ang	ISRM	HAZID Scribe

APPENDIX 3: OTWAY AND BASS BASIN CAMPAIGN HAZID WORKSHOP REPORT (DRILLING)

HAZID Workshop –

Site-Specific Hazards
West Triton Jack-Up

23rd June 2008

Pee Jay / Spikey Beach / Otway Campaign

Prepared For

Beach Petroleum & Australian Drilling Associates

ADA

BEACH PETROLEUM

HORIZON
Risk Management Solutions Pty. Limited

HORIZON Risk Management Solutions Pty Ltd

REPORT

Hazard Identification Workshop West Triton Jack-Up

Pee Jay / Spikey Beach / Otway

G WRIGHT
Director

JULIE ANG

ISRM

MPT-0108/001 REV 0

7 JULY 2008

HORIZON Risk Management Solutions Pty Limited

Suite 21, 66 Kingsway, Glen Waverley, Victoria, Australia 3150

Phone Office – 0417 054 883 Fax – 03 8502 0531

g.wright@horizonrisk.com

To:

International Safety and Risk Management
Level 8 / 350 Collins Street VIC 3000

Attention: Julie Ang

Re: Beach Petroleum
West Triton HAZID
PJ/Spikey Beach/Otway Campaigns

Job Number: MPt0108

We are sending you							
☑	Attached	☑	Via e-mail	☑	Report		
☐	Proposal	☐	Drawings	☐	Plans	☐	Other:

Submittal	Quantity	Date	DOC. #	Description
1	1	4/07/08	MPt0108 revA	Draft Report
2	1	7/07/08	MPt0108 rev0	Final Report

These are transmitted as checked below					
☐	Issued for comment	☑	Issued as Final	☐	Issued for Approval

Comments:

ISSUED By Horizon Risk Management Solutions Pty Limited:

Name : Graham Wright

Position : Director

Date Issued : 7 July 2008

Signature

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Summary

This report presents the results of a HAZID Workshop conducted on 23rd June 2008, in which location-specific Hazards are identified in order to provide input to the Bridging Document prepared to supplement the West Triton Vessel Safety Case, for three Beach Petroleum drilling campaigns by Australian Drilling Associates (ADA):-

- Pee Jay (Bass Basin)
- Spikey Beach (Bass Basin)
- Otway (Owtay Basin)

Site –specific hazards in each location are typical of those to be found in any bridging document, with the emphasis on the Hazards associated with extreme weather risk and distance from established helicopter, both of which require additional risk controls to be in place for the Otway site.

Introduction

This report contains the records from a Hazard Identification (HAZID) workshop conducted on 23rd June 2008, to identify drilling campaign-specific hazards associated with mobilization and drilling activities of the West Triton Jack-Up rig at three drilling locations.

The West Triton is a Baker Marine – Pacific Class 375 Jack-Up Mobile Offshore Drilling Unit (MODU), classified by ABS - CDS and registered in Singapore.

The rig is owned and operated by Atlas Drilling (S) Pte Ltd which is 100% owned by Seadrill. As such, all systems to be used in the operation of the West Triton will be Seadrill management systems.

The Vessel Safety Case (VSC) complies with the Australian Safety Case Legislation (P(SL)A), National Offshore Petroleum Safety Authority (NOPSA) Safety Case Guidelines and the International Association of Drilling Contractors (IADC) HSE Case Guidelines for Mobile Offshore Drilling Units (ref:2).

This HAZID Workshop is prepared to identify any campaign-specific issues that lead to changes or additions to the Major Accident Event (MAE) list identified in the VSC associated with three different well locations, referred to in this report as:

1. Pee Jay (Bass Basin)
2. Spikey Beach (Bass Basin)
3. Otway (Otway Basin)

Attachments 1, 2, & 3 in this report presents the minutes from the HAZID related to each location, and highlight those that have changed or been added. In particular, those Recommendations that have been added in order to continue to manage risk to a level As Low As Reasonably Practicable (ALARP) are identified, and highlighted in the draft report.

Hazards associated with Well-testing have not been studied as no details of this activity were available to the Workshop team.

Attendees

Table 1: HAZID Attendees

First Name	Last Name	Title	Company
Trevor	Wadham	Petroleum Engineer	Beach Petroleum
Scott	Healey	Petroleum Engineer	Beach Petroleum
Mark	Sales	Reservoir Engineer	Beach Petroleum
Brian	Foley	HSE	ISRM
Melissa	Dawson	Engineer	Schlumberger
Richard	De Groot	QHSE	Schlumberger
Tanya	Moussa	QHSE	ADA
Paul	Barrett	Drilling Superintendent	ADA
Rajiv	Tikkoo	Snr Drilling Engineer	ADA
Mark	Nasarczky	Snr Drilling Engineer	ADA
David	Parker	HSE manager	ADA
Paul	Basey	Rig Manager	Seadrill
Matt	Siegman	Drilling Engineer	ADA
Premkumar	Salibendla	CMT Engineer	Halliburton
Graham	Wright	HAZID Facilitator	Horizon Risk Management Solutions
Julie	Ang	HAZID Scribe	ISRM

Methodology

The HAZID Workshop adopted a process in which each existing Hazard was reviewed in sequence, and tested by the HAZID Team (see Table 1) to determine whether any one was not relevant for the location, whether existing controls were influenced by location, whether additional controls would be available, or whether additional recommendations would be appropriate in order to maintain risk at an ALARP level while at each location. In addition to these changed aspects, some additional definition is provided for the details recorded for existing controls.

The records of the HAZID (i.e. Hazards that are specific to the location) are presented in tables in the Attachments to this report, and follow the structure shown in Table 2. This layout provides the information related to the Hazards, their potential Causes and Consequences, the Barriers in place to prevent and manage those Hazards, and finally adds Recommendations, when considered appropriate, that are made to cover Hazards related to the specific activities at each location.

The assumption in this HAZID is that the drilling campaign in the Bass Basin is completed prior to a move to Otway due to weather or other factors. It is possible the move could take place in reverse. In this case there may be some changes to the mobilization and de-mobilization of equipment from the rig prior to the first campaign, and the Portland shore base would be used first. This would not introduce new Hazards so this does not require duplicate worksheets to cover the alternate cases.

Outcome of the Workshop

The complete HAZID Worksheets for the campaign-specific hazards are presented in Attachments 1 to 3, and this includes a range of Recommendations of which some are specific to the location and others are generic. The format and content of the cases at Pee Jay and Spikey Beach are almost identical because of the proximity of the two.

During the course of this HAZID a number of Recommendations were made - a total of 21 Recommendations for both the Spikey, and Pee Jay wells, and 20 for the Otway well.

The main factors that would impact on the magnitude of risk of operation at each site (not introducing additional Hazards, but influencing the effectiveness of controls) are:

- The increased potential for and magnitude of extreme weather at the Otway site over the Pee Jay and Spikey Beach sites, as a result of the open aspect of the Otway location (being direct to the Southern Ocean), whereas the Bass Basin is located within an area protected to some extent by its location relative to Tasmania and Islands in Bass Strait
- The increased distance from the Otway site to sheltered areas to which the rig could move in the event of extreme weather
- The increased distance of the Otway site from helicopter support, and consequential need for coordination of Emergency Response plans with other facilities operating in the Otway Basin

Table 2:-HAZID Minute Record Sheet

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers		
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control

Attachment 1

HAZID Worksheets

Pee Jay

1. HAZID Worksheet - PJ - Minutes from 23rd June 2008

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Mobilisation	1. Shifting of unsecured or poorly secured equipment on the pipe deck including stacked tubulars	1. Direct fatalities due to crushing, and potential further accidents via load shift impact on rig stability. Moving objects can also knock vents, possible allow water to be taken on (instability)	1. Remove all unnecessary equipment from rig (6-7 day move).	Procedures not followed (rig move)	Pre rig move meeting	1. Movement into sheltered harbour	Distance from sheltered harbour TBA	Study being undertaken		
			2. De mob drill pipe.	Procedure not followed	Pre rig move meeting					
			3.							
	2. Extreme weather / sea state / heavy weathers	1. Weather limits and forecast. Sudden squalls / rough seas, rig listing, exceptionally strong winds.	1. Weather forecasting and operating limits in accordance with Marine Ops Manual. Get 2 weather forecasts from separate sources every two hours during rig movement. 3 day look ahead.	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with	Training/ emergency response exercises and drills	1. Rig move from Stuart site to Beach site is approx 6-7 days(TBC). Investigate requirement for a greater than 3 day look ahead on weather forecasting. To be included on rig move procedures.	
			2. Details of weather policies etc are detailed within the VSC. These include adverse weather policies, Marine operations manual, Emergency response and heavy weather emergency response	Procedures not followed		1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with	Training/ emergency response exercises and drills		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			3. Use of weather windows. Heavy Weather Emergency Plan.	reliable weather forecasts only covers 3 days. Rig move up to 6-7 days	Refer to safe haven study	1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	3. Down-flooding (if hatches not closed).	1. Capsize and/or sinking of the rig when in float mode.	1. Operating within the guidelines of the MODU Marine Operations Manual (MOM).	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills	2. Confirm location of any platforms and pipe lay barges and any other vessels that may be within tow path.	
			2. Correct marine lock-down / water tight integrity	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills	3. Additional Barge Engineer, any other additional personnel to be discussed at Rig Move meeting.	
			3. Tow plan with identification of safe harbour and soft pin sites. Local coast and marine rescue centres notified of passage plan.	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
			4. Mud tanks emptied and VCG calculations done and Plimsoll mark check done before rig move.	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
			5. Design standards, material certification and construction standards for the vessel, and maintenance.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			6. Materials on board for the performance of emergency repairs if necessary - part of Rig Move procedures	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	4. Structural failure of hull e.g. due to material defects or collision with another vessel or reef (grounding)	1. Capsize and/or sinking of the rig when in float mode.	1. Design standards, material certification and construction standards for the vessel, and maintenance.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan. Use of helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills	4. Helicopter support for emergency evacuation will be determined by a combination of factors. This includes location of rig at the time support is required (i.e. rig movement to location). Additional support from aircraft in the vicinity will, of course, be requested if available.	
			2. Materials on board for the performance of emergency repairs if necessary - part of Rig Move procedures	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan. Use of helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	5. Uneven leg loading resulting in over-loading of legs (high leg reactions).	1. Structural collapse of rig in elevated mode	1. Detailed rig loading procedure	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan. Use of standby vessel/ helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills	5. Refer to 'Go Offshore' study.	

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Extreme weather limits, weather monitoring and ability to go into storm mode.	Procedures not followed Equipment failure	Training and competency. Competency and training including selection of personnel, assessments and records and training Equipment checked before mobilization. Marine notices issued prior to rig move. 2 Hourly security VHF announcements made	1. Limit POB	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	6. Ship collision with rig structure(supply boat or errant vessel, ferry)	1. Structural failure buoyancy loss	1. 24-hour radio communications & watch, SBV, obstruction lights,	Procedures not followed Equipment failure	Training and competency of crew Rig move plan. Move plan provided to				6. Ferry schedule and other shipping schedules across Bass Strait to be determined to identify specific risk to facility..	

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
					AMSA Training and competency. Competency and training including selection of personnel, assessments and records and training Equipment checked before mobilization. Marine notices issued prior to rig move. 2 Hourly security VHF announcements made				7. Automatic Identification Systems (AIS) - ID system between marine vessels using GPS (fitted to vessels over 500 tonne) Verify if this is required	
	7. Towing of MODU to Bass Basin Site	1. Collision with other vessels in area or tow vessel	1. Site survey & Official approval from site.	Procedures not followed Failure of tow equipment	Training and competency Equipment certification Tow procedures					
			2. Operation / rig move procedures - already in manual.	Procedures not followed Failure of tow equipment	Training and competency Equipment certification Tow procedures					

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
2. Towing	1. Loss of tow wire (Weather deterioration, tow wire failure)	1. Rig drifting uncontrolled	1. Tow will be done outside heavy weather conditions. Weather forecasting - Continually receive details of predicted weather conditions in the area of operation Approved tow plan Certification of tow wire (marine warranty survey) Tow cables are rated for 300 tonne, vessel can only tow 120 tonne Emergency tow wires kept on board and rigged up on rig and tow vessels Two tugs with tow lines will be used	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP		8. Confirm actions from last rig move (refer to lessons learned documentation).	
									9. Confirm spare tow wires are available on tow vessel.	
									10. Ensure adequate personnel (rig shift extras) are available for rig move and that pre rig move meeting is attended by reps from rig and tow vessel. Check on additional rig shift extras to be made a minimum of one week prior to rig move.	
3. Collision	1. Passing merchant vessels or drifting vessel (fishing vessel, ferry etc)	1. Major structural damage to MODU. Loss of drilling mud's. Potential loss of life	1. Separation from shipping lanes Navigational aids (lights etc) Standby vessels on site	Errant vessel not aware of presence of rig	500m exclusion zone, radio contact will be attempted, Standby vessel approach errant vessel to notify and raise awareness of current position and course, contact AMSA to attempt to raise errant vessel	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP			

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	2. Supply vessel strikes MODU	1. Minor structural damage to MODU, significant damage to supply vessel	1. DP on supply vessel	DP failure	Supply vessel contractor testing regime	1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
			2. Supply vessel approaches rig on down side	Procedure not followed	Weather forecasts, amd supply vessel approach procedures, communication between rig and supply vessel	1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
		2. Potential loss of life								
	3. Helicopter strikes rig on approach or departure	1. Potential fire and explosion	1. Weather forecasting, maintenance of helicopter, approach path,	Human error		1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
						2. Drain arrangements for heli deck allow for emergency dumping over the side in the event there is a fire	Physical damage			
						3. Fire crew avaliable for heli deck incidents	Unable to access the fire	fire drills for emergencies on the heli deck		
						4. Supply / standby vessel to respond	Vessel failure or equipment failure on Supply /Standby vessel	fire drills		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Elements of rig ERM may be able to prevent fire and explosion	Area of impace inaccessible and fuel spill too widely to prevent fire		1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
				Fire immediately on impact						
			3. Communication with HLO	miss communication	Procedure not followed					
				Failure to contact HLO	Procedure not followed					
		2. Potential loss of life on MODU	1. As above							
		3. Potential loss of life on helicopter	1. As above			1. BOSIET training				
		4. Potential structural damage	1. Structural design if heli deck							
		5. Environmental pollution	1. Structural design							
			2.							
		6. Potential loss of well control								
4. Helicopter Travel	1. Aircraft faults	1. Helicopter crash in transit or onto the rig.	1. Equipment Certification and QA & pre tested & equipment and loading	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
	2. Extreme weather / sea state / heavy weather - note Bass Strait can be more difficult than other Possible icing of aircraft	1. Helicopter crash in transit or onto the rig.	1. Weather forecasting and operating limits in accordance with Marine Ops Manual. Reporting of weather from rig itself - prior to departure.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
	3. Pilot Error	1. Helicopter crash in transit or onto the rig.	1. Training and Competency/ flight schedules and industry accepted limits on flying times	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
5. Personnel Performance Impairment	1. Fatigue due to extended travel time	1. Overall journey time may vary if contractors are flying in from overseas	1. Working directive to minimize fatigue	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training				11. Confirm that fatigue management plan is in place.	
									12. Confirm the process of identifying requirement for rest prior to commencement of a shift.	
6. Punch-Through	1. load from rig is too great for seabed to handle.	1. Rig becomes unstable, can tip causing equipment damage, loss of rig, injury.	1. Marine survey - signed off by Seadrill, insurance. Seabed coring has taken place. Data indicates the site is suitable for a jack up. However a leg penetration of up to 25m can be expected. Offset data available that indicates that conditions are suitable for jack up.	survey is incorrect	Jacking procedure – preloading procedures when penetration is less than expected. Can do single-leg pre-loading if necessary. Covered by rig moving procedures.	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard). Training and competency / ERP drills and exercises	13. Develop preload procedures to account for leg hold up and for the potential 25m penetration.	
		Location is 25 m of penetration								

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
7. Large Marine Life	1. Collision with animal (e.g. whale)	1. No damage to rig - probably only a PR threat. Legislation on approach distances to marine animals.	1. Environment plan. Whale watching. Seasonal variations in animal movements. Interaction guidelines	Not following procedures, personnel not aware of plans & procedures	Crew induction & training prior to move.					
8. Skidding Package	1. Weather deteriorations causing vessel to role and skids to shift	1. Damage to rig or materials								
9. Seismic Surveys done at the same time	1. Other vessels in area	1. Damage to rig / collision with ship	1. Communications with marine vessels.	Not following procedures, personnel not aware of plans & procedures	Competency of personnel/ training				14. ADA to contact authorities prior to movement to determine if any seismic activity is being done - suggested that AMSA website can be used.	
10. Drug & Alcohol	1. Personnel arriving at helicopter check in under the influence of drugs and alcohol.	1. Personnel potentially going offshore under the influence of drugs and alcohol.	1. Random alcohol testing at helicopter check in. Drug testing for cause only.	Not following procedures, personnel not aware of plans & procedures	Competency of personnel/ training					
11. Helicopter Ditching	1. Helicopter ditching/ failure while flying over water	1. Personnel in water	1. BOSIET Training/ survival training	Personnel allowed to fly without BOSIET training	All personnel required to have BOSIET training	1. Emergency Response/ standby vessels/ communications	Barrier recovery not complied with	Training/ emergency response exercises and drills	15. All 3rd party contractors need to confirm the have cold water BOSIET training	

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. BOSIET Training/ survival training	Personnel allowed to fly without BOSIET training	Checks undertaken at helicopter check in and verification that passengers have BOSIET cards	1. Emergency Response/ standby vessels/ communications	Barrier recovery not complied with	Training/ emergency response exercises and drills		
12. SIMOPS	1. No additional issues	1.	1.			1.				
13. Towing over Subsea Equipment	1. No additional issues	1.	1.			1.				

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Reservoir	1. Hydrogen Sulphide	1. Exposure to hydrogen sulphide.	1. Drill programme	Inappropriate offset data	Engineering checks/ seismic data/ competency of engineering personnel	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises	16. Check sole data for presence of H2S	
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			2. Forced ventilation in mud pump room / mud pit / drill floor.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			3. Toxic gas detection provided around drill floor / mud room and test spread if H2S is suspected (no expected during this drill). Low level alarm at 5ppm - activates emergency plan.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			4. Mud volume monitoring/scavengers used.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
	2. Carbon dioxide (up to 15% based on experience in area)	1. Exposure to elevated levels of CO2 - note expecting low levels of CO2	1.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Hazardous zoning	Recovery barrier not complied with	Validation and acceptance by NOPSA		
		2. Pipe corrosion - low levels of CO2 expected	1. Equipment Certification and QA & pre tested & equipment and loading	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
	3. High Temperature	1. Exposure of equipment above design parameters	1. Equipment Certification and QA & pre tested & equipment fit for purpose	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
		2. Exposure of personnel to	1. Vessel / piping insulation							

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
		elevated temperatures on vessel equipment/ piping	2. Personnel Protective Equipment (PPE)	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training					
	4. High Pressure	1. Exposure of equipment above design parameters	1. Equipment Certification and QA & pre tested & equipment fit for purpose. Following drill program (high mud weight)	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
2. Well Control	1. Inaccurate pore pressure prediction leading to higher pressure than anticipated - historically it is very unusual to have this issue at these depths.	1. Loss of Primary well control	1. Lost circulation procedures Internal review of expectant pore pressure Well control procedures Well designed to take full gas column Mud weight monitoring Gas monitors Reliable offset well data Shallow hazard assessment	Procedures not followed/ inaccurate well data	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response	Recovery barrier not complied with	Certification of equipment Training of personnel/ emergency response exercises		
	2. Fault intersection causing well kick due to higher pressure than expected (relevant to Bass Basin Wells).								17. Verify if this is an issue	

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Drilling	1. Loss of well control due to failure to properly install or test the BOP, incorrect mud composition, shallow gas, failure to react correctly or quickly enough to a kick / influx of hydrocarbons into the well bore, unexpected high pressure zone	1. Unignited blowout of a gas reservoir, leading to large volumes of asphyxiating and/or toxic natural gas engulfing personnel. Gas cloud may be asphyxiating, narcotic and toxic (as well as being flammable). Ignition threats include faulty /sparking electric	1.							
		2. Ignited blowout of any hydrocarbon reservoir, resulting in major fire, possibly preceded by a vapour cloud explosion, with high potential to substantially destroy the rig.								

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	2. Lost circulation and seepage	1. Dynamic overbalance leading to lost circulation. Losses into reservoir	1. Mud properties/ no losses seen in offset wells Maintain minimum overbalance consistent with hole stability Use LCM as required.	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures	Recovery barrier not complied with	Competency of personnel		
	3. Borehole stability .	1. Cave in leading to hole pack off. Loss of well control and possible surface fire	1. Mud weight design and monitoring/ drilling procedures	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures/ mud logging monitoring procedures/ loss of control procedures	Recovery barrier not complied with	Competency of personnel		
	4. Incorrect mud density	1. Ingress of hydrocarbons into well bore. Loss of well control and possible surface fire	1. Analysis of well bore cuttings/ Geological information/ shut-in well procedures/ lost circulation procedures/ pore pressures understood	Incorrect mud mixing/ uncalibrated scales/ human error/ drilling underbalanced/ degassing system failure	Training and competency. Equipment certification	1. Drilling procedures/ mud logging monitoring procedures/ loss of control procedures	Recovery barrier not complied with	Competency of personnel		
	5. Reservoir gas in mud; failure to circulate out gas safely for any reason.	1. Vapor cloud explosion in the shale shakers or mud pits area.	1. Mud logging/ mud monitoring Gas monitors Offset data .	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures/ Gas monitors/ emergency response actions	Recovery barrier not complied with	Competency of personnel		

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	6. Congestion / enclosure resulting in increased vapour cloud explosion overpressure.	1. Vapour cloud explosion	1. Gas monitors/ inspection of equipment/ certification of equipment	Human error/ Competency Equipment failure	Training and competency. Equipment certification by qualified electrician/ engineer for use of equipment in area	1. Hazardous zoning/ emergency response	Recovery barrier not complied with	Competency of personnel/ emergency response drills and exercises		
	7. Ignition threats include faulty /sparking electrical equipment, non-standard equipment, expansion of gas cloud beyond defined Hazardous area, hot work	1. Vapour cloud explosion/ Fire resulting from ignition of gas	1. Hazardous areas defined/ electrical equipment certified	Human error/ Competency Equipment failure	Training and competency. Equipment certification by qualified electrician/ engineer for use of equipment in area	1. Hazardous zoning/ emergency response	Recovery barrier not complied with	Competency of personnel/ emergency response drills and exercises		
2. Shallow Gas	1. Potential subsea blowout while drilling riser less	1. Vapour cloud explosion/ Fire resulting from ignition of gas	1. Offset well data	Human Error	Competency of personnel	1. Drilling procedures/ Gas monitors/ emergency response actions	Recovery barrier not complied with	Competency of personnel		
3. Lifting	1. Mechanism failures (lifting assembly – trolley beams etc.) Unrevealed loss of integrity of lifting gear / material defects.	1. Structural collapse of crane onto the deck or onto a supply vessel alongside.	1. Inspection and certification of all lifting & rigging gear including the crane itself.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Known loads/ lifting plan	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			3. PTW/ Competency	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
		2. Dropped Blocks/TDS from derrick onto drill floor.	1. Inspection and certification of all lifting & rigging gear	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			2. Restricted access to drill floor and derrick.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
		3. Dropped BOP.	1. Inspection and certification of all lifting & rigging gear	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			2. Defined fall zone (de-manned and wells closed-in and bled-off – i.e. minimize SIMOPS).	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
4. ROV	1. Operating ROV in vicinity of rig.	1. Snagging of ROV	1. ROV procedures	Human Error/ procedures not followed Changes in weather/ sea state conditions	Training and competency/ induction training Limits on operating (sea states etc).	1. Limits on operating (sea states etc). Recovery procedures/ emergency response	Recovery barrier not complied with	Pre survey/ engineering checks/		
5. Explosives (primary and secondary)	1. Logging operations	1. multiple fatalities, facility damage	1. third party handling procedures and Vic legislation	Procedures not followed	Training and competency and job observation	1. Emergency Response actions/ procedures	Procedures not complied with/ Human error		18. Investigate existing drills to see if they cover or close to explosives store.	
				controlled access to store	Training and competency and job observation				19. If current drills do not cover these cases modify accordingly.	

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. PTW to control work around area and controlling movement	PTW not raised or followed	Training and competency and job observation	1. Emergency Response actions/ procedures	Procedures not complied with/ Human error			

Phase/Activity: 6. Shore Base

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Heavy Lift	1. Possibility that there may be some heavy lifts undertaken at Geelong shore base	1. Dropped objects damage to equipment	1. JSA and lifting plans Certification of all lifting gear.	Procedures not followed	Training and competency and job observation					
				incorrectly labeled loads	Competency of personnel					
				incorrect selection/marked slings						
2. Dangerous goods	1. Storage of methanol	1. Methanol fires	1. Methanol stored in dedicated bund/firefighting equip	Fire fighting insufficient					20. Verify handling procedures and restrictions at shore base	
	2. Storage of HC at shore base	1. Spillage or possible fires.	1. Condensate stored in designated DG storage area/firefighting equip.	Fire fighting insufficient						
				Storage mis labeled	Covered under shore base DG license					
			2. Spill Kit.							

Phase/Activity: 6. Shore Base

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	3. Storage of RA sources	1. possible contamination and exposure to RA material	1. Handling procedures require shipment straight to rig	Procedure not followed	Training and competency and job observation Chain of custody documentation	1. Third party contractor responsibility				
3. Equipment	1. Equipment arriving at site without being flushed or depressurized	1. Spillage or personal injury	1. All equipment flushed and depressurized prior to arrival at site. EXPRO checklist procedure.							
4. Security	1.	1. Unauthorized personnel entering site.	1. Security plan for site approved by authorities.							
5. Management system and competency.	1. Competency of personnel and equip not correctly maintained.	1. Injury or damage to equip.	1. Site management system and PMS.							

Phase/Activity: 8. Aviation

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Helicopter refuelling	1. Commissioning of helicopter refuelling system								21. Ensure actions form the helicopter refuelling commissioning audit are closed out	

Attachment 2

HAZID Worksheets

Spikey Beach

2. HAZID Worksheet – Spikey Beach (Direct Copy From PJ Bass Strait Case) - Minutes from 23rd June 2008

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Mobilisation	1. Shifting of unsecured or poorly secured equipment on the pipe deck including stacked tubulars	1. Direct fatalities due to crushing, and potential further accidents via load shift impact on rig stability. Moving objects can also knock vents, possible allow water to be taken on (instability)	1. Remove all unnecessary equipment from rig (6-7 day move).	Procedures not followed (rig move)	Pre rig move meeting	1. Movement into sheltered harbour	Distance from sheltered harbour TBA	Study being undertaken		
			2. De mob drill pipe.	Procedure not followed	Pre rig move meeting					
			3.							
	2. Extreme weather / sea state / heavy weathers	1. Weather limits and forecast. Sudden squalls / rough seas, rig listing, exceptionally strong winds.	1. Weather forecasting and operating limits in accordance with Marine Ops Manual. Get 2 weather forecasts from separate sources every two hours during rig movement. 3 day look ahead.	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with	Training/ emergency response exercises and drills	1. Rig move from Stuart site to Beach site is approx 6-7 days(TBC). Investigate requirement for a greater than 3 day look ahead on weather forecasting. To be included on rig move procedures.	
			2. Details of weather policies etc are detailed within the VSC. These include adverse weather policies, Marine operations manual, Emergency response and heavy weather emergency response	Procedures not followed		1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with	Training/ emergency response exercises and drills		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			3. Use of weather windows. Heavy Weather Emergency Plan.	reliable weather forecasts only covers 3 days. Rig move up to 6-7 days	Refer to safe haven study	1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	3. Down-flooding (if hatches not closed).	1. Capsize and/or sinking of the rig when in float mode.	1. Operating within the guidelines of the MODU Marine Operations Manual (MOM).	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills	2. Confirm location of any platforms and pipe lay barges and any other vessels that may be within tow path.	
			2. Correct marine lock-down / water tight integrity	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills	3. Additional Barge Engineer, any other additional personnel to be discussed at Rig Move meeting.	
			3. Tow plan with identification of safe harbour and soft pin sites. Local coast and marine rescue centres notified of passage plan.	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
			4. Mud tanks emptied and VCG calculations done and Plimsoll mark check done before rig move.	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
			5. Design standards, material certification and construction standards for the vessel, and maintenance.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			6. Materials on board for the performance of emergency repairs if necessary - part of Rig Move procedures	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	4. Structural failure of hull e.g. due to material defects or collision with another vessel or reef (grounding)	1. Capsize and/or sinking of the rig when in float mode.	1. Design standards, material certification and construction standards for the vessel, and maintenance.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan. Use of helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills	4. Helicopter support for emergency evacuation will be determined by a combination of factors. This includes location of rig at the time support is required (i.e. rig movement to location). Additional support from aircraft in the vicinity will, of course, be requested Yolla Consortium will also be approached to determine potential to use aircraft servicing their facility(ies). Note Ocean Patriot (Santos) also in area.	
			2. Materials on board for the performance of emergency repairs if necessary - part of Rig Move procedures	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan. Use of helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	5. Uneven leg loading resulting in over-loading of legs (high leg reactions).	1. Structural collapse of rig in elevated mode	1. Detailed rig loading procedure	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan. Use of standby vessel/ helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills	5. Refer to 'Go Offshore' study.	

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Extreme weather limits, weather monitoring and ability to go into storm mode.	Procedures not followed Equipment failure	Training and competency. Competency and training including selection of personnel, assessments and records and training Equipment checked before mobilization. Marine notices issued prior to rig move. 2 Hourly security VHF announcements made	1. Limit POB	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	6. Ship collision with rig structure(supply boat or errant vessel, ferry)	1. Structural failure buoyancy loss	1. 24-hour radio communications & watch, SBV, obstruction lights,	Procedures not followed Equipment failure	Training and competency of crew Rig move plan. Move plan provided to				6. Ferry schedule and other shipping schedules across Bass Strait to be determined to identify specific risk to facility..	

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
					AMSA Training and competency. Competency and training including selection of personnel, assessments and records and training Equipment checked before mobilization. Marine notices issued prior to rig move. 2 Hourly security VHF announcements made				7. Automatic Identification Systems (AIS) - ID system between marine vessels using GPS (fitted to vessels over 500 tonne) Verify if this is required	
	7. Towing of MODU to Bass Basin Site	1. Collision with other vessels in area or tow vessel	1. Site survey & Official approval from site.	Procedures not followed Failure of tow equipment	Training and competency Equipment certification Tow procedures					
			2. Operation / rig move procedures - already in manual.	Procedures not followed Failure of tow equipment	Training and competency Equipment certification Tow procedures					

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
2. Towing	1. Loss of tow wire (Weather deterioration, tow wire failure)	1. Rig drifting uncontrolled	1. Tow will be done outside heavy weather conditions. Weather forecasting - Continually receive details of predicted weather conditions in the area of operation Approved tow plan Certification of tow wire (marine warranty survey) Tow cables are rated for 300 tonne, vessel can only tow 120 tonne Emergency tow wires kept on board and rigged up on rig and tow vessels Two tugs with tow lines will be used	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP		8. Confirm actions from last rig move (refer to lessons learned documentation).	
									9. Confirm spare tow wires are available on tow vessel.	
									10. Ensure adequate personnel (rig shift extras) are available for rig move and that pre rig move meeting is attended by reps from rig and tow vessel. Check on additional rig shift extras to be made a minimum of one week prior to rig move.	
3. Collision	1. Passing merchant vessels or drifting vessel (fishing vessel, ferry etc)	1. Major structural damage to MODU. Loss of drilling mud's. Potential loss of life	1. Separation from shipping lanes Navigational aids (lights etc) Standby vessels on site	Errant vessel not aware of presence of rig	500m exclusion zone, radio contact will be attempted, Standby vessel approach errant vessel to notify and raise awareness of current position and course, contact AMSA to attempt to raise errant vessel	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP			

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	2. Supply vessel strikes MODU	1. Minor structural damage to MODU, significant damage to supply vessel	1. DP on supply vessel	DP failure	Supply vessel contractor testing regime	1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
			2. Supply vessel approaches rig on down side	Procedure not followed	Weather forecasts, amd supply vessel approach procedures, communication between rig and supply vessel	1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
		2. Potential loss of life								
	3. Helicopter strikes rig on approach or departure	1. Potential fire and explosion	1. Weather forecasting, maintenance of helicopter, approach path,	Human error		1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
						2. Drain arrangements for heli deck allow fore emergency dumping over the side in the event there is a fire	Physical damage			
						3. Fire crew available for heli deck incidents	Unable to access the fire	fire drills for emergencies on the heli deck		
						4. Supply / standby vessel to respond	Vessel failure or equipment failure on Supply /Standby vessel	fire drills		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Elements of rig ERM may be able to prevent fire and explosion	Area of impact inaccessible and fuel spill too widely to prevent fire		1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
				Fire immediately on impact						
			3. Communication with HLO	miss communication	Procedure not followed					
				Failure to contact HLO	Procedure not followed					
		2. Potential loss of life on MODU	1. As above							
		3. Potential loss of life on helicopter	1. As above			1. BOSIET training				
		4. Potential structural damage	1. Structural design if heli deck							
		5. Environmental pollution	1. Structural design							
			2.							
		6. Potential loss of well control								
4. Helicopter Travel	1. Aircraft faults	1. Helicopter crash in transit or onto the rig.	1. Equipment Certification and QA & pre tested & equipment and loading	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
	2. Extreme weather / sea state / heavy weather - note Bass Strait can be more difficult than other Possible icing of aircraft	1. Helicopter crash in transit or onto the rig.	1. Weather forecasting and operating limits in accordance with Marine Ops Manual. Reporting of weather from rig itself - prior to departure.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	3. Pilot Error	1. Helicopter crash in transit or onto the rig.	1. Training and Competency/ flight schedules and industry accepted limits on flying times	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
5. Personnel Performance Impairment	1. Fatigue due to extended travel time	1. Overall journey time may vary if contractors are flying in from overseas	1. Working directive to minimize fatigue	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training				11. Confirm that fatigue management plan is in place.	
									12. Confirm the process of identifying requirement for rest prior to commencement of a shift.	

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
6. Punch-Through	1. load from rig is too great for seabed to handle.	1. Rig becomes unstable, can tip causing equipment damage, loss of rig, injury.	1. Marine survey - signed off by Seadrill, insurance. Seabed coring has taken place. Data indicates the site is suitable for a jack up. However a leg penetration of up to 25m can be expected. Offset data available that indicates that conditions are suitable for jack up.	survey is incorrect	Jacking procedure - preloading procedures when penetration is less than expected. Can do single-leg pre-loading if necessary. Covered by rig moving procedures.	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard). Training and competency / ERP drills and exercises	13. Develop preload procedures to account for leg hold up and for the potential 25m penetration.	
		Location is 25 m of penetration	1.							
7. Large Marine Life	1. Collision with animal (e.g. whale)	1. No damage to rig - probably only a PR threat. Legislation on approach distances to marine animals.	1. Environment plan. Whale watching. Seasonal variations in animal movements. Interaction guidelines	Not following procedures, personnel not aware of plans & procedures	Crew induction & training prior to move.					
8. Skidding Package	1. Weather deteriorations causing vessel to role and skids to shift	1. Damage to rig or materials								
9. Seismic Surveys done at the same time	1. Other vessels in area	1. Damage to rig / collision with ship	1. Communications with marine vessels.	Not following procedures, personnel not aware of plans & procedures	Competency of personnel/ training				14. ADA to contact authorities prior to movement to determine if any seismic activity is being done - suggested that AMSA website can be used.	

Phase/Activity: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
10. Drug & Alcohol	1. Personnel arriving at helicopter check in under the influence of drugs and alcohol.	1. Personnel potentially going offshore under the influence of drugs and alcohol.	1. Random alcohol testing at helicopter check in. Drug testing for cause only.	Not following procedures, personnel not aware of plans & procedures False Positive or negative reading due to inaccurate method	Competency of personnel/ training New Calibrated equipment has been selected with higher reliability than previous system, personnel trained to use new equipment					
11. Helicopter Ditching	1. Helicopter ditching/ failure while flying over water	1. Personnel in water	1. BOSIET Training/ survival training	Personnel allowed to fly without BOSIET training	All personnel required to have BOSIET training	1. Emergency Response/ standby vessels/ communications	Barrier recovery not complied with	Training/ emergency response exercises and drills	15. All 3rd party contractors need to confirm the have cold water BOSIET training	
			2. BOSIET Training/ survival training	Personnel allowed to fly without BOSIET training	Checks undertaken at helicopter check in and verification that passengers have BOSIET cards	1. Emergency Response/ standby vessels/ communications	Barrier recovery not complied with	Training/ emergency response exercises and drills		
12. SIMOPS	1. No additional issues	1.	1.			1.				
13. Towing over Subsea Equipment	1. No additional issues	1.	1.			1.				

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Reservoir	1. Hydrogen Sulphide	1. Exposure to hydrogen sulphide.	1. Drill programme	Inappropriate offset data	Engineering checks/ seismic data/ competency of engineering personnel	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises	16. Check sole data for presence of H2S	
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			2. Forced ventilation in mud pump room / mud pit / drill floor.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			3. Toxic gas detection provided around drill floor / mud room and test spread if H2S is suspected (no expected during this drill). Low level alarm at 5ppm - activates emergency plan.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			4. Mud volume monitoring/scavengers used.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
	2. Carbon dioxide (up to 15% based on experience in area)	1. Exposure to elevated levels of CO2 - note expecting low levels of CO2	1.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Hazardous zoning	Recovery barrier not complied with	Validation and acceptance by NOPSA		

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
		2. Pipe corrosion - low levels of CO2 expected	1. Equipment Certification and QA & pre tested & equipment and loading	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
	3. High Temperature	1. Exposure of equipment above design parameters	1. Equipment Certification and QA & pre tested & equipment fit for purpose	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
		2. Exposure of personnel to elevated temperatures on vessel equipment/ piping	1. Vessel / piping insulation							
			2. Personnel Protective Equipment (PPE)	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training					
	4. High Pressure	1. Exposure of equipment above design parameters	1. Equipment Certification and QA & pre tested & equipment fit for purpose. Following drill program (high mud weight)	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					

Phase/Activity: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
2. Well Control	1. Inaccurate pore pressure prediction leading to higher pressure than anticipated - historically it is very unusually to have this issue at these depths.	1. Loss of Primary well control	1. Lost circulation procedures Internal review of expectant pore pressure Well control procedures Well designed to take full gas column Mud weight monitoring Gas monitors Reliable offset well data Shallow hazard assessment	Procedures not followed/ inaccurate well data	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response	Recovery barrier not complied with	Certification of equipment Training of personnel/ emergency response exercises		
	2. Fault intersection causing well kick due to higher pressure than expected (relevant to Bass Basin Wells).		1. Lost circulation procedures Internal review of expectant pore pressure Well control procedures Well designed to take full gas column Mud weight monitoring Gas monitors Reliable offset well data Shallow hazard assessment	Procedures not followed/ inaccurate well data	Training and competency. Competency and training including selection of personnel, assessments and records and training				17. Verify if this is an issue	

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Responsibility
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Drilling	1. Loss of well control due to failure to properly install or test the BOP, incorrect mud composition, shallow gas, failure to react correctly or quickly enough to a kick / influx of hydrocarbons into the well bore, unexpected high pressure zone	1. Unignited blowout of a gas reservoir, leading to large volumes of asphyxiating and/or toxic natural gas engulfing personnel. Gas cloud may be asphyxiating, narcotic and toxic (as well as being flammable). Ignition threats include faulty /sparking electric	1.							
		2. Ignited blowout of any hydrocarbon reservoir, resulting in major fire, possibly preceded by a vapour cloud explosion, with high potential to substantially destroy the rig.								

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Responsibility
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	2. Lost circulation and seepage	1. Dynamic overbalance leading to lost circulation. Losses into reservoir	1. Mud properties/ no losses seen in offset wells Maintain minimum overbalance consistent with hole stability Use LCM as required.	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures	Recovery barrier not complied with	Competency of personnel		
	3. Borehole stability .	1. Cave in leading to hole pack off. Loss of well control and possible surface fire	1. Mud weight design and monitoring/ drilling procedures	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures/ mud logging monitoring procedures/ loss of control procedures	Recovery barrier not complied with	Competency of personnel		
	4. Incorrect mud density	1. Ingress of hydrocarbons into well bore. Loss of well control and possible surface fire	1. Analysis of well bore cuttings/ Geological information/ shut-in well procedures/ lost circulation procedures/ pore pressures understood	Incorrect mud mixing/ uncalibrated scales/ human error/ drilling underbalanced/ degassing system failure	Training and competency. Equipment certification	1. Drilling procedures/ mud logging monitoring procedures/ loss of control procedures	Recovery barrier not complied with	Competency of personnel		
	5. Reservoir gas in mud; failure to circulate out gas safely for any reason.	1. Vapor cloud explosion in the shale shakers or mud pits area.	1. Mud logging/ mud monitoring Gas monitors Offset data .	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures/ Gas monitors/ emergency response actions	Recovery barrier not complied with	Competency of personnel		

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Responsibility
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	6. Congestion / enclosure resulting in increased vapour cloud explosion overpressure.	1. Vapour cloud explosion	1. Gas monitors/ inspection of equipment/ certification of equipment	Human error/ Competency Equipment failure	Training and competency. Equipment certification by qualified electrician/ engineer for use of equipment in area	1. Hazardous zoning/ emergency response	Recovery barrier not complied with	Competency of personnel/ emergency response drills and exercises		
	7. Ignition threats include faulty /sparking electrical equipment, non-standard equipment, expansion of gas cloud beyond defined Hazardous area, hot work	1. Vapour cloud explosion/ Fire resulting from ignition of gas	1. Hazardous areas defined/ electrical equipment certified	Human error/ Competency Equipment failure	Training and competency. Equipment certification by qualified electrician/ engineer for use of equipment in area	1. Hazardous zoning/ emergency response	Recovery barrier not complied with	Competency of personnel/ emergency response drills and exercises		
2. Shallow Gas	1. Potential subsea blowout while drilling riser less	1. Vapour cloud explosion/ Fire resulting from ignition of gas	1. Offset well data	Human Error	Competency of personnel	1. Drilling procedures/ Gas monitors/ emergency response actions	Recovery barrier not complied with	Competency of personnel		
3. Lifting	1. Mechanism failures (lifting assembly – trolley beams etc.) Unrevealed loss of integrity of lifting gear / material defects.	1. Structural collapse of crane onto the deck or onto a supply vessel alongside.	1. Inspection and certification of all lifting & rigging gear including the crane itself.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Responsibility
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Known loads/ lifting plan	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			3. PTW/ Competency	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
		2. Dropped Blocks/TDS from derrick onto drill floor.	1. Inspection and certification of all lifting & rigging gear	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			2. Restricted access to drill floor and derrick.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Responsibility
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
		3. Dropped BOP.	1. Inspection and certification of all lifting & rigging gear	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			2. Defined fall zone (de-manned and wells closed-in and bled-off – i.e. minimize SIMOPS).	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
4. ROV	1. Operating ROV in vicinity of rig.	1. Snagging of ROV	1. ROV procedures	Human Error/ procedures not followed Changes in weather/ sea state conditions	Training and competency/ induction training Limits on operating (sea states etc).	1. Limits on operating (sea states etc). Recovery procedures/ emergency response	Recovery barrier not complied with	Pre survey/ engineering checks/		
5. Explosives (primary and secondary)	1. Logging operations	1. multiple fatalities, facility damage	1. third party handling procedures and Vic legislation	Procedures not followed	Training and competency and job observation	1. Emergency Response actions/ procedures	Procedures not complied with/ Human error		18. Investigate existing drills to see if they cover or close to explosives store.	
				controlled access to store	Training and competency and job observation				19. If current drills do not cover these cases modify accordingly.	

Phase/Activity: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Responsibility
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. PTW to control work around area and controlling movement	PTW not raised or followed	Training and competency and job observation	1. Emergency Response actions/ procedures	Procedures not complied with/ Human error			

Phase/Activity: 6. Shore Base

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Heavy Lift	1. Possibility that there may be some heavy lifts undertaken at Geelong shore base	1. Dropped objects damage to equipment	1. JSA and lifting plans Certification of all lifting gear.	Procedures not followed	Training and competency and job observation					
				incorrectly labeled loads	Competency of personnel					
				incorrect selection/marked slings						
2. Dangerous goods	1. Storage of methanol	1. Methanol fires	1. Methanol stored in dedicated bund/firefighting equip	Fire fighting insufficient					20. Verify handling procedures and restrictions at shore base	
	2. Storage of HC at shorebase	1. Spillage or possible fires.	1. Condensate stored in designated DG storage area/firefighting equip.	Fire fighting insufficient						
				Storage mis labeled	Covered under shore base DG license					
			2. Spill Kit.							

Phase/Activity: 6. Shore Base

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	3. Storage of RA sources	1. possible contamination and exposure to RA material	1. Handling procedures require shipment straight to rig	Procedure not followed	Training and competency and job observation Chain of custody documentation	1. Third party contractor responsibility				
3. Equipment	1. Equipment arriving at site without being flushed or depressurized	1. Spillage or personal injury	1. All equipment flushed and depressurized prior to arrival at site. EXPRO checklist procedure.							
4. Security	1.	1. Unauthorized personnel entering site.	1. Security plan for site approved by authorities.							
5. Management system and competency.	1. Competency of personnel and equip not correctly maintained.	1. Injury or damage to equip.	1. Site management system and PMS.							

Phase/Activity: 8. Aviation

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Helicopter refuelling	1. Commissioning of helicopter refuelling system								21. Ensure actions form the helicopter refuelling commissioning audit are closed out	

Attachment 3

HAZID Worksheets

Otway

3. HAZID Worksheet – Otway – Minutes from 23rd June 2008

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Mobilisation	1. Shifting of unsecured or poorly secured equipment on the pipe deck including stacked tubulars	1. Direct fatalities due to crushing, and potential further accidents via load shift impact on rig stability. Moving objects can also knock vents, possible allow water to be taken on (instability)	1. Remove all unnecessary equipment from rig (3 day move PJ - Otway, 5 day move Gippsland to Otway).	Procedures not followed (rig move)	Pre rig move meeting	1. Movement into sheltered harbour	Distance from sheltered harbour TBA	Study being undertaken		
			2. De mob drill pipe.	Procedure not followed	Pre rig move meeting					
	2. Extreme weather / sea state / heavy weathers Note location is more exposed to severe storms and large seas because of open aspect of southern ocean	1. Weather limits and forecast. Extremely rough seas, squalls / exceptionally strong winds. Difficulty to resupply and no helicopter service	1. Weather forecasting and operating limits in accordance with Marine Ops Manual. Get 2 weather forecasts from separate sources every two hours during rig movement. 3 day look ahead.	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with, the extreme weather prevents use of supply vessel and helicopters	Training/ emergency response exercises and drills. Emergency response plan provides for lifeboat evacuation as a last measure	1. Rig move from Stuart/Bass Basin (alternate route may be selected) site to Beach site is approx 6-7 days(TBC). Investigate requirement for a greater than 3 day look ahead on weather forecasting. To be included on rig move procedures.	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Details of weather policies etc are detailed within the VSC. These include adverse weather policies, Marine operations manual, Emergency response and heavy weather emergency response	Procedures not followed		1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with, the extreme weather prevents use of supply vessel and helicopters	Training/ emergency response exercises and drills. Emergency response plan provides for lifeboat evacuation as a last measure	2. Identification of safe locations to note location of Otway and absence of protective harbours in area (therefore, may need to hold up in area around King Island for example)	
			3. Use of weather windows. Heavy Weather Emergency Plan.	reliable weather forecasts only covers 3 days. Rig move up to 6-7 days	Refer to safe haven study	1. Emergency Response Plan. Weather emergency response plan	Barrier recovery not complied with, the extreme weather prevents use of supply vessel and helicopters	Training/ emergency response exercises and drills. Emergency response plan provides for lifeboat evacuation as a last measure		
	3. Down-flooding (if hatches not closed).	1. Capsize and/or sinking of the rig when in float mode.	1. Operating within the guidelines of the MODU Marine Operations Manual (MOM).	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills	3. Confirm location of any platforms and pipe lay barges and any other vessels that may be within tow path.	
			2. Correct marine lock-down / water tight integrity	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills	4. Additional Barge Engineer, any other additional personnel to be discussed at Rig Move meeting.	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			3. Tow plan with identification of safe harbour and soft pin sites. Local coast and marine rescue centres notified of passage plan.	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
			4. Mud tanks emptied and VCG calculations done and Plimsoll mark check done before rig move.	Human Error	Crew complement kept to minimum during tow. Tow master on board.	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
			5. Design standards, material certification and construction standards for the vessel, and maintenance.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
			6. Materials on board for the performance of emergency repairs if necessary - part of Rig Move procedures	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan.	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	4. Structural failure of hull e.g. due to material defects or collision with another vessel or	1. Capsize and/or sinking of the rig when in float mode.	1. Design standards, material certification and construction standards for the vessel, and maintenance.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan. Use of helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills	5. Helicopter support for emergency evacuation will be determined by a combination of factors. This includes	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	reef (grounding)		2. Materials on board for the performance of emergency repairs if necessary - part of Rig Move procedures	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan. Use of helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills	location of rig at the time support is required (i.e. rig movement to location). Additional support from aircraft in the vicinity will, of course, be requested Yolla Consortium will also be approached to determine potential to use aircraft servicing their facility(ies). Note Ocean Patriot (Santos) also in area.	
	5. Uneven leg loading resulting in over-loading of legs (high leg reactions).	1. Structural collapse of rig in elevated mode	1. Detailed rig loading procedure	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan. Use of standby vessel/ helicopters (evacuation of personnel)	Barrier recovery not complied with	Training/ emergency response exercises and drills	6. Refer to 'Go Offshore' study.	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Extreme weather limits, weather monitoring and ability to go into storm mode.	Procedures not followed Equipment failure	Training and competency. Competency and training including selection of personnel, assessments and records and training Equipment checked before mobilization. Marine notices issued prior to rig move. 2 Hourly security VHF announcements made	1. Limit POB	Barrier recovery not complied with	Training/ emergency response exercises and drills		
	6. Ship collision with rig structure(supply boat or errant vessel, ferry)	1. Structural failure buoyancy loss	1. 24-hour radio communications & watch, SBV, obstruction lights,	Procedures not followed Equipment failure	Training and competency of crew Rig move plan. Move plan provided to				7. Ferry schedule and other shipping schedules across Bass Strait to be determined to identify specific risk to facility..	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
					AMSA Training and competency. Competency and training including selection of personnel, assessments and records and training Equipment checked before mobilization. Marine notices issued prior to rig move. 2 Hourly security VHF announcements made				8. Automatic Identification Systems (AIS) - ID system between marine vessels using GPS (fitted to vessels over 500 tonne) Verify if this is required	
	7. Towing of MODU to Otway Basin Site	1. Collision with other vessels in area or tow vessel	1. Site survey & Official approval from site.	Procedures not followed Failure of tow equipment	Training and competency Equipment certification Tow procedures					

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Operation / rig move procedures - already in manual.	Procedures not followed Failure of tow equipment	Training and competency Equipment certification Tow procedures					
2. Towing	1. Loss of tow wire (Weather deterioration, tow wire failure)	1. Rig drifting uncontrolled	1. Tow will be done outside heavy weather conditions. Weather forecasting - Continually receive details of predicted weather conditions in the area of operation Approved tow plan Certification of tow wire (marine warranty survey) Tow cables are rated for 300 tonne, vessel can only tow 120 tonne Emergency tow wires kept on board and rigged up on rig and tow vessels Two tugs with tow lines will be used	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP		9. Confirm actions from last rig move (refer to lessons learned documentation).	
									10. Confirm spare tow wires are available on tow vessel.	
									11. Ensure adequate personnel (rig shift extras) are available for rig move and that pre rig move meeting is attended by reps from rig and tow vessel. Check on additional rig shift extras to be made a minimum of one week prior to rig move.	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
3. Collision	1. Passing merchant vessels or drifting vessel (fishing vessel, ferry etc)	1. Major structural damage to MODU. Loss of drilling mud's. Potential loss of life	1. Separation from shipping lanes Navigational aids (lights etc) Standby vessels on site	Errant vessel not aware of presence of rig	500m exclusion zone, radio contact will be attempted, Standby vessel approach errant vessel to notify and raise awareness of current position and course, contact AMSA to attempt to raise errant vessel	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP			
	2. Supply vessel strikes MODU	1. Minor structural damage to MODU, significant damage to supply vessel	1. DP on supply vessel	DP failure	Supply vessel contractor testing regime	1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
			2. Supply vessel approaches rig on down side	Procedure not followed	Weather forecasts, and supply vessel approach procedures, communication between rig and supply vessel	1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
		2. Potential loss of life								
	3. Helicopter strikes rig on approach or departure	1. Potential fire and explosion	1. Weather forecasting, maintenance of helicopter, approach path,	Human error		1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Drain arrangements for heli deck allow fore emergency dumping over the side in the event there is a fire	Physical damage			
						3. Fire crew available for heli deck incidents	Unable to access the fire	fire drills for emergencies on the heli deck		
						4. Supply / standby vessel to respond	Vessel failure or equipment failure on Supply /Standby vessel	fire drills		
			2. Elements of rig ERM may be able to prevent fire and explosion	Area of impact inaccessible and fuel spill too widely to prevent fire		1. Emergency Response Plan /Supply vessel	Failure to comply / inadequate ERP			
				Fire immediately on impact						
			3. Communication with HLO	miss communication	Procedure not followed					
				Failure to contact HLO	Procedure not followed					
		2. Potential loss of life on MODU	1. As above							
		3. Potential loss of life on helicopter	1. As above			1. BOSIET training				

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
		4. Potential structural damage	1. Structural design if heli deck							
		5. Environmental pollution	1. Structural design							
			2.							
		6. Potential loss of well control								
4. Helicopter Travel	1. Aircraft faults	1. Helicopter crash in transit or onto the rig.	1. Equipment Certification and QA & pre tested & equipment and loading	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
	2. Extreme weather / sea state / heavy weather - note Otway basin can be more difficult than other Possible icing of aircraft	1. Helicopter crash in transit or onto the rig.	1. Weather forecasting and operating limits in accordance with Marine Ops Manual. Reporting of weather from rig itself - prior to departure.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
	3. Pilot Error	1. Helicopter crash in transit or onto the rig.	1. Training and Competency/ flight schedules and industry accepted limits on flying times	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard).		
						2. Emergency Response Plan / Standby vessels Immersion suits to be worn on all flights, cold-water-based BOSIET	Failure to comply / inadequate ERP	Training/ emergency response exercises and drills		
5. Personnel Performance Impairment	1. Fatigue due to extended travel time	1. Overall journey time may vary if contractors are flying in from overseas	1. Working directive to minimize fatigue	Procedures not followed	Training and competency. Competency and training including selection of personnel, assessments and records and training				12. Confirm that fatigue management plan is in place.	
									13. Confirm the process of identifying requirement for rest prior to commencement of a shift.	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
6. Punch-Through	1. load from rig is too great for seabed to handle.	1. Rig becomes unstable, can tip causing equipment damage, loss of rig, injury.	1. Marine survey - signed off by Seadrill, insurance. Seabed coring has also been done. Offset data available that indicates that conditions are suitable for jack up.	survey is incorrect	Jacking procedure - if penetration is apparent then mitigating measures made. Can do single-leg pre-loading if necessary. Covered by rig moving procedures.	1. Emergency Response Plan / Standby vessels	Failure to comply / inadequate ERP	Equipment certification provide to OIM and verified prior to use (onboard). Training and competency / ERP drills and exercises	14. Develop moving on to site and preload procedures to account for the hard bottom	
7. Large Marine Life	1. Collision with animal (e.g. whale)	1. No damage to rig - probably only a PR threat. Legislation on approach distances to marine animals.	1. Environment plan. Whale watching. Seasonal variations in animal movements. Interaction guidelines	Not following procedures, personnel not aware of plans & procedures	Crew induction & training prior to move.					
8. Skidding Package	1. Weather deteriorations causing vessel to role and skids to shift	1. Damage to rig or materials								
9. Seismic Surveys done at the same time	1. Other vessels in area	1. Damage to rig / collision with ship	1. Communications with marine vessels.	Not following procedures, personnel not aware of plans & procedures	Competency of personnel/ training				15. ADA to contact authorities prior to movement to determine if any seismic activity is being done - suggested that AMSA website can be used.	

System: 1. Location

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
10. Drug & Alcohol	1. Personnel arriving at helicopter check in under the influence of drugs and alcohol.	1. Personnel potentially going offshore under the influence of drugs and alcohol.	1. Random alcohol testing at helicopter check in. Drug testing for cause only.	Not following procedures, personnel not aware of plans & procedures	Competency of personnel/ training					
				False positive or negative reading due to inaccurate method	New calibrated equipment has been selected with high reliability than previous system, personnel trained to use new equipment					
11. Helicopter Ditching	1. Helicopter ditching/ failure while flying over water	1. Personnel in water	1. BOSIET Training/ survival training	Personnel allowed to fly without BOSIET training	All personnel required to have BOSIET training	1. Emergency Response/ standby vessels/ communications	Barrier recovery not complied with	Training/ emergency response exercises and drills	16. All 3rd party contractors need to confirm the have BOSIET training	
			2. BOSIET Training/ survival training	Personnel allowed to fly without BOSIET training	Checks undertaken at helicopter check in and verification that passengers have BOSIET cards	1. Emergency Response/ standby vessels/ communications	Barrier recovery not complied with	Training/ emergency response exercises and drills		
12. Towing over Subsea Equipment	1. Covered in vessel safety case									

System: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Reservoir	1. Hydrogen Sulphide	1. Exposure to hydrogen sulphide.	1. Drill programme	Inappropriate offset data	Engineering checks/ seismic data/ competency of engineering personnel	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises	17. Check sole data for presence of H2S	
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			2. Forced ventilation in mud pump room / mud pit / drill floor.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		

System: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			3. Toxic gas detection provided around drill floor / mud room and test spread if H2S is suspected (no expected during this drill). Low level alarm at 5ppm - activates emergency plan.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		

System: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
			4. Mud volume monitoring/scavengers used.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response Plans/ alarms and muster	Failure to comply with ERP/ failure of gas detectors and monitors	Certification of equipment Training of personnel/ emergency response exercises		
						2. Compliance with Hazardous area classification	Recovery barrier not complied with	Validation and acceptance by NOPSA		
						3. Compliance with Hazardous area classification	Recovery barrier not complied with	Supervision and Monitoring by OIM		
						4. Compliance with Hazardous area classification	Recovery barrier not complied with	Equipment certification provide to OIM and verified prior to use (onboard).		
	2. Carbon dioxide (up to 15% based on experience in area, there has been experience of high level in	1. Exposure to elevated levels of CO2 - note expecting low levels of CO2	1.	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Hazardous zoning	Recovery barrier not complied with	Validation and acceptance by NOPSA		

System: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	some locations)	2. Pipe corrosion - low levels of CO2 expected	1. Equipment Certification and QA & pre tested & equipment and loading	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
	3. High Temperature	1. Exposure of equipment above design parameters	1. Equipment Certification and QA & pre tested & equipment fit for purpose	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
		2. Exposure of personnel to elevated temperatures on vessel equipment/ piping	1. Vessel / piping insulation							
			2. Personnel Protective Equipment (PPE)	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training					
	4. High Pressure	1. Exposure of equipment above design parameters	1. Equipment Certification and QA & pre tested & equipment fit for purpose. Following drill program (high mud weight)	Equipment failure	Equipment certification provide to barge master and verified prior to use (onboard).					
					Thorough offset review					

System: 2. Reservoir

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
2. Well Control	1. Inaccurate pore pressure prediction leading to higher pressure than anticipated	1. Loss of Primary well control	1. Lost circulation procedures Internal review of expectant pore pressure Well control procedures Well designed to take full gas column Mud weight monitoring Gas monitors Reliable offset well data Shallow hazard assessment	Procedures not followed/ inaccurate well data	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response	Recovery barrier not complied with	Certification of equipment Training of personnel/ emergency response exercises		
	2. Fault intersection causing well kick due to higher pressure than expected (relevant to Otway Basin Wells).	1. Loss of Primary well control							18. Verify if this is an issue	

System: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Drilling	1. Loss of well control due to failure to properly install or test the BOP, incorrect mud composition, shallow gas, failure to react correctly or quickly enough to a kick / influx of hydrocarbons into the well bore, unexpected high pressure zone	1. Unignited blowout of a gas reservoir, leading to large volumes of asphyxiating and/or toxic natural gas engulfing personnel. Gas cloud may be asphyxiating, narcotic and toxic (as well as being flammable). Ignition threats include faulty /sparking electric	1.							
		2. Ignited blowout of any hydrocarbon reservoir, resulting in major fire, possibly preceded by a vapour cloud explosion, with high potential to substantially destroy the rig.								

System: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	2. Lost circulation and seepage	1. Dynamic overbalance leading to lost circulation. Losses into reservoir	1. Mud properties/ no losses seen in offset wells Maintain minimum overbalance consistent with hole stability Use LCM as required.	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures	Recovery barrier not complied with	Competency of personnel		
	3. Borehole stability .	1. Cave in leading to hole pack off. Loss of well control and possible surface fire	1. Mud weight design and monitoring/ drilling procedures	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures/ mud logging monitoring procedures/ loss of control procedures	Recovery barrier not complied with	Competency of personnel		
	4. Incorrect mud density	1. Ingress of hydrocarbons into well bore. Loss of well control and possible surface fire	1. Analysis of well bore cuttings/ Geological information/ shut-in well procedures/ lost circulation procedures/ pore pressures understood	Incorrect mud mixing/ uncalibrated scales/ human error/ drilling underbalanced/ degassing system failure	Training and competency. Equipment certification	1. Drilling procedures/ mud logging monitoring procedures/ loss of control procedures	Recovery barrier not complied with	Competency of personnel		
	5. Reservoir gas in mud; failure to circulate out gas safely for any reason.	1. Vapor cloud explosion in the shale shakers or mud pits area.	1. Mud logging/ mud monitoring Gas monitors Offset data .	Human error/ competency Mud logging/ well monitoring	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Drilling procedures/ Gas monitors/ emergency response actions	Recovery barrier not complied with	Competency of personnel		

System: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
	6. Congestion / enclosure resulting in increased vapour cloud explosion overpressure.	1. Vapour cloud explosion	1. Gas monitors/ inspection of equipment/ certification of equipment	Human error/ Competency Equipment failure	Training and competency. Equipment certification by qualified electrician/ engineer for use of equipment in area	1. Hazardous zoning/ emergency response	Recovery barrier not complied with	Competency of personnel/ emergency response drills and exercises		
	7. Ignition threats include faulty /sparking electrical equipment, non-standard equipment, expansion of gas cloud beyond defined Hazardous area, hot work	1. Vapour cloud explosion/ Fire resulting from ignition of gas	1. Hazardous areas defined/ electrical equipment certified	Human error/ Competency Equipment failure	Training and competency. Equipment certification by qualified electrician/ engineer for use of equipment in area	1. Hazardous zoning/ emergency response	Recovery barrier not complied with	Competency of personnel/ emergency response drills and exercises		
2. Shallow Gas	1. Potential subsea blowout while drilling riser less	1. Vapour cloud explosion/ Fire resulting from ignition of gas	1. Offset well data	Human Error	Competency of personnel	1. Drilling procedures/ Gas monitors/ emergency response actions	Recovery barrier not complied with	Competency of personnel		
3. Lifting	1. Mechanism failures (lifting assembly – trolley beams etc.) Unrevealed loss of integrity of lifting gear / material defects.	1. Structural collapse of crane onto the deck or onto a supply vessel alongside.	1. Inspection and certification of all lifting & rigging gear including the crane itself.	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		

System: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. Known loads/ lifting plan	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			3. PTW/ Competency	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
		2. Dropped Blocks/TDS from derrick onto drill floor.	1. Inspection and certification of all lifting & rigging gear	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			2. Restricted access to drill floor and derrick.	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		

System: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
		3. Dropped BOP.	1. Inspection and certification of all lifting & rigging gear	Equipment Failure	Equipment certification provide to barge master and verified prior to use (onboard).	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
			2. Defined fall zone (de-manned and wells closed-in and bled-off – i.e. minimize SIMOPS).	Human Error	Training and competency. Competency and training including selection of personnel, assessments and records and training	1. Emergency Response actions/ procedures	1. Recovery barrier not complied with Equipment/ mechanical failure	Equipment certification provided and verified prior to use onboard.		
4. ROV	1. Operating ROV in vicinity of rig.	1. Snagging of ROV	1. ROV procedures	Human Error/ procedures not followed Changes in weather/ sea state conditions	Training and competency/ induction training Limits on operating (sea states etc).	1. Limits on operating (sea states etc). Recovery procedures/ emergency response	Recovery barrier not complied with	Pre survey/ engineering checks/		
5. Explosives (primary and secondary)	1. Logging operations	1. multiple fatalities, facility damage	1. third party handling procedures and Vic legislation	Procedures not followed	Training and competency and job observation	1. Emergency Response actions/ procedures	Procedures not complied with/ Human error		19. Investigate existing drills to see if they cover or close to explosives store.	
				controlled access to store	Training and competency and job observation				20. If current drills do not cover these cases modify accordingly.	

System: 3. Drilling

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
			2. PTW to control work around area and controlling movement	PTW not raised or followed	Training and competency and job observation	1. Emergency Response actions/ procedures	Procedures not complied with/ Human error			
• Tree handling whilst on ring • Unfamiliarity • Pressure testing • SBM • Handling of high pressure riser • Non-standard casing sizes	Note that additional Hazards in this group have been removed as not applicable									

System: 8. Aviation

Hazard	Cause	Consequences	Prevention Barriers			Recovery Barriers			Recommendations (HAZID)	Status
			Description	Barrier Failure Mode	Control	Description	Barrier Failure Mode	Control		
1. Helicopter refuelling	1. Commissioning of helicopter refuelling system								19. Ensure actions form the helicopter refuelling commissioning audit are closed out	

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APPENDIX 4: SEADRILL/ADA HSE POLICIES

Health, safety and environment policy

Our goal is no accidents, injuries or losses

We will achieve this through:

- taking the time needed to plan and carry out the work in a safe manner
- knowledge of and commitment to our management system
- reacting immediately to unsatisfactory conditions

June 1, 2006

Kjell E. Jacobsen
CEO

Seadrill

Health, Safety and Environmental Policy

ADA is committed to the application of proactive management in the elimination of injuries, dangerous occurrences and harm to the environment in its efforts to provide a safe, healthy and progressive work environment for all employees, clients and all who come in contact with our operations.

To achieve this ADA shall:

- Maintain a work environment that is safe, conducive to high levels of work performance, and in conformance with all ADA's policies, standards and procedures
- Endeavour to prevent all injuries and work related ill health, in the work place
- Maintain our Management System in compliance with current legislation and apply where relevant, "best practice" methodology in preventing injury, caring for the environment and ensure contractors operate a similar system and suitable interfacing is applied
- Establish and maintain, safe systems of work, throughout our operations and ensure contractors operate similar systems and appropriate interfacing exists
- Develop commitment, responsibility and accountability to ADA's Health, Safety and Environmental (HSE) objectives and targets
- Monitor and analyse all hazards to ensure appropriate corrective actions are applied and verify their effective application
- Ensure that all facilities and projects are resourced, designed, engineered and maintained to satisfy legislative and ADA's HSE requirements
- Ensure all operations comply with relevant statutory obligations
- Encourage open communication with employees and contractors and support participation in all activities related to the improvement and fulfilment of all HSE Issues
- Continually develop and support appropriate behaviour to reduce human error with respect to the job, the individual and the team

John Bell
Managing Director

August 8th 2006
Date

APPENDIX 5: SUPPORT VESSEL SPECIFICATIONS

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. ?
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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

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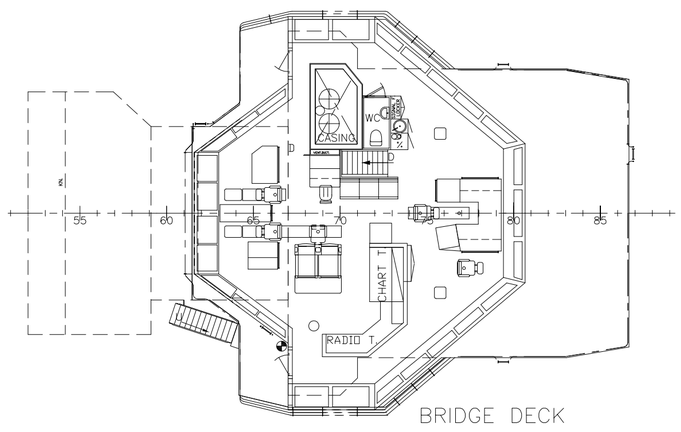
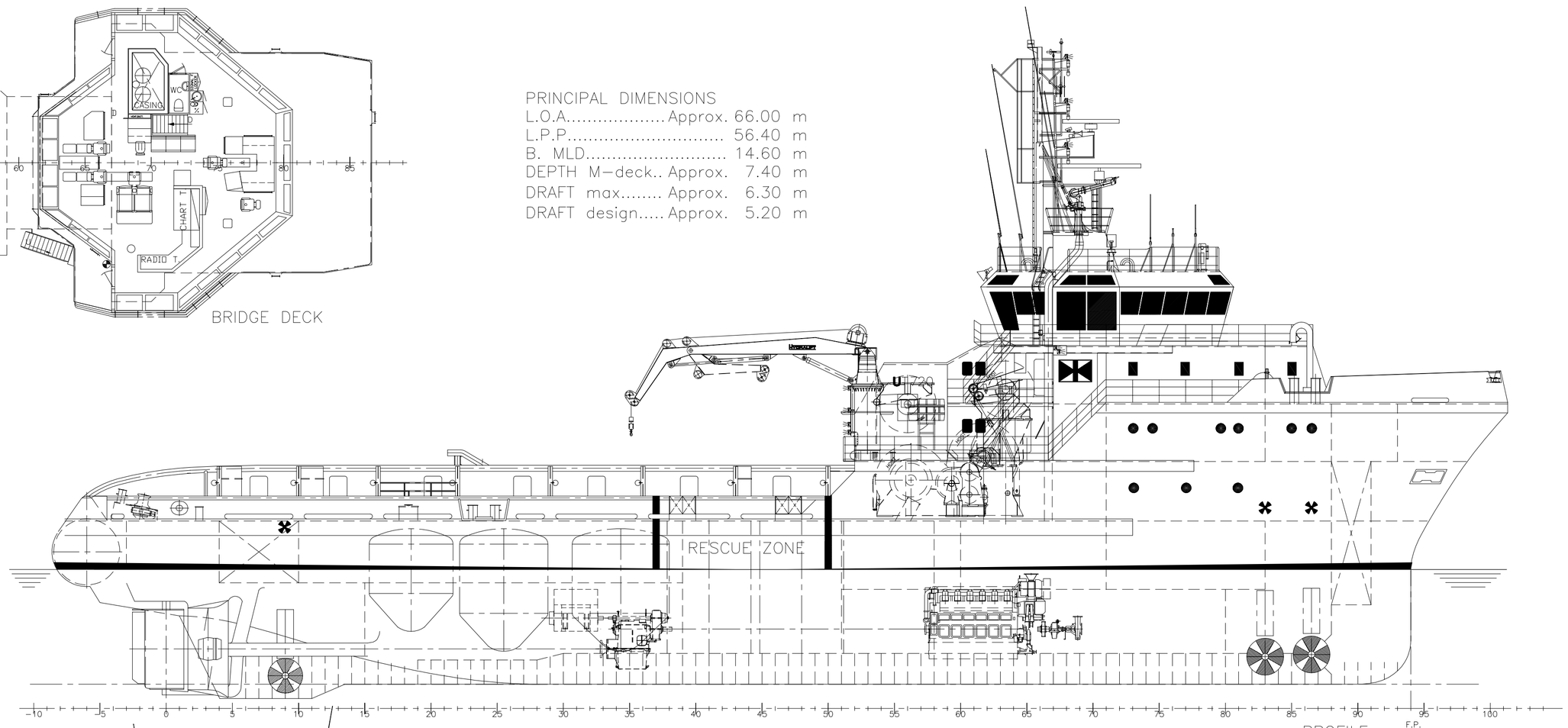


BRIDGE DECK

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



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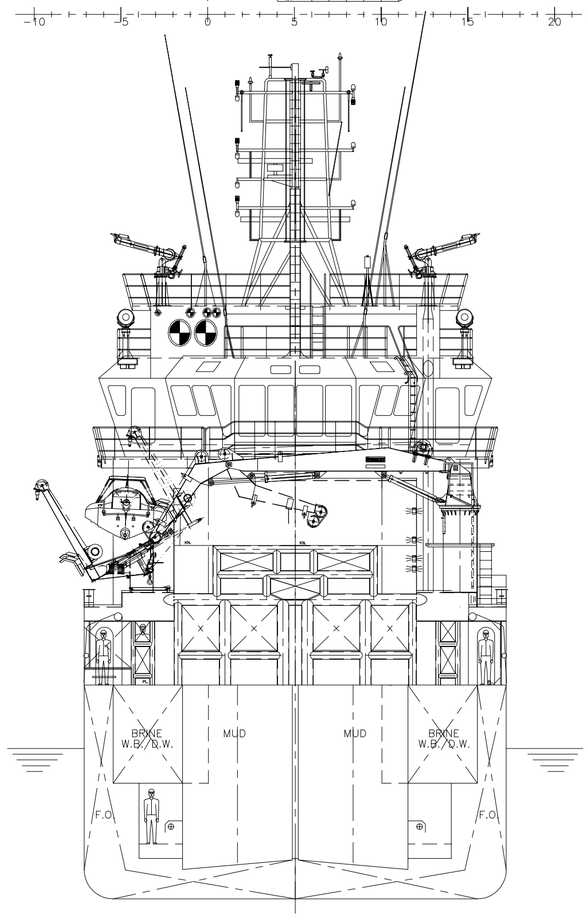

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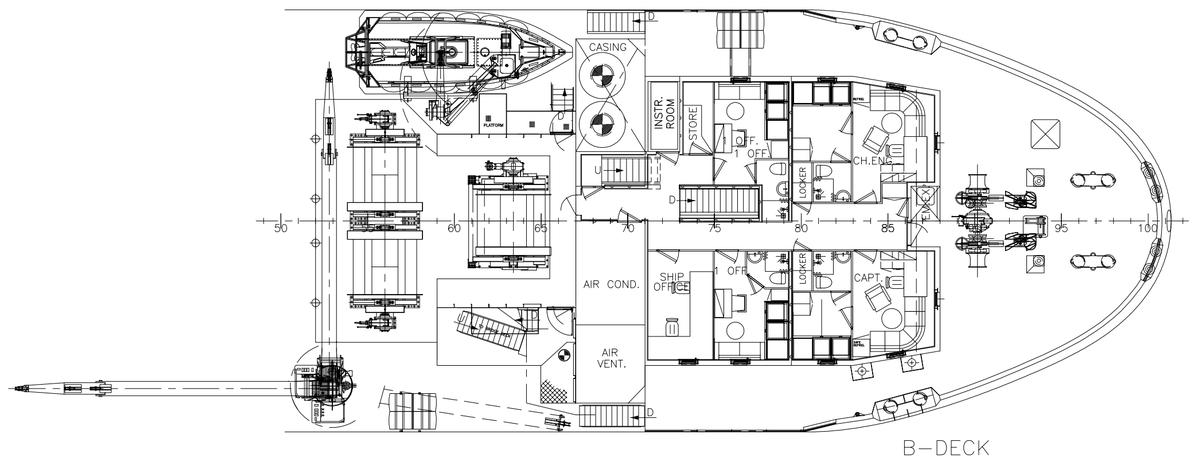
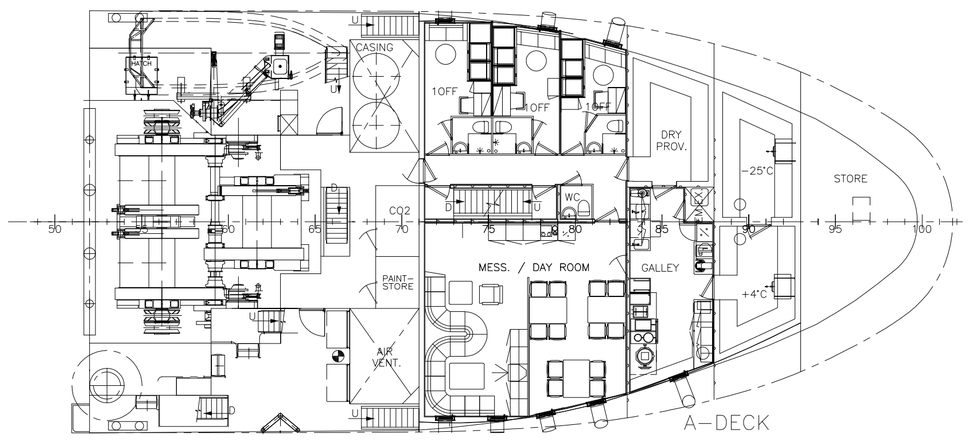
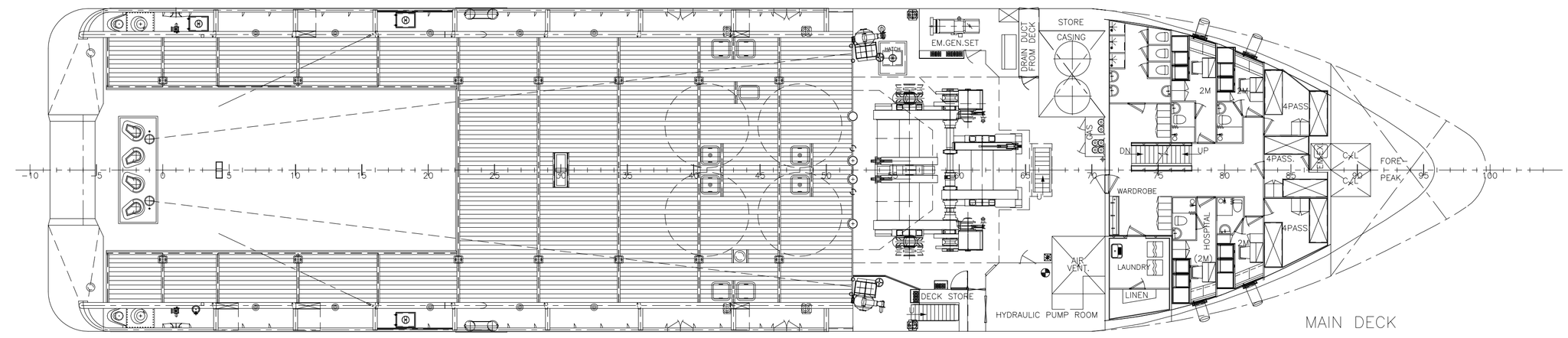


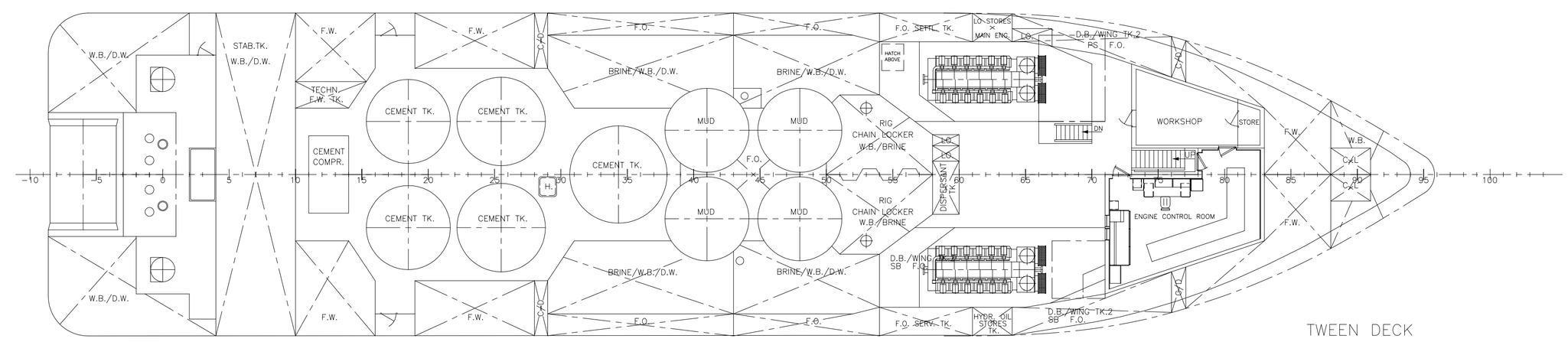
B-DECK



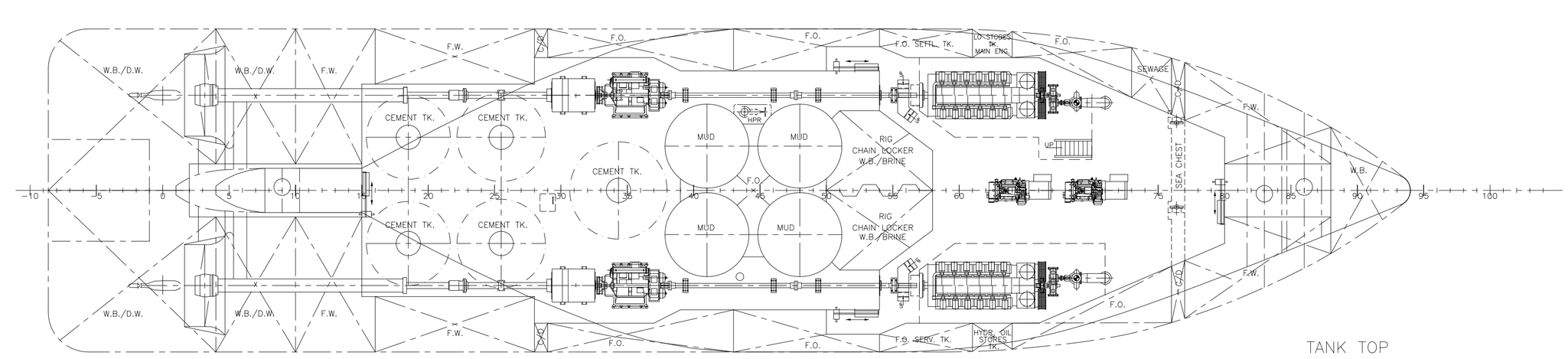
A-DECK



MAIN DECK



TWEEN DECK



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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

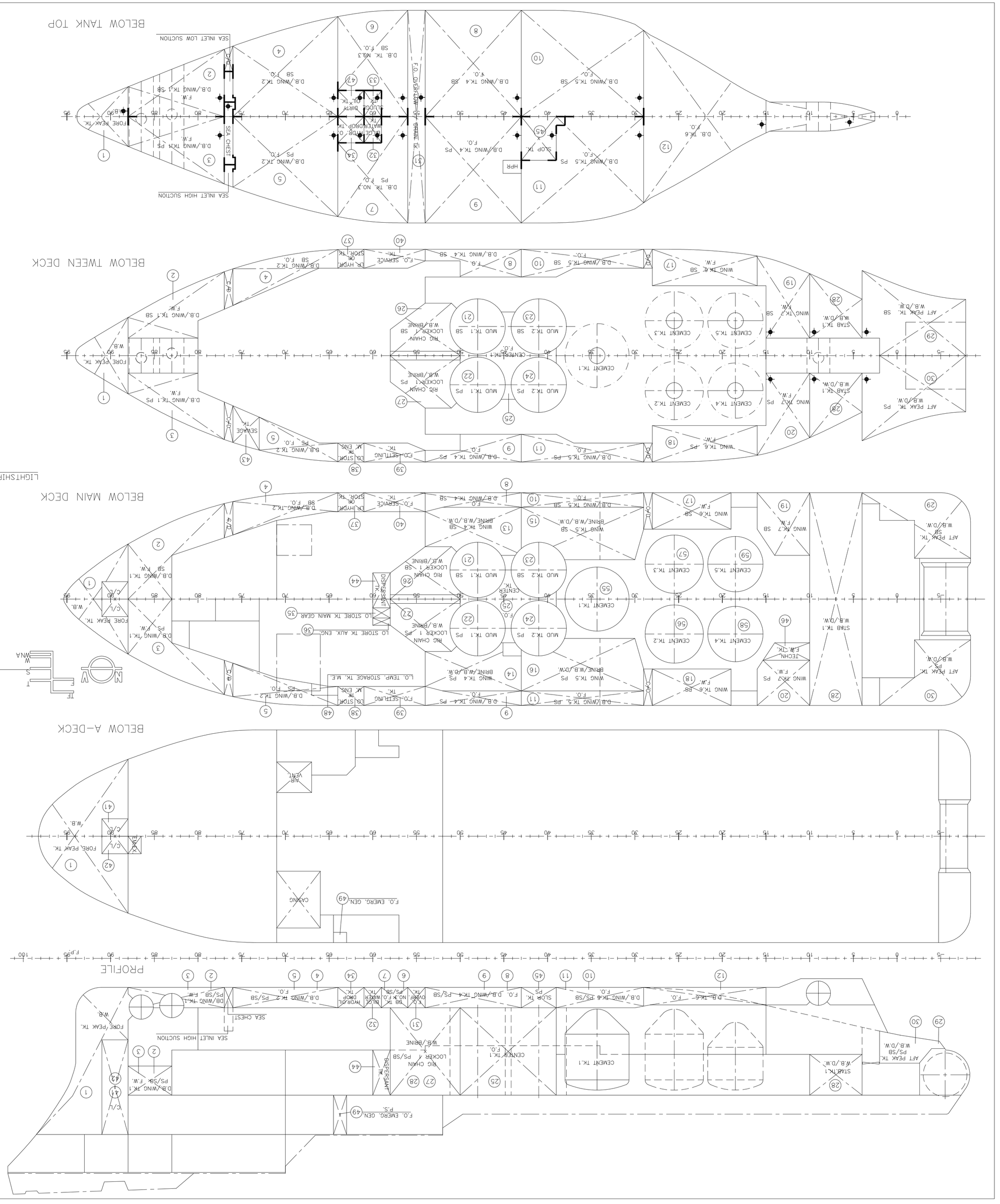
TITLE

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

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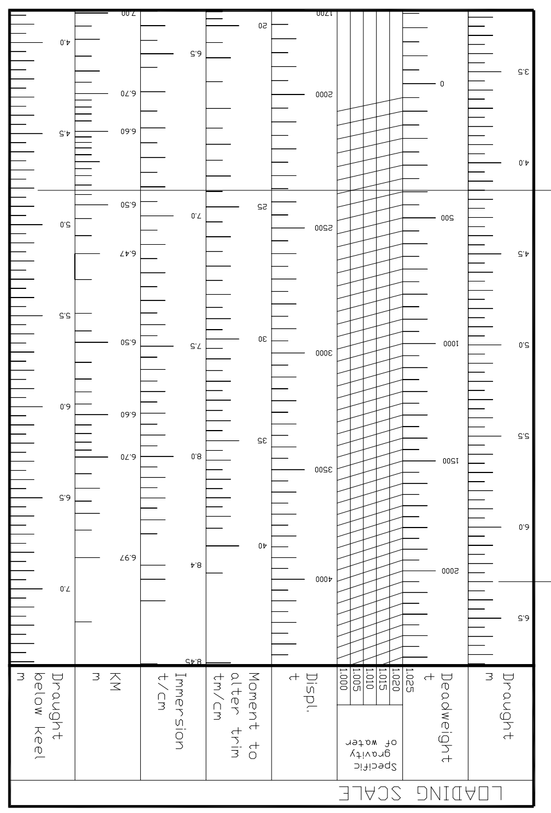
NOTE: PLUGS NS 2573 M42x2 MARKED WITH NO./CONTENTS STAINLESS STEEL W/M; BILGE WELL

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. ?
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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. ?
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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**

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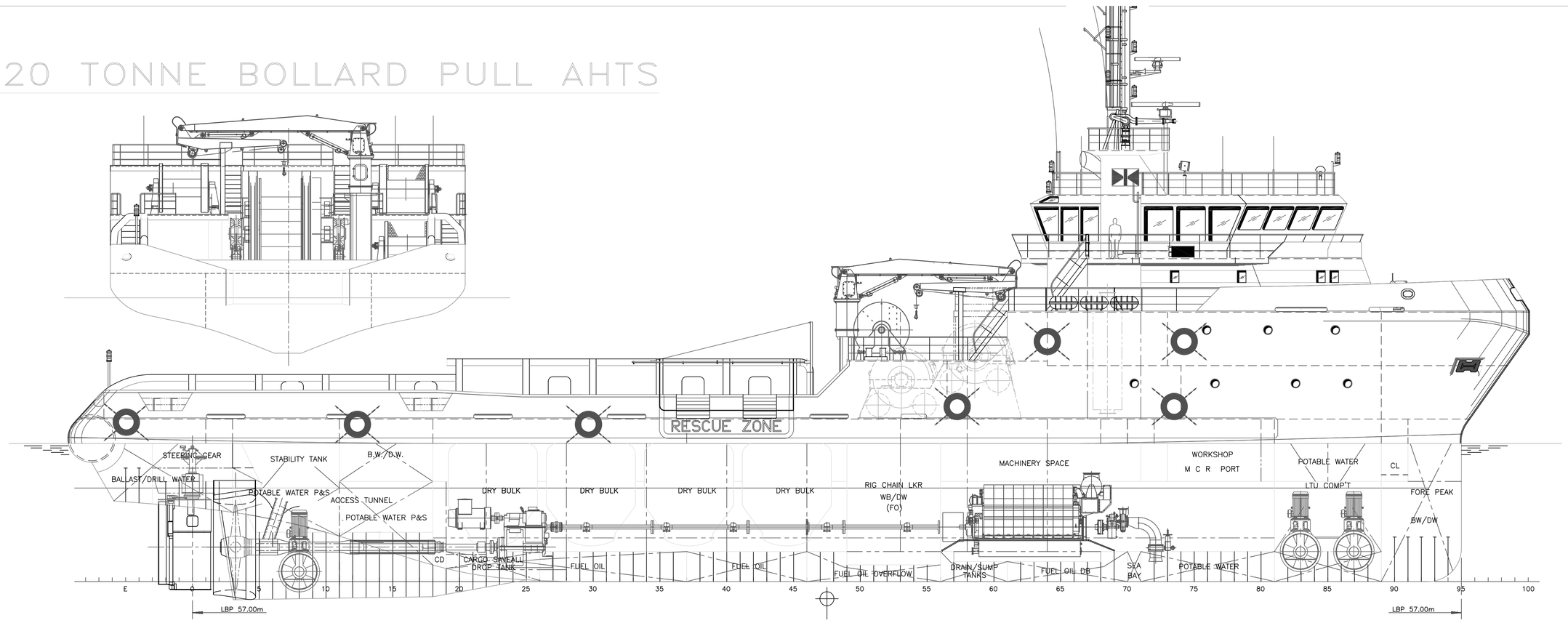
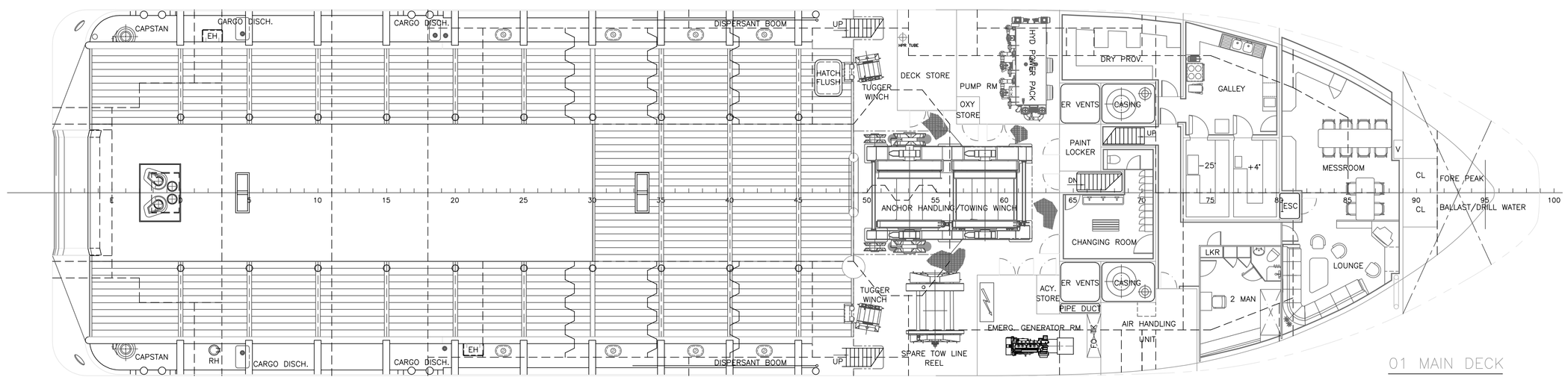
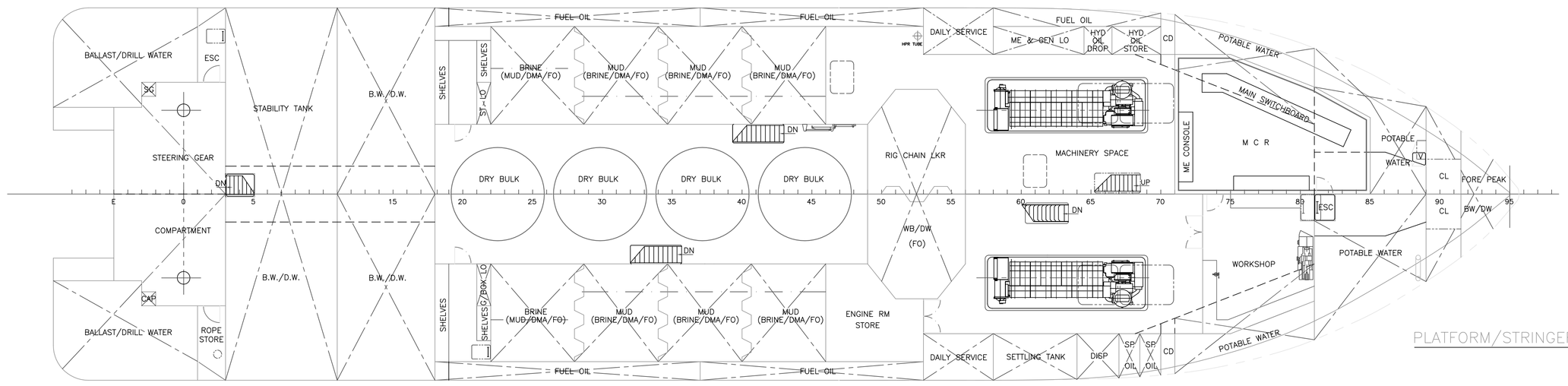
120 TONNE BOLLARD PULL AHTS

SWIRE PACIFIC OFFSHORE

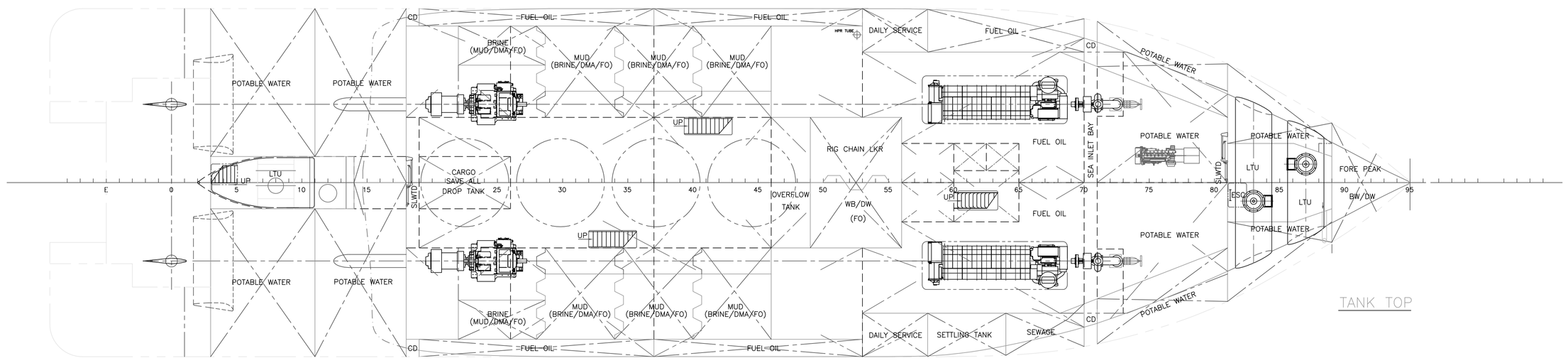




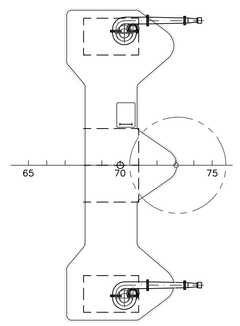
01 MAIN DECK



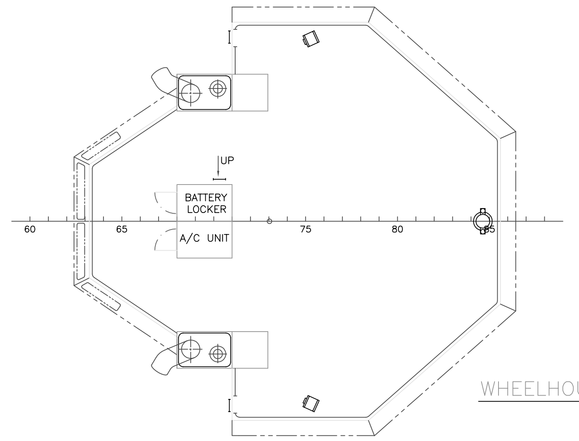
PLATFORM/STRINGER DECK



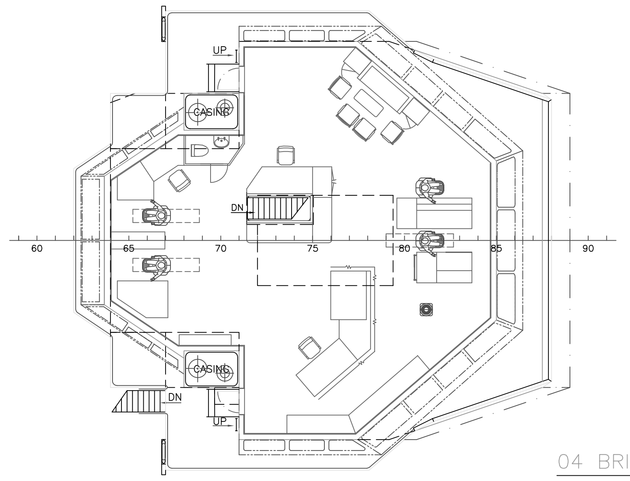
TANK TOP



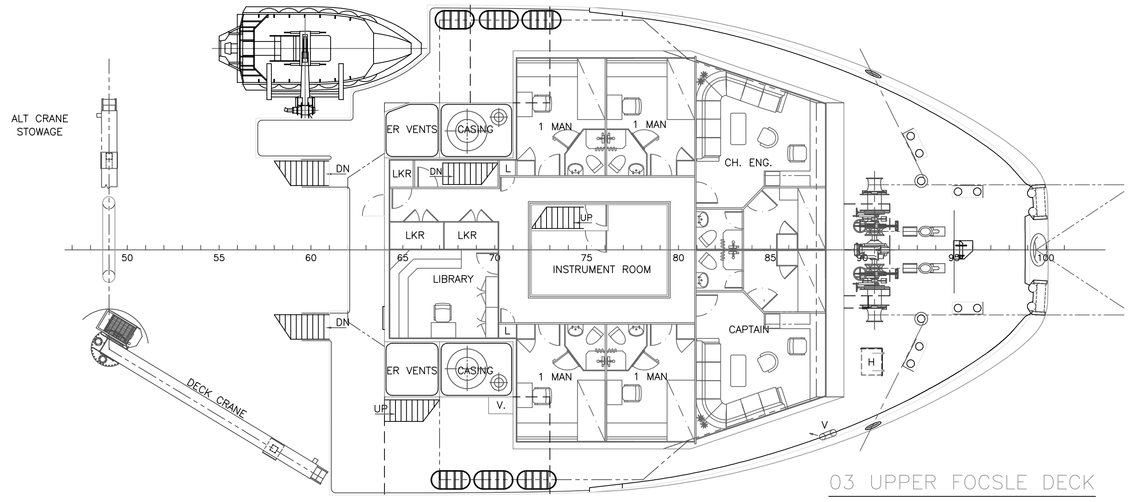
MONITOR PLATFORM



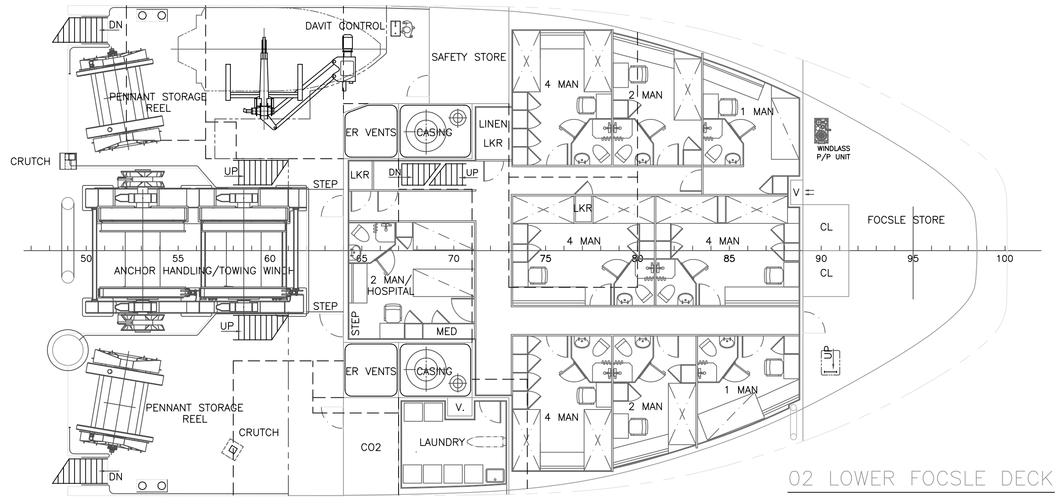
WHEELHOUSE TOP



04 BRIDGE DECK



03 UPPER FOCSLE DECK

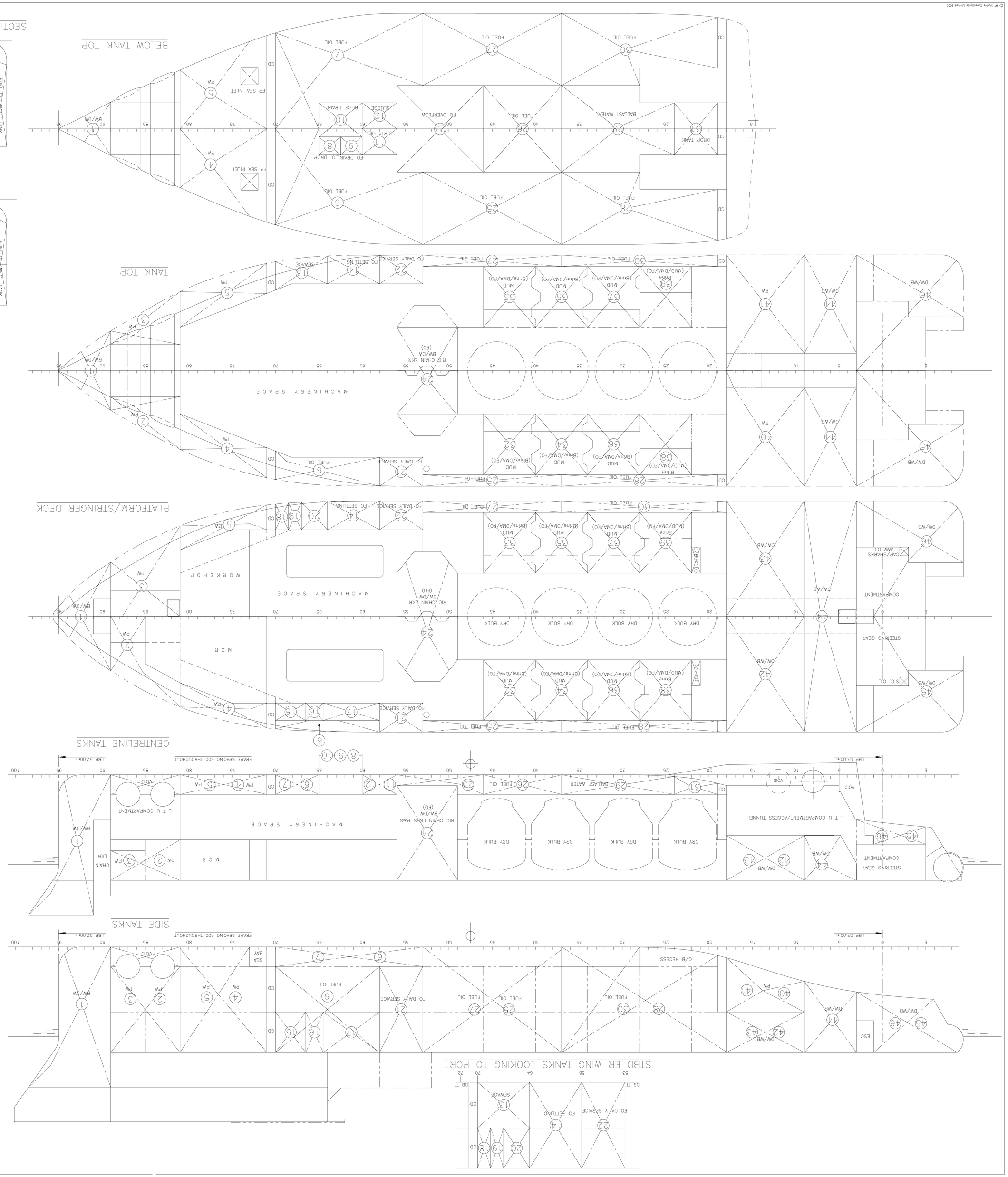


02 LOWER FOCSLE DECK

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

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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 6: HELICOPTER EMERGENCY MEDICAL SERVICES (HEMS) VICTORIA

Helicopter Emergency Medical Service (HEMS) Victoria

Air Ambulance Victoria

Based at Essendon Airport, Melbourne (Head Office) is manned 24 hour a day 7 days a week. There is one Eurocopter N3 Dauphin helicopter owned by CHC (Canadian Helicopter Corporation) and leased to Air Ambulance and crewed by Victoria Police Airwing.

The Victoria Police Airwing also has one Eurocopter N3 Dauphin helicopter which when available can be converted into an additional Ambulance helicopter. Fixed wing assets are also based at Essendon.

Telephone (03) 8341 9910

Latrobe Valley Airport Air Ambulance Base

Based at Traralgon and has a Bell 412 EP helicopter owned and crewed by CHC.

Telephone (03) 5176 1265

Bendigo Airport Air Ambulance Base

Based at Bendigo and also has a Bell 412 EP helicopter owned and crewed by CHC.

Telephone (03) 5441 8631

All Air Ambulance Victoria helicopters are manned with one MICA (Mobile Intensive Care Ambulance) Flight Paramedic. These 3 aircraft are all winch equipped, multi engine, single pilot IFR (Instrument Flight Rules) capable day and night.

Air Ambulance Victoria Call out Protocol:

The preferred call out protocol is to establish a file containing all relevant details on the vessel or platform with Air Ambulance Victoria.

Direct telephone communication to Essendons Air Ambulance Base Flight Co-ordinator (**Telephone 1300 883100**) and the established file will allow the most expeditious medical evacuation with the least confusion.

The assessment of the patient by the Flight Co-ordinator at Essendon with the assistance of the medical personnel on the vessel will determine the need for a medical evacuation or if the patient can by flown off on a routine flight by the aviation provider. Medical evacuation is a function of Air Ambulance Victoria once the call has been made to the Flight Co-ordinator all the logistics will be managed by them.

The decision as to which hospital the patient is flown to will depend on a variety of factors. If the patient is suffering trauma the options are the Alfred Hospital Trauma Centre or the Royal Melbourne Hospital Trauma centre, both with helipads.

For minor trauma or non life threatening injuries or illness there are a number of regional hospitals that have suitable helipads. The final decision as to which hospital is to be used is almost always made by the helicopters MICA paramedic in consultation with a clinician via radio or telephone.

Other hospital related factors such as no available bed or the helipad is already being used can limit hospital availability. If fixed wing (Beechcraft Kingair) transport is required Air Ambulance Victoria will organize those logistics through their fixed wing provider.

Limitations;

Currently the Victoria Police Airwing are not permitted to land or winch to offshore moving platforms or ships <u>at night</u> however this will be amended in the future. CHC will land on moving platforms and ships at night with a pitch, roll and heave limitation of 3 metres, 3 metres and 5 metres.

They will in some circumstances winch to these vessels if there is sufficient lighting and weather is suitable which will all be assessed by the pilot in command. Note the pilot in command has discretion as to whether or not to attempt such operations if conditions are difficult or approaching the limitations of the operation.

ESSO have a memorandum of understanding with Air Ambulance that requires the medical kit be transferred to an ESSO Sikorsky S-76 helicopter to retrieve the patient from the rig back to ESSO Base Longford.

This is not seen as a fix to the problem as it is a function of an insurance issue and a requirement of two crew helicopter operations to ESSO rigs. The Operations Manager of the aviation provider Jayrow has stated that any patient with a medical condition requiring medical assistance would not be flow by their aircraft.

Therefore the task would be directed to Air Ambulance Victoria. At this stage Air Ambulance Victoria are not keen to transfer there kit into Jayrow helicopters similar to ESSO due to the associated delays and inconvenience. Additionally Jayrow helicopters are not fitted with winches and some helicopters do not have a sliding door which means a winch cannot be fitted at all.

The hospital phone numbers are included however all logistics and notification of the arriving patient are conducted by Air Ambulance.

Air Ambulance Victoria File should include at a minimum;

Required Detail	Client Response
1. Name of Company	
2. Name of Owner/Operator	
3. Contact Number of Owner/Operator	
4. Location GPS Lat / Long	
5. Vessels Involved Including colour pictures	
6. Expected Start and Finish Date	
7. Number of people onboard	
8. Hospital Facilities onboard	
9. Status of Medical Staff onboard	
10. Helideck Rating	
a. Dimensions	
b. Maximum load limit	
c. Obstacles	
d. Flare	
e. Tie down points available	
f. Fuel Available	
g. Radio Communications	
h. Lighting	
11. Vessels Dimensions	
12. Contact Details of Vessels and Head Office	
13. Incident Response Information Required	
a. Exact location GPS co-ordinates Lat/Long	
b. Incident type (what happened)	
c. Number of Patients and their condition	
14. Prevailing Weather Conditions	
a. Wind speed and direction	
b. Cloud Base	
c. Fog	
d. Visibility	
e. Rain	
f. Motion characteristics pitch, roll and heave	

Search and Rescue;

In respect to a search and Rescue task the ambulance helicopters can be despatched to assist in most SAR operations depending on availability. If unavailable or there are no injuries then additionally to these assets the Victoria Police Airwing Dauphin helicopter and the RAAF S-76 helicopter are located at Essendon and East Sale RAAF Base respectively will be activated.

These assets are not always available 24 hours a day and some delay could occur if crews are called in to man the machines.

The S-76 has the advantage of auto hover which allows it to winch at night over water however the main focus of this aircraft is to support the RAAF and subsequently may not be available.

Search and Rescue Call Out Protocol;

In all cases a call to 000 will activate the SAR plan. If emergency locator beacons are activated AUSSAR in Canberra will activate their SAR plan once the signal has been detected via satellite.

#	Hospital Name	Hospital Numbers
1.	Alexandra Hospital	5772 0900
2.	Alfred Hospital - Switch	9276 2000
3.	Alfred Hospital - Trauma	9276 2258
4.	Angliss Hospital	9764 6111
5.	Apollo Bay Hospital	5237 8500
6.	Ararat Hospital	5352 9300
7.	Austin Hospital	9496 5000
8.	Bairnsdale Hospital	5150 3333
9.	Ballarat Hospital	5320 4000
10.	Benalla Hospital	5760 2222
11.	Bendigo Hospital	5454 6000
12.	Birchip Hospital	5492 2400
13.	Boort District Hospital	5455 2100
14.	Box Hill Hospital	9895 3333
15.	Bright Hospital	5755 0100
16.	Camperdown	5593 7300
17.	Casey Hospital	8768 1200
18.	Cobram Hospital	5871 0777
19.	Colac Hospital	5232 5100
20.	Cowes Hospital	5952 2345
21.	Dandenong Hospital	9554 1000
22.	Denniliquin Hospital	5881 2222
23.	Donald Hospital	5478 6200
24.	Echuca Regional Hospital	5485 5000
25.	Edenhope District Hospital	5585 1188
26.	Epping (Northern) Hospital	9219 8000
27.	Foster (Sth Gippsland)	5683 9777
28.	Frankston Hospital	9784 7777
29.	Geelong Hospital	5226 7111
30.	Goulburn Valley Hosp (A&E)	5832 2505
31.	Hamilton Hospital	5551 8222
32.	Healesville Hospital	5962 4300
33.	Heathcote Hospital	5433 3390
34.	Hopetoun Hospital	5083 3202
35.	Horsham Hospital	5381 9111
36.	Kerang District	5450 9200
37.	Kerang District Hospital	5450 9200
38.	Kilmore Hospital	5734 2000
39.	Korumburra Hospital	5654 2777
40.	Kyabram District Hospital	5857 0200
41.	Kyneton Hospital	5422 9900
42.	Latrobe Regional Hospital	5173 8266
43.	Leongatha Hospital	5667 5555
44.	Lorne Community Hospital	5289 4300
45.	Maldon Hospital	5475 1006
46.	Manangatang District Hospital	5035 1402
47.	Maroondah Hospital	9871 3333
48.	Mildura Base Hospital	5022 3333
49.	Monash Medical Centre - Switch	9594 6666
50.	Monash Medical Centre - Trauma	9594 2149

#	Hospital Name	Hospital Numbers
51.	Mornington Peninsula Hospital	9784 7777
52.	Mt Beauty Hospital	5754 3520
53.	Mt Buller Med centre	5777 6185
54.	Mt Hotham Med Centre	5759 3551
55.	Myrtleford Hospital	5751 9323
56.	Nhill Hospital	5391 4222
57.	Northern Hospital	9219 8000
58.	Omeo District Hospital	5159 0100
59.	Orbost Regional Hospital	5154 6666
60.	Police Hosp. Freemasons	9483 3483
61.	Police Hosp. R.M.H.	9342 7000
62.	Port Fairy Hospital	5568 1303
63.	Portland District Hospital	5521 0333
64.	Rosebud Hospital	5986 0666
65.	Royal Childrens - ICU	9345 6555
66.	Royal Childrens - Switch	9345 5522
67.	Royal Melbourne Hospital - ED	9342 7009
68.	Royal Melbourne Hospital - Trauma	9342 8880
69.	Sale (Central Gippsland) A&E	5143 8770
70.	Sealake Hospital	5070 2111
71.	Seymour Hospital	5793 6100
72.	Shepparton Hospital	5832 2322
73.	St Vincents Hospital	9288 2211
74.	Stawell Hospital	5358 2255
75.	Sunshine Hospital	8345 1333
76.	Swan Hill District Hospital	5033 9300
77.	Tocumwal Hospital	5874 2166
78.	Warracknabeal Hospital	5398 1000
79.	Warragul Hospital	5623 0611
80.	Werribee Mercy Hospital	9216 8888
81.	Wonthaggi Hospital	5671 3333
82.	Yarrawonga District Hospital	5743 8111
83.	Yea Hospital	5736 0400