ENVIRONMENTAL PROTECTION AUTHORITY

Assessment Report

Application Ref No.: EEZ100019

Technical Review and Analysis of Operational Activities associated with Beach Energy's Marine Discharge Consent Application – Canterbury Basin Exploration & Appraisal Drilling

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1.0 QUALIFICATIONS AND EXPERIENCE

My name is Frank Lyle Broomhead and I am a Senior Operations Consultant employed by Oil & Gas Solutions Pty Ltd for the purpose of undertaking a technical review and analysis on information specified in the Beach Energy NZ (Holdings) Limited Marine Consent application no. EEZ100019.

I have previous experience in the Electrical and Instrument and Control field in the papermaking industry in Scotland, the steel industry in South Africa and the sugar refining industry in Swaziland before joining Shell B.P. Todd in New Zealand in 1974.

In 2010, I completed thirty-six years of service with Shell companies worldwide involved in both the onshore and offshore environments at a supervisory and senior management level.

I joined Shell BP Todd in 1974 as an Electrical and Instrument Control Supervisor at the Kapuni Field before making the transition to Production Operations in 1978 and working in the Maui Field as Operations Supervisor involved in the commissioning and start-up of the Maui Production Station (MPS).

I transferred to Petroleum Development Oman (PDO) in 1980 and was Production Supervisor at the onshore oil and gas facilities at Fahud and Qarn Alam.

I returned to New Zealand in 1984 as Kapuni Field Superintendent until 1987 when I moved to The Netherlands and joined Nederlandse Aardolie Maatschappij (NAM) BV as Onshore Platform Manager responsible for three gas and condensate platforms in the Dutch sector of the North Sea.

In 1990, I transferred to Shell Expro, Aberdeen as Offshore Installation Manager (OIM) on the Brent Delta. I remained there until 1993 when I returned to New Zealand and took the position of Maui Field Superintendent, responsible for Maui-A (MPA), Maui-B (MPB) and MPS. This included the manning, commissioning and steady state operation of the new Floating Production and Storage Offloading (FPSO) facility. I also transitioned MPB to a Not Normally Manned (NNM) installation.

In 1998 I left New Zealand to take a position on the Camisea Project in Peru as Onshore Coastal Facilities Manager based in Houston in the USA, where the design office for this project was located.

The Camisea project was later deferred so in 1998 I transferred to the Malampaya project as Platform Manager. The design office for this project was also in a Houston. I later relocated to Singapore where the construction of the Malampaya platform was being carried out and then to The Philippines where I was responsible for establishing the offshore procedures and business processes for the project, the technical training of local staff and the handover from Projects to Production Operations. I finished with the project in 2004 having achieved the position of Operations Manager, responsible for the onshore and offshore facilities.

In 2004, I transferred to the Sakhalin Energy Investment Company (SEIC) on the Sakhalin project in Russia and remained there until 2008 as Upstream Operations Readiness Manager, responsible for managing the handover of two offshore platforms, an onshore gas plant and two 800 km pipelines from Projects to Production Operations. I also established a suite of policies and procedures covering operations and maintenance, Permit to Work (PTW), Health, Safety and Environmental (HSE) in preparation for the handover from Project to steady state operations. In addition, I developed and implemented a technical competency system for local staff. I was also responsible for negotiating and managing the transition of the two pipelines and SEIC staff to Gazprom, a Russian energy company.

In 2008 I joined the North Caspian Operating Company (NCOC) Kashagan project in Kazakhstan charged with managing the transition of all responsibilities from the current operator to NCOC. I later became Technical Capability Manager, establishing a technical competency framework for local staff.

During this time, I assisted the Shell Learning and Development department in The Hague to build competency profiles for technicians.

I was also involved with local government and other agencies associated with the project and technical competency training. I left Kazakhstan and Shell service in 2010.

From 2010 to 2016, I provided consultancy services through a third-party consultancy company Wood Group ODL as a Senior Operations Consultant. During this time, I provided services to Apache, Chevron and INPEX which covered the development of documentation management systems and I carried out a manning study for Bumi Armada. In addition, I project managed an offshore organisation and efficiency review on behalf of Wood Group ODL prior to a major reorganisation by Repsol – Talisman in Malaysia.

I provided consultancy services to OMV, again through the third-party consultancy company Wood Group ODL. The services provided covered the development of an Operations Readiness Assurance (ORA) Graduate Training toolkit and Performance Standards for Safety Critical Elements for OMV corporate in Austria.

I have also worked independently on a review of BHP assurance processes on a mining project, assisting Lloyds Register Energy Drilling on developing an assurance process and for Woodside Energy in a 'cold eye' review of operating expenditure.

More recently, I have provided consultancy services to AWE Limited through a third-party consultancy company, Oil & Gas Solutions Pty Ltd. The services provided covered the Operability & Maintainability review of the Front-End Engineering Design of a new onshore natural gas processing facility, the Waitsia Gas Plant (WGP) in the Northern Perth Basin approximately 360km from Perth which will provide conditioning of raw gas to sales gas quality prior to export to gas distribution pipelines. Under a separate assignment through Oil & Gas Solutions Pty Ltd, I also conducted an audit of the Computerised Maintenance Management System (CMMS) used on the current AWE Perth Basin Operational assets of Xyris and Dongara, also situated in the Northern Perth Basin.

I have previously completed technical reviews and analysis for EPA NZ of Shell Todd Oil Services (Maui Field), Tamarind Taranaki Limited (Tui Field), OMV (Maari Field), OMV (Great South Basin) and OMV Taranaki Ltd (Maui Field).

I was a member of the Instrument & Control panel (NZ) setting the curriculum for Instrument & Control apprenticeship schemes. I have presented papers in New Zealand on Dual-Skilling and in Kazakhstan on developing a technical competency framework.

My qualifications are:

a) New Zealand University Diploma in Industrial Production.

b) U.K. Full Technological Certificate (Credit) – Electrical Installation Work.

c) U.K. Technological Certificate (Credit) – Industrial Measurement & Control.

d) Management of Major Emergencies (Offshore Installation Manager assessment) – Health and Safety Executive U.K.

2.0 EXPERT WITNESS

I confirm that I have read and comply with the Code of Conduct for Expert Witnesses in the Environment Court of New Zealand Practice Note (2014).

3.0 EXECUTIVE SUMMARY

In March 2020, Beach Energy NZ (Holdings) Limited (**Beach**) applied for a Marine Discharge Consent under section 38 of the Exclusive Economic and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act). The application (EEZ100019) is seeking authorization to discharge small (trace) amounts of harmful substances from the deck drains of a Mobile Offshore Drilling Unit (MODU) associated with the Canterbury Basin Exploration and Appraisal Drilling (Canterbury Basin EAD) program within Petroleum Exploration Permit (PEP) 38264. The location of PEP 38264 and the potential well locations (Wherry and Gondola) are shown in Appendix 1 – Beach Canterbury Basin EAD Potential Well Locations (Wherry and Gondola), this extracted from the Beach Marine Discharge Consent Application - Discharge of Harmful Substances from Deck Drains.

For the purpose of this document, the term 'deck drains' includes both hazardous and non-hazardous deck drains under regulation 3 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations 2015 (D&D Regulations). No other activities are the subject of this application.

Beach is aware of other regulatory consents and approvals for the Canterbury Basin EAD Program, but these will be addressed through separate applications at a later date.

Beach is proposing to drill one exploration well (Wherry Prospect) as part of the Canterbury Basin EAD Program and depending on the learnings and results from this well, Beach may pursue a wider work program within PEP 38264 that could include up to 11 follow-up exploration or appraisal wells. Drilling is anticipated to commence late 2020 and will be completed as part of one or more drilling campaigns, using either a semi-submersible Mobile Offshore Drilling Unit (MODU), a drill ship MODU or a combination of both.

PEP 38264 has an expiry date of 7 November 2021 but Beach may seek an extension of the PEP of up to eight years for appraisal purposes, which means that drilling could occur beyond 2021. Therefore, Beach is seeking an expiry date for this marine discharge consent of 7 November 2029.

This report is limited to statements lodged by Beach covering the following activity:

- Discharge of trace amounts of harmful substances from the deck drains of a Mobile Offshore Drilling Unit (MODU) associated with the Canterbury EAD program.

Therefore, the focus of this report is to provide information on the industry standards for deck drainage systems that would be required for any MODUs chosen, review the operational effects associated with the activity listed, identify any gaps or conflicting information and best practices to assess if any issues should be brought to the attention of the Decision Making Committee (DMC).

As mentioned above, the activity requires a Discharge Consent for the trace amounts of harmful substance from the deck drains of an MODU as stipulated by Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations (2015) of the Discharge and Dumping (D&D) Regulations.

This report does not consider any issues associated with marine ecology or activities covered by an existing marine consent or Beach's Kupe project in the Taranaki Basin, located along the west cost of the North Island in New Zealand.

Alternative locations for an MODU were not considered as Beach is undertaking the Canterbury Basin EAD program to meet its Permit obligations under the Crown Minerals Act 1991, which requires the drilling of exploration and potentially future appraisal wells within the PEP 38264 area.

Alternative methods of avoiding discharge of harmful substances residue from deck drainage was also considered, one which would involve collecting all the water that may accumulate on the decks of the MODU and transporting it to a suitable disposal facility onshore. This would include pumping potentially large volumes of collected water between the MODU and supply vessel(s) and then to suitable road tankers, which would add to a range of health, safety and environmental risks and additional fuel usage. In order to collect and store all that water for offtake, a specially designed zero-discharge MODU would have to be contracted, which may not coincide with the Canterbury Basin EAD program.

In addition, if this type of MODU is available, it cannot guarantee to contain all deck runoff 100% of the time. I have no knowledge or experience of this type of MODU and could not find any information on the design specifications or if it had been previously employed in a drilling campaign.

These alternative methods to avoid, remedy or mitigate any adverse effects are covered in Beach Marine Discharge Consent Application document – Deck Drainage, Assessment of Alternatives, section 7.5, page 124.

Selection and contracting of an appropriate MODU (Semi-Submersible or Drill Ship) to undertake the Canterbury Basin EAD program has not occurred yet, therefore the specific options available for the onboard management of harmful substances and treatment of deck drainage prior to discharge is unknown at this stage.

Beach mentioned the COSL Prospector, recently used in previous campaigns by other oil and gas operators in New Zealand as an example of a typical deck drainage system. The COSL Prospector is a semi-submersible drilling rig built in 2014 and designed to operate in water depths up to 1500m and drilling depths to 7500m, therefore the systems should meet the required specifications.

It is apparent that Beach is meeting its regulatory obligations by developing an Emergency Spill Response Plan (ESRP), which will be submitted to EPA for approval before any activities will commence.

Beach will also create a Safety Case for each MODU contracted for the Canterbury EAD program, which will describe how hazards are controlled on or near the MODU. This will be submitted to WorkSafe New Zealand (High Hazards Unit) for approval.

Beach will develop an Oil Spill Contingency Plan (OSCP), which will consist of a suite of procedures that the operator and personnel will follow in the event of an oil spill. This will be submitted to Maritime New Zealand (MNZ) for approval.

To reduce the potential of unauthorized persons interfering with the MODU or entering the area of operation during the Canterbury Basin EAD program, Beach will apply to the Chief Executive of the Ministry for Business, Innovation, and Employment to establish a 500m safety zone around the MODU. Beach should advise EPA how it will manage this at a later date.

The first exploration well to be drilled will target the Wherry structure with water depths of between 1200 and 1300 metres. Therefore, once the MODU type has been contracted, additional details will be made available such as, the dynamic positioning (DP) system capability, number of support vessels required, the transfer of chemicals and fuel and the storage method for riser joints.

Beach is committed to following industry best practice by adopting 'Environmental Best Practice Guidelines' for the Offshore Petroleum Industry, which has been developed by The Ministry for the Environment (MfE, 2006). However, it should be noted that there are activities that are recognised as an industry norm and can be used interchangeably with the term best practices.

Beach has stated that it will require minimum design requirements for the deck drainage of selected MODUs and will place strict environmental and operational requirements on the MODU suppliers prior to awarding the contract. The minimum environmental and operational requirements of a deck drainage system (refer Beach Marine Discharge Consent Application document – Deck Drainage document, section 3.2, pages 37 to 40) and systems and procedures (Marine Discharge Consent Application document - Deck Drainage document, section 3.3, pages 40 to 42) to be used to manage and monitor the deck drains stated in the Beach Marine Discharge Consent Application document appear to capture industry best practice.

In addition to this, Beach is also recommending the use of covered and bunded pallets where additional storage space is required for harmful substances. These hard-covered spill pallets offer protection against direct exposure to rainwater. Refer Appendix 2 – Hard bunded and covered pallets and Beach Marine Discharge Consent Application document – Deck Drainage document, section 3.2.2.2, page 39.

The selection of harmful substances to be used for the Canterbury Basin EAD program cannot be verified at this stage but will be driven by operational needs of an MODU, the design of the well and the geology of the formation to be drilled. Nevertheless, Beach has reviewed the harmful substances used during previous drilling campaigns to inform this application.

Although briefly mentioned in the Beach Marine Discharge Consent Application document, any other risks associated with mobilizing and demobilizing an MODU, drilling in the EEZ, or emergency response plans will be addressed through separate applications at a later date.

Beach has a Health, Safety and Environment Management System aligned to Australian/New Zealand Standard ISO 14001:2004 Environmental Management Systems. It is apparent in the application that Beach is committed to continuous improvement in Health, Safety, Environment (HSE) performance and acknowledges it as an integral part of managing the business. This covers compliance with applicable laws, regulations and standards, ensuring equipment integrity by carrying out regular maintenance, training of staff and regular monitoring and audits associated with Beach management systems.

In addition to this, Beach will implement an assurance program on the selected MODU to confirm that all critical systems are meeting their performance standards. This especially relates to the deck drainage system by implementing planned maintenance and regular calibration of the Oil in Water (OIW) in-line monitor. Visual checks will be made daily to establish that no loss of containment has occurred and a daily monitoring regime will be established for the Oily Water Separator (OWS) and the Oil in Water (OIW) monitor. Once a MODU is selected, Beach should advise if the assurance tasks listed above will be carried out on the MODU by a competent person or sent to an onshore facility for analysis. The latter may introduce an unacceptable time delay in addressing any issues (**Refer to Appendix 4 – Clarification Register No. 1**).

Training, competency and drills plus spill kits complete the systems and procedures being implemented by Beach

Beach is aware of other regulatory approvals required for the Canterbury Basin EAD program but these will be addressed through separate applications at a later date.

A proposed request for further information has been included relating to the activity, comprising 4 clarifications (Refer to Appendix 4 – Clarification Register). These clarifications are included as an optional aid for the DMC, should they choose to request information that I feel would provide additional detail to Beach's impact assessment. If the proposed clarifications are pursued by the DMC and a

further assessment of the response from Beach is required, a second report can be drafted that reviews this information.

I deem that the key risks as stated in section 6.1 have been recognised, understood and addressed by Beach as part of their application.

Some proposed activities are in the early stages of planning and therefore certain information such as type of MODU, drain system configuration on the contracted MODU and the chemicals to be used during the Canterbury Basin EAD campaign is not available. Beach is committed to containing harmful discharges and has acknowledged this and has stated that these details will be provided to the EPA prior to the works.

4.0 INTRODUCTION

Beach has lodged an application with the EPA for a marine discharge consent associated with the Exploration and Appraisal Drilling program utilizing a Mobile Offshore Drilling Unit (EEZ100019).

The application is to cover the potential discharge of harmful substances through deck drains on an MODU.

This activity is restricted by the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations (2015) of the Discharge and Dumping (D&D) Regulations.

The EPA may obtain advice or information by commissioning any person to provide a report on any matter described in the activity to which an application relates.

The purpose and scope of this report is to:

- Review the marine discharge consent application activity contained in the Beach Marine Discharge Consent Application document – Discharge of Harmful Substances from Deck Drains for the Canterbury Basin
- Provide a findings and recommendations report based on assessment of the contents contained in the documents and information received and through further requests for information
- Allow Beach to respond with any further information requested for subsequent review.

5.0 ASSESSMENT APPLICATION

5.1 Documents Reviewed

The following documents issued by EPA were reviewed as part of this study:

- Environmental Protection Authority Application Form EPA0401, Marine Discharge Consent, Beach Energy Resources NZ (Holdings) Limited, dated 25 March 2020
- Beach Marine Discharge Consent Application document – Discharge of Harmful Substances from Deck Drains, Canterbury Basin. Document SLR Ref: 740.10106.00100-R01.

In addition, the following source documents were also used:

- Environmental Best Practice Guidelines for the Offshore Petroleum Industry, The Ministry for the Environment, 2006
- Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations (2015) of the Discharge and Dumping Regulations.

5.2 Information Principles

It is understood that more detailed information cannot be presented by Beach on the type of MODU that will be employed in the field, the range of drilling chemicals that will be used or the design of the deck drainage system as the project is currently in the early stages of planning. Therefore, there is no information or schematics concerning these areas provided by Beach.

Beach has stated that either, or both, a semi-submersible MODU or a drill ship MODU will be used under this marine discharge consent for one or more drilling campaigns for the Canterbury Basin EAD program and that the program would commence late 2020 and continue through to November 2021. However, Beach can seek an extension of the existing PEP of up to eight years for appraisal purposes and if successful, this would mean drilling could occur until November 2029. In this case, it is assumed that all MODUs contracted for the Canterbury Basin EAD program would meet the same exacting standards.

Nevertheless, in my opinion the application has provided the best available information known to Beach at this time and more detail will be supplied to the EPA by Beach when the extent of the work is known. Any outstanding issues can be risk assessed as part of a final report and recommendations put forward making them a condition of the consent.

6.0 KEY RISKS AND CONSIDERATIONS

A Semi-Submersible MODU is self-contained with personnel accommodation and services but the generation (age) of the rig contracted for the work could affect deck drain design, deck space, location of liquid storage vessels and the type of liquid storage equipment e.g. fixed or transportable Intermediate Bulk Containers (IBCs) on an MODU.

A Drill Ship MODU is a marine vessel that has been modified or designed specifically to drill oil and gas wells. It is also self-contained with personnel accommodation and services. It has extensive mooring or positioning equipment and is typically employed in deep water. It has the added advantage of having easy mobility to propel itself from well to well and location to location, unlike the Semi-Submersible MODU, which must rely on an outside transport vessel to transfer them from place to place.

To ensure that MODU systems are operated and maintained correctly, it is important that the personnel are familiar with any chosen MODU and are deemed competent in their area of expertise. This includes the maintenance and operation of the deck drain system and associated equipment, oil spill procedures, the deployment of oil spill equipment and the lines of communication between the field and those managing the spill event in the Beach emergency control centre.

6.1 Key Risks

The key risks for a Semi-Submersible or Drill Ship MODU and considerations are given below:

<u>Key Risks for a Semi-Submersible:</u>

- Irregular maintenance and calibration of the Oily Water Separator (OWS) and Oil in Water (OIW) monitor
- Inadequate MODU deck drainage system (an adequate and preferred deck drainage system, including all controls and functionality is described in section 7.2 and shown in Appendix 3 – Key Elements of a MODU Drainage System)
- No coaming on the peripheries of the open deck areas
- Design of bunds, coaming and hard-covered bunded pallets for hazardous areas if they are not able to contain the maximum potential volume of harmful substances in the storage vessels held in the governed area
- Gaps in technical skills and oil spill response
- Poorly designated non-hazardous areas.

<u>Key Risks for a Drill Ship:</u>

- Inadequate MODU deck drainage system (an adequate and preferred deck drainage system, including all controls and functionality is described in section 7.2 and shown in Appendix 3 – Key Elements of a MODU Drainage System)
- The method of storing riser joints to avoid increasing the vertical centre of gravity (VCG) of the Drill Ship
- Gaps in technical skills and oil spill response.

6.2 Key Considerations

- Visible commitment by Beach management in maintaining the integrity and reliability of structures and equipment by providing the processes and tools to achieve this, including adequate financial resources to support the planned activities
- Applying a robust and structured approach to the planning and execution of the Canterbury Basin EAD program and support activities
- Employing competent and experienced staff at all levels within the organisation
- Ensuring service contract staff and equipment meet Beach standards. This ensures a degree of consistency in the quality of work carried out on an MODU and the standard of the equipment brought onto the rig to execute the planned activities
- Carrying out regular emergency exercises on an MODU and between an MODU, support vessels, and the Beach emergency control centre
- Ensuring that any on-site repair or modification work to an MODU or any of its critical systems is subject to a review and if required re-classification by a recognised certifying authority e.g. Det Norske Veritas (DNV) or Lloyds Register (LR) to guarantee compliance
- Valid class certificates for the duration of the Canterbury Basin EAD campaign with no conditions of class placed on an MODU.

7.0 EVALUATION OF INFORMATION

7.1 Marine Discharge from MODU Deck Drains

A range of chemicals are anticipated to be used during the Canterbury Basin EAD campaign and the current application for a Marine Discharge Consent covers for the discharge of harmful substances via the deck drain systems on a MODU.

As Beach is in the early planning phase of identifying and securing a MODU, the full details of the deck drainage system cannot be provided.

Also, a comprehensive list of chemicals products, hazardous classifications, physical properties, maximum volumes and frequency of discharge cannot be provided for the same reason. Beach has reviewed previous drilling campaigns by the COSL Prospector in Taranaki and the Great South Basin to identify potentially harmful substances.

Beach has specifically mentioned the use of Sodium Hypochlorite Potable Grade, which is used for treating the potable water supply of the MODU. This chemical is classified under the Hazardous Substances and New Organisms Act 1996 as 9.1A, which is very ecotoxic in the aquatic environment. However, Beach does not clarify if the Sodium Hypochlorite will be stored on the MODU and then added to the water storage tanks on the MODU or if it will be already added to the potable water transferred from a supply vessel (**Refer to Appendix 4 – Clarification Register No. 2**). In my professional opinion, mixing the Sodium Hypochlorite on the MODU would mitigate the risks involved with transporting and transferring large quantities of pre-mixed fluid between supply vessels and the MODU.

Alternatives to Sodium Hypochlorite are used on some MODU's and offshore platforms within the offshore drilling industry. These include the use of heat treatment, activated charcoal adsorption, chemical disinfection, ultraviolet (UV) purification, distillation and flocculation to treat potable water. Often these methods are used in combination. The UV purification system is the most reliable and most commonly used, killing up to 99.9% of bacteria and viruses. No mention has been made in the Beach application of any alternative to the use of Sodium Hypochlorite Potable Grade. It is advisable to request if alternatives to Sodium Hypochlorite are available for use on the selected MODU (**Refer to Appendix 4 – Clarification Register No. 3**).

The Emergency Spill Response Plan (ESRP) will contain information on all harmful substances that will be stored on the MODU(s), including their Safety Data Sheets (SDS), and the prevention, mitigation and control of any spills. The ESRP will be submitted to the EPA for approval prior to any drilling commences.

7.2 Deck Drainage System

A typical deck drainage system is designed to manage the potential loss of containment of a harmful substance from discharging to the marine environment.

A schematic of a preferred and adequate drain system, showing the separation between non-hazardous drains and hazardous drains and the systems, controls and treatment measures is shown in Appendix 3 – Key Elements of a MODU Drainage System.

Beach will focus on MODUs that have its open deck areas fitted with coaming on their peripheries that act as bund walls (Refer Beach Marine Discharge Consent Application document para 3.2.2.1 page 37). This prevents any rainwater, deluge water or wash-down water from discharging directly over the side to the sea. Open deck areas are identified as either hazardous areas or non-hazardous areas and should be depicted on the MODU deck plans (**Refer to Appendix 4 – Clarification Register No. 4**).

It can be seen from Appendix 3 – Key Elements of a MODU Drainage System, that harmful substance storage will take place in bunded areas, which are only connected to the hazardous drain system. Operations and handling of harmful substances also occur in areas where any release would be captured and only flow to the hazardous drain system. This system consists of multi-chambered settling or collection tanks. From here the water is put through an Oily Water Separator (OWS) fitted with an inline Oil-in-Water (OIW) monitor. The OWS only allows water to be discharged overboard when the discharge has less than 15 ppm OIW content in accordance with Marine Pollution (MARPOL) standards, which is typically 15 ppm prior to discharge overboard.

If the content is greater than 15 ppm, then the contaminated water is redirected back to the settling tank where further separation occurs until the stream has OIW concentrations of less than 15 ppm. This system will meet the criteria set by regulations 17 and 18 of D&D Regulations that are classified as permitted activities.

Any oil that collects in the slops tanks is normally transferred to intermediate bulk containers (IBCs) for removing to shore for disposal at a consented facility. This approach has been stated by Beach (Refer Beach Marine Discharge Consent Application document 3.2.2.1.1, para 3, page 38).

There may be a need to install temporary drain plugs (refer to Appendix 3 – Key Elements of a MODU Drainage System) in specific areas during certain operations such as bunkering. A procedure would be developed covering this activity and the Permit to Work (PTW) system would be used to control the risks associated with the installation and removal of the plugs. Drains can also be temporarily blocked with plugs to prevent discharge into the deck drain system while clean-up activities are being carried out.

It is possible that some of the MODUs contracted for the Canterbury Basin EAD program will route drainage from non-hazardous areas directly overboard and not through a treatment system as shown in Appendix 3 – Key Elements of a MODU Drainage System. This would mean that these areas would have to be clearly demarcated and no harmful substances handled or stored in non-hazardous areas.

If additional storage is required, Beach is recommending the use of hard covered and bunded pallets as shown in Appendix 2 – Hard bunded and covered pallets. These would be placed in bunded hazardous areas.

In exceptional circumstances, it is noted in the application (Refer Beach Marine Discharge Consent Application document section 3.2.2.4, pages 39 and 40) that the deck drain system could be by-passed due to two primary situations which cause an excessive amount of water to be present:

1. The deluge system is activated by the detection of fire or heat by the automated monitoring system on board an MODU. In this case, the fire pumps would quickly deliver large volumes of seawater to the affected area via the deluge system causing the deck drainage systems to become overloaded. In this event, the deck drainage systems may have to be by-passed. Another cause could be as a result of a faulty fire or heat detector but in this case, the volume of water would not be delivered for a sustained period.

2. Extended torrential rain is experienced, which again could overload the deck drainage system to the extent that the stability of an MODU is at risk. In this scenario the decision to

discharge deck drainage directly overboard would be made by the Offshore Installation Manager (OIM).

The application also states (Refer Beach Marine Discharge Consent Application document section 3.2.2.4, page 39 and 40) that valves that would allow the discharge of the contents directly overboard by by-passing the OWS are normally padlocked shut, managed under a Permit to Work (PTW) system and recorded in the open / locked close isolation register. The status of these valves can only be changed by the OIM. This use of the permit to work system, isolation register and level of PTW authority is considered industry best practice. Any direct overboard discharge from the hazardous areas would also be recorded in the Oil Record Book as required by regulation 23 of the D&D Regulations.

As part of best practice, it is important to confirm that any critical systems meet their performance standard by carrying out certain assurance tasks such as:

- Adherence to the Planned Maintenance Routines (PMRs), including OWS and OIW monitor
- Regular calibration of the OIW in-line monitor
- Maintaining adequate spares for critical pieces of equipment
- Implementing regular additional water quality checks by competent personnel as specified in operational procedures
- Stock management and maintenance of a harmful substance register as required by the Emergency Spill Response Plan (ESRP).

The team responsible for managing spills, including the use of procedures for notification, containment, isolating, cleaning, disposing and reporting of any loss of containment to deck would be trained, assessed and drilled.

The training should be included in any MODU emergency exercise plans with the roles and responsibilities clearly defined.

A loss of containment to the deck will require the substance to be contained and cleaned up using spill kits that are strategically located around an MODU. The details concerning the spill kits, contents and locations will be provided in the ESRP and the Oil Spill Contingency Plan for an MODU.

Spill kits that have been used to clean up a loss of containment event for a substance will be sealed inside a suitable container and taken onshore to a facility authorized to accept such waste material. This would be in accordance with the Safety Data Sheet (SDS) and in accordance with the garbage management plan required under regulation 29 of the D&D regulations.

7.2.1 Possible Discharge Substances

At this stage in activity planning, no specific chemicals have been selected for use. However, as mentioned in Beach Marine Discharge Consent Application document, section 3.4.2, paragraph 1, page 43, Beach has reviewed data from previous drilling campaigns to use in the application.

In addition, Beach would confirm all chemicals to be used, including their potential for ecotoxicity and other hazard characteristics. Full details would be provided to EPA prior to work commencing.

7.2.2 Discharges from Machinery Space

Machinery that has the potential to discharge harmful substances would normally be enclosed in a bunded area with the discharge routed to the non-hazardous drain system and separated via a settling tank. Temporary plugs can also be fitted to allow absorbent spill pads to be used to mop up the spillage before removing the plug and washing down the bunded area. The volume of any harmful substance accumulating in the machinery bunded area would generally be negligible and could be managed as stated in Beach Marine Discharge Consent Application document section 3.3.4, page 42.

7.2.3 Harmful Substance Dilution Calculations

It is noted in the Beach Marine Discharge Consent Application document, section 3.6.2, page 46 that to provide a worst-case assessment, the maximum total volume of Sodium Hypochlorite (the most ecotoxic substance that could be stored and used on the MODU) left behind as a residue on the deck following clean-up is 250ml and this volume is immediately entrained within the deck drainage system. This is noted to be a conservative assumption. As stated, any substance contained on the deck would pass to the settling tank in the drainage system and be diluted further.

Beach notes that the 250ml residual volume formed the basis of two recent Impact Assessments prepared in support marine discharge consent applications considered by the EPA (EEZ100017 and EEZ1000018). Both applications were accepted by the respective decision-making committees as an appropriate volume of residual harmful substances left on the deck following clean-up of any spill.

A loss of containment of any harmful substance on the deck will be contained and cleaned up using spill kits. Therefore, the volume of any residue on the deck following clean-up of 250ml is a reasonable worst-case assumption. It is noted that this volume has been used to determine the concentrations of harmful substances that would be discharged after dilution in the deck drainage system settling tank, with results presenting a negligible ecotoxicity risk.

In the most likely scenario, a loss of containment of any harmful substance would occur in a hazardous deck area and the substance would be diluted in the settling tank prior to being discharged. In a worst-case scenario, the loss of containment could occur in a non-hazardous deck area which may be directly discharged to the sea (without dilution) or diluted in a settling tank in the non-hazardous drain system prior to being discharged (if using the preferred deck drainage system as shown in Appendix 3 – Key Elements of a MODU Drainage System).

None of the sodium hypochlorite is removed through the treatment system. While the water will flow through the settling tanks and then through the OWS, harmful substances may not necessarily be removed if they are in a dissolved state. However, any such substances adhering to particles may be collected in the settlement tanks and any that are floatable may be removed by the OWS. Beach has assumed no removal of sodium hypochlorite through the treatment system therefore its calculations represents a worst-case scenario.

8.0 CONCLUSIONS

Based on a review and analysis of the information provided by Beach, it is my opinion that there are no perceived residual risks that cannot be mitigated or managed that the Decision Making Committee should be aware of when making a decision.

An outline of the uncertainties stated by Beach (Refer Beach Marine Discharge Consent Application document section 7.2 page 110) clearly shows the threats and the mitigating measures to be put in place to manage the hazards associated with deck drainage and a harmful substance discharge.

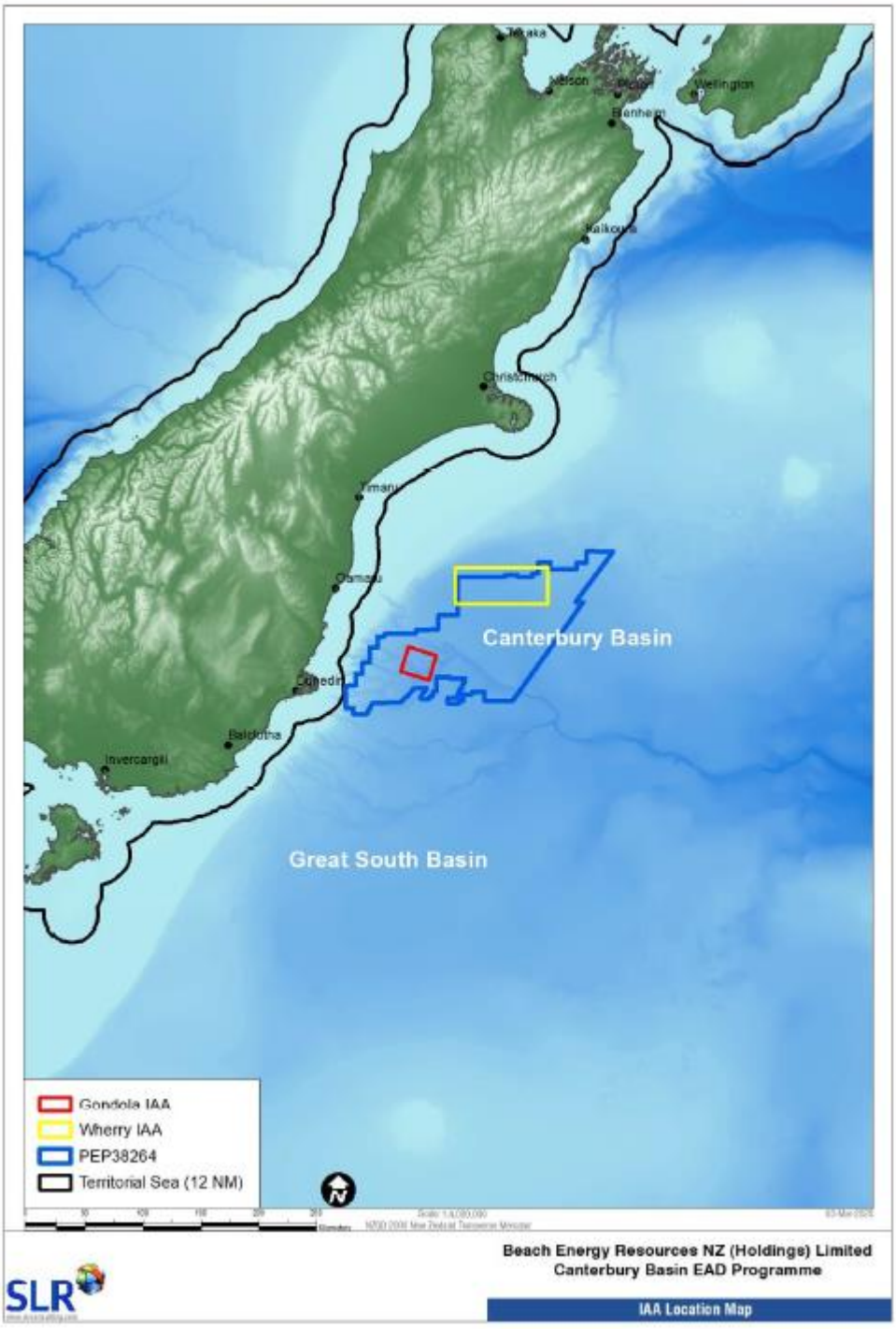
Nevertheless, I have raised 4 points for clarification which are noted in the report and listed in a Clarifications Register under Appendix 4 – Clarification Register. Within the clarification register, a risk rating has been applied to points raised. Any activities deemed to be of low risk can be mitigated by the EPA by making them a condition of the consent. Any medium or high-risk items can be addressed accordingly.

The question raised has been assigned a significance level to guide the Decision-Making Committee (DMC).

Beach has stated that the following documents and plans will be developed in the future:

- An approved activity – specific Emergency Spill Response Plan (ESRP) for Canterbury Basin EAD activities
- An approved project specific Oil Spill Contingency Plan (OSCP)
- An approved activity – specific Safety Case for the MODUs contracted for the Canterbury EAD activities.

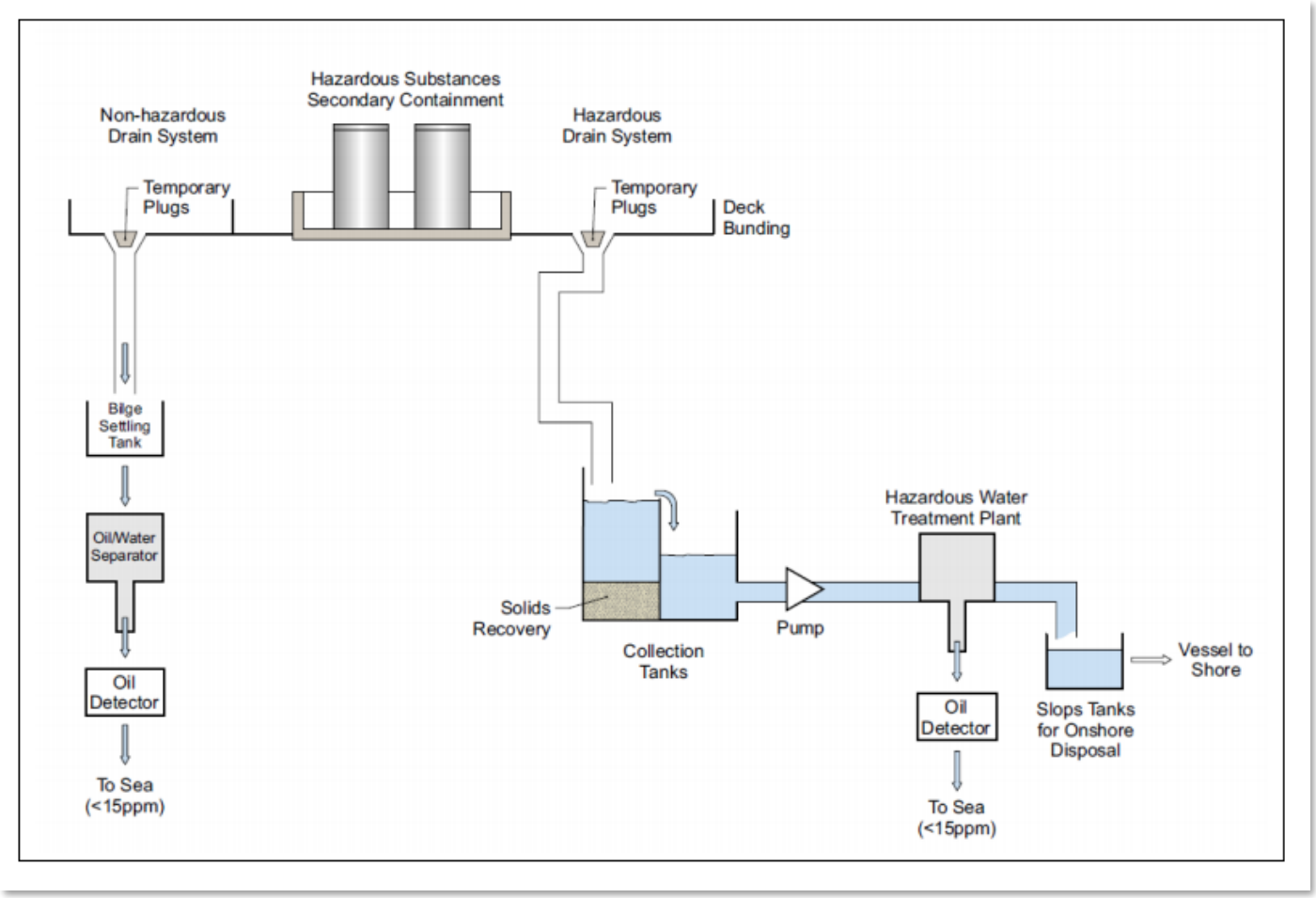
APPENDIX 1 – BEACH CANTERBURY BASIN EAD POTENTIAL WELL LOCATIONS (WHERRY AND GONDOLA)



APPENDIX 2 – HARD BUNDED AND COVERED PALLETS

Beach Marine Discharge Consent Application document, section 3.2.2.2, figure 5 page 39

APPENDIX 3 – KEY ELEMENTS OF A MODU DRAINAGE SYSTEM



APPENDIX 4 – CLARIFICATION REGISTER

A summary of the points for clarification are tabled below. Please note that reference in bold text relate to the Beach Canterbury Basin Marine Discharge Consent Application document no. EEZ100019. For completeness, the relevant section in this report is also is referenced.

All questions have been assigned a significance level to guide the Decision-Making Committee based on the following:

RED: Obtaining answers to these questions is critical to understanding the proposed activities

AMBER: Obtaining answers to these questions would be valuable in understanding the proposed activities

GREEN: Obtaining answers to these questions would provide insight towards understanding the proposed activities.

No.	REFERENCE #	CLARIFICATION	LEVEL	STATUS	RESPONSE
1	This document P8, para 6 **Beach application 3.3.2, bullet 3, p41**	Once the MODU is selected, advise if the assurance task to check the discharged water calibration processes will be carried out on the MODU by a competent person or sent onshore for analysis as this could introduce an unacceptable time delay in addressing any issue.			
2	This document P14, para 4 **Beach application 3.4.2, para 2, p43**	Advise if the Sodium Hypochlorite Potable Grade will be added to the potable water tank on the MODU or added to the potable water being transferred from the supply boat.			
3	This document P14, para 5 **Beach application No Reference**	Advise if there is an alternative to Sodium Hypochlorite for treating the potable water.			
4	This document P15, para 1 **Beach application No Reference**	Ensure that a deck plan of the selected MODU is provided to EPA clearly showing that open deck areas are identified as either hazardous areas or non-hazardous areas			