Decision on marine discharge consent application: Hydrosure and acetic acid

Tamarind Taranaki Limited

EEZ300010

MAY 2019
MARINE DISCHARGE CONSENT EEZ300010

Pursuant to section 62(1)(a) of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012, the application for marine discharge consent by Tamarind Taranaki Limited to undertake restricted discretionary activities (listed in Schedule 1) associated with its sidetrack drilling programme in the Tui Field, offshore Taranaki, is GRANTED.

Pursuant to section 71(2) of the EEZ Act this marine discharge consent commences on 23 May 2019.

Marine discharge consent EEZ300010 expires on 23 May 2024.

Dated this 23rd day of May 2019.

___________________
Siobhan Quayle
General Manager, Climate, Land & Oceans

Under delegation from the Chief Executive of the Environmental Protection Authority
SCHEDULE 1: TAMARIND MARINE DISCHARGE CONSENT

EEZ300010 AUTHORISED RESTRICTED ACTIVITIES

This marine discharge consent authorises the following restricted activity, subject to conditions listed in Schedule 2.

Section 20B – No person may discharge a harmful substance from a structure or from a submarine pipeline into the sea or into or onto the seabed of the exclusive economic zone.

1. The discharge of **Hydrosure** from underneath the well debris caps at four (4) of the five (5) existing wells in the Tui Field.
2. The discharge of **acetic acid** in produced water from the Floating, Production, Storage, and Offtake facility, the *Umuroa*. 
SCHEDULE 2: TAMARIND TARANAKI LIMITED MARINE DISCHARGE CONSENT

EEZ300010 CONDITIONS

DEFINITIONS

Terms used in this Schedule of Conditions shall have the following meanings:

- **Dose**: A portion of a substance added during a process.
- **Dose event**: A single period of time over which a substance is dosed. A dose event may occur over multiple days and involve the treatment of multiple wells. For example, a dose event may incorporate a single campaign to treat multiple wells with a given harmful substance over multiple days.
- **EPA**: Environmental Protection Authority.
- **FPSO**: Floating Production Storage and Offtake facility.
- **D&D Regulations**: The Exclusive Economic Zone and Continental Shelf (Environmental Effects – Dumping and Discharge) Regulations 2015.
- **Harmful substance**: As defined in regulation 4 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations 2015.
- **PMP**: Petroleum Mining Permit.
- **Produced water**: Water produced from a wellbore.
- **ROV**: Remotely Operated Vehicle.
- **Suitably qualified person**: Where any condition refers to “a suitably qualified and experienced person” it shall mean a person who holds a qualification in the relevant subject matter and has at least 3 years relevant experience.
- **Tamarind**: Tamarind Taranaki Limited (the applicant).
- **Working days**: Has the same meaning as defined in the EEZ Act 2012.
CONDITIONS
Pursuant to section 63 of the EEZ Act, this marine discharge consent authorises the discharge of two harmful substances, Hydrosure and acetic acid subject to the following conditions:

1. Subject to compliance with these consent conditions, the activities authorised by this Marine Discharge Consent shall be undertaken in general accordance with:
   a. the application document entitled “Tui Field Drilling Activities – Impact Assessment to Support a Non-Notified Marine Discharge Consent Application " (dated February 2019) prepared by ERM New Zealand Limited and supporting documents submitted as part of the application lodged on 11 February 2019; and
   b. The response for further information email from Simon Knapman titled “Marine discharge consent EEZ300010 - Further information request 1” (dated 18 March 2019).

2. The Consent Holder shall ensure that a copy of this Marine Discharge Consent, and any variations to it, are available for inspection at the Consent Holder’s head office in New Zealand, and on board the FPSO Umuroa, and the COSL Prospector.

3. In undertaking any of the activities authorised by this Marine Discharge Consent, The Consent Holder shall ensure all personnel, including any contractors, involved in undertaking any of the authorised activities fully understand these conditions and their obligations to comply with them.

4. The Consent Holder shall keep a record to show that the personnel, including contractors, have been informed of their obligations under this consent. The Consent Holder shall provide a copy of this record to the EPA upon request.

5. The Consent Holder shall, at least 20 working days prior to first commencing the activities authorised by this Marine Discharge Consent, or any other timeframe agreed to by the EPA, provide to the EPA, in writing, the name and contact details of the person who has delegated responsibility for compliance management, collating information, and reporting in accordance with the requirements of this consent. In the event that the responsible person changes, the Consent Holder shall advise the EPA, in writing, of the name and contact details of the new person within five (5) working days of the change.

6. The Consent Holder shall notify the EPA within five (5) days of any discharge events described in this Discharge Consent being undertaken, including the location of the discharge and the estimated volume of each harmful substance that has been discharged during the event.

7. The Consent Holder shall comply with the dosage parameters detailed in Table 1.

8. The Consent Holder shall keep an electronic record of the use of the harmful substance detailed in Table 1 in accordance with Condition 10 of this consent.

9. The Consent Holder must prepare and provide to the EPA for the period 1 January – 31 December each year in which the discharges occur an Annual Report. The Annual Report must be provided by 30 June each year.
10. The Annual Report must be prepared by a suitably qualified and experienced person(s), where relevant.

11. The Annual Report must include the following:
   a. An annual record of the discharge of acetic acid authorised by this Marine Discharge Consent, including:
      i. the number of doses per year of the substance for each dosing period, and
      ii. the quantity of the substance discharged per dosing event and for the preceding 12 month period in accordance with Table 1.
   b. Any measures that have been taken to reduce the adverse effects of the discharge of the hazardous substances authorised by this Marine Discharge Consent.

Table 1 –Harmful substances authorised for discharge

<table>
<thead>
<tr>
<th>Product name</th>
<th>HSNO Approval</th>
<th>Aquatic ecotoxicity classification</th>
<th>Use</th>
<th>Maximum duration of dose event</th>
<th>Maximum volume per dose event (litres)</th>
<th>Maximum frequency of dose events per period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinetic Acetic Acid</td>
<td>HSR00975</td>
<td>9.1D</td>
<td>Water treatment chemical</td>
<td>10 days</td>
<td>3,975 per day. Up to 39,750 over 10 days</td>
<td>-</td>
</tr>
<tr>
<td>*Hydrosure</td>
<td>HSR003563</td>
<td>9.1A</td>
<td>Biocide</td>
<td>instantaneous</td>
<td>250 ml in 3 L of water</td>
<td>-</td>
</tr>
</tbody>
</table>

*Advice note: The release of Hydrosure from the well caps cannot be controlled or limited, or any potential adverse environmental effects mitigated through conditions. The details of the release of Hydrosure are included in this table as a matter of record.
EXCLUSIVE ECONOMIC ZONE AND CONTINENTAL SHELF (ENVIRONMENTAL EFFECTS) ACT 2012

Tamarind Taranaki Limited

Reasons for decision on application for marine discharge consent EEZ300010
Executive Summary

i. Pursuant to section 62(1) of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (the EEZ Act), the application for a marine discharge consent by Tamarind Taranaki Limited (Tamarind) to undertake a discretionary activity under section 20B of the EEZ Act and regulations 20 and 16(3) of the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations 2015, is GRANTED subject to conditions (listed in Schedule 2 of this decision).

ii. Tamarind applied for the discharge of two (2) harmful substances in relation to its sidetrack drilling programme. The drilling activities for this programme have already been consented under EEZ100016. The discharges related to the release of trace amounts of biocide (Hydrosure) from four (4) wells in the Tui Field, and for the discharge of acetic acid that assists with the oil and water separation processing aboard the Floating Production Storage and Offtake Facility (FPSO) Umuroa, offshore Taranaki.

iii. The reasons for granting the marine discharge consent are set out in this decision as required under section 69 of the EEZ Act. In making my decision, I have acted as a decision maker under delegation authority from the Chief Executive of the Environmental Protection Authority (EPA).

iv. After considering all the information available to me, taking into account the matters listed in sections 59 and 60, and the information principles under section 61 of the EEZ Act, I have determined the adverse effects of both discharges are negligible on the environment and existing interests. I consider the suite of conditions I have imposed on Tamarind will ensure than any adverse effect are appropriately avoided, remedied, and mitigated.

v. Overall, I find that granting this marine discharge consent meets the purpose of the EEZ Act, as set out in section 10 of the EEZ Act.
Table of Contents

1. Background ............................................. 4

2. The context and details of the application ................. 4
   2.1 The context of the application ........................................ 4
   2.2 The details of the application ........................................ 5
   2.3 Serving copies ................................................................. 6

3. Decision-making Process ................................... 7
   3.1 Requests for Information from applicant ......................... 7
   3.2 Section 56 advice ............................................................... 7
   3.3 EPA Reports ................................................................. 7
   3.4 The Hearing ................................................................. 7

4. EEZ ACT AND REGULATIONS ............................... 8
   4.1 Duties of the EPA ............................................................. 8
   4.2 Information Principles .................................................... 9
   4.3 Decision Making ............................................................ 10

5. Activities Subject to EEZ Act Authorisation ................. 11
   5.1 Marine Discharge Consent ............................................... 11

6. Assessment ....................................................... 12
   6.1 Description of the Physical Environment ......................... 12
   6.2 Section 59(2A)(a) ............................................................. 13
   6.3 Section 59(2A)(b) ............................................................. 17

7. Duration of consent ............................................ 17

8. Conclusion ....................................................... 18

Tables and Figures

Figure 1: Layout of the FPSO and the 5 well sites in the Tui Field ............................................. 6
Table 1: EPA Further Information Requested from applicant under section 54 ............................... 7
Table 2: Marine Consent Requirements ............................................ 11

Appendices

Appendix 1 – Staff assessment of the application against the matters under section 59(2A) of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 ......................... A1
## Glossary of Abbreviations and Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge and Dumping Regulations</td>
<td>Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations 2015</td>
</tr>
<tr>
<td>Dose</td>
<td>A portion of a substance added during a process</td>
</tr>
<tr>
<td>Dose event</td>
<td>A single period of time over which a substance is dosed. A dose event may occur over multiple days and involve the treatment of multiple wells. For example, a dose event may incorporate a single campaign to treat multiple wells with a given harmful substance over multiple days</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Authority</td>
</tr>
<tr>
<td>EEZ Act</td>
<td>Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012</td>
</tr>
<tr>
<td>FPSO</td>
<td>Floating Production Storage and Offtake facility</td>
</tr>
<tr>
<td>D&amp;D Regulations</td>
<td>The Exclusive Economic Zone and Continental Shelf (Environmental Effects – Dumping and Discharge) Regulations 2015</td>
</tr>
<tr>
<td>Harmful substance</td>
<td>As defined in regulation 4 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects – Discharge and Dumping) Regulations 2015.</td>
</tr>
<tr>
<td>PMP</td>
<td>Petroleum Mining Permit</td>
</tr>
<tr>
<td>Produced water</td>
<td>Water produced from a wellbore</td>
</tr>
<tr>
<td>ROV</td>
<td>Remotely Operated Vehicle</td>
</tr>
<tr>
<td>Tamarind</td>
<td>Tamarind Taranaki Limited (the applicant)</td>
</tr>
<tr>
<td>Working days</td>
<td>Has the same meaning as defined in the EEZ Act 2012</td>
</tr>
</tbody>
</table>
1. **Background**

1. The Environmental Protection Authority (EPA) is the marine consent authority for certain activities that are restricted within the Exclusive Economic Zone (EEZ) and continental shelf beyond the 12 nautical mile limit from New Zealand's coastline.

2. One of the EPA's functions, pursuant to section 13(1)(a) of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (the ‘EEZ Act’), is to decide applications for marine discharge consents.

3. Tamarind is the operator of the Tui Field (petroleum mining permit 38158) and was granted consent to undertake sidetrack drilling activities from four (4) of five (5) wells in the Tui Field in February 2019 (EEZ100016).

4. On 11 February 2019, Tamarind Taranaki Limited (Tamarind) lodged an application for marine discharge consent for the discharge of two harmful substances in relation to the sidetrack development drilling of four (4) wells in the Tui Field.

2. **The context and details of the application**

2.1 **The context of the application**

5. Tamarind have been granted a marine consent by the EPA to undertake a sidetrack drilling programme from up to four (4) wells of the five (5) wells within the Tui Field (application EEZ100016). In order to undertake the sidetrack drilling, Tamarind must attach a blow-out preventer to the top connection of each well. The top connection of each well is protected from damage by debris and corrosion by a well debris cap which must be removed to attach a blow-out preventer. Tamarind intend to use a Remotely Operated Vehicle (ROV) to remove the debris caps.

6. Removing the well debris cap will result in the discharge of a harmful substance (Hydrosure) that was placed under each of the well debris caps to control any algal or bacterial growth. This discharge is captured by the Discharge and Dumping Regulation under:

   a. Regulation 20: The discharge of harmful substances described in regulation 4(a) from mining activities

7. Once well debris caps are removed and the blow-out preventer is attached, the sidetrack drilling activities consented under EEZ100016 can commence.

8. The sidetrack drilling process leaves small quantities of drilling muds and fine cuttings material known as "rock flour" throughout the well bore. After each sidetrack well is completed, it is added to the production stream from the reservoir to the FPSO.

9. When the reservoir fluids from the new side-tracked wells are first flowed back to the FPSO some of this rock flour will be entrained in the reservoir fluids. The presence of this material within the reservoir fluids will potentially result in the formation of strong oil-in-water emulsions, which need to
be broken down to allow effective separation on board the FPSO of the oil and water phases and removal of any particulate matter.

10. Tamarind propose to dose the reservoir fluids with acetic acid to reduce the pH of the mixture to enable effective separation of oil and particulates from the produced water. The discharge of acetic acid in the produced water is captured by the Discharge and Dumping Regulation under:

   a. Regulation 16(3): The discharge of harmful substances described in regulation 4(a) and (b) from offshore processing drainage, displacement water, and production water from an existing structure

2.2 The details of the application

Discharge of Hydrosure

11. Tamarind estimate three (3) liters of fluid is contained under each debris cap. This fluid is under the same pressure as the surrounding environment and will dissipate into the surrounding environment after the debris cap is removed. Tamarind state that the fluid under each debris cap may contain up to 250 ml of biocide to control any algal or bacterial growth. The biocide (Hydrosure) is classified as a 9.1A (very ecotoxic) on the New Zealand Chemical Classification and Inventory Database (CCID).

12. The biocide was placed under the debris caps of four (4) of the five (5) wells in the Tui field in 2007, and the fifth well in 2014. Tamarind’s application is for the discharge of biocide from any four (4) of the five (5) wells in the Tui Field.

13. The proposed discharge of biocide will take place near the sea floor which is at a depth of between 100 m to 120 m below the sea surface.

14. Tamarind is requesting a consent for a period of up to 5 years, anticipating the debris caps to be removed sometime between May 2019 and April 2020.

15. Hydrosure has only one component (100% composition) and is readily biodegradable and non-bioaccumulative\(^1\).

Discharge of acetic acid

16. Acetic Acid is classified as a 9.1D on the CCID and is present at 90% concentration in the discharged product. During the separation of the oil from the produced water onboard the FPSO, acetic acid will partition to the water phase and be discharged with produced water which is currently consented to be discharged at 19,000 m\(^3\) per day under EEZ300006.

17. Tamarind estimate the following dosage parameters of acetic acid for each well based on a maximum production flow rate of 1,590 m\(^3\) per day:

   a. A maximum dosage rate of 3.975 m\(^3\) per day

   b. A maximum concentration at the point of discharge of 209.21 mg/L

\(^1\) Persistence and bio-accumulation are defined in Annex D, Schedule 1AA of the HSNO Act 1996.

EEZ3000010 Tamarind Marine Discharge Consent Page 5
c. A maximum dosage duration of 10 days, and
d. 40 days between dose periods (i.e. between wells drilled).

Figure 1: Layout of the FPSO and the 5 well sites in the Tui Field.

18. Figure 1 illustrates the layout of the FPSO in relation to the 5 wells. In reality, Pateke 3H and Pateke 4H are 5 km from the FPSO, Amokura 2H is 2 km from the FPSO, and Tui 2H and Tui 3H are 1.5 km from the FPSO.

2.3 Serving copies

19. Under section 45 of the EEZ Act, the EPA is required to serve copies of the application on specific parties. The EPA served copies of the application on 41 parties on 15 April 2019.

20. These parties were served by way of email with a link to the application documents on the EPA website. These parties consisted of:

a. 40 iwi authorities that may be affected by the application, and
b. Maritime New Zealand.
3. Decision-making Process

3.1 Requests for Information from applicant

21. The EPA sought further information from Tamarind under section 54(1) of the EEZ Act on one (1) occasion.

<table>
<thead>
<tr>
<th>From</th>
<th>About</th>
<th>Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamarind</td>
<td>Clarification of description of activities</td>
<td>18 March 2019</td>
</tr>
</tbody>
</table>

3.2 Section 56 advice

22. The EPA did not consider it necessary to commission any advice or reports under section 56 of the EEZ Act in order to determine the application.

3.3 EPA Reports

23. The EPA undertook an Evaluation Report which consisted of:

   a. Environmental Risk Assessment (ERA) which characterises the environmental risk associated with the discharge of harmful substances, and

   b. An assessment of the application against the section 59(2A) matters (the ‘section 59(2A) staff assessment’), this assessment is Appendix 1 to this decision.

24. I considered the ERA and the section 59(2A) staff assessment when assessing the application against s 59 of the EEZ Act (Appendix 1).

3.4 The Hearing

25. Section 50 of the EEZ Act stipulates that the EPA may conduct a hearing on an application for a marine consent for a non-notified activity if the EPA considers it necessary or desirable, and that the EPA must hold a hearing if the applicant requests one.

26. A hearing was not held. The EPA did not consider a hearing necessary or desirable for this application, and the applicant did not request a hearing.
4. EEZ ACT AND REGULATIONS

4.1. Duties of the EPA

4.1.1 Purpose of the EEZ Act

27. Section 10 of the EEZ Act states that its purpose is to promote the sustainable management of natural resources in the exclusive economic zone (EEZ).

“10 Purpose

(1) The purpose of this Act is—

(a) to promote the sustainable management of the natural resources of the exclusive economic zone and the continental shelf; and

(b) in relation to the exclusive economic zone, the continental shelf, and the waters above the continental shelf beyond the outer limits of the exclusive economic zone, to protect the environment from pollution by regulating or prohibiting the discharge of harmful substances and the dumping or incineration of waste or other matter.

(2) In this Act, sustainable management means managing the use, development, and protection of natural resources in a way, or at a rate, that enables people to provide for their economic well-being while—

(a) sustaining the potential of natural resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of the environment; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

(3) In order to achieve the purpose, decision-makers must—

(a) take into account decision-making criteria specified in relation to particular decisions; and

(b) apply the information principles to the development of regulations and the consideration of applications for marine consent.”
4.2 Information Principles

28. Section 61 of the EEZ Act sets out my obligations to request and analyse information from the applicant and obtain advice for marine consents.

“61 Information principles

(1) When considering an application for a marine consent, the Marine Consent Authority must—

(a) make full use of its powers to request information from the applicant, obtain advice, and commission a review or a report; and

(b) base decisions on the best available information; and

(c) take into account any uncertainty or inadequacy in the information available.

(2) If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the Marine Consent Authority must favour caution and environmental protection.

(3) If favouring caution and environmental protection means that an activity is likely to be refused, the Marine Consent Authority must first consider whether taking an adaptive management approach would allow the activity to be undertaken.

(4) Subsection (3) does not limit section 63 or 64.

(5) In this section, best available information means the best information that, in the particular circumstances, is available without unreasonable cost, effort, or time.”

29. I consider the information sought and provided was commensurate to the scale, intensity and duration of the effects of the proposed activities and was sufficient for the purpose of determining this application.

4.2.1 Full Use of Powers

30. I am required to make full use of my powers to seek out information, base my decision on the best available information and consider any uncertainty or inadequacy in the information available. The concept of best available information is defined by the EEZ Act. It means the best information that, in the circumstances, is available without unreasonable cost, effort, or time.

31. In addition to the information lodged with the application, the EPA requested other information from Tamarind during the assessment period. The request covered the matters discussed in Section 3.1 of this decision report.

32. I am satisfied I have made full use of my powers to request and access information and I consider I have met my responsibilities under sections 61(1)(a) of the EEZ Act.
4.2.2 Best Available Information

33. It is important to note that best available information is not necessarily ‘all information’. Rather, under sections 61 it is “the best information that in the particular circumstances, is available without unreasonable cost, effort or time”. I have relied on the parties to put the best available information before me and have sought additional advice where necessary. I have exercised my judgment about what information is the best available information for this application, having regard to issues of cost, effort and time.

34. I have had the benefit of:
   a. The application by Tamarind and the IA,

35. Based on the above, I am satisfied that I have been able to make my decision based on the best available information in accordance with sections 61(1)(b) of the EEZ Act.

4.2.3 Certainty and caution

36. Sections 61(2) of the EEZ Act require me firstly to consider whether the information put before me is uncertain or inadequate. If I consider that it is uncertain, then the same section requires me to favour caution and environmental protection in making my decision.

37. In deciding to grant consent, I consider that the consent conditions reflect the appropriate degree of caution. In making that judgment, I have followed sections 61(2) of the EEZ Act by favouring caution and applying environmental protection to the extent I consider necessary.

38. There is no requirement on me, as the decision maker, to apply a precautionary approach. When faced with uncertainty I am required to favour caution. I have done that. The consent holder will have to conduct the operation in such a way that it avoids adverse effects, remedies adverse effects, or mitigates them. I have imposed conditions which manage the potential for effects on the environment in these ways.

39. Section 61(2) of the EEZ Act requires me to favour environmental protection in addition to caution if the information I receive is uncertain or inadequate. I have done so.

40. My decision acknowledges that there will be negligible effects related to the activities. I recognise that the effects will be short-term and will not be permanent.

4.3 Decision Making

41. Section 59(2A) of the EEZ Act sets out matters which I must take into account. Underlying my consideration of those matters, sections 61 of the EEZ Act set out the need for me to base my decisions on the best available information. Where information is inadequate or uncertain, I must favour caution and environmental protection. The matters covered by sections 59 to 61 of the EEZ Act are the basis of my analysis as detailed in Section 6 of my decision.
42. Sections 59(2A) of the EEZ Act set out matters I “must take into account”, and section 59(3) of the EEZ Act states I “must have regard to” any submissions or evidence given to me, any advice or reports I have sought, and any advice from the Maori Advisory Committee.

43. Submission are not applicable to non-notified applications and the only advice sought was further information from the applicant. No advice was sought from the Maori Advisory Committee.

44. The EEZ Act establishes no hierarchy in the matters that must be taken into account and those that I must have regard to under section 59 of the EEZ Act. The importance of all of the matters listed in all of the subsections depends on the specifics of the proposed activities.

5. Activities Subject to EEZ Act Authorisation

5.1 Marine Discharge Consent

45. Details of the activities for which Tamarind is applying for authorisation under section 20B of the EEZ Act are set out in Table 2.

Table 2: Marine Consent Requirements

<table>
<thead>
<tr>
<th>Section of Act</th>
<th>Applicable Activity</th>
</tr>
</thead>
</table>
| Section 20B(1) No person may discharge a harmful substance from a structure or from a submarine pipeline into the sea or into or onto the seabed of the exclusive economic zone. | • Discharge of residual biocide from under four (4) well debris caps.  
• Discharge of acetic acid in produced water from the FPSO Umuroa. |
6. Assessment

46. The EPA’s experts have provided me with an Evaluation Report which contains:
   a. An assessment of the application in which the effects of the discharges of harmful substances were considered in relation to all of the matters I must take into account listed under section 59 of the EEZ Act. The Evaluation Report provided a recommendation to grant the application subject to conditions.
   b. An Environmental Risk Assessment (ERA) which characterises the environmental risk associated with the discharge of harmful substances.

47. I have considered the advice in the EPA’s Evaluation Report in my consideration of the application. Appendix 1 of this decision details the EPA expert’s evaluation of the application against all the matters under section 59(2A) of the EEZ Act. I have reviewed this assessment and accept it as the basis of my assessment and decision on the application. The sections below only discuss matters that I consider warrant further discussion in relation to Tamarind’s application.

6.1 Description of the Physical Environment

48. The proposed discharge activities are part of a proposal by Tamarind to undertake sidetrack drilling in the Tui Field. Other activities associated with the sidetrack drilling are already consented under EEZ100016 and EEZ300006.

49. In its impact assessment, Tamarind state that the proposed discharge activities will be undertaken after or concurrently with the activities consented under EEZ100016 and EEZ300006. I consider these activities form part of the existing environment against which I assess the effects of the proposed discharges.

50. The discharge of the Hydrosure will take place after the drill rig and its anchors have been installed and prior to the sidetrack drilling at each well. The areas surrounding the wells are likely to be subject to increased levels of sedimentation due to the installation activities.

51. The discharge of acetic acid will occur in four (4) discrete events from the FPSO. The FPSO has been discharging produced water since 2007, but recent monitoring by Tamarind in 2018 states all contaminants in the receiving water are below ANZECC guidelines. This suggests the water quality surrounding the FPSO is reasonably high.
6.2 Section 59(2A)(a)

Section 59(2)(a) and (b) matters

Effects on marine ecology

52. When considering whether to grant or refuse this application, I must, under section 59(2)(a) of the EEZ Act, take into account any effects on the environment or existing interests including cumulative effects and effects in the waters above or beyond the continental shelf beyond the outer limits of the exclusive economic zone.

53. The ERA characterised the environmental risk to marine organisms (from a single instance of a discharge) and informs the section 59(2A) staff assessment of the effects on the environment and existing interests on which I based this decision. The ERA characterised the risk of both the discharge of Hydrosure and acetic acid as negligible and provided estimates of the area of effects expected from the discharges. The section 59(2A) staff assessment considered the effects of the discharges on all of the marine species and biological communities expected to be found in the area of effects of both discharges. The marine species and biological communities were identified by Tamarind in section 4 of the IA and I agree with the section 59(2A) staff assessment consider these to be a comprehensive description of the biological environment.

54. The section 59(2A) staff assessment identified both discharges to have negligible effects on all aspects of the biological environment primarily due to the short-duration of the discharges and rapid dilution in the surrounding environment. The exception is for the effects of acetic acid on plankton communities, which was assessed as up to minor due to the sensitivity of the plankton communities to the discharge and the repeated nature of the discharges.

55. The concentration of acetic acid that will be discharged in the produced water could be up to 6 times the LC50 of planktonic organisms present in the area of effects. I understand this concentration will become more dilute with distance from the FPSO. I consider this discharge may kill any planktonic individuals on a local scale within the area of effects and this will continue for the duration of the discharge. However, I note these planktonic organisms are prolific in the Tui Field and wider Taranaki region and the area of effects occupies an extremely small part of the Tui Field.

56. I agree with this assessment and I consider the conditions imposed on the volumes and duration discharge of acetic acid is sufficient to mitigate the scale, duration and intensity of any adverse effects on planktonic communities arising from exposure to the discharge near the FPSO.

Cumulative effects

57. The section 59(2A) staff assessment took into account effects of other consented activities that will be occurring concurrently with the proposed discharge activities when assessing the effects of the discharges. As discussed under section 6.1 of this report, the existing environment differs between

---

2 Section 4.3.1 of the IA.
the discharges of Hydrosure and acetic acid as both discharges are spatially and temporally separate. This required separate considerations of cumulative effects.

58. I agree with the section 59(2A) staff assessment of cumulative effects of the discharge of Hydrosure which concluded:

a. Hydrosure will be discharged in environments where the effects of other activities in the area include the effects from sidetrack drilling preparation activities, this includes pre-placing the four (4) rig anchors and installing the BOP (also with anchors). The anchors and chains will cause disturbance of the seabed that will likely result in re-suspended sediments which may smother nearby benthic organisms.

b. The area of effects of the discharge of Hydrosure from each well is very limited (approximately 1 x 1 x 1.6 m around each well). The area of effects from the discharges are within the area of disturbance of the preparation activities. This means any benthic organisms within the area of effects of the discharge that have survived being smothered may be adversely affected.

c. The discharges are unlikely to be at a concentration beyond LC50 for marine species even within the area of effects, and are of sufficiently short duration as to not have ongoing effects that would impair the ability of smothered benthic organisms to recover from existing disturbance activities.

d. Overall the cumulative effects of Hydrosure are negligible.

59. I agree with the section 59(2A) staff assessment of cumulative effects of the discharge of acetic acid which concluded:

a. Acetic acid will be discharged in an environment where the effects of other activities in the area include 12 years of produced water discharges from the FPSO. The ERA considers the risk of a single discharge of acetic acid to be negligible if done in isolation. In reality, the acetic acid is discharged repeatedly in produced water that already contains various concentrations other harmful substances consented under EEZ300006.

b. EPA ecotoxicology staff suggest that precisely quantifying the effects of acetic acid in combination with the existing harmful substances is difficult due to the complex nature of interactions. The combined effects could be appropriately considered by turning my mind to:

i. The risk quotient in relation to the risk quotients of the existing discharges. The ERA determined the risk of the discharge of acetic acid to be negligible. The ERA undertaken for EEZ300006 determined the risk of all eight (8) consented discharges in the produced water to be at most "very low". I agree with the section 59(2A) staff assessment that the addition of another substance that poses negligible risk to the produced water discharge stream is unlikely to result in significant cumulative effects on the receiving environment.

ii. The duration of the proposed discharge and whether the effects of the proposed discharge would persist in the environment after the discharge ceases. The ERA states the

3 Appendix 5 of the ERA.
discharges of acetic acid are short lived (less than 10 days per event) and are non-bioaccumulative and will be almost completely degraded between discharge events.

c. Overall the cumulative effects of acetic acid are negligible.

**Effects on existing interests**

60. Existing interests are defined under section 4 of the EEZ Act as a person that has an interest in:

(a) any lawfully established existing activity, whether or not authorised by or under any Act or regulations, including rights of access, navigation, and fishing:

(b) any activity that may be undertaken under the authority of an existing marine consent granted under section 62:

(c) any activity that may be undertaken under the authority of an existing resource consent granted under the Resource Management Act 1991:

(d) the settlement of a historical claim under the Treaty of Waitangi Act 1975:

(e) the settlement of a contemporary claim under the Treaty of Waitangi as provided for in an Act, including the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992:

(f) a protected customary right or customary marine title recognised under the Marine and Coastal Area (Takutai Moana) Act 2011

61. I do not consider any existing interests will be affected by the proposed discharge activities because:

a. Lawfully established users of the wider area are identified by Tamarind as commercial fishers and maritime users however the proposed discharge activities will not impose a barrier to navigation or fishing in the area and the areas where the discharges take place are within the Umuroa Safety Zone that excludes passage from the area under the Continental Shelf (Umuroa Installation Safety Zone) Regulations 2008.

b. The activities will not have an effect on any activity that may be undertaken under the authority of an existing resource consent granted under the Resource Management Act 1991 due to the distance from Coastal Marine Area.

c. Advice from Kaupapa Kura Taiao did not identify any persons that may be affected by the application with an interest in either:

   i. the settlement of a historical claim under the Treaty of Waitangi Act 1975, or

   ii. the settlement of a contemporary claim under the Treaty of Waitangi as provided for in an Act, including the Treaty of Waitangi (Fisheries Claims) Settlement Act 1992, or

   iii. a protected customary right or customary marine title recognised under the Marine and Coastal Area (Takutai Moana) Act 2011.

---

4 Section E.4.1 of the IA.
Section 59(2)(d) and (e) matters

Effects on biological diversity and the integrity of marine species and ecosystems, and rare and vulnerable ecosystems, and the habitats of threatened species

62. When considering whether to grant or refuse this application, I must, under section 59(2)(d) and (e) of the EEZ Act, take into account the importance of:
   a. Protecting biological diversity and the integrity of marine species and ecosystems, and
   b. Protecting rare and vulnerable ecosystems, and the habitats of threatened species.

63. Both of these matters were addressed in the IA by Tamarind and considered in the section 59(2A) staff assessment. I agree with both assessments that any effects from these discharge activities are not likely to have population or ecosystem level effects for any marine species.

64. I also note that there may be transient marine mammal species and threatened seabirds present in the wider region\(^5\), however, I agree with the section 59(2A) staff assessment that these are unlikely to be located near the discharges, nor are the discharges at a duration, scale, or intensity that would pose a risk to these organisms, or their habitats.

65. Overall, I consider the effects on biological diversity and the integrity of marine species and ecosystems, and rare and vulnerable ecosystems, and the habitats of threatened species to be negligible.

Section 59(2)(j)

The extent to which imposing conditions under section 63 might avoid, remedy, or mitigate the adverse effects of the activity

66. When considering whether to grant or refuse this application, I must, under section 59(2)(j) of the EEZ Act, take into account the extent to which imposing conditions might avoid, remedy, or mitigate the adverse effects of the activity.

67. I have imposed conditions to mitigate the adverse effects of the discharge of acetic acid by limiting Tamarind to the discharge volumes and durations specified in its application. Specifically, the conditions:
   a. Limited the volume of discharge of acetic acid per event
   b. Limit the duration of each discharge event
   c. Limit the frequency of discharge events, and
   d. Require reporting from Tamarind on dosage parameters.

68. I have turned my mind to the extent to which conditions might avoid, remedy, or mitigate the adverse effects of the discharge of Hydrosure. Based on the assessment in the ERA and the section 59(2A)

---

\(^5\) Sections 4.3.7 and 4.3.8 of the IA.
staff assessment, I do not consider that imposing conditions that limited the volumes, duration or frequency of these discharges would avoid, remedy, or mitigate any adverse effects. I reached this conclusion because:

a. Tamarind cannot control the dosing or duration of this discharge
b. Tamarind cannot practically contain this discharge without unreasonable cost, time, or effort, and
c. The predicted adverse effects for these discharges are expected to be negligible. Any conditions imposed on Tamarind to limit this discharge would not be commensurate to the scale, duration, or intensity of these effects.

6.3 Section 59(2A)(b)

Effects on human health

69. When considering whether to grant or refuse this application, I must, under section 59(2A)(b) of the EEZ Act, take into account the effects on human health of the discharge of harmful substances if consent is granted. The ERA concluded both Hydrosure and acetic acid are non-persistent and non-bioaccumulative. The section 59(2A) staff assessment considers the substances would not accumulate in the tissues of organisms that may be harvested for human consumption nor would these discharge pose a direct risk to humans given the distance of the discharge locations from any recreational activities.

70. I agree with this assessment and consider the effects of on human health of the discharges of Hydrosure and acetic acid to be negligible.

7. Duration of consent

71. Section 73 of the EEZ Act sets out the matters relevant to determining the duration of the consent. It states:

“(1A) The duration of a marine discharge consent or a marine dumping consent is---

(a) The term specified in the consent, which must not be more than 35 years; or

(b) If no term is specified, 5 years after the date of the granting of the consent.

(2) When determining the duration of a consent, the EPA must---

(a) comply with sections 59 and 61; and

(b) take into account the duration sought by the applicant; and

(c) take into account the duration of any other legislative authorisations granted or required for the activity that is the subject of the application for consent.”
72. Pursuant to section 73(2)(b) of the EEZ Act, in determining the duration of the consent, I must take into account the duration sought by Tamarind. Tamarind has sought a duration of 5 years.

73. Tamarind has a marine consent until 2024 to undertake the sidetrack development drilling activities consented under EEZ100016, and have a marine discharge consent until 2025 for the discharge of produced water from the FPSO Umuroa.

74. The duration sought by Tamarind aligns with its duration granted under EEZ100016, I consider it appropriate in the circumstances to grant consent for 5 years.

75. I have determined that this marine discharge consent shall expire on 19 March 2024.

8. Conclusion

76. Pursuant to my delegated authority, the application by Tamarind Taranaki Limited for a marine discharge consent is GRANTED, subject to conditions listed in Schedule 2 on the basis that:

   a. All relevant matters under sections 59(2A) to 63 of the EEZ Act have been taken into account and that, in summary, I find:
      i. The potential adverse effects on the environment will be negligible
      ii. The potential adverse effects on existing interests will be negligible
      iii. Potential cumulative effects will be negligible, and
      iv. The potential effects on human health will be negligible.

   b. Granting the application meets the purpose of the EEZ Act, and

   c. The conditions imposed in Schedule 2 of this decision will ensure that any adverse effects of the activity authorised by this consent are appropriately avoided, remedied, or mitigated.
Appendix 1 – Staff assessment of the application against the matters under section 59(2A) of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012
Assessment against the relevant matters under section 59(2A) of the EEZ Act

<table>
<thead>
<tr>
<th>Information taken into account under section 59 of the EEZ Act</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 59(2)(a)(i) any effects on the environment or existing interests of allowing the activity including cumulative effects</td>
<td>Sections 59(2)(a)(i) and (ii) require the Decision Maker to take into account effects on the environment. A full understanding of all effects requires a clear understanding of the existing environment in which the proposed discharge activities will take place.</td>
</tr>
</tbody>
</table>

The existing environment

The proposed discharge activities are part of a proposal by Tamarind to undertake sidetrack drilling in the Tui Field. The other activities associated with the sidetrack drilling are already consented under EEZ100016 and EEZ300006.

In its impact assessment, Tamarind state that the proposed discharge activities will be undertaken after or concurrently with the activities consented under EEZ100016 and EEZ300006. I consider these activities form part of the existing environment against which I assess the effects of the proposed discharges. In the following paragraphs I describe the sidetrack development drilling programme in an attempt to illustrate the existing environment at the time and place that each of the proposed discharges will take place. This enables me to undertake a bespoke assessment of each proposed discharge on their respective existing environments.

Description of the sidetrack drilling programme

Tamarind currently have five (5) wells flowing back to the FPSO in the Tui Field. Tamarind intend to sidetrack from up to four (4) of these wells to access additional reservoir fluids in Tui Field. Sidetracking is the process of entering an existing well and drilling horizontally through the well casing to access additional reservoir fluids without having to drill a new well. Once completed, the fluid in the sidetracked well will join the production stream of the original well and flow up to the FPSO for oil-water separation and processing.

Tamarind may prepare the wells prior to the drill rig arriving. This involves:

---

6 “Existing interests” is defined in section 4 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012.
1. Pre-placing rig anchors on the seabed

Tamarind have contracted a semi-submersible rig. This rig is attached to the seabed by an array of up to four (4) preplaced anchors that are dragged into position. Each anchor has a length of anchor chain that sweeps the seabed for the duration of the placement.

2. Pre-placing blow-out preventer anchors on the seabed

Tamarind will also pre-place four (4) anchors on the seabed to support the blow-out preventer (BOP) that will be placed over each top well connection. A BOP is a piece of equipment with a series of shut-in valves that prevents the uncontrolled flow of fluids from within the well once the drilling operations begin. The BOP is held in place by four (4) anchors placed approximately 25 m from the wellhead.

The placement of the BOP occurs after the rig has been placed and connected to its anchor array.

These preparation activities may take place up to 3 months prior to the rig arriving.

To undertake the drilling, Tamarind must first contract a drill rig and install it over the well it intends to sidetrack by connecting it to the pre-placed anchor array. Each time the drill rig completes a sidetrack drilling operation it is removed and installed over the next well location. This means the rig could be installed and removed up to four (4) times.

Once the rig is installed over a well, Tamarind must remove the well debris caps to attach the BOP to the top connection of the well. Well debris caps are non-pressurised caps that sit over the top well connection and prevent the connection from corrosion or mechanical damage. Removal of these caps does not compromise the integrity of the well nor does it risk the uncontrolled flow of fluids from within the well.

After the well debris cap is removed, Tamarind will place a BOP atop the well connector. Tamarind can then enter the well through the BOP and begin drilling through the well casing toward the target reservoir. The drilling process leaves fine particulates inside the sidetrack well which are then carried with the production fluids in the first flowback to the FPSO. These fine particulates are called ‘rock flour’. After each sidetrack well is completed, the well is sequentially added to the production stream from the reservoir to the FPSO until all four (4) wells are flowing back to the FPSO.
When the production fluids from the new side-tracked wells are first flowed back to the FPSO some of this rock flour will be entrained in the production fluids. The presence of this material within the production fluids will potentially result in the formation of strong oil-in-water emulsions, which need to be broken down to allow effective separation on board the FPSO of the oil and water phases and removal of any particulate matter.

After the water and oil are separated the oil is stored on board the FPSO then offloaded to a tanker for transport. The water (now termed ‘produced water’) is discharged from the FPSO. Tamarind have been discharging produced water from the FPSO since 2007. This discharge is consented under EEZ300006.

The proposed discharges in the current application are:

1. A biocide (Hydrosure) held under each of the well debris caps. This will be discharged into the environment when the well debris caps are removed and will take place in an environment disturbed by the placed drill rig, and

2. For acetic acid which will be added to the production fluid before it enters the oil and water separator. Acetic acid aids the separation of the oil, water, and particulates. It dissolves in the water phase so will be discharged in the produced water from the FPSO. This will be taking place in an environment already subject to 12 years of produced water discharges.

**Cumulative effects**

I consider the cumulative effects of the discharges of both Hydrosure and acetic acid to be **negligible** on the environment and existing interests.

The EEZ Act does not provide a specific definition of cumulative effects. However, section 6(d) of the EEZ Act defines an effect as including any cumulative effect “that arises over time or in combination with other effects”.

I have used this definition to guide my interpretation of cumulative effects.

**Hydrosure**

Hydrosure is highly ecotoxic to the aquatic environment – particularly algae (9.1A)\(^8\). Hydrosure is a biocide that is non-bioaccumulative and is readily biodegradable. Hydrosure will not persist in the receiving environment (100% degradability over 28 days), nor will it accumulate in the tissues of organisms that have been exposed to the discharge. Based on this

---

\(8\) Appendix 4 of the ERA.
information I do not consider any effects to arise over time from any of the discrete discharges of this substance at each well.

Other effects in the area include the effects from the other sidetrack preparation activities, this includes pre-placing the four (4) rig anchors and installing the BOP (also with anchors). The anchors and chains will cause disturbance of the seabed that will likely result in re-suspended sediments which may smother nearby benthic organisms\(^9\). The Board of Inquiry that determined EEZ100016 heard that these organisms are likely to recover with 5-10 years after the rig is removed\(^10\). The area of effects of the discharge of Hydrosure from each well is very limited (approximately 1 x 1 x 1.6 m around each well)\(^11\). The area of effects from the discharges are within the area of disturbance of the preparation activities. This means any benthic organisms within the area of effects of the discharge that have survived being smothered may be adversely affected.

I consider the discharges are unlikely to be at a concentration beyond LC50 for marine species even within the area of effects\(^12\), and of sufficiently short duration as to not have ongoing effects that would impair the ability of smothered benthic organisms to recover from existing disturbance activities.

Overall I consider the cumulative effects of Hydrosure to be **negligible**.

### Acetic acid

Other effects in the area of effects of acetic acid include the 12 years of produced water discharges from the FPSO. The ERA considers the risk of a single discharge of acetic acid to be negligible if done in isolation. In reality, the acetic acid is discharged repeatedly in produced water that already contains various concentrations other harmful substances consented under EEZ300006. Advice from EPA ecotoxicology staff suggests that precisely quantifying the effects of acetic acid in combination with the existing harmful substances is difficult due to the complex nature of the chemical interactions. EPA ecotoxicology staff suggest appropriate considerations of cumulative effects would include:

1. An assessment of the risk quotient of the proposed harmful substances in relation to the risk quotients of harmful substances that form the existing discharges. This approach would provide an

---

\(^9\) Page 20 Decision on Marine Consent and Marine Discharge Consent Applications EEZ100016.

\(^10\) Further information received on the EEZ100016 application, July 2018.

\(^11\) Appendix 5 of the ERA.

\(^12\) Ibid.
indicating the change in the risk to the environment by both discharges, in lieu of quantifying any combined effects.

2. The duration of the proposed discharge and whether the effects of proposed discharge would persist in the environment after the proposed discharge ceases.

The risk quotient of all eight (8) harmful substances consented under EEZ300006 is <1 (i.e., negligible), except for one substance which is characterised as 10.75 (i.e., very low). The risk quotient of acetic acid is <1 (i.e., negligible). I consider the addition of another substance that poses negligible risk to the produced water discharge stream is unlikely to result in significant cumulative effects on the receiving environment.

Acetic acid has relatively low ecotoxicity, it is harmful to the aquatic environment (9.1D) and is on the PLONOR list\(^\text{13}\). Acetic acid will be discharged in four (4) discrete events, with each discharge event lasting up to 10 days. Acetic acid is non-bioaccumulative and is readily biodegradable (>70% over 28 days). The discharge events are likely to take place 40 days apart, over which time the acetic acid will have dispersed to undetectable levels and likely completely degraded\(^\text{14}\). Based on this information I do not consider any effects to arise over time from any of the discrete discharges of this substance from the FPSO.

Based on the information above, I do not consider any cumulative effects would arise over time from multiple discharges of acetic acid or in combination with other effects.

Overall I consider the cumulative effects of acetic acid to be negligible.

In addition, I do not consider there will be any cumulative effects due to overlap in areas of effect of Hydrosure and acetic acid. The discharges will occur at different locations at different times (likely days apart) with no expected overlap in the areas of effects\(^\text{15}\). Therefore, I do not consider that any cumulative effects will arise should both discharges of Hydrosure and acetic acid be granted.

<table>
<thead>
<tr>
<th>Section 59(2)(a)(ii) any effects on the environment or existing interests of allowing the activity including effects that</th>
<th>Effects on the environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamarind describe existing environment in section 4 of the Impact Assessment (IA), including the:</td>
<td></td>
</tr>
</tbody>
</table>

\(^{13}\) OSPAR list of substances that Poses Little or No Risk to the environment.

\(^{14}\) Appendix 4 of the Environmental Risk Assessment for chemicals in application EEZ300010.

\(^{15}\) Appendix 5 to the Environmental Risk Assessment for chemicals in application EEZ300010.
may occur in New Zealand\textsuperscript{16} or in the waters above or beyond the continental shelf beyond the outer limits of the exclusive economic zone

1. Physical environment
2. Biological environment, and
3. Socio-Economic and Cultural Environment

As discussed under my consideration of section 59(2)(a)(i), I consider the existing environment to include ongoing activities associated with the sidetrack development drilling programme.

Tamarind describe its impact assessment methodology in section 5 that it uses to determine the scale and significance of effects of the discharge activities on environmental receptors (i.e., features of the physical, biological, or socio-economic/cultural environment).

Tamarind take a staged approached to its impact assessment methodology.

First, Tamarind undertake a “scoping assessment” that is akin to a coarse likelihood and significance assessment of potential impacts of the discharge activities on the receptors.

If Tamarind determine a receptor to have “no interaction”\textsuperscript{17} with the discharge activities it is removed from further assessment. Tamarind list the excluded receptors as:

1. Marine reptiles, and
2. Human health.

I note that Tamarind address the effects of human health regardless under section 6.2.5 of the IA, as this is a requirement under section 39(2)(a) of the EEZ Act.

Secondly, the remaining receptors are assessed based on their sensitivity to the discharge and the magnitude of the impact.

I consider this methodology of assessing the impacts of the proposed discharges is sufficient to describe the risk posed to the receptors in this application, albeit unnecessarily complicated.

**The physical environment**

The proposed activities are located within the Tui Field (PMP 38158), which has a total area of 467.2 km\textsuperscript{2}. The Tui Field is located approximately 50 km

\textsuperscript{16} New Zealand is defined in section 29 of the Interpretation Act (1999) as “the islands and territories within the Realm of New Zealand”

\textsuperscript{17} On page 68 of the IA Tamarind define “no interaction” as where the discharges are unlikely to interact with the existing environment or interests (e.g. lighting on the drilling rig is unlikely to have any interaction with benthic species)
offshore Taranaki between depths of 100 m to 120 m. The seabed is comprised mostly of soft sediment, predominantly low-relief silt and clay (c. 80%), and very fine/fine sand. Tamarind have been producing from its five (5) wells in the Tui Field since 2007. Each well is connected to the FPSO which has been discharging produced water since its placement in 2007 (consented under EEZ300006).

1. Water quality

**Hydrosure**

Information provided during the hearing for EEZ100016 states that removal of the well debris caps will occur after the drill rig has been installed over each well\(^\text{18}\). The Board of Inquiry that decided on application EEZ100016 noted that the placement and removal of the drill rig is likely to disturb sediments, resulting in finer-grained sediments becoming temporarily suspended in the water column adversely affecting water quality at the well sites. The suspended sediment may affect the area around the well caps where Hydrosure will be released, however, the Board considered any effects of the sedimentation would be short-lived and will have negligible impacts on biotic receptors.

I consider the effects of the discharge of Hydrosure from the wells is of such a limited scale as to be practically undetectable in the receiving water other than for a few brief moments after release.

I consider the effects of the discharge of Hydrosure and acetic acid on water quality to be temporary, geographically limited, and overall negligible.

**Acetic acid**

Tamarind state it has been undertaking water quality and sediment quality sampling since 2012 in the Tui Field, between 300 m and 6,000 m from the FPSO.

Previous sampling has revealed exceedances of ANZECC (2000) ISQG-Low criteria. The latest results (2018) suggest that all metals, metalloids and polycyclic aromatic hydrocarbon concentrations were below ANZECC (2000) ISQG-Low criteria at all sites and other contaminants, in most cases, were below laboratory detection limits. These result suggests the current state of the receiving water quality near FPSO (300 m to 6,0000 m) is reasonably high. The water quality within 300 m of the FPSO is not monitored but may exceed ANZECC thresholds as concentrations of harmful substances increase with proximity to the discharge point. The

---

\(^{18}\) Chapter 5 of the Decision on application EEZ100016
effects of the discharge of acetic acid are likely to be limited to within 300 m from the FPSO.

I consider that any effects on water quality will be short lived given the ready biodegradability of acetic acid. I also consider the short-term duration of the discharge, high dilution rate, small area of effects, and negligible environmental risk\(^{19}\) of the discharge amount to a **negligible** effect on water quality, after all four (4) discharge events.

2. Sediment chemistry

In general, there is potential for some harmful substances to accumulate in marine sediments if they are not readily biodegradable. Sediment contamination is known to have significant impacts on benthic community composition.

I consider that both Hydrosure and acetic acid are highly unlikely to accumulate in sediments as both substances are readily biodegradable (i.e. degrade >70% over the course of 28 days)\(^{20}\), and non-bioaccumulative (i.e. will not accumulate in the tissues of organisms within or on the benthos).

I consider the effects on sediment chemistry to be **negligible**.

The biological environment

1. Fish

Tamarind have collected data on fish species from ROV surveys near the wellheads\(^{21}\). The surveys suggest a relatively low abundance of pelagic and demersal fish species. MacDiarmid (2018) determined that there are 10 fish species have a more than 50% probability of occurring in the AOI including barracouta, carpet shark, cucumberfish, gurnard, john dory, scaly gurnard, school shark, spiny dogfish, silver warehou and terakihi.

Those species with a 10-50% probability of occurring within the AOI include frostfish, hapuka, Murphy's mackerel, leather jacket, ling, lemon sole, porcupine fish, redbait, red cod, rig, silver dory, silverside, snapper, sea perch and witch. Tamarind state none of these species are listed in the New Zealand Threat Classification System Listing as being in gradual decline or sparse\(^{22}\).

---

\(^{19}\) Environmental Risk Assessment for chemicals in application EEZ300010.

\(^{20}\) Appendix 3 of the ERA

\(^{21}\) These ROV surveys were not for the purpose of observing fish.

\(^{22}\) Section 4.3.4 of the IA
Tamarind state that fish may be exposed to Hydrosure but it will be very short-term and in low concentrations. I agree with Tamarind’s conclusion that the effects of Hydrosure on fish will be negligible.

Tamarind state that fish may also be exposed to acetic acid discharged in the produced water from the FPSO. This discharge will cover a wider area, but will rapidly dilute to below EC50 values for fish\textsuperscript{23}. I agree with Tamarind that the discharge is temporary and fish have the ability to manoeuvre away from the area of effects. I consider these effects are likely to only affect individuals and will have no population level effects on exposed fish species and that the overall effects on fish are negligible.

2. Marine mammals

Tamarind state that 40 species of marine mammals have been reported in the greater Taranaki region and that fur seals are the marine mammals most likely to be affected by the discharges. Tamarind conclude that effects on fur seals and any other marine mammals will be negligible due to the transient/mobile nature of these organisms and the temporary and highly dilute nature of the discharges\textsuperscript{24}.

I agree with Tamarind’s conclusion and consider there is very unlikely to be any short-term or long-term effects on these highly mobile species.

3. Seabirds

Tamarind state that 11 ‘threatened’ species and 25 ‘at risk’ species of seabird are likely to occur in the Tui Field. Seabirds will not be affected by the discharges of Hydrosure given it is discharged at a depth of 100 m – 120 m under the sea surface. Seabirds may be exposed to short-term, low concentrations of acetic acid as it will be discharged near the sea surface. As the discharge events are of short duration and separated by a minimum of 40 days, I consider the likelihood of any potential effect to be rare and the overall effects on seabirds to be negligible.

4. Planktonic communities

Tamarind acknowledge there is potential for planktonic organisms (phytoplankton and zooplankton) to be adversely affected by the discharges if they are directly exposed to either acetic acid or Hydrosure\textsuperscript{25}. Tamarind state any effects will be localised to the point of discharge.

\textsuperscript{23} Appendix 5 of the ERA
\textsuperscript{24} Section 6.2.1 of the IA
\textsuperscript{25} Section 6.2.2 of the IA.
Tamarind suggest that the effects will be negligible for Hydrosure and minor for acetic acid, and will not result in community level effects.

I agree with Tamarind’s assessment and note that both Hydrosure and acetic acid are non-bioaccumulative, therefore, there is no risk of biomagnification of the substances throughout the food web to high trophic organisms via consumption of contaminated plankton.

Short-term impacts on plankton may be observed during the discharge of acetic acid, estimates on the sensitivity of marine algae to acetic acid vary substantially. Tamarind have assessed the effects of acetic acid on a freshwater alga and used a conservative conversion factor to estimate the LC50 in marine algae species. The estimate Tamarind used is more conservative than any of the data on marine algae present on the PubChem database or the NZEPA database for marine algae. Therefore, I consider Tamarind’s conclusion is appropriate for this assessment (effects of acetic acid discharge on plankton are minor).

I conclude the effects on planktonic communities will be **negligible** for Hydrosure and **minor** for acetic acid.

5. **Benthic communities**

I do not consider the discharge of acetic acid poses any risk to benthic communities as it will likely dilute to below EC50 value before reaching the seabed.

The discharge of Hydrosure is likely to impact benthic organisms living adjacent to or on the wellhead. Tamarind state the discharge of Hydrosure is in very small quantities, is non-bioaccumulative and readily biodegradable so any effects on benthic communities will be negligible. I agree with this assessment and consider any effects will likely be limited to a handful of individuals on or immediately surrounding (>1 m) the wellhead. Overall, I consider the effects on benthic communities will be **negligible**.

**Existing interests**

1. **Fisheries interests**

Tamarind state that it considers effects on water quality and marine fauna (including fish) to be negligible and, with the 500 m exclusion area
surrounding the FPSO, it considers any effects on fisheries to be negligible.

I agree that the effects on fisheries are likely to be negligible. However, I note the 500 m exclusion zone would not prevent commercially fished species being exposed to the discharges, nor would it prevent these species from being caught outside of 500 m from the FPSO and the wellheads.

2. Human health

Tamarind consider the potential impact on human health to be negligible as the discharges are occurring at substantial distances from shore and will occur in areas that are excluded from vessel traffic.

I agree that the effects on human health are likely to be negligible. I also note that both substances are non-bioaccumulative so will not accumulate in the tissues of exposed organisms that may be harvested for human consumption.

Tamarind intend to exercise some of the activities consented under EEZ100016 concurrently with the discharges proposed in this application. I have taken into account the activities consented under EEZ100016 and their likely effects when I considered the effects on the environment and existing interests of the discharge activity under section 59(2)(a)(ii).

Tamarind also discuss the ongoing discharges from the FPSO Umuroa (consented under EEZ300006) and conclude the cumulative impacts of these existing discharge and the proposed discharges is negligible. I consider that the proposed discharges are unlikely to cause a substantial additional risk to the existing environmental receptors, or existing interests.

---

29 Established under the Continental Shelf (Umuroa Installation Safety Zone) Regulations 2008.
30 Section 6.2.4 of the IA.
31 Section 6.2.5 of the IA.
32 Section 8 of the IA.
Section 59(2)(b)(ii) the effects on the environment or existing interests of other activities undertaken in the area covered by the application or in its vicinity including effects that may occur in New Zealand or in the waters or beyond the continental shelf beyond the outer limits of the exclusive economic zone  
No other activities have been identified as occurring in the area affected by the discharges other than those covered under section 59(2)(b)(i).

<table>
<thead>
<tr>
<th>Section 59(2)(d) the importance of protecting the biological diversity and integrity of marine species, ecosystems and processes</th>
<th>I have considered the effects of the activities on the receiving biological environment and, more generally, the ecosystems and processes in the area. I consider than any effects on the biological diversity and integrity of marine species, ecosystems and processes will be <strong>negligible</strong>.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Section 59(2)(e) the importance of protecting rare and vulnerable ecosystems and the habitats of threatened species</th>
<th>I have considered the presence of rare and vulnerable flora and fauna in the areas affected by the discharges. I acknowledge there may be transient marine mammal species and threatened seabirds present in the wider region. I consider the effects of the proposed discharges will impact a very small part of the natural habitat range for these species, and the overall effects on rare and vulnerable ecosystems and the habitats of threatened species are <strong>negligible</strong>.</th>
</tr>
</thead>
</table>

| Section 59(2)(f) the economic benefit to New Zealand of allowing the application | The proposed discharges are a direct result of Tamarind exercising its consent to undertake sidetrack development drilling from four (4) of its five (5) wells in the Tui Field (EEZ100016).  
The economic benefit of the sidetrack drilling activity is discussed in the decision document for EEZ100016[^33]. In summary, the Board of Inquiry found the evidence[^34] presented demonstrated a significant likelihood of economic benefit. This discharge consent enables Tamarind to undertake that sidetrack development drilling and realise those benefits. |

[^33]: Page 105 of the Board of Inquiry decision into the Tamarind Taranaki Limited development drilling applications EEZ100016  
[^34]: Statement of Expert Evidence of Fraser James Colegrave For Tamarind Taranaki Limited, 20 July 2018, Paragraph 1.5.
| Section 59(2)(g) the efficient use and development of natural resources | As stated above, the proposed discharges are a direct result of Tamarind exercising its consent to undertake sidetrack drilling from four (4) of its five (5) wells in the Tui Field (EEZ100016). |
| Section 59(2)(h) the nature and effect of other marine management regimes | The effect on human health of using harmful substances on board the FPSO Umuroa is regulated under the Health and Safety at Work Act 2015. I do not consider the nature and effect of any other marine management regimes are relevant to this activity. |
| Section 59(2)(i) best practice in relation to an industry or activity | In relation to the use of acetic acid, I understand using acids to aid the separation of oil, water, and particulate emulsions is an integral component of the production process. Tamarind state it has selected acetic acid as the least ecotoxic substance available for the use and that it will use the minimum effective dosage required. I consider this appropriate to ensure the lowest level of ecotoxic effects on the receiving environment in the circumstances and recommend the dosage parameters be captured in conditions of consent. I note that best practice internationally, in the northeast Atlantic, provides regional goals including a ‘zero discharge’ goal for oil, added process chemicals and naturally occurring substances in produced water. Zero discharge in practice means banning substances that are likely to present a risk to the marine environment. In Norway, operators are required to report to regulators regarding the progress of their zero discharge work on an annual basis. There is no parallel regulatory requirement in New Zealand but consent conditions have been imposed for operators to mitigate the effects of their discharges. |
| Section 59(2)(j) the extent to which imposing conditions under section 63 might avoid, remedy, or mitigate the adverse effects of the activity | Tamarind proffered a set of conditions in their application documents. These conditions impose reporting requirements on Tamarind in relation to the proposed discharge activities. The proffered conditions do not attempt to avoid, remedy, or mitigate the adverse effects of the discharge activities. |

35 Section 3.3 of the IA.
36 Section 63 of the EEZ Act allows the EPA to grant a marine consent on any condition that it considers appropriate to deal with adverse effects of the activity authorised by the consent on the environment or existing interests, unless the condition would be inconsistent with the EEZ Act or any regulations made under the EEZ Act, or conflicts with a measure required in relation to the activity by another marine management regime or the Health and Safety at Work Act 2015.
37 Section 9 of the IA.
Tamarind state it is not able to capture, nor measure, the discharge of Hydrosure from underneath the well caps given the depth, volume and nature of the discharge\textsuperscript{38}. Given the effects of this discharge on the environment and existing interests are likely to be negligible, and the instantaneous nature of the discharge, I do not think the effects of this activity will be effectively avoided, remedied, or mitigated by way of conditions that impose environmental monitoring or operational restrictions on this activity.

Tamarind have provided maximum dosage rates, dosage durations, and a minimum time between dosage events which their IA was based on. I consider these parameters should be captured in conditions of consent to ensure the environmental effects are limited to those described in the impact assessment.

I have reviewed the conditions of consent imposed upon Tamarind in marine discharge consent EEZ30006 and consider some conditions appropriate for the discharge of acetic acid as it is also discharged in the produced water.

<table>
<thead>
<tr>
<th>Section 59(2)(k) relevant regulations (other than EEZ policy statements)</th>
<th>I do not consider any other legislation is relevant to this decision.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 59(2)(l) any other applicable law (other than EEZ policy statements)</td>
<td>I do not consider any other law is applicable to this decision. I note that Tamarind must abide by the Health and Safety at Work Act 2015 for the handling of harmful substances aboard the FPSO.</td>
</tr>
<tr>
<td>Section 59(2)(m) any other matter the EPA considers relevant and reasonably necessary to determine the application</td>
<td>I do not consider any other matters are relevant and reasonably necessary to determine the application.</td>
</tr>
<tr>
<td>Section 59(2A)(b) the effects on human health of the discharge of harmful substances if consent is granted</td>
<td>As discussed under my consideration of 59(a)(ii), Tamarind consider the potential impact on human health to be negligible as the discharges are occurring at substantial distances from shore and will occur in areas that are excluded from vessel traffic\textsuperscript{39}. I agree that the effects on human health are likely to be negligible. I also note that both substances are non-bioaccumulative so will not accumulate</td>
</tr>
</tbody>
</table>

\textsuperscript{38} Page 93 of the IA.
\textsuperscript{39} Section 6.2.5 of the IA.
in the tissues of exposed organisms that may be harvested for human consumption.