

**BEFORE THE BOARD OF INQUIRY
TAMARIND DEVELOPMENT DRILLING APPLICATIONS**

5

EEZ100016

IN THE MATTER of the Exclusive Economic Zone and
Continental Shelf (Environmental
Effects) Act 2012

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AND

IN THE MATTER of a Board of Inquiry appointed under
s52 of the Exclusive Economic Zone and
Continental Shelf (Environmental
Effects) Act 2012 to decide on Tamarind
Taranaki Limited's marine consent and
marine discharge consent applications

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Held in the Blenheim Room at the Quality Hotel Plymouth
International (on the corner of Courtenay and
Leach Streets), New Plymouth, Wednesday 7 November 2018
commenced at 9.00 a.m. (Day 2)

25

Board Committee Members:

Mr David Hill (Chair)

Ms Glenice Paine

Dr Dan McClary

30

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[9.00 a.m.]

PRELIMINARY MATTERS

5 **CHAIR:** Good morning everybody. It's 8.58, according to that clock, it's 9 o'clock by mine, so I'm going to go by mine. We've got a couple of matters that we just want to put out there before we commence with the scheduled proceedings.

10 First things first, a mechanical issue. When you're giving evidence can you please not get too relaxed, apparently some of you yesterday were getting too relaxed. That's my fault, I should have made it far more concerned and therefore you're relaxing back from
15 the microphone and the microphones weren't picking up everything that was being said, so if you wouldn't mind maintaining a tense posture when you're talking that would be helpful. We'll do you best to make sure you remain tense.

20 And if you do have strange accents, there are a couple in the room who have strange accents, I might be one of them, a little bit more slowly please. And I'll just look for confirmation from our team on the side whether the transcription is likely to work or not, or
25 you may have some rather bizarre things attributed to you that you may regret later on.

Finer points. We had quite a conversation yesterday with respect to loss of control matters. When we reviewed it following yesterday's proceedings, it is
30 clear that we are still not clear as to precisely what the situation is with respect to that, so we would like for us to be really clear as to when you do actually end up penetrating the reservoir, what might occur that would invoke sufficient pressure that you might actually
35 invoke or might stimulate a loss of control?

I think we got several answers which seemed to take us both ways on that and we're still unclear as to how realistic this is as a possibility. And it obviously relates to all sorts of matters, some of which we'll
5 hear shortly from Dr King on. So, if we could get a clear answer on that, that would be helpful. If you need the question to be better considered than I've just given you, just let me know.

MS WALLACE: Sir, would it be helpful to perhaps get
10 Mr Peacock back?

CHAIR: I don't mind who comes back and at what stage but just so that we're clear by the end of the hearing as to exactly - we are still unclear as to whether this is something we really need to worry about or not, putting
15 it simply. We think it's not but we want to be clear about that.

MS WALLACE: Okay. We'll discuss that at the morning tea break.

CHAIR: Thank you. The second issue, and I think this is
20 probably one for you, there was a lot of talk yesterday about three side tracks and two contingent side tracks. I just want to be clear whether, in actually fact, have you applied for three plus two, or have you applied for five side tracks?

25 **MS WALLACE:** The application is for up to five side tracks.

CHAIR: Yeah, yeah, that's what we thought it was. So, technically you could side track five and not three plus two contingents? We just want to be clear what we might be consenting to.

30 **MS WALLACE:** A contingent side track is still a side track.

CHAIR: Yeah but it's a side track off one, so it's a one plus one. You've applied for up to four wells, so technically you could drive four side tracks in one contingent. So we just want to be clear what it is we

might actually be consenting. So if you could come back to us on that one.

And I think we have a couple of other questions arising out of the conversation about conditions too, if you wouldn't mind, Glenice, thank you.

MS PAINE: Good morning, Ms Wallace.

MS WALLACE: Good morning.

MS PAINE: I was looking at condition 7 in attachment 2, and that was the conversation around that -- the comments beside the condition was about not including Te Korowai or Ngaruahine in that condition.

MS WALLACE: Yes.

MS PAINE: And then I'm thinking, well, we've also got letters from Te Korowai to say how they're looking at a relationship agreement with Tamarind, and I'm thinking, well, why would Tamarind not want them included in this condition if you're progressing your relationship?

MS WALLACE: I will also take instructions from that and respond to you on that when we deal with the other responses, if that's okay.

MS PAINE: Yes, that's fine. The second question was, we've had letters from both the iwi, from Te Kahui or Taranaki and from Te Korowai about how comfortable they are with the progress with Tamarind and those letters were dated the 18th and 29th of October. The latest iteration of the conditions was dated the 30th of October. Did either of the Iwis see the latest condition iteration of conditions?

MS WALLACE: So, the conditions, Te Kahui has been provided with the conditions which were relevant to it and those were attached to its letter.

In terms of the full suite of conditions, as I understand it, they hadn't been agreed as until the day before the hearing. So, no, they haven't been provided with the copy that's been provided to the Board but the

conditions essentially reflect those agreements that have been reached between Iwi and Tamarind.

MS PAINE: And I was particularly concerned about the conditions that were actually relevant to the Iwi, so
5 yeah, I'm happy with that. Thank you, Ms Wallace.

CHAIR: Can I flag too, not necessarily on that matter but generally. Some of the conditions do appear effectively
10 augur conditions, not conditions that we would necessarily impose. I don't know whether you want to actually think about whether you want to offer some of those as that which might avoid us coming to a conclusion that we don't need them and striking them out?

MS WALLACE: Yes, I mean, that's an interesting question.
15 Certainly some of them, perhaps Tamarind, wouldn't have offered up, they are new conditions that Mr Faithful has suggested be added. Certainly, if the Board considers them appropriate, Tamarind is comfortable with them being imposed.

CHAIR: I mean, I'm not saying that's where we are but I
20 guess what I'm flagging is I wouldn't want to set a de facto precedent on conditions for things that we're not entirely sure should be there.

MS WALLACE: Certainly, I understand that, sir.

CHAIR: Well, if nothing else, let's -

MS WALLACE: Sir, I just have one procedural matter to ask
the Board about.

CHAIR: Thank you.

MS WALLACE: In terms of the applicant's reply, my preference
30 would be to provide that in writing if possible because there's a few matters that have arisen.

CHAIR: Yes, I'm very happy with that, it's not a problem.
This hearing is going to go very fast, so I understand you might want some time on that.

MS WALLACE: Thank you, sir.
35

CHAIR: All right, well, Dr King, thank you, unless you've got some other sequence this morning?

MS WALLACE: No, sir, we'll just follow the hearing schedule.

DR KING: Good morning everyone.

5 **CHAIR:** And apologies for not getting half of you done yesterday. It wasn't my fault, I can tell you. (Copies of summary statement distributed).

**EVIDENCE OF DR BRIAN KING
ON BEHALF OF THE APPLICANT**

DR KING: I would just like to read the summary statement
5 I've prepared.

(Mr King reads summary statement from start of
paragraph 1 to mid seventh on
page 4 - "...screening purposes is minor")
And really only related to the in water concentrations.

10 (Mr King continues reading summary statement from
end of seventh line on page 4 to end of statement)

QUESTIONED BY BOARD MEMBERS

15 **CHAIR:** Thank you, Dr King. Let me just go through my notes
and see if there's anything that I need to cover.

DR KING: Can I add, I'm also happy to talk about the MARPOL
15PPM.

CHAIR: Thank you, yes, go ahead.

20 **DR KING:** So the MARPOL 15PPM relates to an oily water
mixture that is intentionally discharged from a ship and
while it's a reasonably high number, they come about
because the assumption is a ship is moving and such a
discharge of that concentration is unlikely to
25 accumulate or persist for long periods of time.

All the threshold concentrations, while we talk about
them in concentrations, really must be a dosage, so you
have to be exposed to that concentration.

CHAIR: Sorry, can I just check with you, you said the
30 assumption was a moving vessel, not a stationary vessel,
so they would be mixing when it went overboard?

DR KING: Yes. I don't know how well that's policed, whether
they do it stationary or not, I'm sure they're not going
to do it in the harbour but that's a closed environment
35 and it's unlikely to get the sort of mixing you would

expect if you were in a deep water environment, but that's how that came about, that 15PPM. It's a small discharge and the assumption is that it's unlikely to accumulate over a period of time.

5 **CHAIR:** And when you say small, have you got any idea, is there sort of a threshold or volume that they're thinking about in terms of that? Does it move to a different threshold with a different volume, or this is just a one off?

10 **DR KING:** No, I haven't seen that. I guess, operationally ships are not discharging, and this is oil that might be in their bilge, waste oil, quantities typically are small, probably less than a few cubic metres. It's been in place a long time, so I don't quite know the history
15 but -

CHAIR: Yes, it always worries me when things have been in place a long time. Yes, all right.

Just noting, just looking at your paragraph 4.2 there and just where you talk about the temperatures and just
20 noting of course that last year in Tasman it was an exceptional year in terms of sea temperatures. Does that make any difference or what sort of a difference does that make in the model, or did the model use a range of sea temperatures, a wide representative range
25 of sea temperatures?

DR KING: Yes, yes. So, we put in a full profile of temperature through the water column and then we varied that by month over the year. Typically speaking, you would expect if we went from say North America to the
30 tropics where you might have water temperatures of 5 to potentially 25, if you had that kind of degree of temperature change in your water temperatures, then you might see a slower evaporation rate. Whereas, if it's, you know, a fluctuation just on a daily basis or a few

degrees changes, you wouldn't really be able to tell the difference.

CHAIR: Okay. But something as marked as last year might make a difference? I mean, last year the temperatures were something like 5 or 6 degrees measured, and certainly out in the mid-Tasman they were. Not so much onshore but even onshore I think they were 3 degrees higher than normal, something of that sort of range. Would that make a difference?

5
10 **DR KING:** No, I really think you need to be in the order of 10 to 20.

CHAIR: We're talking Celsius here, aren't we?

DR KING: Yes. Primarily, wind strength is the main driver of the evaporation process.

15 **CHAIR:** Yes. Well, there's certainly no lack of that out there.

DR KING: No.

CHAIR: The problem with lengthy evidence is I have lots of notes on it, so just bear with me, and a lot of them have been answered, so that's good.

20
Just let me turn to your joint witness statement, if I can, and just double check that. And I take it, Dr King, you will be here when we Skype Mr Rogers later on or you're not sure?

25 **DR KING:** I'm about to be booted out of the hotel.

CHAIR: Are you? Oh well, I wouldn't want to stop that from happening, yes. What time are we linking in with -

DR KING: I think it's nice and early in the morning. Certainly as early as possible.

30 **CHAIR:** He's not today?

MS SMITS: Tomorrow morning.

CHAIR: All right, that answers that question. I'm just assuming that he doesn't have anything that Dr King wants to respond to.

MS WALLACE: Sir, Dr King has travelled from Australia, so he has to get back tomorrow.

CHAIR: I detected that in his voice.

MS WALLACE: But if there are questions that perhaps come up,
5 I'm sure I could ring Dr King to get some clarification.

CHAIR: I appreciate it. In paragraph 13 of your joint
witness statement where it's noted "it was agreed
between Mr Rogers and Dr King that while the information
deficit is moderate, the impact on decision making is
10 low". Can you just explain that a little bit further
for us? What does that actually mean? I think you've,
sort of, summarised it in your summary. I think you're
talking there about - I assume you're talking there
about the validation issue, aren't you? Oh no, that one
15 is next.

In this one you're talking about, that's the
conclusion of the French-McCay work. I just want to
understand how a moderate information deficit could have
no impact on a decision?

20 **DR KING:** These thresholds that they're using are screening
thresholds and they're designed always to include the
precautionary principle, and sometimes they do that just
by making order of magnitude changes.

The original work that Dr French-McCay did was part
25 of really the US Government's response to the Exxon
Valdez spill and her and a number of experts got
together and had a look at all the ECOTOX testing that
had been done to date and what they tried to do there is
have a look at what sort of range of toxic effects did
30 various exposures in concentrations have to a whole
range of animals to give, I guess, an overview of what
concentration do you need to get to before you can
consider the area safe. And this little bit goes back
to the 15PPM.

Some of these toxicity tests were done with what were called total oils, so someone just took the oils straight from the source and poured it into a tank with some critters and observed some responses from that.

5 I guess, as the information or the understanding of oil toxicity developed, they have realised then that it's the light in aromatic components of an oil because they're soluble, that therefore makes them bioavailable, are the main contributors, if not almost exclusively,
10 total contributors, to toxicity.

And so, as we got smarter about the process, we started then to look at, well, what are these toxic components, this subset of the total oil, the aromatics, the light aromatics? We're more recently doing toxicity
15 tests just on them.

So when we're doing this summary back on the Exxon Valdez in the late '80s and they're looking at these ECOTOX tests, some of the aromatic information or the aromatic content of that oil information was no
20 longer available or could only be assumed. And then they put all those tests together and they kind of did a curve fitting to see, well, what is the average toxicity to animals and where does that have its tail and when can you consider this oil to be safe? And then let's
25 put a precautionary principle on that.

That first round of, I guess, curve fitting, some of the aromatic compositions of the oil because it wasn't recorded in the experiments at the time was assumed and that was always done with the precautionary principle in
30 mind, and so it was never an exact science in those early days but once that data set was put together and Dr French-McCay was, I guess, the custodian of that data set, as new toxicity tests come along she's been inserting these more known points. So, our level of

confidence in what is going on in those toxicity values is improving but it's still a process underway.

Certainly the deep water horizon and the amount of money that was put into investigating that has added to that database. Her 2016 Paper, I guess was a first-stab attempt at coming up with some new "post" Macondo numbers, which is what everyone likes to do in the United States now.

So it's kind of the background science has those degrees of uncertainty unit, and it will probably be an ongoing debate and, you know, maybe I'll be here in a year's time and they could be a different number again, but the ones we've used have been these outstanding ones that have continued to be used for more than a decade, 1999, and are just in very widespread use at this point in time.

CHAIR: Right, okay. So, can I characterise it in this way, and tell me whether you think that's a reasonable characterisation, that the shift from 1PPB to 6PPB takes out the precautionary principle because the science now in actual fact doesn't require the precautionary principle to be applied?

DR KING: Screening levels, I think, should always be based on some sort of precautionary level. The spread is really wide in the toxicity tests. So, when they originally did the full analysis and they did this curve fitting, the numbers were like, if you got down to 6PPB, and that needs too have an exposure of 96 hours before that toxicity eventuates, then that was originally describing a number that they thought from the curve fitting would enable 99% protection of all animals. And the 1% that might be impacted by that are microscopic, you know, it's a biomass kind of relationship.

The 50PPB, which is an order of magnitude above the 6, a 50 times factor above the 1PPB, would give you a

number that would protect 95% of the species. So that whole range of the 50 down to 1 is kind of a number that's somewhere between the 1 and 5%. Then to get up to, to start to be causing toxicity levels for larger animals and a more frequent thing, then you're looking at 400 PPB exposure for 96 hours.

As a result of the Macondo spill, the 6PPB went from being the 99% protection number to the 97.6% or 97.5% number. So it's just a 1.5% change.

10 **CHAIR:** All right, thank you. Mr Allen?

DR BRIAN KING QUESTIONED BY LEGAL ADVISOR

15 **DR ALLEN:** Thank you and good morning, Dr King. And following on from that one, in terms of the validation part of it too, my understanding is now you and Mr Rogers, as per your summary, are in agreement with the validation mechanisms that are in play?

DR KING: Yes, yes.

20 **DR ALLEN:** And you've got the confidence, as explained again in your summary which answered a number of the questions, in terms of the validation for that?

25 **DR KING:** Yes. You know, we agreed that the reporting could have done with some more validation. I did explain to Mr Rogers that when we introduced these data sets, and primarily they were to be used for search and rescue, and search and rescue is a human life and safety issue and people invest heavily in that sort of capability, and so we like to use them because they are being tested all the time for search and rescue cases.

30
35 Maritime NZ, well, I was tasked with the task, I was looking to rollout this system. It was a system that they put in place for the United States Coast Guard and I was very impressed with it, it had a lot of satellite based information involved in it. So, it's not just a

model anymore, it's really satellite data from a number of satellites taking measurements and then they use modelling to kind of explain what happens in-between those known sets, those known data points. So, there's a level of reliability. It's not just a model, it's not guesswork; it's data and modelling.

These data sets are in widespread use now in the US Coast Guard and I was tasked with rolling them out here in the Asia/Pacific region. Maritime NZ just happened to be on a funding cycle where they were looking to improve their systems and they were seeing what the US Coast Guard was doing, and they were really the first SAR agency to adopt these new data sets and we were commissioned by them to do that.

So, I've had a relationship with Maritime NZ to supply these data sets on an ongoing basis, because we've got to get the satellite data, put it in a form that they can use, we put it on our servers in the Gold Coast and if Maritime NZ needs those data sets for a search and rescue case, then they just draw a little box on the screen, it comes back to our office, fetches that data set and delivers it to them and then they can do their search and rescue predictions from that.

Because they invest so heavily on the search and rescue system because of the human safety and life factor, they pretty much say, well look, oil spills don't happen very often but it would be great if we could just have an oil spill model as well, just so we can use the same data sets that we understand very well for search and rescue purposes and we could be prepared for an oil spill as well. So, that's what took place. They bought our oil spill model and they bought our SAR model and we've been supplying those data sets to them for 12 years. So, there's more than a decade experience

of the very models that we used in this project from Maritime NZ.

I'm not privy to their results but, you know, they have to answer to Coroner inquests and various things.

5 The other thing that we do is the satellite data sets, there's a number of the agencies, there's the European agency, there's the US Navy, which is usually a confidential data set but they do make that available for search and rescue purposes to other Government
10 agencies, and there's the HYCOM data set with the HydroMap tides.

So, when you have a SAR situation or an oil spill situation, then you can do a forecast on where that oil might go or where that person might drift to using
15 multiple data sets. So, you can grab this one, you can grab that one, and then you can have a look at the range of predictions that those models give you and if they all agree, you feel really confident that that could be what's going to happen. And if they disagree, well, you
20 get some, sort of, understanding that perhaps the circumstances at the time just mean you have less certainty in the outcome.

Maritime NZ are particularly fond of the data sets that we used in this project and, quite frankly, so were
25 all the other SAR agencies.

Subsequent to Maritime NZ buying these data sets for search and rescue purposes, we also now have every State in Australia, we have the Australian Government, we have the Solomons, Papua New Guinea, Philippines, Malaysia,
30 we can go all the way up to Sakhalin in Far East Russia. We're all running these data sets for the purposes of oil spill response and search and rescue purposes.

In addition to that, our company are oil spill responders. I have been a modeler for oil spill, a
35 number of them, and I have had that role since, oh, '93

up until my going part-time, and so I've used these data sets in anger in a spill response situation, marine emergencies and other SAR cases.

5 So, I guess it was a matter of explaining to Mr Rogers that I had to take a more regional view to, I guess, promoting these data sets, and so I haven't specifically concentrated on putting validations together for New Zealand but I ran a PhD programme, I took a student, got his PhD, published five papers, and
10 we used this global drifter programme to have a look at the performance of these data sets. We don't own them, so we're not particularly - we're not an advocate for any one of them but we wanted to test how they went and I guess it's new technology, doing this, it's all come
15 about around the 2007 mark, so it was very important in the early piece that, you know, we do establish confidence.

And so, I guess that's more the background.

DR ALLEN: Thank you. And, just following on from that, you
20 mention at paragraph 1.4 of your evidence that you've been on-call for spill events and attended some.

DR KING: Yes.

DR ALLEN: Including the loss of well-control.

DR KING: Yes.

25 **DR ALLEN:** Just so everyone is clear, was that in New Zealand?

DR KING: No.

DR ALLEN: Thank you. And I now know the Macondo incident is the one in America.

30 **DR KING:** Yes.

MR ALLEN: So that's useful, that was one of my questions.

Now, at paragraph 8.2 of your evidence, you say that Tui crude oil is unlikely to form any thick surface slicks more than 46 to 58. Just so I'm clear, in terms

of thick surface slicks, is that a PPB measurement or is that -

DR KING: It's a thickness.

DR ALLEN: So, it's a millimetre type measurement?

5 **DR KING:** That's right, yes.

DR ALLEN: And what would you class as thick, or is there a categorisation?

DR KING: Yes. So, again using the precautionary principle, there is a level, I guess, where it, and I guess to
10 paraphrase the words, it could not be excluded that that thickness resulted in harm to an animal at the surface, and so they're the ones that I'm referring to.

DR ALLEN: And then at paragraph 9.2, you talk about the oil potentially if it was to reach a shoreline, having small
15 wax flakes by that time and Dr Lane's evidence is that those flakes may take weeks to form. But, my understanding of your evidence, they could actually form sooner than that; is that correct? Because, from memory, it might be 56 hours to get to the shoreline, by
20 which time there will be these flakes in? As I read it, the flakes may be better because it's weathered? Could you maybe just explain some of that please or I can ask it in smaller questions?

DR KING: Look, so what happens when oil weathers is that the
25 lighter components are evaporating out, and that's a function of wind speed and water temperature. And those lighter components will make waxes and some of these heavier components that we might normally expect to be solid at room temperature or solid at the sea
30 temperatures, remain in a liquid form. And as those evaporate out, then the wax has a tendency then to be wax and it wants to be solid at the kind of sea temperatures that we have here.

So, when that happens, it depends on the evaporation
35 rate and the rate of weathering, the amount of time the

oil is on the surface. So, it would be a range of times that that would take place. Certainly, the more time that that oil was on the surface, then the quicker that evaporation occurs, and those are the kind of conditions that would lead to, and if it was an onshore wind, moderate to light, that would lead to those oils coming ashore.

5

DR ALLEN: Thank you, Dr King, no further questions. Thank you, sir.

10 **CHAIR:** All right. Ms Wallace?

MS WALLACE: No, thank you, sir.

CHAIR: Thank you, Dr King, safe passage back to Australia and if we need to talk to you again we'll talk to you again. I hope you're not back here in a year's time, not in this one anyway. Dr Childerhouse.

15

**EVIDENCE OF DR SIMON CHILDERHOUSE
ON BEHALF OF THE APPLICANT**

CHAIR: When you're ready, Dr Childerhouse. Thank you,
5 welcome.

DR CHILDERHOUSE: Good morning, thank you for the opportunity
to speak before you this morning. I'm just going to
read my Summary Statement of Evidence.

(Dr Childerhouse reads summary statement from start
10 of paragraph 1 to end of paragraph 7)

DR CHILDERHOUSE: I just thought at that point I'd provide a
little bit of extra definition for temporary threshold
shift and permanent threshold shift.

So, essentially it relates to physiological impact on
15 hearing of the animal. And permanent threshold shift is
a physiological injury that results in an animal not
being able to hear within that potential frequency
range. And temporary threshold shift is the same event
but obviously over only a temporary period, so they move
20 out of it, similar to what people experience at loud
rock concerts.

CHAIR: Speaking personally, having had hours and hours on
the acoustic matters when we did the Chatham rock
phosphate hearings, I think we had four different
25 acoustic marine mammal and fish experts talking to us in
rather lengthy terms for long times. So, I appreciate
your succinct explanation.

DR CHILDERHOUSE: You probably know more about it than me in
that case.

(Dr Childerhouse continues reading summary
30 statement from start of paragraph 8 to end of
paragraph 10)

35 **DR SIMON CHILDERHOUSE QUESTIONED BY BOARD**

COMMITTEE MEMBERS

CHAIR: Yesterday Mr Peacock gave us some interesting anecdotal material with respect to seals and various other critters in and around the FPSO. Does that come as a surprise to you?

DR CHILDERHOUSE: No, not at all. The permanent rigs and structures out there actually provide positive habitat for fur seals as haul out areas, so they don't have to return back to their fallouts on land. So, there's actually some potential benefits from those.

I've seen photos of fur seals lying on the lines floating off the FPSOs resting and recovering. So, yes, they're certainly there and they do use the facility.

CHAIR: So, the removal of the rig in due course might actually be a disbenefit, might it? We might require them to stay on a permanent basis.

DR CHILDERHOUSE: Yeah. There's certainly some good evidence that those structures provide some positive habitat for fur seals in particular.

CHAIR: Well, I guess they're comparable to FADs, aren't they, in many respects?

DR CHILDERHOUSE: Yes.

CHAIR: I have no questions. Mr Allen, are you going to question, are you?

DR ALLEN: Well, just short.

QUESTIONED BY LEGAL ADVISOR

DR ALLEN: Just picking up on that, so the fur seals, therefore, obviously from the FPSO production operations, the noise levels are totally comfortable for them?

DR CHILDERHOUSE: Yeah, yeah, they're certainly found there year round and in reasonably large numbers. And the

advantage that fur seals have, of course, is they can come out of the water and bring their head out of the water or haul up onto platforms if they need to.

DR ALLEN: In your evidence, you mention the sort of scale of
5 the areas being affected and the distance of noise travel et cetera, to the scales of distances in the south Taranaki by Tamarind, is that context important in your assessment in terms of the overall effects level that you've determined?

10 **DR CHILDERHOUSE:** When looking at cumulative impacts, which is something we did, it's important to consider all the different activities in the region and the potential area of impact. And the area of behaviour disturbance for this activity is just over a kilometre, so 1250.
15 And actually the level of disturbance from the other activity, the other platforms and operations in the area, is probably in that similar order of magnitude. So, you wouldn't expect to see a lot of cumulative effects from noise over all those activities.

20 So, I'm not sure, did that answer your question?

DR ALLEN: Yes, that answers part of it. And, in terms of is there a lot of other - as I read your evidence, there's a lot of other habitat for these animals or mammals in your case to travel to?

25 **DR CHILDERHOUSE:** Yes. I mean, most marine mammals have very large home ranges. I mean, blue whales potentially are over hundreds, if not thousands, of kilometres. So if there is a behavioural impact over the kind of range we're talking about, it's likely to be a very small part
30 of their home range or foraging areas and we don't think that the area of interest actually is a particularly important area for them anyway.

DR ALLEN: Just picking up on that because that was my next question, why is it that it's they're generally

considered they're feeding further south? Is that just where people have seen them and there's records of them?

DR CHILDERHOUSE: Yeah, exactly. So, the seismic survey vessels that undertake work out there all carry
5 dedicated marine mammal observers and so that's the single best data set we have for establishing what marine mammals may be out there. And, overwhelmingly, the majority of blue whale sightings in particular are well to the south, partly because they're driven by the
10 plumes coming off Farewell Spit in Kahurangi which generally are further south than this area.

DR ALLEN: Yesterday I asked some questions about the, sort of, nine month duration, and I am just interested whether that's relevant at all in terms of effects
15 assessments or not. Would it concern you, for example, if a drilling operation went for more than nine months or that just wasn't a factor in your assessment?

DR CHILDERHOUSE: No, I don't think so, given the low level of impacts we're potentially going to see are restricted
20 to a reasonably narrow area around that and the likely drilling campaigns are going to be run at three or four different locations, then that nine month disturbance will actually be spread over a whole range of sites. So, if any one of those sites is of particular
25 importance to them, they won't be excluded from that area, in the worst case, for nine months. They'll only be excluded for potentially 40-45 days, I think is what the expected campaign time at each location is.

DR ALLEN: With the noise propagation model you've used,
30 you're comfortable with the veracity, the accuracy of that as being fit for purpose for the use that you've applied it to?

DR CHILDERHOUSE: Yes, yeah, I've used this quite widely in previous applications and it is a simple model, there
35 is - sound propagation modelling is a really complex

procedure and to do it properly you need salinity, temperature, depth, all sorts of variables that are not particularly easy to get hold of. But, for the purposes, the simple approach I've taken is useful for giving us a, kind of, ballpark idea about the impact level. I'm confident that it's a realistic - I've compared it against some of the more complex models and it performs reasonably well.

5
10 **DR ALLEN:** And, in terms of the latest set of conditions, you obviously in your report propose conditions.

DR CHILDERHOUSE: Yes.

DR ALLEN: You're comfortable that those conditions have adequately been picked up by Dr Lane and Mr Faithful?

DR CHILDERHOUSE: Yes.

15 **DR ALLEN:** And applied through into the condition set?

DR CHILDERHOUSE: Yeah, I think pretty much all of my suggestions have been picked up. There was one related to noise monitoring which I don't think has been picked up but I've had discussions with the applicants and some of the other people about that subsequently.

20
25
Yeah, I guess a question I normally get asked is that we don't know - we don't know the exact level of noise that's going to be produced by the activity, and I've made what I believe is a good assessment of what the maximum noise is likely to be based on international literature, but because this rig has never been here before we don't actually know what it is. So, we're assuming that our assessment is based on a reliable estimate of what that noise is.

30 **DR ALLEN:** And, from memory, your assessment was up to 180, is that right?

DR CHILDERHOUSE: Yeah, 170 to 180, yeah.

DR ALLEN: And in terms of now that we know the hoped for rig, are you confident that will be within that range, given it's a modern-day rig?

35

DR CHILDERHOUSE: Based on what I've read in the literature, it seems like the noise from this rig will be well within those limits. There is a general tendency for as technology improves for things to get quieter as efficiencies develop, so yes, I would expect it to be within that range.

DR ALLEN: So, overall, you're comfortable with the level of information as to the marine mammals present and to the potential effects on them?

10 **DR CHILDERHOUSE:** Yes, I am.

DR ALLEN: Thank you, sir, no further questions.

**DR SIMON CHILDERHOUSE FURTHER QUESTIONED BY BOARD
COMMITTEE MEMBERS**

15

CHAIR: Just one that comes to mind before I ask Ms Wallace if she has any. I meant to ask the question and I'm not sure, Dr Childerhouse, whether it's to you or not. It's about the Te Kahui welling system and the natural variability of that. Is that a question that you can answer?

20

DR CHILDERHOUSE: Probably better for Dr McDiamid, I think he is much for expert in that area.

CHAIR: Just to flag, I'm just interested in what that natural variability is and whether there are circumstances in which it moves further north and further east.

25

DR CHILDERHOUSE: I mean, I think that's certainly true, it's quite a variable system and, in fact, I think last year, as you were saying, it was quite an unusual year. There was very little productivity in that region. We spent three weeks trying to find blue whales in the Taranaki and we couldn't find any because there was no food for them. But yes, probably Dr McDiamid is better to -

30

35 **CHAIR:** Looked in the wrong place.

DR CHILDERHOUSE: Yes, that's right. Well, we found them in Westport but that wasn't very helpful for us.

CHAIR: All right. Ms Wallace, have you got anything?

MS WALLACE: No, thank you.

5 **CHAIR:** Thank you, Dr Childerhouse. Ms Gibbs.

**EVIDENCE OF NICOLA GIBBS
ON BEHALF OF THE APPLICANT**

MS GIBBS: Thank you, I'll just read my summary statement.

5 (Ms Gibbs reads summary statement from start of
 paragraph 1 end of paragraph 13)

 And I provide some more detail in my evidence as to
why I think those ones are the most vulnerable.

10 (Ms Gibbs continues reading summary statement from
 start of paragraph 14 to end of paragraph 16)

QUESTIONED BY BOARD COMMITTEE MEMBERS

DR McCLARY: Thank you, Ms Gibbs. I note that you indicated
15 that you considered that the most vulnerable fish in the
 event of an oil spill would be the CRA 9, or one of the
 most vulnerable, CRA 9 rock lobster?

MS GIBBS: Yes.

DR McCLARY: Can you comment on the potential for long-term
20 impacts on that fishery, not just restricted to the
 period of the initial spill, potential spill, which I
 recognise is potentially unlikely, but longer terms of
 multi-general impacts?

MS GIBBS: I can't comment on it from a biological point of
25 view because that's not my area of expertise but I can
 comment on it in terms of impacts on commercial fishing.
 The reason why I think the CRA 9 rock lobster fishery is
 one of the most fisheries which is most vulnerable to an
 oil spill is because it's a spacially confined fishery.
30 In other words, rock lobsters only exist in a really
 small area along the coast and the fishery is really
 confined to those areas. So, although the CRA 9 quota
 management area is quite large, the area in which
 fishing takes place is really small and about 50% of the
35 catch of CRA 9 comes from the Taranaki coastline. So,

if there was a spill that affected that area of the coastline and if the fishers who previously fished in that area shifted to other parts of the fishery, that could have a negative effect on the abundance of the entire fish stock, so that could take some years to recover.

MR McCALLUM: Thank you, I'll also follow up with Dr McDiamid as well.

MS GIBBS: Sure.

10 **CHAIR:** All right. I don't have any questions of you, Ms Gibbons. I don't know if Mr Allen has any.

DR ALLEN: Just a couple.

NICOLA GIBBS QUESTIONED BY LEGAL ADVISER

15

MR ALLEN: First up, as I understand it for jack mackerel probably the biggest risk would be for the juvenile, the larvae, the eggs; is that a correct reading?

MS GIBBS: Are you talking about from an oil spill?

20 **DR ALLEN:** From an oil spill.

MS GIBBS: Yes, that's my understanding.

DR ALLEN: And then just your discussion with Dr McClary then, in terms of the effects on the commercial fishery, it's more a stigma effect rather than a biological effect; is that correct?

25

MS GIBBS: Yes, completely. I've kind of based my assessment on the idea that if any visible signs of oil or oil products are present on a coastline or on the surface, then that's going to affect fishing behaviour because people are not going to want to fish in that area, they are not going to want to market fish from that area and potentially even fish from other areas, the marketing of those fish might be affected by knowledge that there's been an oil spill.

30

DR ALLEN: And that's the public knowledge, the public sort of stigma?

MS GIBBS: Yes.

DR ALLEN: And just also following up a question from

5 Dr McClary about the CRA 9 rock lobster. In terms of the Manawatu fisheries, you mention paddle crab type potential there. Are paddle crabs more, sort of, able to move around than rock lobsters over a wider sandy bottom I assume beach environment as opposed to a reef
10 environment, or do you have any concerns in respect of the Manawatu fisheries?

MS GIBBS: Yes, I would be concerned about the paddle crab fishery for the same reasons, that it's not particularly mobile. I mean, it would be limited to particular
15 areas. But I'm not actually sure how active that fishery is at the moment. And also, the resource, the fish stock is a lot bigger than the amount of fish that are being taken from it at the moment, so there's more potential perhaps for the fishers to move to other
20 areas. Whereas, in a rock lobster fishery, you know, any displacement of commercial catch is going to have sustainability implications for the stock.

DR ALLEN: And there's mention about a submission from Mr Warrington in relation to the tuna along the
25 Manawatu?

MS GIBBS: Yes.

DR ALLEN: And Hokio, as I understand it. In terms of tuna, am I right, is that a commercial fishery or a customary fishery?

30 **MS GIBBS:** It's both.

DR ALLEN: Both. And so, for tuna would it be the larvae that would be most at risk?

MS GIBBS: I think that's addressed in the evidence of Dr McDiamid.

DR ALLEN: I'll ask her about that, thank you. No further questions, thank you.

MS WALLACE: I don't have any, sir.

CHAIR: Thank you, Ms Gibbs, thank you for your time.

5 Dr Thompson.

**EVIDENCE OF DR DAVID THOMPSON
ON BEHALF OF THE APPLICANT**

CHAIR: Thank you, Dr Thompson, welcome.

5 **DR THOMPSON:** I'll just read my summary statement.

(Dr Thompson reads summary statement from start of
paragraph 1 to end of paragraph 4)

CHAIR: What's the difference between a migrant and a
vagrant?

10 **DR THOMPSON:** It's basically around, so a migrant is a
species or a taxa that would regularly occur in
New Zealand. So, for example, in this context it would
be a bar-tailed godwit, a species that regularly
migrates from the northern hemisphere breeding sites.

15 **CHAIR:** And a vagrant is a one-off, is it?

DR THOMPSON: And a vagrant is something that is much rarer.

(Dr Thompson continues reading summary statement
from start of paragraph 6 to end of paragraph 12)

CHAIR: Thank you, Dr Thompson.

20

QUESTIONED BY BOARD COMMITTEE MEMBERS

MS PAINE: Mr Thompson, it's about how many birds were
counted out there. Considering how many sea birds are
25 out there, did you find it unusual that there was
historically no recording of sea bird sightings in the
Tui Field?

DR THOMPSON: Do I assume that you're referring here to deck
strikes or strikes where the structures were already in
30 existence in the Tui Field?

MS PAINE: Yes.

DR THOMPSON: Yes, so I think there are several reasons for
that. One, as I've kind of outlined in my evidence,
seabirds strikes nocturnally in attraction to
35 artificially light really only occur where the light

source is very close to breeding colonies, almost exclusively in very bad weather and that often includes not just rain and wind but fog, you know, dense misty type conditions where vision is impaired. And I think - and also where light sources are deliberately often directed outwards and upwards from the structure.

If none of those conditions apply, and so in terms of distance to breeding colonies that's some 80 kilometres in the case of the Tui Field, misty, cloudy, foggy weather at night, not particularly common in south Taranaki, I accept that poor weather is reasonably common. And the light sources being directed outwards and upwards really don't occur.

So, in my opinion, those three things or those three factors in combination could quite easily explain why there have been so few and in the Tui case apparently no seabird interactions with the rigs to date.

MS PAINE: So you state that the risk is minor risk, that the lighting poses a minor risk to the seabirds. So, you would be quite comfortable with the condition that Tamarind has about lighting?

DR THOMPSON: Yes, I am. I've read those conditions and I think that they cover off all - there isn't any detail in there about how the light sources would be minimised but the standard procedures do cover off those things, so blinds on windows, for example, shielding of light, direction of light downwards and inwards wherever practicable. It's not particularly rocket science how those conditions are actually activated in a practical sense. So, I'm comfortable with what's being proposed, those conditions.

MS PAINE: Thank you.

CHAIR: Can I just check with you, Dr Thompson, that you've seen the latest rendition of that condition which is condition 17 which proposes that it be qualified by a

number of terms? I just want to be sure that that still meets your recommendation, "And the qualifications are it's minimised to the greatest practicable extent while still meeting operational and safety requirements".

5 That's I think the qualification that's been produced?

DR THOMPSON: Yes, I think that's fine.

CHAIR: Okay, thank you. I don't have any questions of you, so Mr Allen, thank you.

10 **DR THOMPSON QUESTIONED BY LEGAL ADVISOR**

DR ALLEN: Just a couple of quick questions. Firstly, at paragraph 1.5, and it's in the summary too, you talk about lighting is known to attract some seabirds. Is there any issue for you in the type of seabirds that might be attracted to lighting, or it's general enough that it can be classed across - like, for example, does it particularly attract threatened seabirds or something?

15
20 **DR THOMPSON:** No. So, obviously the attraction to light is a biological response and a threatened classification is a human construct, so not all sea bird species are attracted to light nocturnally. For example, Albatrosses tend not to be attracted to light at night. Whereas smaller petrels, storm petrels and so on, given
25 those conditions I've already outlined, would be more likely to be attracted to light. So, it's quite species specific.

DR ALLEN: And just sticking to the threatened
30 classification. At paragraph 3.4, you set out the various types. The nationally critical species there, like Albatross et cetera, what are their ranges? Do they range far and wide or are they very confined with their ranges?

DR THOMPSON: No, so, in a very general sense, most seabirds in New Zealand which belong to families like the Albatross family, the petrels and storm petrels and shearwaters, have relatively very large ranges. For the species that you've mentioned there, the nationally critical category, and typically Albatross and Gibson's Albatross and Salvin's Albatross, their range is whilst they're breeding in New Zealand would cover the entire EEZ population level. So, in effect, what that would mean is you could head out on a boat more or less anywhere in the EEZ during the breeding season, and you could encounter one of those species.

DR ALLEN: Now, Ms Paine asked you some questions about bird strikes and certainly my understanding is the record is that there's been no reported strikes on the FPSO and that's been there since 2008?

DR THOMPSON: I'm not sure of the date but my understanding is there's been no strikes, yes.

DR ALLEN: And just also in terms of lighting and you mentioned sometimes lighting that goes in can go out, is that more a fishing type lighting exercise rather than an oil rig type?

DR THOMPSON: It could be. The examples of that that I'm aware of, one in particular was effectively a search light type scenario, the weather was poor, there was navigation issues, there was the risk of collision with rocks and/or icebergs and so they were using very bright search lights and directed out from the boat to be able to see where they were going. And it was that sort of scenario, in conjunction with poor weather and proximity to breeding colony of seabirds, that resulted in birds hitting the vessel.

DR ALLEN: Now, you mention about anecdotal reports of birds regularly alighting on structures, that's at paragraph 4.6. Has there been any species

identification, or it's just purely there's been seabirds landing et cetera?

DR THOMPSON: I'm not aware of identifications that have been done in a formal sense. I would imagine that those
5 anecdotal reports would refer to things like red-billed gull, perhaps even non-seabird species, terrestrial bird species that have kind of found their way, for whatever reason, out over the ocean, seen the structure and gone down for a bit of a perch and a rest. But it would be
10 unlikely, I think, to be an Albatross, for example. It would more likely be a gull.

DR ALLEN: And, just something I forgot to ask earlier, in terms of bird strikes, are you aware of any bird strikes reported on the other oil platforms?

DR THOMPSON: I'm aware of one or two. The numbers would be a handful, less than five probably over the operational life, that I'm aware of anyway, in terms of the applications that I've been involved with in similar situations. It's a very small number.

DR ALLEN: And those wells, some of them have been out there for 40 plus years?

DR THOMPSON: Correct.

DR ALLEN: Ms Paine covered all the conditions, so no further questions, thank you, Dr Thompson.

25

**DR THOMPSON FURTHER QUESTIONED BY BOARD
COMMITTEE MEMBERS**

CHAIR: Dr Thompson, just on the last point, those strikes
30 that you're aware of on other structures were in the general area. What sort of temporal distribution is that, is that over the last 10 years, 20 years? Is there any, sort of, pattern on that?

DR THOMPSON: It would be a small number of birds, perhaps less than five or up to five over the last ten years would be my understanding of the situation.

CHAIR: And was that on one particular facility or was that
5 on a number of facilities?

DR THOMPSON: From recollection, it might have been just from one facility.

CHAIR: I won't ask you to name the facility.

DR THOMPSON: I couldn't recall that at the moment.

10 **CHAIR:** Right, okay, all right.

MS WALLACE: No questions, thank you, sir.

CHAIR: Thank you very much, Dr Thompson. I think we'll take an early coffee break, I think, back at 1.35, thank you.

15 **(Hearing adjourned from 10.22 to 10.39 a.m.)**

20

**EVIDENCE OF DR SHARON DE LUCA
ON BEHALF OF THE APPLICANT**

CHAIR: Dr De Luca, thank you very much.

5 **DR DEL LUCA:** Good morning. Before I read my summary
statement I've got one minor correction to my primary
evidence. (Copies of summary statement distributed).
The correction to my primary evidence is on page 11 in
the footnotes. It's footnote 6. That should read "Area
10 of interest".

CHAIR: They're one and the same thing really, aren't they?

DR DE LUCA: Just to be consistent with the other witnesses.

(Dr De Luca reads summary statement from start of
paragraph 1 to mid third line of paragraph

15 10 - "...that the substances")

"Do not".

(Dr De Luca continues reading summary statement
from mid-third line of paragraph 10 - "present a
feasible risk...", to end of paragraph 14)

20

QUESTIONED BY BOARD COMMITTEE MEMBERS

DR McCLARY: Thank you, Dr De Luca. I'll refer to your
primary evidence and in particular section D relating to
25 biosecurity matters. I'll make an observation and then
a comment or a question. I note in section 5.39 you
referred to the antifouling coating likely on the rig
which will be used. It's a new rig so it likely has a
new antifouling coating. The observation would be,
30 might be worthwhile should the consent be granted that
the operators confirm there is actually an antifouling
coating present. In many instances, or I should say in
some instances, particularly with these drill rigs when
they work in high latitudes, they often don't have an
35 antifouling coating as all. They don't have any

de-fouling coating, they just have an epoxy coating. So, worthwhile just clarifying that and being sure that the coating itself is actually fit for purpose. That's just a comment.

5 **DR DE LUCA:** Okay, thank you, and that would form part of the craft management plan.

DR McCLARY: Yes, it could.

DR DE LUCA: Yes, there's a number of items listed in the guidance documents for those plans and those coatings
10 would form part of that document for approval by MPI.

DR McCLARY: Okay, good. Currently the rig is located off Sakhalin Island in Russia and that's well within the range of an unwanted species for New Zealand, which is North Pacific Sea Star. Introduction of North Pacific
15 Sea Star into New Zealand would be devastating, and I'm sure you probably agree, in terms of the potential impacts on local ecology.

Now, yesterday I'd asked Mr Peacock about some of the measures that are going to be taken to minimise risks,
20 and I under those, I accept what he's saying but I'm just looking for a bit more clarification from you, particularly around preparing the rig for entry into New Zealand and meeting the standards required under the craft risk management standard.

25 Drill rigs, particularly semi-sub, are really complex pieces of marine infrastructure, there's no question of that. Combine that with the craft risk management standard long stay threshold, which is, as you're probably aware, very very high. It sets the bar
30 very high for the bio-fouling that's present.

So, given that and the complexities of a drill rig, lots of different niche areas, there are nooks and crannies for things to hide, has any thought been put
into place towards the types of interventions that will
35 be required to basically meet this very very high

threshold, so the level of experience of the operators, that sort of thing; I just wonder if there's been any comment around that or consideration around that?

DR DE LUCA: I suppose the first comment would be that the
5 biosecurity matters sit outside of this application and sit with MPI, and it's their approval that would be sought to make sure those matters are adequately covered off.

DR McCLARY: Yes, I was going to suggest over to Ms Wallace
10 if that was appropriate more to shuffle that over sideways.

MS DE LUCA: But there is within the craft risk management plan guidance documents, there are a clear set of factors that have to be covered off, including those
15 niche areas and how they will be managed and treated, it includes the vessel details, operating profile, the speed that it's travelling at, days at sea, days at port, training, antifouling systems and record-keeping. There's a whole bunch of stuff that would need to be
20 covered within that document that MPI would expect to see there and would not let that craft leave on its way to New Zealand without those matters being adequately covered.

DR McCLARY: That's fine, I'll leave that for now. And
25 again, Ms Wallace, I guess that's the thing we need to consider, is whether this is part of the consents that we're offering or is this really something else separate?

MS WALLACE: So, certainly this is a matter under a different
30 marine regime and, as Dr De Luca has indicated, there will be separate approvals required in relation to this. I think, as I set out in my legal submissions, you are able to consider those other marine regimes and have regard to them when making your decision, but I wouldn't
35 think that there would be anything concerning

biosecurity that would result in the need for conditions or any reason for your decision to be affected by those.

DR McCLARY: Thank you.

CHAIR: Can I just follow that one up. I mean, if it is
5 identified in these proceedings that there is a particular species of concern, how does that get translated to MPI? I mean, we obviously have to have confidence that MPI will pick that up, and I know that we are, the working assumption is of a competent agency,
10 but is there a mechanism for getting greater assurance on that? I mean, we can discuss it in the decision obviously and that's fine but -

MS WALLACE: Yes, I mean if you were to impose a condition relating to matters which are controlled by biosecurity.

15 **CHAIR:** You might appeal it.

MS WALLACE: I would take issue with that. I mean, as you say, I think it's reasonable to expect that MPI is a competent organisation and those species which you refer to which are of issue should be on their radar and will
20 form part of the consideration when considering and approving that craft risk management plan.

CHAIR: I have no questions actually prepared on your materials, Dr De Luca, but I did have a thought as you were reading paragraph 9 of your supplementaries, and
25 I'm not sure in terms of the mechanics of how the anchors and the chains work, but obviously for a normal vessel the chains move depending on sea state and so on, so they're in a constant state of agitation. Is your assumption that that is the case, or have you assumed they will be likely static on the floor and that the catenary will actually do the heavy lifting, if you
30 like?

DR DE LUCA: Yes, I've assumed that the anchors themselves will be stationary but -

CHAIR: It's the chains which I'm more concerned about, and obviously the turbidity effect of constant movement if that's what they do. I'm not sure whether that's what they do or not.

5 **DR DE LUCA:** It's not a great amount of water movement down at those depths, 100-120 metres deep.

CHAIR: Yes. No, I'm thinking in terms of the rig and the movement of the rig obviously takes up the catenary but I'm not sure how. Can I just ask a general question, I don't know who might answer that but, I mean, are the anchor chains effectively taut, that's how they work?

10

MS WALLACE: Yes, sir, and I think Nicola Gibbs referenced that in her evidence when she confirmed that they would be tensioned - so it may have been Dr Childerhouse actually. So, that risk of entanglement et cetera is minimised because of the tension of the -

15

CHAIR: You would expect with eight secure points that that would be the case, but I was just curious about that.

DR DE LUCA: I have however in my assessment included the area of disturbance to get those anchors in place, so there is quite a bit of drag and disturbance to get them into their final position.

20

CHAIR: But that's effectively, I was going to say a one-off. It's not, it's a two off, isn't it?

25 **MS WALLACE:** Yes, two off.

CHAIR: Placement and recovery. Okay, thank you. Mr Allen.

DR DE LUCA QUESTIONED BY LEGAL ADVISOR

30 **DR ALLEN:** Thank you, sir. Good morning, Dr De Luca.

DR DE LUCA: Good morning.

DR ALLEN: Just you will have heard it come up and just want to check and confirm, this idea of about five to nine months with the nine months. From a benthic

perspective, is there any concern if the drilling actually took longer than nine months?

DR DE LUCA: No, not really because the area of disturbance is going to be the same whether it occurs over 6 months,
5 9 months or 12 months, it's not going to affect the degree of effect on benthic habitats.

DR ALLEN: And just in terms of the conditions as they are, you're comfortable with the conditions in terms of the benthic communities and ecology?

10 **DR DE LUCA:** Yes, I am.

DR ALLEN: And as I read it, benthic ecology is an area where there's good existing information. Is that a correct understanding, that there's been something done I think under the existing marine consents?

15 **DR DE LUCA:** Yes, it's been undertaken over numerous years with the most recent studies undertaken by SLR in 2016 and 2018, and that includes a number of science around the Tui area and control sites north and south of the area.

20 **DR ALLEN:** And you're comfortable that the something that's occurred under there for the operational side of it, is equally applicable and useful for the drilling consents before the Board?

DR DE LUCA: Yes, yes, absolutely. One of the control sites
25 to the northeast I understand is going to be moved 4 kilometres to the west just to have that little bit more separation with the Pateke 4H drill site, so that's a helpful adjustment to the monitoring programme.

DR ALLEN: Thank you, Dr De Luca, no further questions.

30 **MS WALLACE:** I don't have any, sir.

CHAIR: Thank you, Dr De Luca. Thank you very much.
Dr MacDiarmid.

MS WALLACE: Dr MacDiarmid is going to read the Executive Summary.

**EVIDENCE OF DR ALISON MacDIARMID
ON BEHALF OF THE APPLICANT**

DR MacDIARMID: This is the Executive Summary from my
5 Statement of Evidence dated 20th of July 2018.

(Dr MacDiarmid reads Executive Summary from
Statement of Evidence dated 20 July 2018 from start
of paragraph 1.1 to end of paragraph 1.7)

And I can comment further on that if the Board would
10 like me to.

(Dr MacDiarmid reads paragraph 1.8 of
Executive Summary)

QUESTIONED BY BOARD COMMITTEE MEMBERS

15 **DR McCLARY:** Thank you, Dr MacDiarmid. Just following up on
my question before to Ms Gibbs regarding CRA 9, do you
feel there is the potential for any longer-term effects
on cray stocks or coastal stocks such like that?

20 **DR MacDIARMID:** Yes, depending on where the oil might come
ashore. In the unlikely event that it did happen, yes,
there could be longer-term effects on crayfish stock,
but also on a range of kaimoana too. I think it's
important not to overlook those important shore species
25 for the iwi along those particular shores.

MS PAINE: Thank you, Dr MacDiarmid. Actually, it was one of
my questions to ask you about para 1.7. If you would
like to just explain a bit more about why you don't
think any survey would achieve the desired outcomes for
30 Te Korowai?

DR MacDIARMID: Okay. So, in terms of - I think it's
important to reflect on how such a fish survey could be
undertaken. Its capacity to detect what are likely to
be extremely subtle effects in changes in fish abundance
35 or distribution, and what damage a survey itself might

do to the fish population and the environment compared to the scale of effects that might arise from the application being considered here.

5 So, a comprehensive survey of fish populations in and around the area of interest would necessarily need to involve some sort of bottom trawling at quite a large number of sites over the area of interest to obtain a coefficient of variation or an estimate of the natural variability of 20% or less. That's typically the sort
10 of target which you should get. Actually, the key species should have a coefficient of variation in the estimate of 20% or less, but for many of the more mana species, that coefficient will typically be larger.

15 So, that limits the sort of scale of effect that you can actually possibly detect with such a survey. So, what I'm basically saying is that the scale of effect that you might be able to detect with such a survey would have to be, affect the fish population by 20% or more. So, picking up subtle effects is basically
20 impossible with that sort of survey, and such a pattern of trawling would need to be repeated at control sites to determine normal interannual variability in fish abundance against which the effects of some disturbance could be measured.

25 So, you're talking about quite a large programme of work. Now, if you're doing that, then you have to remember that bottom trawling in itself is a destructive practice, both to the fish caught and to the sea floor organisms along the trawl track, and the passage of the
30 trawl net, the doors and the walls invariably lifts a lot of fine secondments into a water column which then drift down current in a plume. So, that in combination over sites and over years a trawl survey, in my opinion, would cause much greater harm to the fish population and

the environment in the area of interest, than would arise from the present application.

5 So, to me it makes no sense to cause more harm by investigation of a mana harm by a method that would have to be employed to actually investigate. So, it just doesn't make sense to me.

MS PAINE: So typically how long, over what period would these surveys be undertaken, if you were to do it?

10 **DR MacDIARMID:** A survey like that could be done over a period of say several weeks, that would be typical so it could be done over in a confined sort of period and if it was repeated among amongst years to get an estimate of the year to year natural variation in fish abundance and distribution, you would have to do that probably for
15 several years, and in some probable control locations as well in order to get a good idea of the natural background, spatial and temporal variation in the abundance and distribution of fish in the area of interest, and that would be the background against which
20 you would want to test for any potential effects of say having the drilling operation there.

MS PAINE: And so several years is five, ten?

DR MacDIARMID: Well, at least three I would say in order to
25 ease a reasonable year to year variation in these sorts of things.

MS PAINE: That's been really helpful, thank you.

CHAIR: Dr MacDiarmid, just a little bit more about the Kahurangi up-welling, if you wouldn't mind. You heard my question earlier?

30 **DR MacDIARMID:** Yes.

CHAIR: I mean, I don't know how well-studied this particular feature, if I can call it that, is. Does it ever move into the sort of mid-upper Bight area, or is it always confined to the lower area?

DR MacDIARMID: Well, the first question first. It was very well studied in the 1970s and 1980s. It's been less well studied since, but our knowledge of up-welling in the area has increased through satellite coverage and that sort of thing. So, we know a lot more about the spatial extent of areas of cold water up-welling and the consequent or subsequent primary production in the upper water colony.

So, I think the main thing to reflect on is it's highly variable and there will probably be no place in the South Taranaki Bight, including in the area of interest, that would not be potentially affected by this up-welling from time to time. So, I think it's best to think of it as in a probabilistic sense, and that there may be occasions where the up-welling or the downstream effects of the up-welling, which is what we're really talking about. The up-welling occurs off the Kahurangi shoals and then the products of that is carried into the South Taranaki Bight and evolves in a dynamic way over time as the phyto-planktonic bloom, and they're grazed down by phytoplankton which is what many of the bird species are actually tracking.

So, from time to time there will be those aggregations of krill occurring at any place in that whole system, but there's nothing to suggest that the area around where the drilling operations is proposed to take place, is particularly special. It's no more special than many other places and possibly a little less given what we know about where the core up-welling and its downstream krill populations have been observed in the past.

CHAIR: What drives the distribution?

DR MacDIARMID: Of krill?

CHAIR: Yes.

DR MacDIARMID: Well, firstly there's got to be up-welling to drive the initial production of nutrient rich water and you heard how last summer that up-welling didn't really occur, so in absence of that up-welling there won't be any upturn in krill populations. But in any normal year, assuming up-welling does take place, then the particular location of the subsequent downstream or down current krill populations will be driven by local weather events, both tidal. Initially it will be what the tides are doing, and then very much where those surface patches of krill are being driven by the prevailing winds.

CHAIR: That makes sense to me, thank you for that.
Mr Allen.

DR MacDIARMID QUESTIONED BY LEGAL ADVISOR

DR ALLEN: Firstly, thank you, I knew I had read somewhere about tuna and Hokio Beach, so that was in your Executive Summary so thank you for covering that off. Overall, in terms of the robustness of the information and its suitability to provide a sound basis to support your conclusions, you're happy with the information that's available for the conclusions you've reached?

DR MacDIARMID: I am.

DR ALLEN: Now, at paragraph 3.12, but just in summary, you say that the fish species, little - not little is known but 50% probability et cetera of various species. Have you watched any of the ROV footage and has any identification been able to occur from that as to specific species that might be present in and around the area of interest?

DR MacDIARMID: Yes, I've seen some snippets of the ROV footage and unfortunately ROV footage is a highly unreliable way of getting a real idea of the number of

fish or the types of fish occurring in area because fish react to under water vehicles such as this and some species are attracted to the ROV and other species want to get away from it. So it gives you an impression but
5 it's a very biased impression of what the make-up of the fauna is like.

DR ALLEN: But that impression matched what you're saying in your evidence in terms of various species et cetera, as you would have expected?

10 **DR MacDIARMID:** It's certainly indicated that occurrence of some of the fish species that was in my list, or that I refer to here in this paragraph.

DR ALLEN: At paragraph 4.22 you talk about under water sound, and from a population perspective. Just so I'm
15 clear, what areas do these populations of fish move over; are they confined area or are they spread over a wide area?

DR MacDIARMID: Most species that occur in that area will have a very large wide range, a large home range, in the
20 orders of tens of kilometres if not more. Some are highly migratory species, and a few species have much more confined home ranges on the order of hundreds of metres.

DR ALLEN: And those ones that are more confined, are they
25 the more sensitive or rare species, or just tend to be common across the South Taranaki Bight?

DR MacDIARMID: Not particularly, they're not - no, rarity is not an indication of these sorts of things. Just their ecology, their behaviour for those particular species
30 means that they live most of their adult life in a more confined area. So, things like blue cod, for example, may occur as adults in quite a small area.

DR ALLEN: And finally, in terms of the conditions that are proposed, from the fish plankton perspective and marine

turtles or reptiles, you're happy with the conditions and that they're suitable to the level of effects?

DR MacDIARMID: I am. I've read through the revised list of conditions and I'm very happy with those. That relates
5 to my area of expertise.

DR ALLEN: Thank you. Thank you, sir.

CHAIR: Thank you, Mr Allen. Thank you Dr MacDiarmid for your time. Dr Lane. (Copies of Summary Statement distributed).

10

**EVIDENCE OF DR ALISON LANE
ON BEHALF OF THE APPLICANT**

CHAIR: Thank you, Dr Lane, I think you've already been
5 playing pass the parcel so feel free to unwrap those
parcels as you go through.

DR LANE: Tena koutou. So, I'll just read my Summary
Statement of Evidence and if you've got questions, I'm
happy to answer those.

10 (Dr Lane reads summary statement from start of
paragraph 1 to end of paragraph 4)

And I note that was an issue that came up as a question
later yesterday, so I'm happy to talk about that.

(Dr Lane continues reading summary statement from
15 start of paragraph 5 to end of paragraph 10)

DR LANE: So, I mean dilution will not occur that
homogenously, but that just helps get a picture.

(Dr Lane continues reading summary statement from
start of paragraph 11 to end of paragraph 15)

20 **DR LANE:** And if I can just put that into context. A visible
spill, the thresholds we've used for that are between
1/100ths and 1/2,000th of a millimetre thick on the sea
surface.

(Dr Lane continues reading summary statement from
25 start of paragraph 16 to end of paragraph 19)

QUESTIONED BY BOARD COMMITTEE MEMBERS

CHAIR: Thank you, Dr Lane. Let me just pick up your
30 paragraph 4. The first question is, obviously the
20 litres is the threshold above which an emergency
spill response plan is actually required. So, is that
20 litres designed to basically to contain to avoid the
need for a spill response plan?

35 **DR LANE:** No.

CHAIR: It's another coincidence you're going to tell me?

DR LANE: It's completely a coincidence. When we looked at what we thought we should consider in the Impact Assessment for deck drain release, the one thing we wanted to be was really conservative, we wanted to make sure our assessment was based on the worst of the worst.

5
10 In practice, the configuration of the deck drains and how materials are handled and where they're used, means that in pretty much every case if a spill on deck was to occur, it would be in an area where there was full containment and no discharge to the deck drains. So, this is a barely credible event, I guess.

15 But then we said, well, okay, in some circumstances something might spill on to the deck. The plan would then be to clean it up as far as possible, but there could be wind blown dust if it was a dry material, there could be stuff in nooks and crannies that can't feasibly be cleaned up before they get washed into the drain system.

20 We looked at, well, how much do we think that could be, and it's a bit of a, you know, how long is a piece of string. We looked at the precedents set by the Shell Maui Deck Drain Consent which allowed for 20 litres of material to go into deck drains. So we thought, well, that's probably a pretty fair starting point and we think we could certainly clean up to below that with no problem, and that's taking into account as well that there is the capacity if more than that went into a deck drain, that you can close the whole system down and not discharge that to the ocean until there's been testing of potential discharge of that material to shore. By comparison, OMV estimated 250 mls of a harmful substance went into a deck drain in that recent application. So

yes, we just went, well, 20 litres, we're really confident that that is as bad as it could be.

CHAIR: Thank you for that explanation, that's helpful. Now, obviously you've been involved with the development of conditions so do you want to just sort of talk to us a little bit about some of the remaining areas, I think remaining areas of disagreement, are there, with respect to a couple of the matters which I think fall within your bailiwick?

5
10 **DR LANE:** Sure. "Disagreement" is a harsh word. We hardly disagreed at all.

CHAIR: So, I take it that's the heavy red ones we're talking about, aren't we?

DR LANE: You're looking at the marked version or the plain version?

15
CHAIR: Oh, I think the unexpurgated version is probably the right one, so. Now, we talked yesterday about the first of those, is it called appendix 1? Yes, attachment 1.

DR LANE: Yes.

20 **CHAIR:** We've already talked about 11C yesterday and I don't think that's your issue, but I think the other one is your issue, which is condition 8 of the Marine Discharge Consent. There are two 8s, but anyway, it's the red 8.

DR LANE: So, in the clean version or this horrible A3 one?

25 **CHAIR:** I'm just having a look which one it is, sorry. Oh no, it's 8A, sorry, which is on page 32, which is the specification or not of the particular ecotoxic substances.

DR LANE: So that's on the Discharge Consent one.

30 **CHAIR:** Whichever one, yes. As I understand it from your comment there, you're seeking not to specify those substances but to leave a certain discretion because you may not be using them?

DR LANE: Correct, and I guess by way of context, because we've done further work on this and Tamarind works very

35

very closely with their chemical supplier on this, that we already have got additional information on one of these substances that shows extensive ecotoxic testing that says, actually, it's not ecotoxic in the definition of the HSNO Act, and then others that have since been replaced with less ecotoxic substances.

So, I guess that's an indication that this is a little bit of a moving feast and that if other substances come up that are technically and toxicity-wise better, that obviously Tamarind wish to have the option to use those.

The other thing I think which is really key, is possibly we were trying to be too helpful in providing this level of detail about what we knew about the substances that were likely to be used, and certainly this has not been able to be done in any of the previous deck drain applications because the planning of the project hasn't been that advanced, and so other applications have not specified the substances that can be used.

We provided these which are only examples from the drilling muds and from the cementing products, because we considered those had the greatest risk of potentially significant volumes, just because they're the things that there's a lot of being handled. But then, as we note, within the Impact Assessment there's other things that could get into the deck drain, you know, cleaning products, hydraulic fluids, splashes of diesel or whatever. So, these were just provided as, look, these are sort of the worst case that we can think of, but we certainly think it's not appropriate that that should be conditioned.

We do think it's appropriate that the conditioning states, and this is consistent with previous

applications, that the least ecotoxic substance that can be used, is used.

CHAIR: Yes, thank you for that. If we accepted your wording on that - let me ask the question. Is there some sort of reporting requirement on that, or as it's framed it just, from just this one condition it would appear to leave that entirely to the discretion of the operator to determine what is the least harmful substance.

DR LANE: Correct. If it was a normal discharge consent where you're applying to discharge something, and I think, as Ms Wallace has pointed out, we hope never to have to exercise this part of the consent because the plan is not to spill material on the decks.

CHAIR: Yes.

DR LANE: So, normally you would provide a lot of specifics to the EPA, and at the risk of speaking on behalf of Mr Peacock, you know, I think Tamarind will probably be happy with a condition that said once the final list of chemicals is known and absolutely nails down at the beginning of the programme that that list would be provided to the EPA.

MR PEACOCK: Yes.

CHAIR: I'll leave that for you to bring forward as a condition, but I would certainly expect that if you were to operate that condition, that there would be some sort of reporting requirement or some certification requirement perhaps.

DR LANE: I guess the other thing to note is that there will be details of every harmful substance, oil, paint et cetera, held on the rig that will be submitted to the EPA as part of the emergency spill response plan. So, we can't operate without that plan. That will be pre-approved and that has all the information about how much of every substance and what its ecotoxicity ranking

is that's held on board the rig, any quantity above about 20KG.

CHAIR: And just remind me what happens with that plan, that plan is submitted?

5 **DR LANE:** It's submitted to both Maritime NZ, who review all the oil spill and oil inventory information, and it's also submitted to the EPA who review all of the chemical inventory and chemical spill response information.

10 **CHAIR:** And then that has to be approved before things can happen presumably?

DR LANE: Correct and so that is regulated under -

CHAIR: Is that a joint approval process or do they approve part each sort of thing?

15 **DR LANE:** They each approve their own part. So, you've got the option of providing them with two plans, one each, which is sort of operationally pretty impractical, so both agencies are happy to have the plan combined. So, for the EPA it's regulated under the discharge and dumping regulations, and for Maritime NZ it's under
20 Marine Protection Rules, Part 1(3)(i).

CHAIR: All right, thank you for that. I didn't take a note of some of the other matters that were tossed back to you. Can you just remind us?

DR LANE: My name seemed to come up a lot.

25 **CHAIR:** Yes, I wasn't sure whether that was purposeful or just because you're at the back-end.

DR LANE: So, one was the rationale for the 20 litres, are you happy with how we've covered that?

CHAIR: Yes.

30 **DR LANE:** Then there was a question about the synthetic-based versus the water-based demands and the toxicity, and one thing I would mention with that, because obviously we've been reviewing all of the chemicals used in the programme for the purposes of the non-notified discharge
35 consent is, firstly, I want to say that of those

water-based milling fluids, not one of them contains any ecotoxic substances. However, if for some reason that was to change, that would also, it would have to be subject to a discharge consent under the discharging and dumping regulations, which would be a non-notified consent that would be approved by the EPA because of the intention to discharge those water-based fluids. So yes, that's just to clarify that one.

And then I had you were mentioning all of these different thresholds, MARPOL versus the oil spill thresholds, and so on were making your head hurt. They make all of our heads hurt. Were you content with the response you got from Dr King on that?

CHAIR: Well, I understand them but I just wasn't sure how they sort of translate, and I still don't. I still can't make that translation.

DR LANE: I guess the key thing about the MARPOL regulation, which has obviously been in place for long time, it's internationally recognised, it gets debated pretty regularly at the IMO, is that is at the point of discharge. So, the monitoring equipment is from bilge water from machinery spaces. It doesn't actually in MARPOL apply in any shape or form to deck drainage. There are no regulations in MARPOL, no international standard for deck drainage.

And it is the point of discharge and you have to achieve it by treatment. You can't just add more water to your bilge tank to dilute it to 15 parts per million, that's not how it works, and obviously that is on the basis that once that discharge hits the water, there will be further dilution.

In the case of the spill modelling, the thresholds that are used, as Dr King explained, are based on a vast amount of ecotoxicity data that's been collected over many decades, and I think, as he tried to explain,

ecotoxicity data is pretty horrible to work with because everyone uses different species, they use different methods of exposing them, there's different exposure times, there's different end points and then they all
5 choose different ways to measure the oil content of the water they are using, so it's pretty horrific having done a PhD on it. So, but basically those thresholds -

CHAIR: But you passed, did you?

DR LANE: Yes, I did.

10 **CHAIR:** That's good. Just checking, you know.

DR LANE: Thank you. So, you know, the thresholds that they're basing it on are based on that kind of ecotoxicity potential response, you know, what levels do you think might affect plankton, what levels do you
15 think might affect less sensitive organisms.

CHAIR: I guess the thing that I got assurance from was just the exposure time, I mean that's the one that kicks it basically.

DR LANE: It is, it is, and it's not to say that you won't
20 get an effect in the immediate area of a discharge but just because of that dilution, the potential effects reduce pretty quickly as you move away from the point of discharge.

CHAIR: Okay, thank you. Mr Allen.

25

DR ALISON LANE QUESTIONED BY LEGAL ADVISOR

DR ALLEN: Thank you, sir. Just a few questions, Dr Lane, and they solely relate to the conditions and I'm using
30 the attachment 1 version, so the red-lined typed version which is page 4 I think of your joint statement with Mr Faithful.

DR LANE: Yes.

DR ALLEN: And some of these are just for flagging and for
35 thinking about rather than maybe needing a response now

and they could come through legal subs or something, but they're just thinking.

In terms of condition 1, there's obviously all the documentation referred to in there. Through evidence
5 more material has come before the Board. Something to think about is whether evidence is also referred to in that list, because some of the evidence is slightly different to the RFI et cetera, and it has been updated, so.

10 **DR LANE:** I would definitely defer that to legal counsel, and I guess also look at, has that been applied in any previous marine consent applications. I'm not aware that it has.

DR ALLEN: And whether that might actually make it more
15 certain to Tamarind as well as to everyone else. Then actually some of those are minor so I will discuss them directly I think with legal counsel, if that's okay, Mr Chair?

CHAIR: Yes.

20 **DR ALLEN:** Just condition 8 on this one, I think this might be the one that Ms Paine has already referred to and the consultation during the term.

The preferred wording is "at least annually" during the term. Now, obviously the term is for five years but
25 the drilling might be nine months. You're happy with that? Or something to think about. If the drilling was nine months there might be one meeting which might be entirely appropriate, but it was just a thought in terms of the level of engagement that might occur through that
30 condition, and I know there's agreements behind this.

DR LANE: Yes and I would simply defer to the agreements. For us, at least annually during the term of the consent as opposed to the term of the activities was originally proposed by Tamarind and has not been varied through any
35 discussions. So, that's a five year -

DR ALLEN: Okay, that's something I can discuss. I'm just not sure the best way of getting this publically out there so I can discuss it.

MS WALLACE: I can respond to that. We did talk about this
5 and obviously the iwi involved requested it, and as I understand it the meetings post the drilling activities would be in relation to monitoring that was going on. And so the monitoring is obviously required for the term of the consent and that's why it's longer than the
10 actual duration of the drilling activities. It also reflects the fact that Tamarind is willing to have that ongoing relationship with these iwi.

DR ALLEN: And a similar one with condition - well, it's the second condition 9, because the first one is blank.
15 Just again totally understand there's agreements and things, and that consultation hasn't been requested.

The removal obviously from them, is whether they're in or out, and it's an issue for Tamarind to consider obviously but given the obligation is consultation, it's
20 just something to consider whether they're in or out.

DR LANE: I guess one thing I would mention in respect to this, is the monitoring referred to in this condition relates to any monitoring that for the planned activities, this is separate to monitoring that would
25 occur if there was some kind of unplanned event, which is addressed in other conditions both in the marine and the Marine Discharge Consent, and in both of those cases where it was an unplanned event, which potentially would effect the rohe of Te Korowai, then they have been
30 included as someone who would be consulted on the nature of that monitoring. The monitoring referred to in this condition is for planned activities within the area of interest, and I think the point made previously in the legal submissions is that our understanding is that is
35 within the rohe of Taranaki Iwi, so that is why we had

referred only to Taranaki Iwi in that particular condition.

DR ALLEN: And that's on the basis Ngaruahine is further inland rather than coastal?

5 **DR LANE:** Yes, further south.

DR ALLEN: Further south, thank you. Now to condition 10A, and I'm sorry, I'm just picking up on Mr Faithful's comments just so you get the chance to respond to them.

10 There's a letter there and it says, highlighted to be made available to the hearing upon request. Just something to think about is whether actually having that letter would provide further evidence for the Board or not. Up to Tamarind, but I just wanted to flag that for everyone's attention. So it's more a comment, sorry,
15 than a question but something to think about.

In condition 11 on page 12 there's an advice note to. Just something, and it's something I'll ask Mr Faithful as well, but whether that needs to be a condition or whether as an advice note it's okay?

20 **DR LANE:** I think both of us were more than happy with it being an advice note, and that is one that subsequently in the clean version, information was provided and Mr Faithful, from my understanding is he's agreed that our wording in that advice note is appropriate based on
25 the legislation.

CHAIR: I might just note, I'm somewhat notoriously known for disliking advice notes.

DR LANE: I'll keep that in mind, sir.

30 **DR ALLEN:** And again with condition 11B there's a comment there about, to be made available, so just whether that would assist the Board in making its decision there?

MS WALLACE: Can I just respond to that. So, those letters were provided to, as between Dr Lane and Mr Faithful. He had indicated that he was uncomfortable agreeing to
35 the condition unless he had evidence from the Iwi as to

their position. Those letters have been provided to Mr Faithful. If the Board requires them we are more than happy to provide them but I think the point to be taken of it is that he was satisfied with that evidence,
5 and that's reflected in the agreed conditions that are in attachment 2.

CHAIR: All right. Do you have a view?

MS PAINE: Actually, I'll just ask one thing, Ms Wallace. We've got two sets of conditions here. We've got an
10 attachment 1 and an attachment 2, and I'm thinking I know for myself I've been working on attachment 2.

MS WALLACE: I think, I mean I would suggest that everyone work from attachment 2. I think it's confusing having the two.

15 **CHAIR:** It is except you can't see the workings in attachment 2, and the workings are always where it matters basically, so.

MS PAINE: So I'm thinking, for me, that attachment is where you got to?

20 **MS WALLACE:** That's where Dr Lane and Mr Faithful got to.

DR LANE: Correct.

MS WALLACE: Attachment 1 really just reflects how they got there.

DR ALLEN: Then turning to 11C which I note it's been
25 discussed, this synthetic-based fluids. As I understand it there from the reading, the key concern for Mr Faithful is probably the second and third paragraphs which ensure the volumes.

30 The first paragraph on synthetic fluids, I think there was discussion that that might be re-worded or re-considered with closings, so it's just a flag there. I think to the degree there's disagreement, it's as you said earlier, very minor and will readily be resolved.

MS WALLACE: Mmm mmm.

DR ALLEN: Condition 17, I'm on page 20 and I am working off the attachment 1, sorry Board. There's the comment there about WorkSafe et cetera and further evidence and that type of thing. Again, there's the highlighted part
5 there and obviously it's up to Tamarind but I just wanted to flag that for the Board's attention.

DR LANE: In that case I had sent Mr Faithful some wording, direct extracts from information from WorkSafe and from the relevant regulations which he had accepted, which is
10 why in the clean version that is now green.

DR ALLEN: Sorry, lots of this is really just dotting the Is and crossing the Ts.

So, turning then to the Marine Discharge Consent. For condition 1 the same comment applies, so I think we
15 can move quickly through to condition 8, and again, this was discussed yesterday, and I think in terms again of the subparagraph (5), or Roman numeral (v), that there's wording that can be done that will readily address the concerns there, so just flagging that.

We've talked about condition 8A, and again I think there's very limited disagreement given under the table in Mr Faithful's version he has, in the event that the products above are not used, the consent holder will select and use the least harmful substances. So, both
20 conditions I think get to the same outcome with that.

DR LANE: Yes.

DR ALLEN: So, I think the red is possibly more just drafting is still underway and will be confirmed. Just noting that for the Board's sort of benefit as well in terms of
30 Mr Faithful's position. And then there's a lot of green.

Condition 10, this is page 39, and excuse me, this reflects my ignorance on it but this Marine Discharge Consent does not authorise the discharge of any drilling
35 fluids to the sea. Now that we've heard about

water-based and synthetic-based, is that condition, you're comfortable with that wording?

DR LANE: No, we're proposing alternate wording which is in column 3, and Mr Faithful has indicated that he's
5 comfortable with that alternate wording.

DR ALLEN: Sorry, thank you.

CHAIR: On your alternate there, I had underlined earlier when I read this, what's a residue?

DR LANE: Because we've got the discharge consent to allow
10 substances that are part of those synthetic-based drilling muds, if they end up on deck residues might end up in the deck drainage. So, that is actually an activity which is consented. So, by wording, you know, by not stating it, you know what I mean, we're sort of
15 actually countering what we're saying, well actually, little bits of synthetic-based drilling fluid could end up in -

CHAIR: The residue refers to the synthetic-based fluids?

DR LANE: Yes.

CHAIR: It's not something else. It wasn't clear to me
20 whether it wasn't something else.

DR LANE: No, it only refers to the drilling muds.

DR ALLEN: Then just for completeness' sake, with condition
15 on page 41, Mr Faithful's accepted the changes on the basis that (b) is also retained. So, you're happy with (b) being retained on that basis?
25

DR LANE: Correct, and that's reflected on the clean version of the conditions.

DR ALLEN: Thank you. You can always tell a Tasmanian or
30 someone who's been in Tasmania. That's all of my comments. Thank you very much, Dr Lane.

CHAIR: Ms Wallace?

MS WALLACE: Sir, I just wondered, condition 7 which relates
to the, in the Marine Discharge Consent, in the clean
35 version, relates to the constant monitoring of water. I

just wondered if Dr Lane might like to - I don't think anyone's asked a question in relation to that condition so I just wondered if you might just want to speak to that, the reasons why that is not supported by Tamarind?

5 **CHAIR:** Is this bullet 5, is it, we're talking about here? Are we talking about bullet 5 on condition 7, this new condition 7?

MS WALLACE: New condition 7.

10 **DR LANE:** Okay, so the way the way the condition is worded at the moment, it refers to there being constant oily water monitoring on both the hazardous and non-hazardous deck drains. I guess one thing to note is obviously Tamarind have provided information on the specifications of the rig that they hope to use, and it does have this
15 capacity. This is highly unusual in my experience, that particularly on the non-hazardous deck drains, which typically there would be no expectation of any kind of hazardous material, including oil, ending up in those drains, most rigs would not have that capacity and in
20 the event that there was a spill on deck that went through a non-hazardous deck drain that ended up in the water of oil, it would be reported as a marine oil spill.

25 The other thing as well is that there's settling that allows for oil to be skimmed off and that if there is concern that there's oil in the discharge, that that discharge can be withheld and pumped ashore.

30 By including this requirement that you've got a water analyser that's calibrated and measuring to 15PPM constantly on deck drains, it's very much limiting the activity to a very specific drill rig or very specific class of drill rig, and is also not consistent with other marine consent conditions that I've seen or with international practice that I've seen. As I mentioned,

the MARPOL requirement for 15PPM applies to machinery space bilge discharges, not to deck drains.

CHAIR: Thank you.

MS WALLACE: Nothing further, thanks, sir.

5 **CHAIR:** Thank you, Dr Lane, appreciate that. Now, the decimal science, Mr Colegrave. Welcome.

MS WALLACE: Sir, again Mr Colegrave is just going to read from his Executive Summary.

10

**EVIDENCE OF FRASER COLEGRAVE
ON BEHALF OF THE APPLICANT**

CHAIR: Thank you, I'll just turn that up.

5 (Mr Colegrave reads Executive Summary from
Statement of Evidence dated 20 July 2018 from start
of paragraph 1.1 to end of paragraph 1.13)

QUESTIONED BY BOARD COMMITTEE MEMBERS

10

CHAIR: Thank you, Mr Colegrave. (Board Committee Members confer). It's a very clear statement and given the assumptions that you've made in that, that's fine. We are required to take that into consideration so
15 appreciate the evidence. Mr Allen, I don't know if you have any questions?

DR ALLEN: Just a couple, sir, and they're very brief. Not that this reflects, as it's clear evidence.

20

QUESTIONED BY LEGAL ADVISOR

DR ALLEN: You mentioned the employment numbers and that there will be employing of numerous Taranaki residents et cetera. Do you have a sort of percentage of the
25 employment figures that would be regional or local or New Zealand-based?

MR COLEGRAVE: Yes, I think that's in here as well. I think for the drilling activity itself that Tamarind estimated about 40% would be from the region. So, I think we had
30 a figure of about 500 people employed all-up, which boiled down to 220 full-time. 40% of those would be in the region which gives about 90 people from the region. So, 40% is the short answer.

DR ALLEN: And that's a sort of expected one. Actually, maybe you won't be able to answer this. Have you been involved in other energy projects?

MR COLEGRAVE: Yes.

5 **DR ALLEN:** So 40% is reasonable for being consistent with this?

MR COLEGRAVE: I think it's quite conservative. The drilling rigs are going to come from somewhere else and bring its own staff, so I think 40% is pretty accurate, yes.

10 **DR ALLEN:** Thank you, no further questions.

CHAIR: Thank you, Mr Colegrave, briefly for your time on that. Ms Wallace?

MS WALLACE: That, sir, concludes the evidence for the applicant.

15 **DR ALLEN:** Sir, just so you know we do, although we haven't tested it, have Mr Rogers. It would be slightly out of order but available from 12 o'clock which is almost perfect timing except we haven't tested the Skype and I'm not sure how long we'd need for that.

20 **CHAIR:** I suggest that we take an early lunch and that will give plenty of time for testing. We won't hold the good Mr Rogers and people up, but maybe shall we come back at say quarter to 1 today and get on with it?

DR ALLEN: The only compounding issue will be ensuring that
25 Mr Baxter and Mr Broomhead in Perth are awake, and we're hoping, I think we're intending to test with them at 1 but we're not sure if they'll be in the office at 1 so we'll be able to find out then, hopefully we can bring it all forward.

30 **CHAIR:** That's all we've got for this afternoon so there's no timing issue. If there's an issue let's push it back till 1.30-2. What's your recommendation?

DR ALLEN: Sir, maybe quarter past 1 and then we can have
35 Mr Rogers and hopefully will flow relatively quickly into the others.

CHAIR: All right, let's get back at 1.15, thank you.

(Hearing adjourned from 12.04 p.m. until 1.18 p.m.)

5

**EVIDENCE OF JUSTIN ROGERS - VIA SKYPE
ON BEHALF OF THE BOARD OF INQUIRY**

DR ALLEN: Hi Justin, David here. Can you hear me?

10 **MR ROGERS:** Hi David, I can hear you.

DR ALLEN: If you can just introduce yourself and read your statement. The whole room can hear you and also see you.

15 **MR ROGERS:** Very well. I'm Justin Rogers, I'm a consulting oceanographer with Coffee, A Tetra Tech Company. I will read the statement as prepared.

(Mr Rogers reads summary statement from start of paragraph 1 to end of paragraph 5)

20 **CHAIR:** Thank you, Mr Rogers. David Hill here. I don't know if you can see me, I'm just waving in the middle here.

MR ROGERS: Yes, I can. (Board Committee Members confer).

CHAIR: Your statement is very clear, Mr Rogers. Have you got some questions you would like to ask?

MS WALLACE: I do not, no.

25 **CHAIR:** I'm not surprised. With a conclusion like that you would be daft to, wouldn't you. Mr Rogers, your statement is very clear. We had Dr King this morning and questioned him, and particularly I was keen to know whether in actual fact there were any residual issues
30 that were in disagreement between the two of you. Your statement quite clearly says there aren't and that you're satisfied on both those two heads. So, if that's where you stand, that's where you stand.

MR ROGERS: Yes, that's right.

CHAIR: Well, in that case you can sit down, we're done.
Thank you very much for your time, Mr Rogers.

5

**EVIDENCE OF FRANK LYLE BROOMHEAD - VIA SKYPE
ON BEHALF OF THE BOARD OF INQUIRY**

10 **DR ALLEN:** Hi Frank, is that you?

MR BROOMHEAD: Yes, it is.

DR ALLEN: It's David Allen here. We can't yet see you but
hopefully we'll get a visual connection shortly.

MR BROOMHEAD: I don't know if it's my end or yours.

15 **MR SMITH:** They need to turn their camera on.

DR ALLEN: There you go. Now, thank you Mr Broomhead, and
just so you're aware, you can currently see the Board of
Inquiry members I think hopefully through your camera.

MR BROOMHEAD: Yes, I can.

20 **DR ALLEN:** And the whole room here can see you and hear you
as well, and just if you could please briefly introduce
yourself and then read your summary statement.

(Mr Broomhead reads summary statement)

25

QUESTIONED BY BOARD COMMITTEE MEMBERS

CHAIR: Thank you, Mr Broomhead. David Hill, I'm waving to
you so I hope you can see where I am.

MR BROOMHEAD: Yes.

30 **CHAIR:** I hope you didn't get up too early. You don't sound
like an Australian.

MR BROOMHEAD: Actually, I'm a New Zealand citizen it's just
I came here for a visit.

CHAIR: Right, can I just ask you about your last paragraph
35 in what you've just read to us, you note that Tamarind's

commitment to progress the issues to a satisfactory conclusion. Does that mean that they're not yet concluded, or that you have seen what they've done and that you're happy that there's finality reached on that matter?

5 **MR BROOMHEAD:** Not all of my points were concluded. However, statements filed, this is because it was early in the planning process. However, the response I got from Tamarind via Mr McCallum shows that there are a number of analyses still underway. There are documents being produced and also evidence to be presented to EPA once those issues have been addressed.

10 **CHAIR:** All right. So, in terms of the traffic light system that you used in your report, so are all matters closed out to green, or are there still some amber, or where are we on those?

15 **MR BROOMHEAD:** I closed down all 24 the coloured sequence, after I concluded that they can be closed down, do not change. So those categorisations remain and once they approach the Board with evidence of what they have put in place, then they will go green.

20 **CHAIR:** So, how do we know that they should go green? What do we look for in terms of your, as you say, your capitalisations there? Because there are quite a few there that are still capitalised.

25 **MR BROOMHEAD:** Yes. I did expect the EPA, or the Board of Inquiry, to look at the review of applicant's statements against the key questions and there should be a register made, which I believe is not my responsibility. However, Tamarind should respond to the EPA with answers on those questions, either concluding them totally or the fact that information is still unavailable and work is still ongoing.

30 **CHAIR:** All right, thank you for that, Mr Broomhead. Is there any other questions? (Board Committee Members

35

confer). That's the only question we have from the Board but I think Mr Allen might have some questions for you.

5

FRANK BROOMHEAD QUESTIONED BY LEGAL ADVISOR

DR ALLEN: I'm just wanting to check quickly, Mr Broomhead, just that my understanding is correct with the comments you made.

10

In the joint witness statement of 19 September you comment that all the issues of concern or uncertainty have been resolved, and that's subject to the inclusion of certain operational understandings and undertakings that are referred to into those conditions.

15

So, in terms of the traffic light system you were just talking about. If those conditions in the joint witness statement are met, then your traffic lights would go to green, is that correct?

20

MR BROOMHEAD: If the evidence is presented to EPA, it is my understanding that EPA will then accept that evidence and the matter will be closed.

25

If I can give just one example. I asked about the chemicals that were going to be used during the drilling campaign and at this stage they do not have that information. However, they do state in the response that once this has been turned up, the types of chemicals that will be used, this will be passed back to EPA.

30

DR ALLEN: Thank you, Mr Broomhead, and we had discussions on the chemicals this morning from the experts for Tamarind. So, as I understand it as those matters are ticked off through the discussions and the conditions, then they're addressed through to your satisfaction, is that correct?

MR BROOMHEAD: I will expect EPA if they have any concerns to come back to OGS and myself to ask if the answer that they received on the evidence produced is acceptable, and I would respond to that accordingly.

5 **DR ALLEN:** And that would be matters then in terms of your joint witness statement, are they matters in paragraph 9(c) and (d)?

MR BROOMHEAD: Yes, yes.

10 **DR ALLEN:** Okay, so we're talking about just those particular matters.

MR BROOMHEAD: From the witness statement, if you look under section 9(b) where it talks about a review of the ballast control systems and records as an example, then when that vessel or a rig comes into New Zealand waters, there will be an inspection carried out and one of those areas will be the ballast control system and any maintenance records to show that it does have a Certificate of Fitness.

15 **DR ALLEN:** Thank you, Mr Broomhead, that's helpful for me because that's a future management document that can be dealt with in the future. So, thank you, on that basis I have no further questions.

CHAIR: Ms Wallace?

25 **FRANK BROOMHEAD QUESTIONED BY MS WALLACE**

MS WALLACE: Good afternoon, Mr Broomhead.

CHAIR: Mr Broomhead, these are questions coming from counsel for Tamarind.

30 **MS WALLACE:** I just want to confirm with you that there are no additional conditions that you are suggesting be imposed on these consents with respect to this information that you're talking about at the moment?

MR BROOMHEAD: That's correct.

MS WALLACE: And I just want to make sure that - well, can you confirm for me that a number of the documents that you are talking about are subject to approvals under different marine management regimes. So, for instance
5 the training requirements in paragraph 9(b), you understand that those are requirements that are not subject to the EEZ Act?

MR BROOMHEAD: I do, yes.

MS WALLACE: Thank you, no further questions.

10 **CHAIR:** Sorry, Mr Broomhead, you looked as though you were about to say something else after you said "I do". Normally people do say something else after that. What were you thinking of?

MR BROOMHEAD: I was just wanting to clarify, yes, indeed
15 there are a number of documents that are in the process of being developed, key documents such as the oil spill contingency plan, the safety case for the rig emergency spill response plan, and these will meet a number of the questions.

20 **CHAIR:** All right. Thank you very much, Mr Broomhead, that's fine. Thank you for your time, appreciate that. You can go.

MR BROOMHEAD: Thank you.

CHAIR: He's gone, summary execution.

25 **DR ALLEN:** We just need to find the next person.

CHAIR: I think we should do all hearings like this.

DR ALLEN: Sir, Mr Baxter is saying that 1.45 may be
possible, 2 p.m. definite. Maybe if we have a short
adjournment and find out, but Ms Wallace has something
30 to say.

MS WALLACE: Sir, I was going to say that there were a couple
of questions that you raised this morning in relation to
the loss of well-control issue and the contingency
wells. If it's suitable Mr Peacock could answer those
35 questions now.

CHAIR: Fine, that's a good idea. Just get Mr Baxter to standby.

DR ALLEN: Also, sir, just something while we're waiting for this is Mr Faithful is available this afternoon so could
5 follow on from Mr Baxter, who I don't envisage will be long either. It's up to the Board but that way if would then free up more time tomorrow.

CHAIR: Absolutely. I wasn't sure whether Mr Faithful wanted a double slot or not, or whether the conditions are at a
10 point where one slot later on tomorrow is sufficient.

MR FAITHFUL: I'm happy to work with the Board's request. I think the issues have been pretty well-traversed.

CHAIR: Yes, that's what I was thinking from this morning.

MR FAITHFUL: I could provide a summary on my position on
15 those and then it could be determined if we need a dual slot tomorrow.

DR ALLEN: And Mr Faithful would be available to do that this afternoon if that assisted.

20

**RESPONSE BY JASON PEACOCK
ON BEHALF OF THE APPLICANT**

CHAIR: Good afternoon, Mr Peacock, thank you.

5 **MR PEACOCK:** Good afternoon, so my recollection is that there were a number of questions in regard of clarification on well-control and the potential for a well-control incident and a blowout. So, I've attempted to draft a bit of a response on that to help provide some clarity
10 around that. So, I'll read, if you don't mind, and I'm also happy to take questions and to speak ad-lib as well.

I think the thing that I need to explain initially is, well, the difference between a well-control incident
15 and a blowout, because they are two quite different things and they have different risk profiles and different likelihoods of occurrence, and also before I do that I think it's important just to explain how well-control is provided.

20 So, let me explain first what provides primary well-control and secondary well-control.

So, primary well-control is provided by the mud and the fluid system that we use when we drill a well, and that is the weight of the mud that we use in the
25 drilling process. That mud does a number of things but its primary purpose is to prevent the reservoir from flowing into the well bore. So, we need to keep the weight of that mud greater than the pressure that's being exerted by the well bore. That's our primary
30 mechanism for well-control.

CHAIR: How do you know, I mean how do you respond to that? How do you know how much pressure, or how much weight to pressure you have to apply?

MR PEACOCK: That's a good question, especially in the
35 context of this particular application and these wells.

CHAIR: Yes, because you're sidetracking as well, so you're going horizontally, aren't you, not just vertically?

MR PEACOCK: Correct, yes. So, the very useful thing about this programme is we're drilling these wells in an area
5 that we've undertaken a lot of activity in the past, and we've also been producing from this particular area for the last 11 or 12 years. So, our knowledge of this area and our understanding of the reservoir and of the pressures and temperatures of that reservoir is very
10 high. It would be difficult to argue that it could get higher. We have drilled in excess of 20 wells in this particular area, all of which have intercepted and targeted this particular reservoir that we're drilling, or we're proposing drilling as part of this application.
15 So, we know this particular area very well.

So, to answer your question, it's based on prior experience and prior knowledge.

Now, the secondary means of well-control is through the use of the blowout preventer, or the BOP, which
20 everyone I'm sure has heard of. This is a piece of equipment that's located on the seabed, it's attached to the top of the well and it's one of the very first things that we install in the well before we start our operations and our activities.

Now, again, on this particular programme we're very
25 fortunate that we can put the blowout preventer on very early on in the process, almost immediately. In some programmes you do have to drill some of the well without the blowout preventer being installed, but in this case
30 it's installed almost immediately.

Now, this blowout preventer, it comprises a number of valves and flow lines, and other pieces of equipment that allow us to shut down the well bore at any time we wish. The blowout preventer is a piece of equipment
35 that has very rigorous inspections and procedures

surrounding it, and it has to go through a certification process that is approved by both local and international standards. So, they're the two means of controlling a well in the event that we have a well-control incident.

5 **CHAIR:** But the BOP is in place before you start putting the muds down, I mean before you penetrate the reservoir?

MR PEACOCK: Correct.

CHAIR: So you've got the combination of the weight of the mud and the BOP if you need it.

10 **MR PEACOCK:** Correct, and as we've said a few times as part of this hearing, we'll be exiting the well bore out of a cased hole, so we're very fortunate we've got a very well-secured pressure envelope. We've got good integrity around the well.

15 Now, just a little bit of context around a well-control event and a blowout because they're two -

CHAIR: Just on the casing issue, so the wells are producing at the moment, all the wells are producing at the moment?

20 **MR PEACOCK:** Yes.

CHAIR: So, you do know the integrity of those casings?

MR PEACOCK: Before we commence any operations there's a series of tests we do on those casings to make sure that they do have pressure integrity. So, we do that as part
25 of operations continuously but Iain's team will put together a programme, Mr McCallum's team will put together a programme that allows for testing to get done.

I should also say that this whole well construction
30 process that we're describing today, and over the last few days, is subject to an independent third party auditing process called a well examination scheme. So, anything that we do will be examined and approved by an independent examiner. So, that's a body outside of our
35 organisation that does this work for us, and that is

also a statutory required process that we have to go through.

So, sorry, back to the well-control event versus a blowout.

5 A well-control event is an event where the primary well barrier, that being the fluid, or the column of fluid, exerts less pressure on the reservoir than what is required to stop it flowing. So, ie the reservoir might start to have what we call an influx or a flow
10 into the well bore.

It's important to point out that not all well control events result in a blowout. Overwhelmingly the vast majority of these are controlled by processes and procedures on the rig, and essentially what we do is we
15 correct the mud weight deficiency to address that influx. It may involve closing the BOP, it may not, but it's controlled on the rig.

To identify and to manage a well-control event we've got very rigorous monitoring of the mud, the fluid
20 system and of the well parameters, and that's done on a continuous basis. So, there's somebody whose reason for being offshore is to monitor that system and to make sure we don't have anything untoward occurring, and again, there's a very rigorous set of procedures and
25 processes around that particular part of drilling a well.

Now, a blowout would only occur in extremely rare occurrence or circumstance when we have an influx into the reservoir that we were not able to control and that we weren't also able to use the BOP to control that
30 event, and that influx of fluid made its way to the surface and created a blowout. Now, this isn't a process that happens quickly, it's something that takes a significant period of time. It doesn't happen in a

minute or two. It would require an ongoing and sustained lack of response to this particular process.

CHAIR: So, what are we talking about, give me an envelope?

MR PEACOCK: How long that would take?

5 **CHAIR:** Mmm.

MR PEACOCK: I'm going to defer to Mr McCallum on that, typically how long would it take for that to become something serious?

MR McCALLUM: 8 to 10 hours.

10 **MR PEACOCK:** Now, to answer your question, sir, on what would cause a loss of well-control during a drilling process or entering into the reservoir. So, we would have to have a process whereby the mud weight reduced below that, what is required to prevent the reservoir flowing.
15 So everything I explained previously about our understanding around the reservoir and our knowledge, we would have to be quite wrong with that and to let the mud weight fall below that required.

CHAIR: How's the mud rate actually - how do you increase the
20 rate, I mean is this done by rams or something, or physically how is it done?

MR PEACOCK: How do we adjust the rate?

CHAIR: I mean, you've obviously got 3000 metres or whatever it is, so you've got the mud column in effect, but how
25 do you increase that?

MR PEACOCK: So, to increase the weight of the mud we add additives to it and specifically that barite, that's a weighting agent. We can also increase the flow rate that is being introduced to the well by pumping mud
30 through the drill string to the drill bit. So, the mud is introduced at the point where the drill bit is located. It sits down the bottom of the well. So, we would have to get our mud weight wrong as a start.

And I have to point out that a complete breakdown in
35 processes and systems on the rig would need to occur for

this to happen. This is not something that can happen quickly or without noticing. We'd have to have a complete breakdown in the systems.

We would then need to have a failure of the
5 monitoring systems and alarms. So, the mud system itself has got a system of monitoring flow rates, pressures, weights, temperatures that would have to completely fail and not alert us to the fact that the mud system was seeing something untoward.

10 We're able to measure quite accurately the amount of mud that we're introducing into the well and the amount of mud or fluid that we're getting back out of the well. And so it's kind of like a material balance, what goes in should equal what comes out. If we're getting more
15 out than what we put in, we know that something else has introduced itself to the well bore. So, we'd have to have a failure of all those systems and the alarms.

We would then also have to have a complete loss of
20 pumping capacity on the rig. So, our ability to pump fluid back into the well bore would have to fail, and that would mean we'd have to have a complete loss of power and backup power on the rig as well.

And then finally, the BOP itself would also have to
25 fail. So, we have the ability to close the BOP even in the event that we have no power.

CHAIR: How do you do that? Have you got some sort of auxiliary system operating, do you? I mean if you lose power -

MR McCALLUM: If you lose power on the rig, the BOP shuts.

30 **MR PEACOCK:** Also known as a dead man's handle, so these things shut automatically.

CHAIR: So, the default is closed in fact.

MR PEACOCK: Yes. We've spoken through some of this area but just to confirm why is this a low risk at Tui.

So, it's at a low pressure reservoir. As Mr McCallum pointed out yesterday, it's normally pressured, so if we needed to just the mere principle of introducing seawater to it would prevent it from flowing.

5 It's very well-known. We've drilled a significant number of wells into this very specific reservoir that we are drilling into, and as I've said, we are drilling, or the vast majority of this well is already secured behind casing, and in our analysis we haven't been able
10 to determine a case where there as been a blowout of a cased hole well drilling the side track with the type of reservoir that we're talking about. But nevertheless we take a very conservative approach.

So, this all sounds very good but we don't treat this
15 particular part of our business lightly. So, our fluid weights are designed conservatively with enough capacity, in there in case we are slightly wrong. There's a significant amount of redundancy in the blowout preventer. So, there's seven potential barriers
20 in the blowout preventer. There's seven different rams or barriers that we can close for shutting the well if we had to, and as we've described, if there is a complete loss of power to the BOP, then it closes automatically anyway.

25 The personnel that are involved in this particular area must have things called well-control certificates, and this is a certificate that's issued two yearly - is that right, Mr McCallum?

MR McCALLUM: Yes.

30 **MR PEACOCK:** Every two years they have to go through a training course and be assessed as being competent. And then we regularly undertake training drills and exercises, both prior to the rig arriving and while the rig is on location, to make sure everyone knows what

they need to do to respond in the event that there were an incident.

CHAIR: That's very helpful, we appreciate that. (Board Committee Members confer). Thank you for that and thank
5 you for arranging that.

JASON PEACOCK QUESTIONED BY MS WALLACE

MS WALLACE: Can I just ask a couple of additional questions.
10 Are you aware of any incidents globally of blowouts arising from side track drilling?

MR PEACOCK: Not that we're aware of. We've done research on it but no, we're not aware of any that have occurred globally. Not with this type of programme that we're
15 proposing, correct.

MS WALLACE: And the other question that was put to us this morning was in relation to the five side track wells that have been applied for and the questions around the fact that three are planned and two are contingent. Do
20 you have any comments around - can I just clarify the specific question in relation to that?

CHAIR: Well, it was whether you've actually applied for two contingencies, so rather than five side tracks. I mean, as I say, you've gone for four wells. Arguably
25 you could go down all four if you've got five side track options rather than three options and two contingencies?

MR PEACOCK: Yes, correct.

CHAIR: And does it matter? I mean, I guess that's the other question.

MR PEACOCK: That's a good question. When we made this
30 application we were still at the early to moderate phase of the planning process and we had a number of targets that we thought we could identify. So, we requested the opportunity to drill five side track wells. We've since
35 matured our understanding of what potential there is in

this reservoir and as it stands at the moment we believe that there are three opportunities that we would like to address.

5 As Mr McCallum pointed out, it's possible through geological reasons or through mechanical reasons that we may wish to have more than one attempt at one of these three side tracks, and we would like to still retain that opportunity or that capability.

10 So, I guess my response to that would be that we would request that it be considered that our original application is still valid but the information that we can give you is that we understand that we will probably only drill three, short of a problem with the geology or short of a problem with any mechanical type of issue

15 **CHAIR:** So if I can just summarise that. So, you're confirming that the application is for up to four wells and up to five side tracks?

MR PEACOCK: That's correct, yes.

20 **CHAIR:** That's just for my understanding, that's good. (Board Committee Members confer). Thank you very much for that, thank you for clarifying, that's very helpful. So are we going to try Mr Baxter?

25

**EVIDENCE OF IAN BAXTER - VIA SKYPE
ON BEHALF OF THE BOARD OF INQUIRY**

- 5 **DR ALLEN:** Hello, Mr Baxter, it's David here. Can you hear me?
- MR BAXTER:** I can.
- DR ALLEN:** Just so you're aware, Mr Baxter, you can hopefully see the Board of Inquiry in front of you?
- MR BAXTER:** Yes.
- 10 **DR ALLEN:** And the whole room can see you here up on a big screen, just so you know that, and we can all hear you as well. So, if you could please introduce yourself and read your summary and then answer any questions, thank you.
- 15 **MR BAXTER:** Yes, sure. Ian Baxter, I've been engaged on behalf of the EPA to look at the marine environmental aspects of this proposal.
 (Ian Baxter reads summary statement from start of paragraph 1 to end of paragraph 4)
- 20 **MR BAXTER:** And there is my statement.
- CHAIR:** Thank you, Mr Baxter. I'm not sure we've any questions for you, I'll just check. (Board Committee Members confer). No questions from the panel. That's very clear, thank you very much. I'll see if there are
- 25 questions from anybody else.
- MS WALLACE:** I don't have any questions, sir.
- CHAIR:** No questions at all. So thank you for coming in and giving us your time, Mr Baxter.
- MR BAXTER:** Very good, you're most welcome.
- 30 **DR ALLEN:** Thank you, Mr Baxter and have a great morning.
- MR BAXTER:** I will do, thanks very much.
- CHAIR:** Thank you, Mr Allen, appreciate that.
- DR ALLEN:** Now, sir, we do have Mr Faithful if you would like to, or whether you want to have a brief adjournment and

then come back, or whether you want to just hear him tomorrow morning?

CHAIR: Let's just have a conversation with Mr Faithful.

Mr Faithful, do you want to come forward and we'll have
5 just a quick conversation.

MR FAITHFUL: I've got a written statement that is 99% done so I can read from that and then -

CHAIR: Would you prefer to complete it and then provide a copy for us?

10 **MR FAITHFUL:** I can talk from it and then produce it, it's relatively short.

MS WALLACE: Sir, can I just confirm because I did want to just take a few further instructions from my clients on conditions. I'm just wondering, will Mr Faithful be
15 available tomorrow if there are questions that arise out of this?

CHAIR: Absolutely, I'm anticipating that that final session in actual fact is a final consent conditions session. So, would you prefer a break now or?

20 **MS WALLACE:** No, I'm happy to hear what Mr Faithful has to say.

**EVIDENCE BY LUKE FAITHFUL
ON BEHALF OF THE BOARD OF INQUIRY**

MR FAITHFUL: I've got an introduction section which says I
5 was the author of the Conditions Report, and then
further to the report there was the preparation of the
informal conferencing statement. So, I'm just
paraphrasing what I have written here.

I've not revisited the items from the
10 Conditions Report as things have progressed. This
statement provides an update on the matters in
contention. I agree with those matters in contention
identified within paragraph 18.8 of the opening legal
submissions and I discuss those now.

CHAIR: Let's just have a look at what 18.8 actually says.
15 So, this is the paragraph referring to the
four outstanding matters.

MR FAITHFUL: Correct. So, with regard to the marine consent
conditions I provide the following comments.

20 Condition 7 in attachment 2, which is condition 8 in
attachment 1, is outlined in the paragraph 18.8(a) in
the legal submissions. I'm satisfied that Te Korowai o
Ngaruahine Trust has expressed that they do not require
inclusion in the condition and therefore support the
25 removal of this party from that condition.

Condition 12. So, the condition that I'm referencing
is the attachment 2 condition, previously condition 11C.
Based on the evidence of Mr McCallum and Dr Lane I
consider that the use of the water-based drilling fluids
30 will not result in any effects that were not identified
and anticipated as part of the technical assessments
undertaken in support of the application. Therefore, I
consider that it is appropriate to specify water-based
drilling fluids within condition 12 if it is considered
35 appropriate. Additionally, I note that a key element of

the condition which will control the effects are the second and third paragraphs of the proposed condition. So, the retention of those is the important part.

With regard to the marine discharge consent
5 conditions -

CHAIR: Can I just check, the retention of those two isn't opposed, is it?

MS WALLACE: No, sir.

MR FAITHFUL: With regard to the marine discharge consent

10 conditions. So, condition 7 which was attachment 2, previously condition 8, paragraph 18.8(c) of the opening legal submissions states that Tamarind considered that the requirement for the constant monitoring has been unworkable and unnecessary. Further, based on the
15 comments from Mr McCallum and Dr Lane at the hearing, I understand that the issue relates to the requirement of the monitoring being constant. While I accept the position of Tamarind's experts, I consider that the condition should require that the discharges from the
20 drainage system to comply with an oil/water content of no more than 15 parts per million - I don't think that's been argued - prior to discharge, but accept that this can be provided for through monitoring prior to a discharge event as opposed to a constant monitoring.
25 Therefore, I propose the following amendment to condition 7, which I was just working through as we were talking. So, I can propose some additional wording, otherwise -

CHAIR: That's the 0.1% you haven't got to yet, is it?

30 **MR FAITHFUL:** Yes. I guess, when I was reading through the requirements of the condition, condition 7 was essentially provided to essentially set the performance standards for the drill rigs.

When I was initially drafting the section 9
35 conditions in the Conditions Report, I referenced the

use of the HYSY rig and was referencing to an appendix, and then sort of moved away from that and provided the sort of key performance standards which essentially were captured by those rigs.

5 So, I toyed with rewording this condition 5 as saying "shall monitor by use of X", but it's actually wording it in that manner would mean it's essentially a monitoring condition on a discharge and essentially is instilling a limit. So, I think the wording, I just
10 have to give the wording a bit more thought because it's actually a performance standard saying that the way it was previously worded, is that the rig shall have a mechanism that constantly monitors. So, because it's a performance standard, so it may actually sit better as
15 an individual condition.

CHAIR: So you'll have a conversation overnight and tell us tomorrow what the answer is?

MS WALLACE: Yes.

MR FAITHFUL: We can have a discussion about that. In terms
20 of condition 8, which is previously the condition 8A, again paragraph 18.8(d) of the legal submissions outlines that identifying the specific harmful substances as unworkable and unduly restrictive. This position is also being supported by various Tamarind
25 experts.

 In the event that condition 8 only contained a table of the six substances, I would agree with Tamarind's position. However, as the condition also contains the additional wording that provides for situations where it
30 is appropriate to use other materials that are the least harmful (ecotoxic substances available) that is technically capable...I consider that the condition is not unduly restrictive as there is a mechanism within the condition which allows other products to be used.

I also consider that the reporting of the substances used is also an important stage in the process as this keeps the EPA permanently updated.

5 Finally, that's the format is that we're in contention. I just have a note there that I support the proposed amendments to Condition 10 of the marine consent, that changes the intention of restricting the maximum number of anchor placements to each location, as opposed to any one time.

10 I think I have covered off the issues as I understand it.

CHAIR: Any questions?

DR ALLEN: No, thank you, sir.

CHAIR: You've still got some time to sort out any

15 differences on condition 8 on the discharge, so between now and tomorrow so that's good, otherwise we will do what we will do. Thank you, Mr Faithful. Thank you, Mr Allen, that's it?

DR ALLEN: Yes, thank you, sir.

20 **CHAIR:** Is there anybody else we can leverage in now? No? Can't give a reply now?

MS WALLACE: No, sir.

CHAIR: All right, well I think in that case we're adjourned until tomorrow and I'm not sure what time - have we got
25 some confirmed start time for tomorrow now?

MS SMITS: We've got a suggested start time of 9.30 tomorrow.

CHAIR: Let's try for 9.30 and we'll see. We're trying to
30 move one of the submitters up for a Skype first thing in the morning, otherwise we won't be able to start until 10 o'clock, but 9.30 here and then we'll go from there, thank you very much.

(Hearing adjourned at 2.09 p.m.)