



## DAY 2 (29 November 2018)

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**OPENING REMARKS**

**CHAIR:** Okay, we're reconvened. The Ministry For  
Primary Industries was scheduled for 10 o'clock and  
5 we have dispensed with that, so we are adjourned  
until 10.15.

**MS HEWETT:** We have the next one on.

**CHAIR:** Oh, you have the next one on? That's excellent.

10 **DANIEL LEDUC - EVIDENCE**

**CHAIR:** Good morning.

**MR LEDUC:** Good morning.

**CHAIR:** Introduce yourself, please. Good morning, I'm  
15 Mark Farnsworth, I am Chair of the DMC, welcome,  
nice to see you. On my left I have Gillian Wratt  
and Basil Morrison.

**MR MORRISON:** Kia ora good morning, morena.

**MS WRATT:** Morena.

20 **MR LEDUC:** Nice to meet you, I am Daniel Leduc, I am a  
scientist at NIWA, Wellington.

**CHAIR:** Great, okay. You have filed an additional  
statement, why don't you read it, please, for the  
record?

25 A. I filed a summary of it. Should I read the summary or  
the whole -

**CHAIR:** No, just read this page here.

A. Okay. So, in summary, I will just say what we did. NIWA  
was contracted by the EPA to undertake a review of some  
30 of the documents provided CRL to support their Consent  
Application.

**MS WRATT:** Dr Leduc, sorry just pause. Can you just  
shift back a little from your computer? That's  
better. We are just seeing the bottom of your chin

on the screen in front of us. That's a much nicer view, thank you.

A. Thanks for that. Okay, I will go through the bullet points then.

5 **CHAIR:** Thank you.

A. So, I identified key methodological and analytical shortcomings in the information provided on the biological community at the NDA, particularly pertaining to benthic communities. These shortcomings limit the conclusions that can be drawn if the same methodology  
10 continues to be used.

Gravity corers such as the one that used for obtaining benthic biota samples in the NDA are rarely used in monitoring studies because they are not deemed  
15 capable of consistently retrieving undisturbed core samples. I recommend testing the adequacy of a gravity corer by doing a pilot study using both a gravity corer and multicorer (which is considered best practice).

There was little consistency in the dimensions of the cores, the nature of the replicates, or the core processing methods used during the six benthic biota surveys conducted from 2013 to 2016.  
20

**CHAIR:** Excuse me, Dr, could you just pause, we are having a little bit of audio problems at this end?

25 A. Sure.

**CHAIR:** Just pause for a minute and we will see if we can resolve it. You're coming up in waves of sound.

A. Okay.

30 **CHAIR:** I am waiting for my technical staff to assist us. Dr, we're going to ask you to turn your video off and we're just going to try and do it by sound. I know that's not nice but I think that could improve the audio. Okay, carry on.

A. I will start at the beginning of that bullet point. There was little consistency in the dimensions of the cores, the nature of the replicates, or the core processing methods used during the six benthic biota surveys conducted from 2013 to 2016.

As a result, it is not possible to draw firm conclusions about any sediment disposal effects on the benthic biota -

**MS WRATT:** Dr Leduc, sorry, you need to pause again. In backing off, are you too far from the microphone? You're coming through really broken up.

A. Okay, I'll stand closer to it. Is this better?

**MS WRATT:** Yeah, that's much better, thank you.

A. Okay. So, as a result of these inconsistencies, it is not possible to draw firm conclusions about any sediment disposal effects on the benthic biota beyond the disposal centre site. Having said this, the impact of sediment dumping is likely to be limited within 500 metre of the NDA centre, based on estimate of the sediment mound dimensions. Future surveys need to use consistent methods to ensure comparability.

Foraminiferans dominated the benthic biota at the NDA. It is best practice to use a stain to differentiate live from dead specimens. A stain was used during only one of the six surveys conducted. I therefore have serious reservations about the quality and reliability of the foraminiferans obtained to date. The appropriate use of staining protocols, or alternative stains, should be investigated.

It seems likely that small patches of hard substrate (such as boulders or cobble) with epifaunal communities, which could include protected taxa such as stony corals, are present within the NDA. This type of community can only be effectively monitored using camera transects,

which have not been conducted to date but need to be included in future surveys.

5 Bathymetry maps obtained during past and future surveys of the NDA should be provided to the EPA to help evaluate the efficacy of the method in describing the growth of the dredge sediment mound, and any conclusions based on bathymetry data.

10 It is likely that sediment fauna will be affected by the accumulation of sediment in the order of 2 centimetres or less per year. Due to bioturbation by sediment fauna, the minimum thickness of dredge spoil sediment that can be detected using sediment cores is about 5 centimetres or more. Therefore, impacts of sediment disposal should be apparent in the benthic biota before they are detected by visual inspection and  
15 chemical analysis of the cores.

In order to provide more robust analyses, we recommend that additional control sites be sampled, at least one or two.

20 All practical means should be used to resolve the issue of statistical power, because designs with low statistical power may result in not detecting impacts until biological communities have been more severely affected than intended.

25 My last point. Defining ecologically significant impact is not formulaic and should be a scientific judgment, preferably by more than one scientist, always based on knowledge of the species involved and the role they play in undisturbed ecosystem.

30 **CHAIR:** Good, thank you for that. I am now going to ask, Gillian, if you would like to question, please.

**DANIEL LEDUC - QUESTIONED BY COMMITTEE MEMBERS**

**MS WRATT:** Thank you, Dr Leduc, and thank you for the  
5 work that you have done looking at the ecological  
work that's been done around the application.

A couple of questions specifically on the summary  
you've just read and then I have some other perhaps more  
general questions. Although first a general question,  
10 have you seen the - yesterday we were provided with some  
revised conditions and a supplementary report from  
Mr West on the marine ecology of the area; have you seen  
those?

A. I have seen Mr West's document but I haven't seen the  
15 revised conditions.

**MS WRATT:** Okay, thank you, just to clarify that.

Your second bullet point you talk about use of the  
gravity corers such and multi corer. Can you just for me  
and for clarity, we've heard about the gravity corer and  
20 then we've heard about grab sampling; so where does a  
multi corer fit into the equation?

A. Multi corer does the same thing as a gravity corer but  
better. It obtains the same kind of samples but it's  
designed to retrieve cores that are undisturbed.

25 **MS WRATT:** Sorry, that are?

A. Undisturbed.

**MS WRATT:** Undisturbed, okay. The comment from Mr West  
yesterday was that grab sampling or box coring, one  
would have potential to cause issues because of the  
30 size of vessel that you would need and, as I  
understood also, the disturbance that they would  
create. So, do you have any comment, any further  
comment in relation to that?

A. I think that the use, after reading Simon's additional

points, I think the best use of a grab or box corer, which obtains larger samples, than gravity corers and multi corers, would be in checking observations that are made using video, camera transects, which are mentioned  
5 somewhere else, because identifying animals from video or images really should be based on obtaining physical and grab samples or box corer samples and provide these kinds. Whereas, a gravity corer is just too small to provide you with a good chance of getting it.

10 **MS WRATT:** Okay, but you are recommending that a multi corer would actually address that issue?

A. The multi corer is just a better method for obtaining the core samples than the gravity corer has been, yep. So, the grab and box corer is to obtain a different type of  
15 sample and to do different kinds of analyses. This will be, you know, in addition to the corers that we obtain. In my view, the box corer for the grab would be good to obtain specimens of larger species which are not sampled well with what are deployed on the gravity corer.

20 **MS WRATT:** Okay, thank you. We may need to give a bit of thought to that in terms of the conditions and whether there's any further conversation needed with you around those conditions but I think for the moment that will do.

25 You mention the need for photographic monitoring using camera transects. There is now within the conditions a suggestion of some video footage being taken, so I think that probably addresses that issue.

A. Okay.

30 **MS WRATT:** In terms of foraminiferans dominating the benthic biota, we did have some discussion around that yesterday. I guess a question that I would have for you is, how important in assessing any ecologically significant impact is the foraminifera



monitoring as part of that benthic monitoring? It seems that it is quite difficult to find a reliable test that will actually differentiate between the live and dead forams.

- 5 A. I think the best thing would be, in order to come up with a product that is reliable, there needs to be a foraminifera expert involved and I don't think that the protocol needs to be very complicated but just needs an expert, and I don't do foraminifera. It's a lot less  
10 common than fauna too.

**MS WRATT:** Sorry, what was less common?

- A. Foraminiferans are not used as often as the fauna, simply because there's a lot more people know about the fauna than people know about the foraminifera.

- 15 **MS WRATT:** Okay. In this site, the concern with not using foraminifera seemed to be the sparsity of other foraminifera; is that correct?

- A. Yes, that is my impression as well. If you take out the foraminiferans, then you're not left with very much and  
20 that a result could be due to different things. It could be that the fauna in the area in that particular size range is sparse. It could be that using a gravity corer simply led to losing a lot of the fauna upon retrieval or even mistaken. It is either an actual thing or something  
25 that is an artefact of it.

- However, some of it may reflect the size fraction which is the macro fauna. These are retained on a half ml mesh. There will be a lot of animals that are smaller than that and lost through that mesh which would be quite  
30 abundant which haven't been considered so far.

So, yeah, it is a concern that we might end up with a lot less animals and, therefore, the analyses, the statistical power of the analyses might be low which is something that would need to be checked, yeah. But, you

know, whether that low density is real or whether it is an artefact, it is not clear.

**MS WRATT:** Okay, thank you. Which takes me on to the monitoring and any conditions around the boundary of the NDA. You make the comment that the fauna will be affected by accumulation of sediment in the order of 2 centimetres or less but the minimum that you can detect using the sediment cause in terms of new sediment is about 5 centimetres. And we're also hearing there are difficulties in monitoring just the sediment plume in itself.

So, it seems that the best way of monitoring is the benthic biota and the suggestion I think that came through from the expert conferencing was that that should be some sort of a multivariate analysis looking at the difference between the biota at the NDA, benthic biota at the NDA, and at the control sites. Do you have any comment to make on that?

A. Yeah. I mean, that emerged during our conversation, teleconferencing ... [audio disrupted] thought trying to detect anything less than this would not work very well and I agree with that.

**MS WRATT:** Can you pause again for a minute, you are breaking up again. Have you moved away from the microphone or is it an issue with the connection?

A. I haven't moved. I'll try again, shall I?

**CHAIR:** Thank you.

**MS WRATT:** Thanks.

A. Okay. So, these issues came up during the expert teleconferencing session we had a week or two ago, and I agree that detecting anything less than 5 centimetres will be difficult but we also discussed that, based on other studies conducted in shallower water, that the fauna would be impacted by accumulation of pretty small

amounts of fauna. So, yes, I do think that fauna is probably the more sensitive parameter to measure or monitor to see if there is an impact. Yeah, multi variate analyses are known to be sensitive and limited and using things like density. I think multi variate comparisons between controlled sites, so more than one, and the boundary sites would be a good way to check for impacts at boundary.

5  
10  
15  
**MS WRATT:** Thank you. Just looking at my other questions, just to go, I guess, right back to sort of one of the - to me what is a reasonably sort of fundamental assumption or piece of information, which is around the, and I am just going back to your conferencing notes, how representative this site of the NDA is in comparison to the other marine acre systems in the vicinity.

20  
So, the comment from the expert witnessing was the NDA is considered to be typical of the wider East Coast of Great Barrier, in a continental shelf habitat, based on the information that the experts are aware of. And then you go on to talk about the likelihood of rare and vulnerable ecosystems being present in the NDA and that it's unlikely there would be anything there that would not be found elsewhere in the vicinity.

25  
So, I think that's quite an important point in relation to this application and I guess I'm just checking whether you're comfortable that that's how you see it as well?

A. Yes, I'm comfortable with that.

30 **MS WRATT:** Okay, thank you. I think that's all the questions that I have for the moment.

**CHAIR:** Dr, it's Mark Farnsworth, the Chair. I just have one question and it's just really a validation one. Yesterday we've been told that the passive

plume and the associated sedimentation rates beyond the NDA are negligible. So, how do you tailor a monitoring system to fix that, to look at it sorry, not fix it?

5 A. Look at the plume or the effect of -

**CHAIR:** To look at the effect of the plume. You've just talked about it. Given the scenario you've outlined, that's what you're recommending, even given that environment?

10 A. Yes.

**CHAIR:** Okay, thank you.

**MR MORRISON:** I'm all right, thanks.

**CHAIR:** Dr, we are just having a little side talk amongst ourselves. The Panel would like you to have a look at the conditions and just run your eye over the conditions, the latest ones, which we will send you at the end of the day, or perhaps a bit later on, it could be a bit later on until we get a little more feedback from everyone, so we would just like you to do that at some stage when we send them to you.

20 A. I can do that.

**MS WRATT:** In particular, looking at the conditions around monitoring of the impact on the benthic biota.

25 A. Sure, yep.

**MS WRATT:** Great, thanks.

**CHAIR:** Any questions from the applicant?

**MR SLYFIELD:** No questions from me, thank you, Sir.

30 **CHAIR:** Department of Conservation?

**MS ARTHUR:** No, thank you.

**CHAIR:** Dr, that concludes. Look, sincere thanks for putting the time aside and persevering with this method of interfacing with us. Have a good

morning.

A. Thank you, no problem.

**MR MORRISON:** Thank you, Dr.

**CHAIR:** Okay. It says a morning tea break at 10.30.

5 **MS HEWETT:** You can keep going if you want.

**CHAIR:** Waikato Regional Council, would you like to come  
up?

**TONY QUICKFALL**  
**DR MIKE TOWNSEND**  
**CHRIS STAITE**  
**WAIKATO REGIONAL COUNCIL**

5

**MR QUICKFALL:** I am Tony Quickfall and I am the policy manager. We have Dr Mike Townsend, our coastal scientist and Chris Staite who is our senior policy  
10 adviser.

**CHAIR:** What I'm going to get you to do, gentlemen, is come up here. Let's have a problem conversation, not one at the back.

You might need that handheld mike just for the record, can we start again, just give your names again?  
15

**MR QUICKFALL:** Good morning, Panel. My name is Tony Quickfall, I am the policy manager at Waikato Regional Council. I am happy to answer any questions around the jurisdiction approach to coastal management. On my right, Dr Mike Townsend, who is our coastal scientist who can answer any questions around coastal science. And on my left, Chris Staite who is one of our senior policy advisers who can answer any questions around policy  
20 impacts. And we are happy to take any questions.  
25

**CHAIR:** Okay.

**QUESTIONED BY COMMITTEE MEMBERS**

30

**CHAIR:** You're clearly up to speed with what the application is. Is there anything that you would at this particular point before we get to see if

there are any questions that you want to draw our attention to? In particular, we are interested in the biosecurity matters, the routes they may travel etc., given the fact that your region is part of this area.

**MR QUICKFALL:** I am happy to let Dr Townsend talk about any biosecurity matters.

From jurisdiction, I presume the Panel's understanding of the different jurisdictions that we have there and our interest in that, that's my point to talk about biosecurity.

**DR TOWNSEND:** Sure. Also just to give a little bit of my background. I worked at NIWA for the last 11 years as a research scientist and some of my work involved focusing on the impacts or the interactions of invasive species in native communities, benthic systems.

The issue around biosecurity is an important one, in terms of worldwide the impacts the invasive species can have in terms of cultural impacts, economic impacts and certainly ecological impacts. So, it's certainly something that wants to be focused on, you know, fully considered.

In my letter, I mentioned a couple of aspects - or in the response from WRC a couple of things around biosecurity were mentioned to do with the nature of species which may be taken, you know, taken to the dredge site. Specifically around flora and then another wealth which hasn't been considered. In all these scenarios, we're talking about something of low likelihood, you know, between negligible and kind of a low probability but you have to balance that against the possible severity of an impact should an introduction occur.

Another point we probably need to make also, it's

not just about the invasive species which are currently in New Zealand, which are currently in these marinas. It's about species which may occur in the marinas over the consented condition over the next 35 years if species were to occur. So, we have to think about what's here now, what's the risk now, but also making sure there is a plan in place for any future risk. And there's certainly a few species on New Zealand's list of least wanted species which have yet to turn up in New Zealand but potentially could.

We have to think about both the vectors going out there and we also have to think about the risk of dredge material kind of turning up at the site.

**CHAIR:** But given the low probability, it's not a show stopper, is it?

**DR TOWNSEND:** Not a show stopper. I mean, this is down for you to decide, in terms of, these are the risks, something of low probability but with possible impacts.

**MS WRATT:** So, there's basically, there's sort of three scenarios that you're highlighting. One is the risk associated with an unplanned incident and loss of material from the barge close to a coastal site?

**DR TOWNSEND:** Yep, yep.

**MS WRATT:** Which is, yeah, potentially high risk but very low probability.

The other is, existing species. There's been some analysis done on a range of those but what you're identifying here is there are a couple that you feel weren't adequately dealt with?

**DR TOWNSEND:** Just a couple of extra bits of information but yeah.

**MS WRATT:** I guess, certainly when I looked at your comment about the Australia Whelk, the mention that



it has been recorded in the intertidal down to 100 metres depth and this is not the intertidal, is it?

**DR TOWNSEND:** The dredge site is not the intertidal, that's on the foreshore effectively, yep.

5 **MS WRATT:** So, that would indicate that the risk of it surviving at the site is less?

**DR TOWNSEND:** In its native Australia it has been recorded in the foreshore down to 100 metres depth. My understanding is we're talking 130-450 metres  
10 depth here. So, it's an unknown quantity, a low likelihood given its predominance of intertidal kind of generally lower abundance going deeper but just to provide you with the information.

**MS WRATT:** Right, okay. And then there is potential of  
15 new invasive species coming into the country. Any new invasive species coming into the country, I am not sure how we can take that into account and that would really be expecting that MPI Biosecurity New Zealand would be looking at, you know, that issue  
20 if there was a new species coming in.

You have commented about a statistically robust monitoring framework. So there, I guess, you are looking that any monitoring in the NDA will be designed so it will pick up any invasive organisms coming into there?

25 **DR TOWNSEND:** Yes. The well designed monitoring programme, from my perspective, is more around kind of the impacts of dredge spoils and in that regard it's because there's a kind of curve which is basically by the time we're in a position to detect  
30 invasive species in the marine realm, there is very little we can often do about them. So, when they're here, they're here.

There's a few examples around the world where people have managed to remove invasive species but they are kind

of few and far between. Generally because we have much less of an idea compared to terrestrial systems of kind of what's under our water at any point in time, by the time invasive species start to creep up and are  
5 identified in our monitoring programme, often there's a delay between when the sample is taken and when it's analysed and going to a special taxonomist, by the time invasive species turn up and we're able to detect them in our country, there's very little we can do for most  
10 invasive species in terms of removal because predominantly the invasive species, one of the things that make them successful is they are very adaptable to these environments, they're very hardy kind of pioneering species.

15 **MS WRATT:** That sort of monitoring really is more around the source site than it is around the NDA?

**DR TOWNSEND:** Yes, that's correct.

**CHAIR:** That would be part of the consent rather than what we're doing? The extraction consent, that's  
20 your area?

**DR TOWNSEND:** Right, yes, yeah, yep.

**CHAIR:** Anything else, Gillian?

**MS WRATT:** On another topic, which I guess is more of a planning one, I think you've really said you don't  
25 have any comment. It is just we did have a question of you in terms of what you perceived as the demand for dredging in the Waikato region.

**MR QUICKFALL:** Yeah, Chris can respond to that one. We just want to clarify, just so we understand, is the  
30 question around the demand for dredging in the Waikato to get new material to put into the EEZ, the demand for material?

**MS WRATT:** Yes.

**MR QUICKFALL:** Chris can answer that one.

**MR STAITE:** Good morning. So, I do wish to apologise, I've spent the last three weeks in Central America and today is my second day back in the office, so I may be a little bit not up to speed but I have  
5 looked at the second question from your last request to the Regional Council.

Six months ago I talked to our resource officers, our consent officers and some of the coastal scientists around exactly how dredging and reclamation, what occurs  
10 in the Waikato for the review of the coastal plan.

At the moment, from my understanding, there appears to be low levels of maintenance dredging, the canal housing around the Coromandel where it's mostly mud that they're dredging up and for the various estuaries that  
15 are managed, where TDDC does some dredging, there is a requirement under the plan for all cores sediment sand to be returned to the coastal system and it is mud or contaminated sediments that are required to be removed from the coastal system.

20 **CHAIR:** So, you have a clear differentiation?

**MR STAITE:** 6 months ago there was just this maintenance dredging. Since then, there has been consultation with the Council about a reclamation and dredging on the Coromandel side. And, with that, trying to  
25 establish whether or not there was contaminated sediment there. It's not just a matter of going out and grabbing a sample. You've got to have quite a well designed sampling programme to avoid - to work out if there's any hotspots. So, I  
30 think they are going through that investigation at the moment. Whether or not it is contaminated material affects the activity status. Prohibited or discretionary seem to be the two choices.

And theoretically, if that was approved, there is

still a very strong policy requirement to maintain sand and cores sediment in the coastal system but the mud and the contaminated sediments would be required to be removed and their suitability to be used in any proposed  
5 reclamation would have to be carefully considered.

I would say that it does seem that a new significant dredging in the Waikato does seem reasonably few and far between.

**CHAIR:** Basil?

10 **MR MORRISON:** Mr Chairman, just to confirm that in my mind again. The Regional Council will be looking at the consents in regards to the areas within your issue, i.e. in particular the eastern seaboard of the Coromandel. And the Regional Council has a  
15 role in consenting of, taking of that material?

**MR STAITE:** Yes.

**MR MORRISON:** What's the experience been to date of the history of consenting and monitoring and any exceedences in recent times? I am mindful of the,  
20 as you will be aware, I've lived in the area, in the Whitianga Marina, I don't know, what 15 years maybe, so what's been the experience?

**MR STAITE:** I've only been with the Council for one year, so my history may be a little lacking. My  
25 understanding is, the Coastal Plan, we are still under the first generation Coastal Plan that was notified in 1995. It became operative in 2005. It's due for its review which we're progressing at the moment but there are a lot of things, a lot of  
30 provisions in it are quite dated and it does not give effect to the NZCPS2010. It's inconsistent with our Second Generation Regional Policy Statement which became operative in 2016.

So, the programme at the moment is to notify a

Second Generation Coastal Plan late 2020 that will give effect to national and regional direction.

5 In terms of demand for dredging, I believe that the construction of the marinas in the Waikato, they have all been through the Courts, they've all had conditions, I believe, imposed by the Courts and they have involved large amounts of reclamation.

10 I really don't know where any dredged material went from any capital dredging there. All I know is the maintenance dredging is subject to retaining the sediment within the coastal system.

**MR MORRISON:** So, to your knowledge, there's been no issues in the last Whitianga? I mean, Tairua came on, what, 5 years ago, whatever, so there's been no issues that you have been aware of that have caused you concern in your jurisdiction?

**MR STAITE:** In terms of consented dredging and disposal, I have heard nothing from the rud or the science team. Although, it will be the second generation plan we are proposing to address biosecurity, biosecurity Vectors and such other things in the plan and that will be something which will need to be taken into account with coastal permits.

**MR MORRISON:** Okay, thank you.

25 **MR QUICKFALL:** I can probably just add to help with that. We do work closely with the consenting, so we are from the policy section, closely with our consenting colleagues. Often if there's issues or concerns or things around monitoring we get to hear about them. I have been at the Council for 5.5 years and around dredging that hasn't become anything that we have become aware of in terms of issues.

I do have something here from our Team Leader

Coastal Consenting which might help in terms of just confirming what Chris has been staying.

5           What Suzanne has said is that maintenance dredging, you are probably aware of this, at Tairua Marina deposited back into the system. The principle is, we take it out, we keep it in the same system. She has indicated thought that the Coromandel Marine Gateway Project, which I don't think we have got consents for, I think it's scoping at the moment, is potentially  
10 significant in terms of new material coming out.

          And we don't know yet because the application hasn't been processed where that material might go but that will just go through its normal process.

**MR MORRISON:** Okay, thank you.

15 **CHAIR:** Applicant, any questions?

**MR SLYFIELD:** No questions from me.

**CHAIR:** Department of Conservation?

20

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**TONY QUICKFALL**

**DR MIKE TOWNSEND**

**CHRIS STAITE**

5

**QUESTIONED BY MS ARTHUR**

10 Q. I am curious about whether you have anything about the  
clean hull biosecurity and what you do about making sure  
vessels coming in and out, into the Coromandel, what the  
state of their bottoms are?

15 **DR TOWNSEND:** Yes, I guess there's a couple of things  
there. I talk from my experiences which are kind  
of relatively limited in terms of my recent arrival  
at Council. In terms of some of the kind of  
consent conditions, so just around agriculture,  
there are kind of guidelines around what is  
expected for vessels in and around agriculture.

20 In terms of, kind of, pest management plans and,  
kind of, pathway plans, Waikato, there isn't, kind of,  
great detail around the marine realm within those plans.  
Currently Northland Regional Council would be the Council  
that kind of stands out in terms of providing guidance  
25 around vessels. But you are right, keeping vessels  
clean, that's the main way of reducing Vector risk, in  
terms of increasing the spread of invasive species when  
they're here.

**MS ARTHUR:** Thank you.

30 **CHAIR:** Anything else?

**MS ARTHUR:** No.

**CHAIR:** Right. Gentlemen, that really is about all we  
require. A long way to come but thank you very  
much, we just needed reassurance on a couple of

points and that's very helpful to us, so thank you  
for that.

**MR QUICKFALL:** Cool, thank you.

**CHAIR:** So, why don't we adjourn for a cup of coffee and  
5 come back in 15 minutes, thank you. We stand  
adjourned.

**Hearing adjourned from 10.44 a.m. until 11.06 a.m.**

10

**CHAIR:** We will reconvene. This is turning into a very  
laid back hearing in terms of how we're operating.  
We now move to Auckland Council. Kath, would you  
15 like to come up the front please?

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**KATH COOMBES**  
**AUCKLAND COUNCIL**

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**CHAIR:** Just give us a minute, we will just find your statement. Welcome. Quick introduction please?

A. I am Kath Coombes, Principal Planner with Auckland-Wide  
10 Planning at Auckland Council.

**CHAIR:** Ms Coombes, do you have anything you want to add to your statement?

A. I've sent in two sets of answers to questions, so it's not really a legal statement in the normal sense of  
15 evidence.

**CHAIR:** No, it is a point of clarification.

A. No, I don't have anything to add to those.

20

**QUESTIONED BY COMMITTEE MEMBERS**

**CHAIR:** Tell us a little bit, expand. There is a statement on demand, can you expand on that a  
25 little bit for the disposal?

A. Sorry, which statement are you referring to?

**CHAIR:** It said there is a demand in Auckland for disposal of dredging or did I get that wrong?

A. That question was more directed at Environment Waikato.  
30 But in the presentation that I attached to my first letter, I did have a map of all the marinas and port sites in Auckland which collectively do create a definite demand for dredging and that material does have to go somewhere, yes.

We had done a report for the preparation of the Unitary Plan in 2012 which assessed dredging consents and found there had been 42 dredging consents between 1994 and 2012, most of them maintenance dredging and eight capital dredging.

5

**MS WRATT:** In your 26 November response, you talk through or outline the policies around disposal of material?

A. Yes.

10 **MS WRATT:** Can you just summarise that for us? I mean, I'm asking you because it's quite salient in terms of other alternatives to marine dumping.

A. Right. In terms of alternatives for disposal of dredge material, yeah, it wasn't entirely clear how much detail you were expecting with the question but just a very high level outline what the key alternatives are, being on land, in Hauraki Gulf, at a West Coast site, reusing reclamation projects and in the EEZ where this application is. And so, there's some pretty obvious conclusions that can be reached for any of those general categories.

15  
20

In terms of the Hauraki Gulf Unitary Plan, it has a clear policy that we should avoid dumping of dredged material within the Hauraki Gulf Marine Park. That was also in the Legacy Regional Coastal Plan and it comes out of the Disposal Options Working Group process from the 1990s.

25

In terms of a West Coast site, most of the West Coast will be pretty impractical in terms of sea conditions or adverse effects in the harbours in terms of effects on navigation or surf breaks or ecological sites.

30

Re-use in reclamation has been quite a realistic and practical alternative in the past. A lot of material has gone into Ferguson but that is nearing its completion.

And then you have the key alternatives really being land issues or in the EEZ. It's quite hard to draw a general conclusion comparing all land options and all EEZ options. Both of those alternatives need an assessment of the site in terms of the costs and practicalities and then what the environmental effects would be.

**CHAIR:** It's interesting, just by way of comment, that we have an economic analysis that shows that land-based disposal is five times that of the dredging disposal in the EEZ in terms of cost.

A. Yeah, that was interesting but it was also for one site and there was another site mentioned in a response from David Hay, I think, saying there was another site for Mahurangi which was much less cost because there was a more practical site and there were less consenting options and there was less transport.

I think those two examples illustrated the scope that you can get between very expensive on land and very cheap on land. And I think each marina will cause demand for - they need dredging, it has to go somewhere, but at each occurrence there will be a range of options.

**MS WRATT:** So, when you're doing your consenting process for the dredging, do you assess the disposal options as well as part of that process?

A. We don't assess it. We determine whether the applicant has applied for all the necessary consents. So, we would ask them where is this material going? Do you actually need another consent that would be an earthworks permit for earthworks on land or are you dumping it in the CMA so you need a coastal permit? If they respond, no, it's going in the EEZ, we would require proof of that. You have a permit.

And then that would be largely the extent of assessing the effects of the dumping itself but we would

be assessing the effects of the dredging operation. So, we are assessing what the application is for, yeah.

**MS WRATT:** So, the fact that there is a consented site for deep-water disposal in the EEZ, does that, to  
5 an extent, sway the options towards use of that site, rather than an investigation of land-based options?

A. I think it would be more up to the applicant to do that investigation of what's the best alternative for the  
10 disposal. That's not the Council's role in that process.

**MS WRATT:** Sure, yep, I appreciate that, okay.

**CHAIR:** Basil, do you have anything?

**MR MORRISON:** No, I'm good, thanks.

**MR SLYFIELD:** Mr Chairman, if I may, I have one  
15 question.

**CHAIR:** I was going to come to you people, don't worry, I was just about to do that. Now questions from the applicant.

20

**KATH COOMBES - QUESTIONED BY MR SLYFIELD**

Q. Just one question. It's a jurisdictional question, I  
25 guess. It relates to the fact that the evidence for the applicant is that the sediment that's dumped at the Northern Disposal Area will give rise to some sediment plume in the water column and with knowledge of the currents it can be modelled that some of that sediment  
30 will go across the boundary of the Northern Disposal Area and will, in all likelihood, be carried into the Coastal Marine Area.

Does that cause you to have any concern or would you like to comment on the Council's jurisdiction in terms of

managing the Coastal Marine Area and whether or not that amounts to - whether that triggers, in your mind, any consenting requirement?

5 A. I think that's really a legal question. I don't know if it's really in my area of expertise to give an opinion on that. My initial thoughts would be the activity is not in the Coastal Marine Area, it is more the role of this process to consider the effects of that activity and that will include consideration of the effects in the Coastal  
10 Marine Area. And in that, I would expect a significant weight to be placed on the Hauraki Gulf Marine Park Act and it's section 7 and 8 in terms of the values of the Gulf. But, no, I don't think it requires a joint application because some of the effect will go into the  
15 Auckland Coastal Marine Area.

**MR SLYFIELD:** Thank you. That is the only question I have, thank you.

20 **KATH COOMBES - FURTHER QUESTIONED BY COMMITTEE MEMBERS**

**MR MORRISON:** Just a clarification for me. So, within  
25 that Coastal Marine Area which is the responsibility of the Auckland Council, okay?

A. Yes.

**MR MORRISON:** That includes the Hauraki Gulf Maritime Park boundaries?

30 A. Yes.

**MR MORRISON:** So, there was some questions in fact from me yesterday in regards to just how close the disposal area is to the boundary of the Hauraki Gulf Maritime Park boundary, i.e. which is Auckland

Council as well.

A. Yep.

**MR MORRISON:** And the EEZ and the effects of a plume  
impacting across that boundary. Have you  
5 considered that in your areas of responsibility?  
And, if so, is there a concern there? I think the  
applicant's lawyer was touching on that as well but  
I just wanted to put it in my language.

A. Yeah, I think when we first looked at it, we thought the  
10 activity and its scale of effects would all be in the  
EEZ.

**CHAIR:** I am going to refine that question a little bit  
further, if you don't mind, in light of the  
factors, the amount of sediment that actually is  
15 going to be, is very, very minor that would enter  
that area. So, does that still cause a concern?

A. Yes, I saw on some of the expert conferencing joint  
statements that some of those effects were thought to be  
negligible at the outer edges of the plume. That doesn't  
20 cause a great concern for me, that there's been no  
Resource Consent Application under the Resource  
Management Act.

**MR MORRISON:** Thank you, that's really what I wanted  
said, so thank you very much.

25 **CHAIR:** Department of Conservation?

**KATH COOMBES - QUESTIONED BY MS ARTHUR**

30

Q. This is probably outside your area of expertise but I am  
kind of interested in the biosecurity stuff that we  
talked about with Waikato as well. They commented that  
Auckland may have had better policies about biosecurity

and clean holds and things like that. Would you like to comment on that in relation to this application?

A. So, we have a much newer Regional Coastal Plan or a revised Regional Coastal Plan but they haven't done a  
5 Second Generation plan yet. In our Unitary Plan, we have new rules about biofouling and the cleaning of vessels. So, it's pulling harmful aquatic organisms into an RMA framework in terms of discharges from vessels as they passively release material from the hull and also when  
10 they do active cleaning.

In terms of commercial vessels and the passive discharges, that's permitted activity regime that's linked to keeping a clean hull under the Craft Risk Management Standards. So, it's trying to integrate with  
15 the Biosecurity Act and, yeah, marry up the two Acts really.

So, I think vessels operating under this permit would need to meet those requirements.

We have biosecurity officers who are expanding their  
20 work in the marine space, so they are doing more responding now to possible infusions and inspections of possible sites on the islands. So, we probably do more in that area than Waikato does, yep.

**MS ARTHUR:** Thank you.

25 **CHAIR:** Any further questions?

**MS ARTHUR:** No, that's fine.

#### **KATH COOMBES - FURTHER QUESTIONED BY COMMITTEE**

30

#### **MEMBERS**

**MS WRATT:** Just one clarification for me. I probably should know this but the Hauraki Gulf Marine Park,

does that extend all the way to the boundary of the CMA to the east of Great Barrier Island?

A. Yes, it is the Coastal Marine Area of Auckland and Waikato regions.

5 **MS WRATT:** Right, okay, thanks.

**CHAIR:** Okay, Ms Coombes, thank you very much for coming and answering our questions.

**MS COOMBES:** Okay, thank you.

**CHAIR:** Right. Well, people, again we've got a few  
10 minutes of time, actually quite a few minutes of time before the next person turns up at 1330, so we stand adjourned. Perhaps the applicant, you might like to carry on working with people to -

**MR SLYFIELD:** We will see what we can achieve.

15 **CHAIR:** Good, thank you. Just on a point of clarification, people, we have excused Maritime New Zealand. The panel has no questions from Maritime New Zealand. DOC, do you have questions of Maritime New Zealand?

20 **MS ARTHUR:** No.

**CHAIR:** So, what we will be doing, is we have the Hauraki Gulf Marine Park Forum at 1330, that will be the last person for the day.

**MS WRATT:** No, Mr Pederson.

25 **CHAIR:** Sorry, Mr Pederson we've got later as well.

**MR SLYFIELD:** Very good, Sir.

**CHAIR:** Okay, thank you.

**Hearing adjourned from 11.22 a.m. until 1.29 p.m.**



**DISCUSSION AS TO PROCEDURE**

**CHAIR:** I want to do some housekeeping for next week. A  
5 little bit of thinking laterally on how we schedule  
next week. As you know, Tuesday, December the 4th  
is a non-hearing day. The economists, the planner  
for the DMC and the closing statements have all  
being scheduled for Wednesday the 5th.

10 If expert conferencing on economics have been  
completed and the joint statement circulated to all  
parties, the economic witnesses could be brought  
forward to Tuesday. The planners might also all  
like to appear together on that Tuesday, clearly  
15 because of the conditions, and then the closing  
statements, if we got to there, could be on Tuesday  
afternoon or Wednesday morning. How do you feel?

**MR SLYFIELD:** It sounds like a very sensible thing for  
the applicant if what we have presently on  
20 Wednesday is all on the Tuesday, if that ends up  
being feasible.

So, the applicant supports having everything  
that was identified for Wednesday on the Tuesday,  
dependent on how the economists have tracked and  
perhaps depending a bit on the DMC's planner,  
25 Ms Clarke, having sufficient time to get to the  
position that she needed to be in by Wednesday  
afternoon. It just puts that bit more pressure on  
her.

30 **CHAIR:** DOC, would I upset the apple cart?

**MS ARTHUR:** Not at all, no.

**CHAIR:** What I'm trying to do is, there's a huge cost of  
everyone gathered here all the time and I am  
thinking, you know, everyone - there are a lot of

dollars represented in this hearing and a lot of effort and if we could take one day out of the schedule for everyone, I think that could aid everybody.

5                   So, can you think on it and let me know tomorrow?

**MS ARTHUR:** There's absolutely no problem with the economists, they can get themselves organised and I'm sure we can.

**MR SLYFIELD:** It is entirely supported by the applicant,  
10                   I can tell you that. From my perspective, it is just a question of the economists and also whether Ms Clarke can be ready to go on Tuesday afternoon.

**CHAIR:** Okay. Gen, have you got the gist of that?

Okay. We will let you know on progress.

15                   Can we now move to the Hauraki Gulf Marine Park Forum. Would you both like to come up over here, please.

20

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**JOHN MEEUWSEN**  
**KATINA CONOMOS**  
**EVIDENCE**

5

**CHAIR:** Can you introduce yourselves first, please?

**MR MEEUWSEN:** Okay, my name is John Meeuwsen, I am the  
Chairperson of the Hauraki Gulf Forum which is the  
10 custodian, if you like, of the Hauraki Gulf Marine  
Park Act.

**MS CONOMOS:** My name is Katina Conomos, I am the Interim  
Executive Officer for the Hauraki Gulf Forum.

**CHAIR:** Welcome to you both. Mr Meeuwsen, you have just  
15 tabled a new document, you are going to have to  
read that please.

**MR MEEUWSEN:** The entire document?

**CHAIR:** This one, presentation notes, you will need to  
read that.

20 **MR MEEUWSEN:** Okay. All right, I didn't realised I  
would be on for that long but there you go.

(Mr Meeuwsen reads document headed "Presentation  
notes to Decision Making Committee, Environmental  
Protection Authority")

25 **CHAIR:** Thank you, Mr Meeuwsen. Starting with you,  
Mr Morrison?

**JOHN MEEUWSEN**  
**KATINA CONOMOS**

30

**QUESTIONED BY COMMITTEE MEMBERS**

**MR MORRISON:** Thank you, Mr Chairman. Just a couple of  
comments. You will have read, no doubt,  
submissions and the applicant's responses leading

up to the hearing process today and you would have seen in regards to the issues of transportation across the gulf, across your area of concern, and the issue of emergency dumping, for instance, is  
5 one case, and we've heard that there have been two cases of that in the last 6-8 years and both of them have been as a consequence of a mechanical failure. And we've heard to date there's been one vessel that's had to hove to on the Eastern  
10 Coromandel because of the difficult weather.

So, the question on that particular area to you is, do you still see that as a major?

**MR MEEUWSEN:** Given the nature of the risk, unfortunately yes, (a) because of the increasing  
15 volume of traffic for dumping and - you know, when and in due course I presume it will be ramped up from the levels over a period of time but in due course the movements will be quite frequent daily and if they're not kept up, I imagine that will  
20 bank up and so even if there's periods of lull because of weather or other things, they will still be the same number of movements.

So, when you add to that climate change and increasing bad weather potential over a 30 year period,  
25 yes, indeed, because it only takes one biosecurity issue or things like the trace elements of zinc. You know, here we are with roofs still letting a tiny amount of zinc off, our muscles and, what word am I looking for, the muscles etc. are extremely sensitive to this stuff,  
30 so the potential for risk is very, very high, so yes.

**MR MORRISON:** Do you see, you mentioned there's some  
26 iwi that have some affiliation or connection to the Gulf, to the Maritime Park. How do you see or can you see them being involved in any sort of

structure or forum for advice? How do you see that being played out? I note in their concerns of being able to monitor which is a different role; how do you see that being played out?

5 **MR MEEUWSEN:** No, that's not for me to answer. Even the six tangata whenua representatives on the forum would have trouble with that one, I think, other than to make the general statement that you would expect that there would be a mechanism for them to  
10 do so and the way that they engage with that is for them to determine or they have an entity that is strictly theirs that has some sort of role but that's not a subject on which I would venture a particular view.

15 **MR MORRISON:** I understand that. You've mentioned in here the alternatives of disposal. How would you see that being played out in regards to - well, we've certainly heard evidence because of land effects siltation of the marinas is causing an  
20 issue for berthing of ferries etc., etc., and we've heard and seen evidence in regards to the costs and the difficulties of disposal on land and access on land to dispose. Have you got any further views on how that can be managed?

25 **MR MEEUWSEN:** No, I don't have the expertise to do that. I am aware that, you know, the sort of landfill scenario that used to apply to the Ports of Auckland have gone as far as they can go now and that, in any case, we are not allowing any  
30 reclamation around Auckland on the current political will settings. So, I take it as read that it will be a very difficult issue to deal with this on a land disposal basis. I understand the difficulty, so I can only, yeah, give my

understanding personally to the fact that this is a complicated issue and maybe one of the reasons why we have to contemplate this sort of thing but, ideally, we shouldn't have to.

5           Just quite how we trade-off these risks, I know to be highly complex and probably quite costly. I can only note that the source of the dumping material is marinas and I personally have a view that we shouldn't have any more of those, including in Kennedy Point. Thank you,  
10       Mark.

**CHAIR:** I was one of the Hearing Commissioners on that hearing. We granted it.

**MR MEEUWSEN:** However, we are the City of Sails, so again we have to be reasonable about this stuff.  
15       It is inherently difficult but I would issue, I am an economist by trade, people that create the problems should be paying for the clean up. I have no problem with that view. And so, if it is expensive, whatever the end point is, or we have to  
20       change our ways to reduce the extent to which we need to dump this stuff in the first place, then so be it.

**CHAIR:** Okay. You are fully aware, of course, our responsibility is the dumping site and most of  
25       those issues you've raised and, Mr Meeuwsen, you've said in your opening comments you are not here as an expert, you are here as a generalist and that's why I'm asking these questions, not as an expert witness.

30       **MR MEEUWSEN:** Yes, thank you very much, I have no problem with the questions.

**MR MORRISON:** So, the issue will be, of course, just how it plays out with your forum responsibilities of the transportation through your area of

responsibility because, of course, as we know, it's outside of the park.

**MR MEEUWSEN:** It is outside the park, other than the extent to which, presumably you will look into this  
5 deeply, there are currents at play that may or may not bring it back in. There will be plumes. You know, the process of it going from the ship down to the ground level, sea level, floor, will have a variety of risks involved and I'm very pleased that  
10 you're looking so deeply at all this stuff.

**MR MORRISON:** No pun intended.

**MR MEEUWSEN:** No, no pun intended.

**MR MORRISON:** All right, thank you.

**CHAIR:** I am going to traverse an area with you about  
15 risk and boats and numbers of boats.

What do you think that the percentage of the increased trip is against the increase in pleasure boats and visiting boats in terms of your quantification of risk?

**MR MEEUWSEN:** Sorry, Mr Chairman, I am not quite sure -

**CHAIR:** Okay. There are tens of thousands of boat trips from other sources bringing in potentially nasties. How do you think the increased number of these trips, in terms of risk, again balanced against  
25 that risk, because it seems to me that it seems rather minor?

**MR MEEUWSEN:** Which begs the question as to whether or not we should be allowing as much as we are now. So, I live on an island, for example, where there  
30 is not a single place where boaties can get rid of their sewerage. As Chairman of the Gulf, we are in the business of reducing risks and problems with whatever is fouling the waters. We are not in the business of adding to them because they are only

just a slight increase. So, sorry, I don't buy the line of logic that says, look, this is a matter of a 2% increase or something to that effect.

5 What we're saying is, we're already pooping literally in our own nest and we need to start reducing that, rather than contemplate making it worse.

I would add to that, that the nature of the material we're talking about here is inherently stuff that sits under all those boats where they sit still week after week. The vast majority hardly ever move.

10 Auckland, it is estimated, use their boats about 80 hours a year, I think it is. So, no, I'm not moved by the question, let alone the logic of it.

**CHAIR:** Okay. The Act is not a no risks Act -

15 **MR MEEUWSEN:** Granted, so this is -

**CHAIR:** Just let me finish, please. It is not a no risks Act, so therefore what level of risk should we accept?

**MR MEEUWSEN:** No, I can't answer that. I don't have the expertise to do that.

**CHAIR:** Okay.

**MS WRATT:** Can I follow-up a little bit on that risk question? In paragraph 24 of what you've read out today, thank you, John, you say you want to bring our attention to two risks. I am not quite clear, you talk a lot about the biosecurity risk, so what is your other risk?

**MR MEEUWSEN:** Thank you. The two are basically the transit issues and the biosecurity - well, three if you like actually. The transit issues and the sedimentation/biosecurity issues that apply to those. The needing to dump if adverse circumstances happen. And the other one is the biosecurity risk more generally at the time dumping



site, currents and flows that accrue to that.

**MS WRATT:** Okay. So, the sediment -

**MR MEEUWSEN:** The sediment mostly, I would have thought, although currents are everything here, I would have  
5 thought. You know, how confident are we for a start that they stay in place the way they are now for over 30 years? That's one of the issues here, isn't it? We're talking about a long period.

10 So, we have to take some wet finger estimates on what could change. You know, the temperatures of the water are changing, does that change current flows? You know, what are the risks here of it blowing back, so to speak, underwater into the marine park?

**MS WRATT:** So, when you talk about unknown current  
15 flows, I am not sure how much time and opportunity you have had to look at the expert reports that we've had. I mean, there has been work contracted both by the applicant and by the EPA to look at the oceanographic currents and oceanographic features.

20 **MR MEEUWSEN:** Good.

**MS WRATT:** And the benthic ecosystems of the area. And I guess what we're being told is there is a fairly  
25 high degree of certainty currently around what those currents are and what the risks are. In fact, the risks are associated with the carrying of sediment into the coastal marine area, so into the park, or of invasive organisms from the site to the coastline, Great Barrier or adjacent coast lines is low.

30 **MR MEEUWSEN:** Good.

**MS WRATT:** One of our responsibilities is to develop conditions, so that any, if we should grant the consent, so that if there is an impact from the dumping beyond the boundaries of the site, then

that is evident on the monitoring and the conditions that are set.

**MR MEEUWSEN:** As I would expect. Then the only other question is a question of time, 30 odd years, and  
5 that can be dealt with, with monitoring and what have you.

But I would say that if it actually happens, it will be after the event that we actually know that we've got a problem but that's for you to  
10 decide, not me. I am just giving you the view that our responsibilities is to look after the health of the Gulf and we can only ask that you be very careful. That is the tenure here, that you really be careful about managing and monitoring and so on.  
15 You are very well aware of that, I know, but it is our duty to say that to you.

**MS WRATT:** So, when you refer to unknown current flows, you don't have any particular inside information that hasn't come up in the reporting that we've  
20 had?

**MR MEEUWSEN:** No, it's unknown in the sense that current flows are limited to how much you can know.

**MS WRATT:** I think you can know a fair amount about what's happening now. I take the point that in  
25 future that may change when we have changing climate, changing ocean currents, sure, but right now the evidence that we have is that there is a high level of knowledge about the currents.

**MR MEEUWSEN:** Good, in that case you have met our  
30 expectation, thank you.

**CHAIR:** We are going to be very conservative in what we do, we have to be, but we will base it on hopefully good logic.

**MR MEEUWSEN:** That's all we can ask for.

**CHAIR:** Can I just make a recommendation to you, that you take the opportunity, and I think it would be really good for some of the forum members to, to have a look at some of the evidence as a group  
5 which has been put before us, especially have a look at the way it has evolved. I think that would give the members of the forum some comfort that the DMC, through the good work of the EPA, has really put some hard questions to everyone and sought  
10 answers. Okay?

**MR MEEUWSEN:** Yes.

**CHAIR:** Right. Applicant, do you have any questions of the gulf forum?

**MR SLYFIELD:** No, thank you.

15 **CHAIR:** Department of Conservation?

**MS ARTHUR:** No.

**CHAIR:** From the EPA, have we missed anything that needs to be asked? No, fine. Thank you both sincerely for coming. John, it is always a pleasure to have  
20 you.

**MR MEEUWSEN:** Good, thank you, and I wish you all the best in your quest.

**CHAIR:** Thank you very much, we need it.

25 Where does that now leave us? We have got one further person to get.

**MR MOGINIE:** They are on Skype at the moment waiting.

30

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**CLAUS PEDERSON****EVIDENCE**

5

**DR PEDERSON:** Good afternoon, can you hear me?

**CHAIR:** Yes, we can, Dr Pederson, we can hear you. I'm  
Mark Farnsworth, I am the Chair of the DMC. I have  
10 Gillian Wratt on my right-hand side here and Basil  
Morrison on my left.

**MR MORRISON:** Hello.

A. Hello.

**CHAIR:** Dr, you've given us a supplementary page.

15 A. Correct, yes.

**CHAIR:** For the record, could you just read that,  
please, for us.

A. Okay. I will just need to pull it up here, yep. This is  
just a very brief summary of my witness statement and  
20 also some extra points after the joint witness hearing  
and the statements we came up with.

So, in summary:

(Witness reads document headed "Summary Points by Dr  
Claus Pederson on Oceanography/Sediment Modelling")

25

**DR PEDERSON - QUESTIONED BY COMMITTEE MEMBERS**

**CHAIR:** Dr, how confident could we, as a DMC, be that  
the modelling has shown that there is negligible  
30 effect outside the NDA?

A. In my opinion, I mean, as I said, in terms of the far  
field modelling, it's quite limited in terms of the  
documentation of the model and I also have concerns in  
respect of how the results are presented because I still

think they do not present what would be the highest concentration outside of the NDA.

5           However, I do feel, in terms of impacts, that by the time the plume reaches the NDA and because of the relevant infrequent deposits, so maybe what is modelled is two per day, so it would be a plume that travels over an area relatively quickly if it's a limited plume size and in the current it will only take in the order of a few minutes to pass a given area. So, any given area  
10       could experience, in my opinion, higher concentrations than what has been documented. I would say that could easily be concentrations in the order of 10mg/L which is far above what is actually shown in the model.

15           But I think that's more an effect of how the model results are presented and the type of model that has been run. So, that's been averaged both in time and space to get those results.

20           But, in my opinion, those relatively infrequent load duration plumes would not have impacts. Again, this is not my field, I have to state, although I am an environmentalist and I do this type of assessment in Malaysia also, it's not within my scope here. So, that's why I would prefer actually just to give a little bit of presentation and let the relevant experts make that  
25       assessment.

          I have to say, Cannon Andrews has provided additional evidence and that does provide additional information. It does show, as I expect, that plumes go outside and well outside of the NDA. But what you see is  
30       it's very patchy which must be, again, associated in terms of how it's derived because I suspect that it's discreet time steps. Whereas, in the relative when it's connected to the area, you cannot have high concentrations far from the boarder without having that

trail of concentrations going from the boarder all the way up there as well. That doesn't make physical sense. Again, it is just an artefact of how the results are presented.

5           But in terms of potential impacts, I think the key for me is that it's limited volumes. It will, with the currents there and I think in terms of the ocean current modelling, although it's not directly compared to the measurements, it is comparable in terms of the statistics  
10 to the measurements, so I think that provides a good basis.

          And with those currents, it will be convicted outside of the NDA what is left in the passive plume.

          To modelling, I think is relatively conservative  
15 values in terms of assessing velocity. In fact, I think some of the material we've settled quickly also on influence of fluctuations between particles and on which has been excluded in the modelling. But I still do believe that the last proportion of the passive plume  
20 will be collected outside of the NDA.

          But I said before, in terms of sedimentation rates, which I see has been more the focus of the impact assessment, it will be so dispersed by the time it goes outside the NDA that the sedimentation rates I think will  
25 be what I would call negligible, so would not be something you can actually go and measure. It will only be an artefact that you can pull out as an estimate from a model.

**CHAIR:** That was an interesting answer. I think I got  
30 my head around it.

          Can you relate that then to volumes and number of drops? Is that going to materially change things?

A. It will - well, not in terms of impacts I think because I think we still stay below thresholds but I did note in

some of the earlier documentation from Flaim that they said because the plume doesn't go outside the NDA basically, then increasing the number of disposals would not really increase the impact risk. And that, I don't  
5 agree with. I mean, if you look at a frequency duration and intensity relation, then twice the number of disposals would - if you don't consider cumulative impacts, that would basically lead to twice the risk of an impact. So, it's closely related.

10 **CHAIR:** So, should we, as a DMC, be looking at the effect of cumulative number of trips in a 24 hour period?

A. In terms of cumulative impacts, I think there is, of course, a possibility that a plume will still be  
15 lingering when the next disposal happens and those plumes will mix. That will have a tendency to potentially increase the concentrations in the plume, meaning that outside of India you could get higher concentrations.

But overall, in terms of sedimentation effects, if  
20 anything, they could actually go down a little bit because higher concentrations in principle basically means higher tendency to fluctuation as well. So, particles mix and become bigger and therefore settle out faster.

25 So, unless there are real concerns in terms of the maximum concentrations, I don't think cumulative impacts will play a role.

**CHAIR:** Okay.

A. But the overall volume, of course, in the sediment and  
30 the number of disposal, yes, that's of course a key consideration.

**CHAIR:** I'm going to now move to other Panel members for their questions, Dr.

A. Yep, thank you.

**MS WRATT:** Thank you, Dr Pederson. Just to clarify what you were just saying about more discharges. What I'm hearing you say is that basically twice the number of discharges, you get twice the amount of sediment dispersal; is that a correct but  
5 simplistic interpretation?

A. Yes, that's correct, yeah, and that would be throughout an area. So, if you look at a given area outside the NDA you can see you expect, in terms of - quite often in  
10 terms of impact assessment, what I'm used to looking at is what is the frequency or the duration of exceeding a given threshold? So, if we, for instance, looked at a given receptor and the threshold where you say they can be affected would be 5mg/L, then we will look at the  
15 intensity and duration of that, sorry the duration of that intensity.

In that respect, the duration would be expected to more or less go up to the top for the total number of disposals, total number of volume, yes, if that makes  
20 sense.

**MS WRATT:** Yes, I think so. In your expert conferencing report, there's discussion about whether or not there should be any attempt made to actually measure the suspended solids in the water column.

25 A. Correct, yes.

**MS WRATT:** I guess, the message I've been getting is that there's a question as to whether you can actually effectively do that at the likely there was concentrations we're talking about?

30 A. Yep.

**MS WRATT:** And also that it would also be very difficult to actually measure the sedimentation on the sea floor at levels at which there starts to be any ecological impact.



And I think perhaps you were referring to this earlier on, that the message to me really is that in terms of monitoring, we actually need to monitor for impact on the benthic ecology, not try to monitor the actual dispersion of the plume or the sedimentation; any comment on that? Could you comment on that, please?

5

A. Yes, yes. I think that's well captured the agreement we came to. Peter Longdill was a little bit more adamant than Cannon Andrews and myself. I would say that monitoring of turbidity as well would be appropriate for this type of exercise.

10

My concern, I mean, we use, I'm very used to using ASP transecting which we do on a daily basis, both in Singapore, Brunei and in Malaysian products but that's more - what I know we cannot do here is actually active management, so a more adaptive management type approach.

15

At this site, it will be very challenging to measure, especially if we need to measure plumes that are not high above the background concentrations for a number of reasons.

20

First of all, the disposal plume when it comes out, it's very - it is not a mixed well defined plume. It's very variable in space as it goes through the water column and the passive plume deposit in the water column after that is very variable in both time and space.

25

For the ASP transects which we also agree is the best way to actually capture this because it's a space of plume and they can do that in a transect over depth but to get that to a quantity to correlate to a TSS, you need to make a calibration between the back scatter measures and the sediment. That means you need simultaneous measurements, and quite accurate measurements, of TSS in the water column at different depth, and that's why I see that's almost impossible to collect because of the

30

variable plume and all the water depths that we're talking about at the site. So, getting that quantification.

5 So, qualitatively, I think it's a very valuable tool. It will tell you where the plume travels, if you can follow it correctly. It will be very difficult to actually quantify that and, in particular, in terms of accuracy when you come closer to background ambient concentrations, then it will not be accurate.

10 That's why I said in my statement that in the end, and I think what we got out of our joint statement is it's a very valuable tool, in terms of confirming modelling but, in terms of the modelling that has already been done and which has to be the basis for your  
15 decision, of course it's too late for that but I think there is value in terms of monitoring if there should be any need for any future revisits the of the modelling and the results.

**MS WRATT:** Thank you. There was a comment in your  
20 initial review, and I think it just relates back to the earlier Flaim modelling, that it was not conservative in relation to the current speeds that were used.

A. Yep.

25 **MS WRATT:** I think there was a comment that high current scenarios, current speeds of 6-7 metres per second compared with observed currents around 5 centimetres per second. I just wanted to check with you, my understanding was that related to the  
30 Flaim modelling and doesn't relate to the more recent modelling that's been done by Beca?

A. That's correct, yes.

**MS WRATT:** Okay. Thank you for that.

**MR MORRISON:** Perhaps a comment on - you mentioned the

frequency of load dumping?

A. Yes.

**MR MORRISON:** And there's an understanding there would be about an hour between and you expressed, as far  
5 as I understood it, that there would be a considerable mingling of the plumes from each of those dumpings; is that what I understood?

A. There can be, it depends of course a lot on the currents at the time it is posed.

10 **MR MORRISON:** Of course, yes.

A. Because generally it's a fairly consistent current feel out there. So, the more likely scenario is the previous plume has been transported away and they will not be mingling. But if you have a situation where either  
15 there's very low currents or the currents have reversed so the plume has gone to one direction and come back with the tides, then, yes, then they can certainly mingle. In most cases, they probably will not.

**MR MORRISON:** Okay. So, there is a risk of that. So,  
20 that risk could be substantially alleviated if it was a couple of hours between dumps; is that what you're saying?

A. To some extent but then again, not really because the passive plume, at least with the sediment losses that are  
25 put in the modelling and which I think are reasonable for the fine component of the sediment, as I said earlier, I think some of it will actually settle out quicker but for the fine component that will remain in the water column, a much longer period.

30 So, of course the longer in between, yes, the risk of mixing will creatively reduce but I think the other comment I have to that, is a little bit what I tried to say earlier, that I don't necessarily think that the mixing of two plumes will increase the risk of impact.

**MR MORRISON:** Okay. So, it's a very minor risk?

A. I would say that's a very minor additional risk which would only come into play if there's a significant concern in terms of the maximum plumes that you would  
5 experience outside the NDA.

**MR MORRISON:** Okay, thank you.

**CHAIR:** Dr, we're now going to move to potential questions from both the applicant and the Department of Conservation. Moving to the  
10 applicant first?

**MR SLYFIELD:** No questions from me.

**CHAIR:** We have no questions from the applicant. Department of Conservation?

**MS ARTHUR:** No questions from me, thank you.

15 A. Okay.

**CHAIR:** Anything else from anyone? Dr, thank you very much for taking the time to speak to us. It's been very useful, thank you.

A. Thank you very much, my pleasure, thank you.

20 **CHAIR:** And we will bid you good afternoon or good morning.

A. Yes, good morning at my end.

**CHAIR:** Thank you. Okay, people, ladies and gentlemen, we have reached the end of the day. Can you just  
25 reflect on our thoughts when we just reconvened about Tuesday and just ruminate on it overnight and come back to us.

**MR SLYFIELD:** Certainly, yes.

**CHAIR:** We stand adjourned until 9.30 tomorrow. I have  
30 to get this right given all the different days and different hours we're changing. All have a great afternoon, thank you.

**Hearing adjourned at 2.20 p.m.**