ENVIRONMENTAL PROTECTION AUTHORITY HEARING

Application APP202804: To import EDN, a fumigant for use on timber/logs under commercial conditions

HEARING at
Clifton's Conference Centre, Majestic Centre,
Wellington
on 21 August 2018

Decision-Making Committee:
Dr John Taylor (Chair)
Dr Kerry Laing
Dr Ngaire Phillips

Please note: the transcripts provided here are in the exact format that the EPA receives them from Real-Time Transcripts Ltd. The transcripts may contain errors or sections that were not recorded and may therefore have some omissions.

TRANSCRIPT OF PROCEEDINGS

I N D E X

[9.01 a.m.]

CHAIR: Good morning everybody, welcome to the hearing today. My name is John Taylor, I'll be the Chair of the Decision-making Committee, on my right is Dr Ngaire Phillips, on my left, Dr Kerry Laing, and collectively we are here to consider the application to import Ethanedinitrile under section 29 of the HSNO Act that empowers us with the rules and responsibilities delegated to us by the EPA through the HSNO Committee.

Before we go any further I would like to invite Mr Julian Jackson to deliver the mihi for us today.

(Mihi delivered by Julian Jackson)

MR JACKSON: When I first started I welcomed everyone here for the hearing for EDN, first of all the Decision Making panel and all the others in the room, the submitters, the Applicant. I acknowledge the Iwi, the mana whenua here that is Taranaki whāanuiau, and also Ngai Tahu. Oliver is presenting on behalf of Ngai Tahu today and this is his last application before the Committee. He's been here for a long time and also been part of our EPA fabric for many years, so -

CHAIR: Thank you, Julian. Before we proceed with the specifics of today I would just like to make some notes about catering and location of the toilets. If you haven't yet found them the toilets are situated down in the corridor on the south side of the building to the right as you come out of the lifts. I also am compelled to advise you on the procedure around evacuation. If the alarm sounds or you're instructed to do so by a member of staff, please leave these rooms immediately and make your way in an orderly fashion to the stairwell on the south corridor which is by the toilets, or the north corridor opposite room 28.03. Don't use the lifts, don't carry food and drinks into the stairwell,

and don't carry bulky items down the stairwell. I'm sure we'll all comply with those instructions.

Now, the procedure today is structured to inform the Decision Making Committee with as much factual information as it feels necessary to empower its decision on this application. The Applicant will be given the first right to present their case and their information, the Decision Making Committee will then ask questions of the Applicant, and I will then invite any of the submitters or the staff to ask questions of the Applicant. Following that the staff of the Environmental Protection Authority will make their case and the Applicant and submitters will be invited to ask questions of them, and then the number of submitters who have indicated they wish to present in person here today will be given the opportunity to make their case in the times allocated in the schedule of today's hearing.

I want to make it very clear that I expect to stick precisely to time and if anybody is tempted to stray well beyond their allocated time, they will be asked to curtail their presentation forthwith.

What I would like to do now is to invite the Applicant, members of the EPA staff and individual submitters to identify themselves to the hearing here today. Please use the microphone if you will. So, would the lead off the Applicant's team, introduce their team, and similarly for the EPA.

MS GEAR: Thank you, Dr Taylor. My name is Helen Gear, I am The Draslovka Group representative in New Zealand. I'm the person who primarily wrote the application, with the science provided effectively by the Draslovka team and the industry facts provided by Industry New Zealand.

I'll pass, well, I'll introduce the team and you'll hear from them all during the application. We've got Dr Swaminathan from Australia who is responsible for

regulatory documentation and translation of the science; Paval Bruzek who is co-owner of Draslovka, the company that is asking for registration, and Kade McConville who is the Deputy Director of Draslovka Services who is responsible for global commercialisation but also for working on the details of how EDN and any other chemical can be properly applied in the field situations.

The other person that we have is actually Dr Matthew Hall. Matt was with Plant & Food and probably knows more about behaviour in EDN in the fumigation chamber than I think about anybody in the world.

CHAIR: Thank you. EPA.

DR VAUGHAN: Good morning, my name is ~~Theresa~~ Teresa Vaughan, I'm the application lead from the EPA on the EDN application. Next to me I have Richard ~~Moon~~ Mohan who is ecotoxicology, we've got James Deyo who is our toxicologist, behind me I've got Julian Jackson who is our cultural specialist, we've got Philippa Gibson from WorkSafe and we have Bruce Graham who is our modelling specialist, and on the end there we have got Susan Collier, and we also have a stenographer transcribing everything we're doing today so that will be available after this hearing.

CHAIR: Submitters would you like to identify yourselves please.

DR SUTHERLAND: Tena koe, Julian. I'm Oliver Sutherland and I'm speaking on behalf of the Ngai Tahu HSNO Committee today and will be joined, I hope, by Gerry Coates a bit later in the day. Kia ora.

MR GRULLEMANS: Good morning, my name is Wil Grullemans. I'm the general manager for Nordiko Quarantine Systems and we have made a submission in support of recapture of Ethanedinitrile. I'll be joined this afternoon by Joe Falco, our technical general manager. He's actually in central America but he'll hopefully, if the phone

link-up works, join for that in the afternoon. He's installing some methyl bromide recapture equipment over there at the moment.

MR OLSEN: Good morning everyone, my name is Dr Shane Olsen. I will be representing the Ministry for Primary Industries. With me also is Ken Glassey, also from the Ministry. Later on today we will have several of my colleagues, Emmanuel Yamoah, Jeff Wriggly and Barry Ward join us for various parts of the meeting.

MR GEAR: My name is Ian Gear, I represent STIMBER, the stakeholders in methyl bromide production. I have with me today Dr Jack Armstrong who works closely with us, Barbara Wardell from Plant & Food, Cecil Grant is sitting in with us, a Board Member, and we will have some others join us in the course of the day. Adriana Najar-Rodriguez has just arrived as well. So, we're here to answer all those questions on behalf of the industry and put the case, thank you.

CHAIR: Okay, thank you for your introductions. There are a few final things I would like to present to the hearing before we kick off. First of all I'm going to issue during the course of the proceedings a direction on a number of aspects that have not been circulated to all parties in relation to the hearing and the application.

First of all I would like to issue a direction that during the consideration of the material relevant to the hearing, the Decision Making Committee have decided that they would benefit in their perception of the application if they were to undertake a site visit to a location where there's a large-scale fumigant of logs taking place. The details, the timing and the other operational information around that site visit will be made publically available after today in a direction that will be minuted in the proceedings, and any party

to the hearing will have the ability to make comment on that should they wish.

The second direction I would like to make is that information has been provided at a late stage by the Applicant and by STIMBER, information supplementary to that which has been publically available since the 10th of August. The Decision Making Committee has exercised its discretion to permit the consideration of this new information because it feels it will be, or could be fundamentally important to the DMC in making a better outcome.

The direction that will be given I'll speak more of after the Applicant has made its submission, but essentially we're going to allow the presentation of the new information in the Applicant's presentation that's made today. We recognise that submitters, and indeed the EPA themselves, will not have had time to digest this new information and refer to it in their own presentations. What we will propose to do in our direction is to allow a period of time after this hearing in which the new information is publically available, in which the EPA and its agents, either its consultants or its experts that it has engaged to advise it in this application, will be able to respond to the new information and if necessary can engage experts for a period of expert consultation or expert conferencing to digest the new information and provide the EPA with expert advice that it may use in preparing its forthcoming public submission.

So, there will be a period of further analysis of this new information, that analysis and reporting on by the EPA will be made publically available, and any submitters who wish to can make a further submission and potentially could even call for their representation at a subsequent hearing if they feel that the new

information or the EPA's analysis of that new information is of relevance. So, the specifics of this direction will appear on the EPA website following the course of today.

And, the very last thing I have to ask, are there any members of the media present? No. So, all media inquiries, if you're inclined to invite anyone in the media, should be addressed through Mark Wardell, is Mark here? Mark Wardell is at the back of the room.

All right, without further ado I would like to ask the Applicant to present their case.

***

PRESENTATION BY THE APPLICANT

MS GEAR: Right, well, thank you very much. It's good to have got to the hearing stage of this process. We seem to have engaged in it in talking with the EPA initially in 2015 and, as you'll know, we submitted the application last July, so just over a year ago.

I would like to thank the EPA and the Decision Making Committee for accepting the additional information that we've put in front of you, and the EPA's thorough analysis and WorkSafe's thorough analysis of the application.

The reason we are sitting here today is because in 2010 the EPA released a decision which said that methyl bromide would not be allowed to be released to the atmosphere beyond 2020. I know this consideration, this hearing is not about methyl bromide, and I can almost promise you it will be the last time you'll hear about it from us, but it is the reason we are standing here today.

STIMBER, who will be addressing you later on, undertook a very comprehensive global search to look for alternatives. The EPA decision at that time identified well over 15 possible alternatives and there was great confidence in 2010 the industry would have a replacement. Despite that international research, and nearly $22 million of research, there is only one at the moment that could possibly be a replacement for methyl bromide by October 2020, and that is EDN. There are others very much in the offering and there's plenty of research still going on about those. There's a lot of work about recapture but there's no certainty that that will be ready by October 2020.

So, with that in mind I would like now to go through the application. I'm sure everybody in this room has

either looked at the summary or looked at the bits of the application that we've put in that interests them. So, the work that I'm going to go through today responds directly to the documents that were released by the EPA just over a month ago - well, just under a month ago, and we will work through a number of uncertainties that were identified, in other words gaps of knowledge that were identified in the application we put forward.

I would like to say, and we recognise that this is quite a big application, and having worked for the EPA in the past I do understand the scrutiny staff may feel they're under. This is a new fumigant and new fumigants don't happen very often. With the regulatory hurdles today it is very difficult to get a new chemical on to the market and with fumigants in particular, which basically are designed to kill things and kill things on quite a big scale, the barrier is very high, and in this case this fumigant is being used in a couple of places in the world but only very recently. It has registration in Australia for logs but the registration that was given in 2013 has controls which have meant that it has not been used. It was registered for soil in Australia in March of this year and currently is being used to fumigate reasonably large areas in Australia, especially because of the problems they have with strawberries and tomatoes. So, it is being used and it's being used quite successfully.

In June of this year it was also granted a critical exemption in the Czech Republic, and this season it will treat over 200,000 cubic metres of wood to control a couple of Ips species, which in layman's terms are wood insects. It's been used with - if you want more detail on the critical use exception it is being used but it's only being used in forests, not in populated places like ports.

There are a couple of other ways in which this is perhaps a rather unusual application, that is that WorkSafe who became responsible for putting in place worker controls, work safety controls, I believe has been involved in one other hazardous substance application since they took over that responsibility in December, but I know we're fairly near the beginning of the list and this is a big application, as I say.

Right, so that's the background. I've given you a good overview of the people who are sitting, who will be delivering, so I won't go over them again. There are only two I would like to introduce, one is Dr Adam Jonas, who is the toxicologist. We are asking that the TEL be reconsidered and he will be hopefully phoning in from the Czech Republic. I'm going to ask one of the people, my husband actually, to see if he can work with the AV people to get it sorted out because it appears he has not already joined. And, the other person I would like to talk about is me.

I'm a bit of a generalist and I have a very diverse background. I actually, as you know, I'm heavily involved with STIMBER, I'm actually the horticultural representative on STIMBER but I'm also married to the research director of STIMBER, which might all sound a little bit incestuous. But in terms of this application and the responsibility to put together this application, I did this very much as an employee of Draslovka.

The one thing that I have brought from my close association with the industry and with my husband in STIMBER, is that we actually, the industry component of this application is very well populated with an industry perspective. So, we're talking about things that are actually happening on the fields or on the port in New Zealand.

I also have a very vested interest in this. I'm now a grandmother and I have two granddaughters who live within two kilometres of the Tauranga port. It is very important to me, just as every other grandmother in this country and every other parent, that we have safe chemicals, and so I have applied, I have pushed Draslovka at times to make sure that they are providing us with good information, especially when it comes into, well when it comes into environmental and health issues.

I'm now going to ask Pavel, co-owner of Draslovka, just to give you an overview of EDN, or of Draslovka. In its own right this is another unique characteristic of this application, this is a family-run business, it's not a Bayer-Monsanto or Syngenta.

***

MR BRUZEK: So, once again good morning everyone. I'm here standing here as a second generation of the owners of the factory actually, and also of the chemical division.

Just a few words about us. We are running currently an assets under management of close to $1 billion US and what we actually do is we are mainly focused on the sustainable development in most, in quite a lot of areas, including energy production. So, we have quite a big portfolio of wind and solar power plants that we generate and that we operate through European Union.

We also are a lot in the start-ups and capital venture space. So, currently we invested and we support more than like 12 R&D projects and the start-up companies in the United States, in Silicon Valley, in Israel and in the European Union mainly focusing on agro-tech, on actually answering the hard questions, so focusing on early stage diagnostic of cancer and treatment of cancer mainly.

We also support basic research, not only applied research, because we believe that getting the answers that it's not the right way to treat a problem is a value, so we are trying to invest in that space. We invested more than like $20 million in these projects. So, that's another part of the portfolio.

We also run private equity and hedge fund in the United States, in New York, and venture capital platform for investing into these start-up fields.

As far as the other activities, we are one of the biggest developers in Prague, which is the capital of Czech Republic, where we focus on sustainable living and sustainable housing. So, highly energy efficient buildings that we, buildings and commercial spaces that we built in European Union.

While that's more about the group, it's currently four families. I'm the second generation. We've got families that are in its second or first generation of self-made people.

About Draslovka. It's one of the core parts of ~~out~~ our? portfolio. Currently we employ more than 310 people across the globe. The biggest part of that is actually in Czech Republic where we currently have the factory that has about 275 full-time staff.

We were established in 1904, so we are in this business for quite a long period of time, and about 10% of our staff is R&D people focusing on CN-based chemicals. So, most of our business is based on cyanide or hydrogen cyanide and CN groups. We feel that it is definitely one of the good ways how to approach the market, because the CN group is here forever basically, it's one of the, like one of the organic substances that is connected to the origination of life and, actually, the world and nature and the human body, or the antibodies can actually deal with that quite well

because it's in quite a lot of fruits and vegetables, and we are getting in touch with CN groups quite often.

Again, since we have been established since 1904 we have been totally outside of city, but as cities are growing we are currently in the city centre. So, we are running under very very close attention to safety. Currently we operate an integrated monitoring system that has more than 360 detectors around the company fence, and inside the factory more than 110 cameras that are overseeing what we are cooking and what is being done in the factory.

We feel that the biggest problem is the human imagination and this is the source of the biggest fear, so we implemented a full transparency policy where the City Government and City Council can actually assess our monitoring system and they can online see what we are doing, and that's how we actually try to fight or try to cooperate with the city so they know exactly what is happening.

Well, all our systems are set to 10 WES because that's the European standard for CN groups so for EDN and for ATN.

So, why EDN? Well, actually it's a long story. We started a long time ago. We were approached by one international company asking if we are able to manufacture this chemical, and we said "yes" because we are one of the few companies in the world that has more than a hundred hundred year history. I'm also Chairman of the Ethics Cyanide Sector Group under the European Chemicals Council, so I'm in the business for quite a long time as well, and basically we started on the project back in 2007. This is when we identified that it's a very interesting chemical. It wasn't our idea, I need to say. It was the idea of brilliant researchers in the CSIRO. CSIRO is the Australian Crown Research

Institute in Australia. They came back together after the methyl bromide was banned and they have been trying to come up with the fumigants of the new generation that can actually replace the methyl bromide, and EDN was identified as one of the best options for timber logs and so for fumigation. The only problem was that it was actually too expensive so we find a way, how to actually make it work.

Well, why registering in New Zealand? Well, we picked New Zealand because we are strong believers in New Zealand process. We believe that the New Zealand EPA establish a very robust process in assessing the data that we are submitting. We had quite a bad experience back in 2013 with the former party that was responsible for registering the process that didn't invest a lot of money in the data and supportive documents. So, we actually acquired also for, acquired the sales and registration part of the process from them as well and we started to heavily invest into R&D and actually supporting materials to prove that the chemical works really well.

Well, now we can say that New Zealand also is a big market for us and what we are planning for the future is also basically to streamline the supply chain. As you know, it's a gas that is actually transported in the cylinders and so we are transporting a lot of steel from European Union so we also plan to streamline the supply chain so this project is fully in compliance with our values, which is the sustainability and a long-term operation. So, basically trying to make process as lean as possible so all the stakeholders in the process can actually benefit. We currently targeting a few destinations where to build another factory. Currently capacity is only 1,500 tonnes. We are going to be extending that to 5,000 tonnes but that capacity is

going to be more allocated to the European Union and Asia.

Well, and we try also to support local industry because we believe that the data they are generating should be more or less generated in the country we are going, so that's why we aligned with PFR and several other researchers in New Zealand to produce the data locally, especially the efficacy data. So, well, that's the plan.

I would like to gift the floor back to Helen so she can actually tell you a bit more about our application. Thank you, Helen.

***

MS GEAR: So, with that overview now looking forward, the information that we're about to present is new information by and large. I'll give you a very quick overview about EDN just to set the scene but with the release of the four documents by the EPA, Dr Graham's report in particular identified a great number of uncertainties and we felt that if the DMC was going to make an informed decision, those uncertainties needed to be plugged.

We actually, because of the time and the fact that as part of our investigations we needed to remodel so that we had a representation of, accurate representation on what was happening on the port. That report was provided to the EPA yesterday and I'm very pleased to hear that it will be made publically available.

So, we will as part of our presentation - I won't dwell on them - we will be looking at the loading factors and the end point concentration, Dr Hall will present that. Dr Swami Nathan who has worked with the modellers in the States will present the findings of

that new modelling. I will then try and give you an overview about our concerns about the TEL level, and I've been assured that Dr Jonas is on the phone and so he is there to answer questions. I just wish he was here to present because he knows a lot more about it than I do so, please, if you do have questions, ask them. We will then look at what this all means to the potential buffer zones and we'll use Dr Swaminathan again. Then we have Kade who knows a lot about protecting worker safety, the PPE, the monitors, and the effect that that will then have on scrubbing. I have a few words to talk about permissions, and then finally we present revised controls. There are very few changes to those controls but obviously they're important to us.

Ethanedinitrile, as Pavel has said, this is a cyanide group, it's more dense than air, less dense than water. It is flammable in its concentrated form, and that will be discussed later on, and it has a boiling point of minus 21 degrees Celsius. So, in New Zealand it will always be a gas which is very usable if it's a fumigant.

What does this mean? It means that EDN, or the characteristics, it will diffuse very quickly in air and will degrade very rapidly in soil, and we've presented a lot of research to that effect. It doesn't move into the aqueous environment. Even though it has a very high aquatic rating it doesn't move into the aqueous environment. Importantly, it is not ozone-depleting and it's not a greenhouse gas. It doesn't bioaccumulate. This is one of the very positive characteristics about EDN as a chemical and as a fumigant. It will not bioaccumulate in the environment and it's broken down into CO2 and ammonia products.

In target pests it actually breaks down in the presence of water to release the cyanide iron which then prevents the mitochondria from using oxygen, leading to

cellular asphyxiation. That's the modus action but importantly with every living thing it is broken down in the body and excreted. Cyanides have always been on our planet since life started, and every living thing has found a way to deal with it. So, at low levels it will be excreted from the body.

So that we submitted quite a hazard classification and you'll see that the EPA have given it a good review, no significant changes. Really, just a not applicable or a no, not detectable change in the few areas that are highlighted there, and so very good to see that the science that we have supplied, our own hazard classification and the EPA's are aligned in the majority of cases. So, that was the application that was submitted and, as I say, we suppose most of you have read that.

Now, on to the changes that we have put in place. As I stated, the uncertainties that were identified, particularly in Dr Graham's report that then has a flow-on to those controls, we felt that we needed to look at quite robustly. Dr Graham questioned the stack size and sensibly questioned the stack size, and so to actually inform our decision going forward we actually went to Genera, who is the largest fumigator in the Asia Pacific region. They also undertake approximately 90% of the fumigations in New Zealand, so the chances are when the DMC goes to visit a port, they will be seeing at least one Genera fumigation.

We asked them to have a look at their database, they have a comprehensive database where for regulatory and for charging purposes they actually, they document the vital statistics for every fumigation that takes place. They looked at the details in their database for the 2017 year and they confirmed that, yes, the stack size had increased from an average of 750 metres cubed in

2015, up to 1,000 metres cubed, and as part of that they also confirmed that the leading percentage had increased from 55% to 58%, and Dr Swaminathan will discuss this as part of his modelling presentation.

My question to them then was, are we going to see stack sizes grow in the future? Because, you know, we've had a change in the time that this application has been underway over the last two years. They have assured me that the thing that stops the stack size growing is two-fold. One, when you put a pile of logs on the port, you effectively have a very big book end, a 6 metre metal book end against which the logs are stacked. So, they start loading and they load. That stack cannot get any bigger. I said, well, can we go on top of that? They said, no, it is unsafe, you possibly could put a few on top but actually the work and safety regulations don't allow that.

In terms of the actual length of the stack. Again, by and large stack or space on port is very constricted. You'll find when you visit a log stack that it will be full of [laons]. So, they have in place roadways effectively between which the log stacks are placed. That will make sure that those log stacks do not grow in size, they have reached a maximum size. Log exports from New Zealand over the last year have been at a very high rate and look as though they'll continue but not necessarily increase in the future.

The other point is that, in terms of the dependability of the information, it's not the fumigators that make, determine the size of the stacks, it's actually the marshallers. So, the information that Genera was able to provide us we can confidently say is representative.

I'll now ask Dr Swaminathan to go over the modelling and the end point - sorry, I've got this the wrong way

round. Matt Hall is going to talk about the importance of the loading factor. He's also going to give you the reassurance as to the end point concentration, and that will be followed by a presentation on modelling.

***

MR HALL: Thank you, so I've got about five years' experience working with EDN. I previously worked with the management of food in Palmerston North and Plant & Food are global leaders in research and development around Ethanedinitrile, particularly for disinfestation of logs.

So, today I would just like to talk a little bit about end point concentration absorption, and why these numbers are so important for the inputs to the modelling and to do with assessment of risk, and why the numbers that we are presenting in those tables are really backed up by thousands and thousands and thousands of data points, and a model which has evolved over time, and I'll briefly look at how that has evolved over time.

So, loading is, as you increase loading you decrease the amount of air space and that has an effect on the concentration. So, the less air space that's available, as you increase the loading, the higher the concentration, and the inverse of that occurs at a lower loading. So, it's primarily influenced by surface area and it's proportional to dose, and these are the two factors that we've identified over the last five or six years that influence absorption, so we understand the factors that will result in a change over time. And then at the commercial scale there's also the possibility of small losses through the tarpaulin which aren't accounted for in the laboratory information.

So, in the report that Dr Graham has prepared they've used the lower loading, the 37%. So, what I would like to present today is some rationale for why that is very conservative and really not representative in light of the new information and the data collected from Genera and the marshalling services. And, then scaling from lab to commercial is quite a well-recognised mathematical process and we have some information in New Zealand of a large scale field trial which was in Tokoroa, as some of you may be aware of.

This figure here refers to flammability threshold. So, the lower level for EDN is 6% and so that's around 130 grams per cube, and so what we're doing at the moment with this recent increase in loading up to 55%, with the new information that's come from the commercial fumigator we're looking at how long it will take in order for the concentration to drop below that threshold.

Okay, so we first looked at EDN back in 2013 and we thought that it's really very soluble. So, in a high moisture content commodity like logs it might be not an applicable fumigant. So, at that point we were really assessing, is this going to work for logs, and so we looked at sawn timber in this case and we looked at a range of factors, so dose, moisture content, in grain sealing which relates to surface area, so we weren't considering sealing the ends of logs but it relates to surface area, and chamber load factor.

And so what we did, I don't want to go into - this is all available in the reports and so on - I don't want to go into the formula too much but what we did is we fitted a two-phase exponential decay curve to that information and that was our starting point. And, so we found that, you know, you do get really high rate absorption for EDN compared to other fumigants but that

it wasn't influenced by moisture content. So, at this point we started looking at EDN a little more seriously for the disinfestation of logs and not a commodity like sawn timber which has low moisture content. So, dose and loading are the primary factors that we've identified as being significant to this response.

So, the next piece of work here is looking at logs and not sawn timber, and a number of factors in there as well. So, we've put more samples in around that transitional - so previously we proposed a two-phase model, so we put some more sampling points in at that transitional level and simplified the model just as an exponential decay. So, we're evolving as we're doing different work.

The information here is from Tokoroa, the trial I mentioned. And, so we're at 750 cubed now, we're not at laboratory scale, and that formula that we proposed in the lab actually fit that information. Our modeller, Dr Alister Hall, that information fit that model very well and so we used the same model as lab studies. So, it shows that moving from lab to field, as far as the modelling and the mathematical prediction of concentrations, does work very accurately.

So, since that field trial in Tokoroa, the dose and the duration has changed, and so we did some modelling work at the lab scale in smaller chambers and we looked at many different doses and many different times. So, we have, you know, thousands and thousands and thousands of data points that are going into this evolving model which allows us to predict concentration under certain conditions.

So, this is a comparison taken from that report of the lab study up the top in 28 litre chambers and then the 750 cubed stacks that were on the side at Tokoroa. So, you can see after ten hours, very crudely the

information from a very small scale can translate to larger scale.

So, this is a recent paper that was put out on hydrogen cyanide, but what was shown here for the very first time - and so we've got EDN with logs in the top left, EDN without logs, and then HCN here. But I don't want to focus on the lower part of the graph, it's mainly the top left. So, this paper did show that EDN does not significantly decompose to hydrogen cyanide, and for the first time, and again Plant & Food are global leaders in this space, for the first time we found that temperature is an important factor as well to do with sorption, and that a higher rate of sorption occurs at 20 degrees as opposed to 10. So, all that modelling work done by Riley, the extensive work that added on to the field trial, was done at 10 degrees. So, all these numbers are the higher more conservative numbers, so that's done at the 10 degrees.

So, this is, when we start producing these types of tables there is a lot of information, a lot of experience and an evolving model that goes into this. So this is what was originally proposed, and the Graham Report has used the 37% unadjusted loading which reflected the loading that we could achieve in the laboratory with the logs that we had at the time. And, what we did is we adjusted that to a 50% loading, which at the time we thought represented a conservative commercial loading, and subsequently we've confirmed that that's 55%, and we've done some additional modelling of that. So, these new unhighlighted areas are potentially new information that has not been seen here.

So, the application is for a dose of 150 grams, and so using the 55% that Helen mentioned before and comparing that to the 37% loading that's been used to

assess risk, you can see that this change will have impacts on the way that the modelling is conducted and so on.

And, so what this all means is that when we propose a value like this, 0.8 grams per cube, after 24 hours at this particular loading at that dose, that number that goes in as an input for the modelling that's done in the US, there's a lot of knowledge behind that number and a lot of confidence behind that number. Thank you.

***

DR SWAMINATHAN: Good morning everyone. I have been involved in the EDN both with BOC and also Draslovka. I have like around ten years of experience working with this product and I was involved in getting this EDN registration for soil fumigation this year. So, I have done all the background work and worked with the APVMA to get that registration, and I am also now helping Helen with this New Zealand application.

In support of this application we have to do our modelling. So, what we have done is we have gone through all the modelling and finally we to say that we use AERMOD modelling. The reason for using the AERMOD modelling is it was developed and established by US EPA and also American Meteorological Society, and in 2005 US EPA officially approved the AERMOD for regulatory purpose, not only in the US it's also accepted in Australia, in several States in Australia for regulated purpose. And, also AERMOD is also routinely used in New Zealand and it's effectively replaced another modelling called AUSPLUME. Based on these characters - finally decided to use AERMOD for EDN emission like from a log.

With this modelling we also use some precautionary, like conservative approach, like we have used some inputs from Plant & Food lab studies and also did some studies in the US to determine the permeation through the New Zealand tarp. We used a conservative approach. For example, the permeation study conducted in the US, they had like 10% permeation through the tarp, but that study used only EDN, no logs were kept inside the lab so there was no absorption happening in that lab situation. There was like a high level of EDN remained throughout the 24 hours. So, there is a possibility to permeate because the level of EDN inside the chamber was higher so it permeated, like 10% permeated through the tarp.

But when you compare that to a commercial field scenario, there will be like a 55% to 58% loading factor and the EDN is absorbed by the logs, so they are more permeable inside the fumigation chamber decreases over the time, so we expect that the 10% permeation won't happen in the real field situation.

And, the second point is, in the lab permeation study we used a high dose rate of 164 grams but we collected that input data and we modelled for 150 grams, so we used a high dose rate for modelling 150 grams.

The third one is, based on the Plant & Food efficacy data we expect EDN to be effective around 120 grams at 5 or 10 degrees to control the target pest, but the modelling was done for a higher dose rate of 150 grams.

And, finally we used 5 years for the data, over like 24 hours, collected from the Tauranga which is one of the largest fumigation ports in New Zealand. We collected from the Tauranga port five years, 24 hours data, and we used that in the modelling.

Okay, this slide as well, the information I'm not going to go through each and everything. In February we did the modelling based on the information, available

information from 2015 and we did the modelling, and we submitted that to the EPA, which was represented by Dr Bruce Graham, and he put some uncertainty factor into that one, particularly around the top volume and the loading factor. So, we went back to Genera to ask what is the average tarp volume, because that's the main thing, and we found out that the average - and Genera is one of the largest fumigation companies in New Zealand, and they told us is that 1,000 metres cubed is the average volume but in Bruce Graham's report he used 1,500. So, for the new modelling we changed to 1,000 metre cubed and also we increased the tarp height from 2.5 to 3.3 metres, and also we used, initially we had like 50% loading factor which had like 1% at the end of the treatment time, but the data from Genera shows that the loading factor can go up to 58% so we revised that one and we found that 0.5% as an end point concentration, and that data has already been explained by Matt Hall, the end point concentration. So, we used the other one. And, finally the output concentration. This is the critical one because Bruce Graham agrees with the worker exposure. The only thing we differ is the bystander exposure. That's for 24 hours average for 30 stacks, like multiple stacks for 24 hours.

So, we used that particular percentile, because we proposed 20 metres in our previous modelling but Bruce Graham came with 120 metres based on the TEL proposal by the EPA, which is like 0.034. So, we have to revise that particular modelling with that particular scenario.

And, this is the new data with the new input of tarp volume and also with the increased loading factor. This data shows for multiple stacks, for 24 hours average TEL value. So, here you can see for 150 grams, the maximum downwind EDN concentration at 20 metres from the source,

and source is like multiple stacks, based on 95th percentile concentration is 0.016. This is far lower than the TEL recommended by EPA, so we are proposing 20 metre buffer zone to protect bystanders.

***

MS GEAR: All right, thank you. So, now I'm afraid if there's one area I feel most at sea, it is the TEL. As I say, we've got Dr Jonas on the phone so if you've got any questions you want to ask him after I've been through the uncertainty factors, please feel free to ask them.

The EPA has proposed a TEL of 0.034 parts per million, which is very low on an international basis and obviously a concern to us if it does, if more uncertainty factors get built into the eventual EPA discussion and where it would have an influence on the buffer figures, but of course this TEL will also be looked at internationally and so we really do want to get the facts right.

Draslovka as actually part of the communications with the EPA did go through a range of ways of, or sent a document in looking at a number of ways that TEL could be produced, and we do consider now that 0.56 parts per million is a more realistic figure.

We recognise that the EPA has used the most conservative approach and has effectively put an uncertainty factor of a hundred, or a hundred times based on the research data. It appears to have done this for, taking data that was produced by rats, or for rats, multiplying that or reducing the figure by 10 for translating that data through to humans, and then also using an uncertainty factor of 10 to account for

differences within the human population, whether it be genetic or age.

The NCR 2001, which I believe is a standard document, and WorkSafe in its calculation of the WES appears to have used lower uncertainty factors. Just using an uncertainty factor of 2 to translate from rat data to human data, and then 3 to translate, or to take into account the difference in humans.

We do notice that Lewis 1984, which is the source research, so it's quite an old research programme, that these trials are very difficult to run and because they're looking at chronic exposure they're also very expensive, and there is nothing more significant up-to-date. Also used rhesus monkeys, which are known to be more sensitive than humans, and they have no effect after 6 months at 25 parts per million. However, as we say, if we use these more conservative TELs, then an uncertainty factor of 6 rather than 100.

On the following page I've got the calculations that are used but I will only now just say that, you know, we're very well, it's the amount of information on cyanide, cyanides as a group, and its relative sensitivities are very well-known, they are a very well researched group compared with a lot of others.

We're also aware that EDN doesn't bioaccumulate in the environment and it is broken down within the body. So, over time you're going to have none of that cumulative effect. And, in other tests cyanides, the NOAELs tend to be much higher. Can I ask the DMC if they're interested in asking questions of Dr Jonas now, it is midnight his time, or do you want to leave it till the end of the presentation?

CHAIR: In view of the time situation for Dr Jonas I'm quite happy for him to present now.

MS GEAR: I've put up the calculations. I'm really asking, are there any questions for him, as much as anything else? (DMC confer).

CHAIR: No questions. Do you intend Dr Jonas to make a presentation, or simply be available to answer questions?

MS GEAR: Simply be available to answer questions.

CHAIR: I think in that case we'll wait until you've concluded your presentation.

MS GEAR: Thank you. So, if Adam can stay on the phone I would appreciate it.

Okay, so tarpaulin removal. This is really now looking at the last of the uncertainties. At the end I've actually prepared a little bit about permeability which I think actually Dr Swaminathan covered off very well, but now I would like to talk about something I'm very comfortable with, which is the practical aspects, and that's the actual how tarpaulins are removed.

Dr Graham adds an uncertainty factor of plus or minus 2 to account for tarpaulin removal. He says that you will always get an instantaneous release along the top and the sides of the stack, and with the unknown geometry of releases we can't disagree with the fact that it's really difficult to understand exactly how gases will move when the tarpaulin is removed, but I think it's really important that you understand that it is almost impossible to pluck a tarpaulin off a huge stack of, and a very long stack at that, I'm sorry, I'm grasping for figures but you'll see when you visit the port that there is nothing we have that can just remove and have an instantaneous release and, in fact, in practice with methyl bromide there are very strict controls around the allowed atmospheric level of methyl bromide on the port. They have monitors that allow them to monitor the level and fumigation. Staff

are very used to controlling the release of that, or the removal of that tarpaulin, which they have to do on a daily basis depending on weather conditions and temperature so that they get a controlled release, so that they can slow it down.

What they do is they have a tractor with a winch with wire ropes on it which they connect to the tarpaulin. They have one person in PPE sitting on their controlling the winch and another person with a monitor, again in PPE, looking at the levels and indicating to the winch operator when that winch should be operating and when it should be stopped.

The same approach is used for shiphold ventilation and containers, and if anything, in those situations you have more control because if the release is going faster than you want, you can actually drop down the hatch or close the doors. With tarpaulins you can only stop removing that tarpaulin. We would expect that when - if EDN is successfully registered, when it is first used they will need to learn how to deal with a different chemical because it is less dense, and we anticipate it will move a bit faster than methyl bromide. But I'm rest assured that the SOPs or the standard operating procedures they have in place, that this should be well-managed.

Right, now that we've gone through the uncertainty factors, Swami is going to actually talk about buffer distances and what the remodelling has shown, what that impact will be re-entry, and then Kade is going to give us an overview of the monitors available for PPE, scrubbing and shipholds before I bring the meeting, or the presentation, to a close.

***

DR SWAMINATHAN: Based on our previous modelling with the application we submitted in February, we came up with these following buffer zones. So, we looked at the situation happening in the Tauranga port and we used the monitoring levels, like the PPE levels. So, we saw the fumigation are and we categorised that fumigation area into four zones. One is the fumigation area. You can see, so the logs, the fumigation area. We categorise that fumigation area as the area surrounding the log stack being fumigated, and we propose 5 metre buffer zone for that fumigation area.

The second one is the risk area. The risk area is the area beyond the fumigation zone. You can see that on the picture, and we propose that this be between 5 metres to 15 metres where the fumigators will be moving around.

And, the third zone is the buffer zone. You can see that is the other workers, port workers moving around. That is the area beyond the risk area where unprotected workers can safely work for 8 hours a day just within 15 metres to 20 metres.

And, the last one is the outside buffer zone which is the area beyond the risk area where the public may be present 24 hours a day, which is 20 metres or about 20 metres.

This is the buffer zone we proposed in our application in February and we want to use the same thing in our present application we have submitted as today.

Okay, Dr Bruce Graham in his assessment report mentioned that anyone closer than 10 metres, based on our previous buffer zone anyone closer than 10 metres can be exposed to 700 to 5,200 ppm, but workers can work safely at 10 metres or about from the log piles without PPE. We completely agree and accept Bruce Graham's

recommendation for worker exposure. Like, 10 metres, we agree with Bruce Graham.

However, for bystanders he used a safety factor of 7.4. This 7.4 came from the loading factor of 37 from Plant & Food report, but we have provided the new input data and we have increased like normally Genera use this loading factor of 58% but in our updated modelling we used 55% loading factor. So, this 7.4, it's not required in the modelling.

And, also he used another two uncertainty factors by increasing the tarp volume from 750 to 1,500 metres. Again, we checked with Genera and the average tarp volume is around 1,000 metres cubed. So, we don't need to have that two uncertainty factor of 7.4 and the two. So Bruce Graham used this uncertainty factor. That's extended the bystander buffer zone of what we propose of 20 metres, from 20 metres to 120 metres, which is not workable under the current fumigation situation.

So, what we are proposing here based on the new modelling is the fumigation, as I mentioned before, it's 5 metres. Though we completely agree that the worker exposure of 3 ppm will be exceeded at the 5 metres, so we recommend that using a PPE during ventilation if the worker is entering they have to use PPE for handling, removing the tarp or handling the timber.

The WES zone is between 5 to 10 metres, which is, like this will be exceeded at times. So, when they are entering into that zone they have to use a monitor and also PPE when the worker exposure of 3 ppm is exceeded between 5 to 10 metres. But the buffer zone, like we agree with Bruce's suggestion that it will be less than 3 ppm so the worker exposures can be safely removed without PPE, and based on our new modelling we found out that the exposure concentration is 0.016 ppm which is much lower than the EPA recommended data 0.034 ppm, but

we are also recommending 0.56 ppm and, again, this is much lower than the recommendation, for 24 hours exposure for the bystanders. Based on the modelling data, we propose 20 metres for bystanders.

Okay, based on our application WorkSafe is also considering a re-entry period but this is unworkable because, based on the situation there is a time pressure, it's recommended to load the ships within 36 hours after the covers are removed. So, there is a time pressure for the fumigators and the loaders to load the logs into the ships, and also the APVMA states that fumigated timber cannot be handled for 24 hours without PPE, which is also based on the old information. But we have shown that EDN only affects workers via inhalation, that's the main mode of action. Dermal absorption is not a mode of action. So handling is not a mode of action. And fumigators have a standard operating procedure because monitoring of free fumigant below levels 3 and 3. Once the level is below WES, that's 3 ppm, and also Matt Hall's studies, Plant & Food, shows that there is no detectable EDN level after 1.5 hours, so no EDN was releasing from the timber. So, we request WorkSafe to carefully consider this re-entry period they imposed on the reassessment application.

MS GEAR: Thank you, Sami, I think we now pass it over to Kade.

***

MR McCONVILLE: Thank you everybody, I'm a bit Gen Y so I'll get my iPad on, hang on a second. Yeah, so actually, sorry Helen, would you mind bringing the monitors up.

MS GEAR: Oh, certainly.

MR McCONVILLE: I brought some props. So, as mentioned by Helen at the start of this presentation, I'm the

Director of the Draslovka Services Group. We're responsible for the global commercialisation of EDN. What that means is that Draslovka as a group have always been a business-to-business entity. What they required was a business-to-customer entity, so what we see now is that the Draslovka Services Group and Draslovka Group now manage the process all the way through from raw product, all the way through to actually applying the chemical in the ground.

Since getting registration in March we have now been in a position where we are commercially applying this product. I have an application team, they go out and they're applying this product every day into soil. On top of that we also do all the global registration work, so we're out working with entities, working with global registration authorities, doing exactly the same thing all around the world. As a part of that obviously the same questions come up every time and the main thing has always been around, how do you tell if this stuff is in the air?

So, we have a couple of different solutions for that. First of all Draslovka, as Pavel mentioned, has something like 300 plus monitors actually situated around their facility. Those monitors have all been provided by a company called MSA, a globally recognised company who are responsible for all kinds of safety equipment and detection equipment, as well as personal protective hard goods, that kind of thing.

As a part of that they have a detector which is able to detect EDN and that is the MSA Ultima X, this unit here. We took this from an in situ situation, which is basically monitoring free EDN in the air in the plant, to monitoring free EDN in the field. Basically turning a static detector into a portable detector, still giving the same reaction time for something like this, battery

powered, lasts 48 hours, guaranteed response time of 12 seconds. So, again, this particular monitor will allow measurement from 0 to 50 ppm, and this is used purely for personal detection. Again, it's used to monitor EDN levels in the atmosphere or just around the actual fumigation zone, and it is to protect workers. This is not a dosing monitor, this is not to try and detect the levels underneath a tarp. It will max out, for example, if there is a spike in concentration, but that also means that you should move out of the area anyway.

In terms of a - one of the things that came up was definitely around the ability to measure the concentration underneath the tarp. The concentration underneath the tarp is obviously much higher. We're talking, I believe in Swami's presentation it was about 360 ppm as the end point concentration. We now have the Riken FI-8000. The Riken FI-8000 measures between 0.4 grams per cubic metre to 300 grams per cubic metre. Again, any kind of detector obviously has a range and it loses clarity over a larger range. So, as we start to define the dose rates with PFR, we can also bring that range in to suit the requirements of the actual application. This allows for a monitoring, so it's actually got built in pumps so you can be monitoring the situation underneath the tarp, again before ventilation, as an example, to ensure that you've always got the right concentration there. That is detectors - sorry, I'll just go back one.

So, this particular unit also has audible and visual alarms on it as well. They can be set at different levels but, again, any detector obviously has a grey area and grey area at the other end, but again, we've got the calibration certificates and we've been working

with MSA to make sure that it is accurate within that range.

PPE. The PPE is something which I'm sort of quite passionate about because I think that the PPE is something that, yes, we need to protect workers but then you also don't want to be too encumbering on the actual worker itself. There's is weigh-up between comfort and exertion that we need to take into consideration. Again, going back to Swami's picture and we have the four different zones. We have the fumigation zone, risk zone, buffer and beyond buffer.

In the fumigation zone, as per our registrations in Australia, even for commercialisation on soil, we have EDN personal detector, closed-toed shoes, gloves, long sleeves and long pants, and full face air purifying respirator, and I'll get to that in a minute. That is basically - in addition we have the SCBA, or self-contained breathing apparatus, on standby, only as per standard operating procedure.

For the risk area, as per fumigation. Look, there's no real, there's no change there, there's no change. You know, that comes down to personal preference, really. There's no different risk between the fumigation zone and the risk zone. For the buffer zone we have the EDN personal detector, again closed-toed shoes, same kind of things. In the end these are standard things that they're wearing on the port anyway. It's not something that's over and above what they're already doing.

Beyond the buffer, obviously no PPE. We want to ensure that all bystanders do not require PPE, and that is why we've revisited the TEL level, we've revisited the buffer zones, and we believe that we can reassure that no PPE is required beyond that buffer zone.

As another point to that just as a side point as per the Australian registration, just to give you an update is we've actually put in a notification of change to that registration in order to remove long sleeves and long pants from the application, because there is no skin risk, there is no dermal toxicity from this product, there is only cold burns. Cold burns come purely from the application and it has nothing to do with actually EDN, it has to do with the physical chemical properties, not the toxicology of the product.

So, self-contained breathing apparatus. Dr Graham predicts that the instantaneous concentrations again are between say 700 to 5,200 ppm. WorkSafe are concerned that people need training for SCBA, that's true, and some PCBUs do not insist that workers use SCBA. I know myself I wear SCBA probably two to three times a year and it's a nightmare. It's one of those things that, you know, it's hard work, there's exertion there, and you're in it for a long period of time.

The concentration - basically what we've shown is that the concentration at the end of fumigation can be accurately measured, again using the Riken and as a personal detector using the Ultima X.

EDN concentrations under the tarp will fall with time, again with again that 357 ppm as the end point concentration.

Fumigators have standard operating procedures for the use of SCBA during fumigation and ventilation with methyl bromide. So, again, SCBA is common practice for them to use in situations where there may be a release due to a tarp tear, or something similar. Staff are trained and aware of the importance of PPE and SCBA where required.

We're not working in a vacuum here, we're not working in a public space or down here in the middle of the

central square of Wellington. We're on a professional port where all workers are aware of what is going on. They must be inducted, they must understand what the risks are associated with that, and the buffer zones are in place to protect those workers. And also, that they're supported by - one of the recommendations I believe in the report was the use of regular health monitoring, which we support.

WorkSafe states that the filters named in the Australian Standard wouldn't provide the range of protection factors that may arise. I kind of don't agree with that. Draslovka recommends applicators involved in ventilation should change filters daily as per standard operating procedures. What the Australian Standard doesn't actually refer to is it doesn't refer specifically to EDN. Every filter, every molecule is very very different. Every filter reacts differently with different molecules. So, what they do in the Australian Standard which says, they have a blanket rule that says cyanides, and they try to cover that underneath there. As you'll see with a lot of the historical data for EDN, it was always captured underneath the cyanide banner, it was not given its own merit in itself. What we were able to do is we were able to work with third parties, we were able to work with suppliers such as Drager, Drager Safety based in Germany, and they actually conducted this testing for us under their own standards, under their own certification, and we were able to determine that, basically, there is a standard filter and there is also basically a very high grade filter. The cost difference is about four times the price between these two filters. However, we can see that the input concentration of EDN, not cyanides, but EDN at 5,000 ppm will still give you 9 minutes of protection. That's constant concentration

for 9 minutes at 5,000 ppm, and that is until the breakthrough of that filter to 5 ppm.

As you can see, once we drop down that table these numbers start getting quite big. So, once we start getting down into even 100 ppm, which again, 100 ppm is a lot of free EDN in the air. At 100 ppm you're getting 348 minutes, or nearly 6 hours of use, but this is continuous concentration on the input of that filter.

Cyanides are smaller, they're a smaller molecule, they'll break through faster. So, this is the kind of things that we've had to go out independently and get this verified by third party equipment suppliers, and we use air purifying respirators all across Australia for every application and self-contained breathing apparatus is always on standby, it's always sitting there and it's ready to use. But, day-to-day we use the filters and we literally throw out the filter every day and we get a new one the next day.

Scrubbing. WorkSafe states that the APVMA indicates that residual EDN again can be between 8% to 39% of the initial dose rate. This is based on 6 hours of fumigation. Dr Graham estimates residual EDN of 700 to 5200 ppm based on 24 hours fumigation, and that it is considering the scrubbing and recapture to remove that risk. We definitely appreciate WorkSafe's concerns at the high atmospheric concentrations quoted in some sources. However, we've shown consistently low end concentrations of EDN at the end of fumigation of 0.5% of the initial dose based on the 24 hours fumigation. In addition, the Riken FI-8000 allows real-time measurement of between 185 and 140,000 ppm in the field.

We note that in the end no scrubber can remove 100% of any fumigant, regardless of what it is. It may be able to remove the head space fumigation but it - head space concentration, but the product will continue to

desorb. Extending the fumigation time from 6 hours to 24 hours will result in continued decreases in EDN without scrubbing. This is why we went to that 24 hour fumigation period. The reason is, is that we are able to use nature itself to scrub this product. When we look at the original data which came from, which was in the original APVMA report, which was also related to or referenced to, that data was done with an FTIR, it was not done with GC data. The GC data showed that the concentration at the end of that time, at the end of the scrubbing, was still higher than three hundred and - 0.5%, I believe it was 360[] ppm.

So, in the end, after a 24 hour fumigation, regardless of scrubbing or not, you're going to be releasing a very very small ppm volume into the atmosphere and let nature do its own work.

As Pavel put it yesterday you can do two things. You can either have a situation where you want to get water, you want to get water from one point to another point. You can either use a pump and you can spend thousands of dollars to put in a pump to pump the water from one spot to another, or you can put the water tank on the top of a hill and you can let gravity do the work. They're both going to do the same job but one's going to cost you a lot more.

So, again, scrubbing as an activity in its own right adds also potential risks to the fumigation process as well as a huge amount of cost. Scrubbing creates further toxic waste, merely transferring the issue and not mitigating it. You're basically saying, here is the problem - it's like Australia transferring all their waste to China. You can say, yes, we're environmentally friendly but in the end you're just transferring it somewhere else. For us it's a matter of saying that this toxic waste we're creating - I need to see my

numbers, we're creating based on the typical concentrations of sodium hydroxide and sodium hyperchloride as the two scrubbing solutions, we're using approximately 62.5 kilograms of liquid to completely scrub, to completely scrub 1 kilogram of EDN. Okay, so you're creating a waste product in the end which you need to then dispose of. I'll hand on to - who is this, is this one me?

MS GEAR: It's flammability and you're our flammability expert.

MR McCONVILLE: Excellent. So, for containers and shipholds. Draslovka is seeking registration for EDN fumigation of logs under tarpaulins, and let's not be confused by that. You know, we're about to talk about containers and shipholds. Our primary focus here is on logs under tarpaulins. However, Draslovka do support that the, they do support the use of EDN in shipholds, and we're very confident and we have the data to support that. However, our primary focus again is tarpaulins.

STIMBER has asked that the registration also be given for EDN treatment of the shipholds and containers because it's a huge market. Industry has stated shiphold fumigation particularly important for the growing Indian market. We have data and we're confident. We know that we can answer the questions that are necessary in order to get those treatment options. We note that containers are comparatively small, only up to 67 cubic metres, and if correctly sealed should provide no additional risks. We are aware of the modelling, that the modelling that we have shows shipholds and creates no additional emissions on the port. So, whether you go from a tarpaulin to a shiphold to a container, the emission data is exactly the same.

MS GEAR: I just would like to add there that one of the reasons that the document that we sent to the

Decision Making Committee yesterday was later than we wanted to, was because the initial modelling, the modeller had included shiphold modelling into it. So, if you want to see the effect of shiphold modelling we can provide that to you. We just felt it was important to provide something that was directly equivalent to tarpaulin modelling that we had supplied to you in February. So that's just a note, that that information will be available.

MR McCONVILLE: Okay, so again, Draslovka are fully supportive and we believe that we are confident in the data that we can present in order to go forward with that shiphold and container fumigation in addition to the tarpaulin registration.

WorkSafe has stated that containers and holds are likely to contain non-intrinsically safe ignition sources, and a flammable atmosphere exists during fumigation. Correct.

However, ships used for the fumigation transport of logs do not contain any potential ignition sources. Fans or lights are all switched off and in the majority of cases where a flammable product is applied, the ship is isolated from power. Exactly the same as fumigating a structure with hydrogen cyanide, or a structure with any fumigant, there is always a risk of flammability. Every fumigant is flammable, it always has a flammable range. Regardless of whether it is sitting within that range during its fumigation time, it will always at some point pass through that flammability range and there is always a risk of flammability. However, that is all controlled by again the hierarchy of controls, and the engineering controls come in place where we say the elimination of that risk is by the isolation of the power.

Containers that contain electrical equipment are too expensive to use for log fumigation. If we do say that we are looking at containers in general though, if we look at a reefer container, for example, same thing exists. They merely isolate the power to that reefer. Yes, the refrigeration system cuts out, but it's a sealed volume. They have a certain amount of time for that to be able to warm up and cool back down again. These are all standard operating procedures for all different types of application.

EDN's flammability has a range. For those of you who don't understand or haven't come across flammability ranges before, you have an LEL which is called the lower explosive limit, and a UEL, an upper explosive limit. What that means is that in-between there is flammable. When it's outside of that area, it's no longer flammable. You can stand there and you can light up a cigarette if you want to and nothing is going to happen. When it is in that range, yes, there is a flammability risk that exists.

You can see by this graph and by the absorption and the degradation of the product or the absorption of the product inside the timber, even at the highest dose rate we only have a flammable zone for two hours. So, only during the first two hours of application or treatment time does a flammable zone exist. Beyond that the zone doesn't exist any more. It is merely - you could stand there, you can have electrical equipment, you can have whatever you want and nothing is going to happen. Yes, during that initial period, as per any fumigant, you should always keep that in mind of the flammability risk.

As you can see here we have the different dose rates. We have the load factor as 58%, the initial concentration in grams per cubic metre, and you can see

that the lower explosive limit is 144 grams per cubic metre, upper explosive limit, 320. This takes into consideration that load factor of up to 55% to 58%.

So, in the end we know that the flammability of EDN, yes, it exists; yes, it is an issue, but for us it's mitigated through the processes and the standard operating procedures which are currently employed by the fumigators.

***

MS GEAR: Thank you, Kade. Right, so thank you very much for your patience, we're on the home straight as far as this is concerned now. I've just got a quick comment about the permissions. The EPA has asked for permissions which they would like to accommodate for site specific concerns. We would really just like to say that permissions, while a good idea, the greater system to a certain extent, especially when it comes to the risks associated with actual specific sites, are already accommodated in a variety of ways. Principally by the Councils. We've got very good evidence in New Zealand at the moment that Councils often put their own requirements on, either as a resource consent or through their just general regulations, and the Port Authorities themselves insist on risk assessments. The requirements for employers under the Health and Safety At Work Act all need risk assessments.

Draslovka really wants to see EDN to be used safely, it really wants it to be a successful chemical that can serve our industry well and can serve them as a business well. We just see this as a way of imposing extra risk. We're very confident in the information that we've put forward and, as we've said, we do feel there are other checks and balances in the system.

We also sympathise with the comments made about sea birds. Sea birds are obviously present. The EPA has identified that actually flying over a fumigation stack or flying through a plume in itself will not cause sea bird deaths, but they express concern about sea bird colonies. Here - yes, we do have sympathy in that respect but we are in a situation where, if you've been on a port, ports often operate 24 hours a day, there is a lot of activity, a lot of machinery, there are people, there is noise. The opportunity for a sea bird colony to set itself up on a port close enough to be influenced by EDN are considered unlikely, and I think you'll find most people working on a port would make sure birds aren't settling in their own right. Having a lot of birds flapping around can be a safety risk.

So, that deals with the two permissions.

We've given you quite a lot of information. It is supported by the document and, in fact, as I've sat and listened to my co-presenters there are some facts that perhaps we haven't got across quite as well as I would like, being the person who put the presentation together. I would like to mention that in the document that we've circulated we do have significant concerns about the data that was put forward in the APVMA registration for logs. It was based on data that had a lot of holes in it. The APVMA used that information as well as it could, and as we noted they put in some very strict controls. We do know that the information that we supplied to the EPA was, while not completely comprehensive - actually we did cover all of the bases, and it's used good quality labs and is up-to-date.

So, please, when you're looking at the APVMA recommendations, to look at them in that light and if you want to look at them, do look at the data that

supports them so that actually you can understand the basis on which the APVMA made their recommendations.

The other thing I would like to say is I appreciate that in this whole area we do have to be precautionary and throughout the science that we've been presented, throughout the estimation of the TEL, there are lots and lots of layers of precaution built in. You will note that the 150 grams that we actually are applying for we won't be using in the field, at the time we applied because we didn't have the efficacy data set, we did need to set the very highest level. It looks as though it will be 75 grams to 120-125 grams. We will know that within the next few weeks I've been assured.

You will see that in the modelling we have tried to be precautionary. So, what we are asking really for is a sensible approach to the information that has been put forward. We do want to see a safe and a workable registration coming out of that, and if any more information is needed, any data is needed, we are more than happy to supply that, so that a good and informed decision can be made.

Just to finish off and to put it into perspective, at the end of the day it is going to come down to controls. What we have done is we have actually documented the controls that were in the EPA staff memo's recommendation, and you will see that we have the red bits, are the bits that we are prepared to change. So, we are asking that the EPA consider it, or the DMC consider the TEL that has been set, nothing else is on that page, and we note that the WorkSafe report has identified a number of possible requirements. We hope that we've presented enough information to show you that at the end of the fumigation time we can reliably predict the concentration under the tarpaulin and we actually have a monitor to measure it.

On that basis and with the information that we've supplied you on filters we would like you to consider whether or not scrubbing is really required.

We have looked at the buffer zones. We've given you our understanding of the need for not needing a strict re-entry requirement. The monitors will be there and I can assure you that with methyl bromide they do use them when they are looking at re-entering an area, and you can ask Genera, who I believe will be presenting in Rotorua, I'm sure they will substantiate that fact. And, we do recognise that onsite monitoring is going to be an important part with either the monitors or perhaps even a larger monitoring situation, will definitely be part of the requirements or may be part of the requirements going forward.

So, with that I would like to allow you all a bit of space and thank you for your time and patience. Thank you, Mr Taylor.

***

CHAIR: Okay, as I said at the outset of proceedings this morning, the fact that much of the information in the Applicant's presentation was received at a relatively late stage has resulted in the DMC's decision to issue a direction to the proceedings which will effectively give all parties more time to assess the information in the application.

In the first instance this will require the EPA staff to use further time to assess this information, consult with their agents, if necessary initiate a period of expert conferencing which may result in the preparation of a document on which both parties can agree on which pieces of factual information they accept and which pieces of factual information they disagree. That document, if it's required, will then influence and direct the EPA to produce a further staff advice and a further scientific report, and those reports will then in due course be made public for the DMC to consider and for other parties to consider, and if they so desire to amend or make further submission to the EPA.

Now, I hope the Applicant has been informed that their decision to present new material at such a late stage is likely to extend the time in which they can expect the DMC to make a decision on the application, but that's what it is.

So, with that said, information - explicit information on that direction will appear in writing on the website within a matter of days. The period of extension that this will require is likely to be some weeks at the very least to allow a reasonable period of time to assess this information. Nevertheless, we're here, the Applicant has presented and we have an opportunity, the DMC members and the submitters, to ask questions of clarification from the Applicant.

So, I would like to start off by inviting my co-DMC members if they have any questions. Ngaire, you first.

***

DR PHILLIPS: Thank you very much for your presentation. It was quite broad and, as Dr Taylor said, there is quite a lot of new information there so it was a bit of a challenge to think about what my questions were before this presentation and what they are now, so they're a bit all over the place really.

I just wanted to confirm, just starting from the first presentation which talked about the Genera data and the log - the stack size, and I notice that Dr Swami, sorry if that's - I know your name is longer than that but everyone else is referring to you as that so I'll use that as well.

DR SWAMINATHAN: Yes.

DR PHILLIPS: So, the reference was made, said that it increased from 750 to 1,000 cubic grams per cubic metre, is that what it was?

DR SWAMINATHAN: Cubic metres.

DR PHILLIPS: Cubic metres, sorry, and I got the impression that that was a maximum but then Swami said that that was an average, so.

MS GEAR: That is the average.

DR PHILLIPS: So that is the average?

MS GEAR: That is the average. The information that Genera provided to us actually provided the average for each of the three ports; fumigation takes place at Napier, Tauranga and Northcote up at Whangarei. That is an average but the average is a very small range. We're not talking an enormous difference in those. So there was the one below, one above, and one at approximately 1,000 cubic metres.

DR SWAMINATHAN: And another thing is to add to that point, like they use 58% loading factor but in our modelling we use only 55%, so we reduce that loading factor to 55% but in Genera they use 58%.

DR PHILLIPS: Yes, I guess my questions are relating to what the potential size of the stack could be, or the volume of the stack, I guess, could be and therefore what the potential - so my next question relates - do you want to add to that?

MS GEAR: I really just want to add this is a bit of an inexact science, and as you will probably see, log stacks depending on the - logs are very variable in nature. The modelling for one stack is what it is, but when you're talking about 30 stacks you are not going to be talking about 30 identical stacks.

DR PHILLIPS: Mmm, sure.

MS GEAR: There will be variations either side of that, that average. And, so with that qualifier we've done our very best to give representative information.

DR PHILLIPS: Yes, and I guess that's what I'm getting at is how representative is the model based on your comments about what the stack size could be, and how representative that is in different ports, because you've made the comment about the length. Because obviously if they do have a maximum height, that's one thing, but then the length, that's going to be influenced by it sounds like the layout of the port, and you'll appreciate, I mean I certainly have never seen log stacks at a port, so it would have been quite useful to have that information but. Yes, because my next question was related to that length.

You made a comment that it was limited by the port facilities and the layout of the port and, you know, how much does that vary between ports, and not just the

three where you've got the data from, but some of these smaller ones?

MS GEAR: When we're talking about an average stack size of 1,000 cubic metres, it's controlled by the height and also the lengths. As I said, we don't have a big variation in that average stack size.

So, I think you can rest assured that we're not talking about a - with time there will be no effective change in that length, or very little change in the length and no change in the height. And, so I would say that we are talking about something that's very representative but I really think that you should see that for yourself and explore it with Genera in Rotorua.

DR PHILLIPS: Sure, and it's likely that these bigger ports will have bigger stack sizes.

MR BRUZEK: Like, this is not really that, with my nature, but I've been to many destinations with Genera and other ports. We actually picked the one that is representing like 45% of the New Zealand exports. That is the biggest port with the biggest operations, that's Tauranga. Like, that's why we picked that one, because that one tends to have the biggest log sizes out of any ports that we have seen in New Zealand.

I think STIMBER can actually tell you a bit more about that potentially later on but we picked the hardest one to do the modelling. And, why we are using the average, it's mainly because, like, the biggest problem with the bystanders is from multiple releases over multiple times and that's why we see that the average is a really representative number in order to do the model.

You can vary in size. Like, the biggest one we've really seen anywhere in the world, including in Czech Republic because we are using the similar structures. So, they start at about 450 cubes and

personally I have never seen a stack size bigger than about 1,400 to 1,500. So, that's what has been used in Bruce Graham's report. So, the 1,500 ones are the biggest one, and then you are getting the limits with really like using the cranes to actually remove the tarp, and you'll start having issues with also like making it happen in practice.

DR PHILLIPS: Yes, okay, thank you. My next question just relates to the experiments that were undertaken, and I think Matt, it's a question for you, and it's just sort of a question around the experimental design, I guess.

Were the chambers that were used, did they have tarp on them in the same way that, you know, were they representative of a real world situation or were they actually boxes?

MR HALL: No, so these were sealed chambers.

DR PHILLIPS: Sealed, completely sealed?

MR HALL: Completely sealed, and at the very first slide that I presented, I did make a note that this doesn't account for losses through the tarpaulin.

DR PHILLIPS: Yes, sorry, I missed that with all the stuff.

MR HALL: No, quite all right.

DR PHILLIPS: Okay, that's good. And just following on from that, but I think it's possibly a question for Dr Swami. Matt made a comment about how the recent research has shown that absorption rates are affected by temperature.

DR SWAMINATHAN: Yes.

DR PHILLIPS: So you get much higher absorption at higher temperature.

DR SWAMINATHAN: Okay -

DR PHILLIPS: Let me ask my question. Firstly, is that correct Matt, that higher -

MR HALL: Yes, that's correct.

DR PHILLIPS: So then the next question is, how does your modelling take into account the fact that at different

rates, because you're using atmospheric information, so how does your modelling take into account the variation in temperature? I notice that you did it in different seasons, so.

DR SWAMINATHAN: Okay, so we picked up 10 degrees in our model. So, 10 degrees is the worst thing, so we used the worst case scenario of 10 degrees and used that in the modelling. But, actually, what we plotted is only the end point concentration, the daytime ppm concentration of 10 degrees and we used that in the modelling.

DR PHILLIPS: So it wasn't the end point that Dr Hall come up with that -

DR SWAMINATHAN: There is a slight change -

DR PHILLIPS: Sorry, just let me finish my question. It wasn't the temperature - the end point concentration that he came up with, wasn't that based on 20 degrees?

DR SWAMINATHAN: Okay, so what you can calculate that gram per metre cubed, you can convert that to ppm based on the temperature, and we used like 10 degrees, which is at the lowest end, so we used that at 10 degrees with a ppm of 357. That will be like based on 10 degrees. But then you are talking about 20 degrees, there will be a slight variation, not a huge variation. The concentration by ppm will be like slight variation of the temperature.

DR PHILLIPS: Perhaps it's a matter of seeing the data.

MR BRUZEK: I would also like to add one more thing, like regarding the dose rate, dose rate is also decreasing with the increased temperature. So, actually, it takes about 125 grams to kill all the target pests in New Zealand currently at 20 degrees - sorry at the 5 to 10 degrees. And, if you go up to 20, like the target pest is becoming more vulnerable so you decrease your

dose rate and we expect it to be target dose rate at 75 grams.

So, currently the numbers are still being crunched because this is a long-term R&D process that we do with the PFR for about now two and a half years, Matt, and Barbara who is sitting in the back, and that's our expectation.

So, basically again, what has been used in the model is on a very very conservative event. So saying 10 degrees and 150 dose rates, which is what most probably will not be used as a rule because the target of the industry is to maximise the efficacy also from the economic point of view.

DR PHILLIPS: Yes, okay, thanks. And, the next question probably relates to Dr Swami again around buffer zone, and just a simple question around do you - I guess, or maybe to Kade. It's around whether you do continuous monitoring, because you talked about monitoring within the buffer zone.

MR McCONVILLE: Yes, so do you mean continuous monitoring at the buffer zone edge?

DR PHILLIPS: Yes, well wherever, in the fumigation area?

MR McCONVILLE: So, we know based on the data that we have, based on a number of treatments in a number of application trials, that the permeation through the tarp itself is very very minimal. So, therefore, again there are different time periods when dealing with fumigation; there is an application time, a treatment time and an aeration time. The only real risk time during that process is the aeration time. Everything else is a contained process.

So, during that aeration time, yes, like people are continuously, they have monitors there, they have them within the buffer zone, they are protected whilst they are there. No, there is not a static detection system

which is in place which is around each particular stack, but each individual worker is protected within that zone.

DR PHILLIPS: Okay, thank you. And, just finally, I think maybe this is one for whoever talked about re-entry period, maybe Swami or Kade, I'm not sure, and just an observation I guess that you talked about that the risk was from inhalation rather than handling, and I was just wondering about the fact that my understanding is that EDN does actually desorb at whatever rate, but there is some desorption, isn't it? It's not like it's locked in there. So, there is a risk. I know it has low dermal toxicity but there is some risk of hand - I guess it's to do with the handling rather than -

MR McCONVILLE: We'll cover this in two parts. The first part is around desorption, so I think, Matt, you can probably comment on desorption first and then I'll comment on the dermal interaction with EDN.

MR HALL: So, just like understanding the absorption curve, with a whole range and fumigants that Plant & Food works with, interested in desorption rates, and we've looked at that in detail for EDN, and it is very difficult to measure the desorption rate because it is so low and the instrument used has a limit of detection of one part per million. And, so compared to other fumigants, the desorption rate of EDN is extremely low, and off the top of my head I'm not sure what that rate is but it's in the report. So, yes, there may be a risk but it is a very low rate of desorption that's occurring.

MR McCONVILLE: So, from a dermal, dermal contact perspective, two parts to it. The first part is that you're not dealing - again, you've got very very low desorption rates, but on top of that we know that the dermal, actual penetration of EDN, or the dermal contact, causes no blistering, no burns, or anything

like that. And, we also have the data to support that from, I believe it was also from that study that was conducted in 1984, but also a study has recently been conducted which unfortunately we don't have access to because it is Department of Defence, but they have also done some work around this and basically we know we're in the thousands of ppm before anything even remotely happens. They tested up to 10,000 ppm with absolutely zero effect as a dermal contact.

DR PHILLIPS: Yes, thanks. No, I was actually talking about the inhalation risk associated with the desorption, but that's kind of answered. But, thank you, thank you very much. Thanks John.

CHAIR: Okay, Kerry?

DR LAING: Thanks, John. Thank you, Helen, and the team for your presentation. I guess I have a couple of comments rather than questions on what you presented this morning, because I look at some of it and wonder whether I'm more confused or in a better shape than I was before or not, and there are two.

Ngaire started off with stack size and I guess my only comment would be that you've talked about average stack size, and I understand the reason why you may have put that into the modelling, but averages can always cause us a problem, and if I take the dimensions that you've talked about, that is may be 6 metres high and 60 metres log and a 5 metre log, then you're up to 1,800 cubic metres, and Bruce Graham may have some thoughts about that later when he, because he originally raised, hey, the stack size may be higher and therefore you may have a scenario where you're getting a significantly greater volume or quantity of gas being emitted.

My other comment is related to your comments, Helen, on tarpaulin removal. My understanding is Bruce made his comments because the modelling assumes an

instantaneous release from the area of the stack, so and I think that comment was -

MS GEAR: Thank you, I misunderstand.

DR LAING: I understand the practicalities of removing tarpaulins and it won't be an instantaneous release and there will be interactions between the tarpaulin and everything that's around it but my main questions are really around modelling. Some other comments Swami, something you had up there and you talked about an April or October time period --

DR SWAMINATHAN: Yes.

DR LAING: -- or related to the 36 hours of loading on to ships?

MS GEAR: That was - from the person who wrote the slide, that was just to give you - WorkSafe had brought up the issue that in New Zealand there's the 36 hour rule during the oreophilus flying season, which is Burnt Pine Longhorn Beetle. From the time that a tarpaulin is removed from the stack, it must be on a boat and effectively secured so that it can't be reinfested. So, there is that time pressure. We appreciate the fact that WorkSafe have picked that up and recognise that that would be one of the restraints. The Burnt Pine Longhorn Beetle flight season is normally from October through to April. Outside that time, and Emmanuel who's here, who is responsible for that monitoring in New Zealand, it's usually a 72 hour loading time. There's always time pressure to actually get those logs on the boat.

DR LAING: Okay, thanks. And one thing, Swami, in your response to Ngaire's questions you referred to the change that you've made in modelling from a loading rate from 55%-58%. My reading of Sullivan's original report says that you are looking at 700 or 750 cubic metre stacks with a 500 cubic metre air space --

DR SWAMINATHAN: Yes.

DR LAING: -- which is down at 33%. So, what was modelled, 33% or 55%?

DR SWAMINATHAN: Okay, so in the revised modelling - have you seen that revised modelling or the most recent one? Okay, because we have to change that air space based on that 1,000 metre cubed. It's again based on the loading factor. So, what we have mentioned is like 450 cubic metres of air in our updated modelling, because it's again based on the logs which carries 55% loading, and the remaining space of 45 which is just like the free air space. So, what we have used in the revised modelling is like 450 metre cubed of air space. That will be accommodating in a 1,000 metre cube air volume. In the previous, we used 500 metre cubed. But in the revised, we revised according to the loading factor.

DR LAING: Okay, I understand that, and I guess my questions are mainly only around the air modelling that has been undertaken and I'm trying to understand exactly what has been done, and it's not that easy to get it from Sullivan's report. So, I don't actually know where to start asking my questions.

Let's start with the Met data. You've defined there were deficiencies in the Tauranga Airport data and the number of 53% of critical data being available comes up, and I wondered what the deficiencies were that you needed to go to a different data set?

DR SWAMINATHAN: Okay, when we checked on that data, there was only daytime data, there was no nighttime data, so that's the reason we have to go to Met data or US Meteorological data to get like 24 hours information for five years. That was the main reason we went on that one. When we first checked, it was only daytime information.

DR LAING: Okay, now I think Bruce also raised the point, was any of the actual Tauranga Airport data used in that final dataset, or was it totally generated by WRF?

DR SWAMINATHAN: Yes, it's totally from WRF, but in that same report Bruce also mentioned that the data used on the WRF coincided with the other modelling data, like similar to the other modelling, like for the different fumigants. They also used that other data, and Bruce compared that weather with the WRF and he mentioned in that report, that coincides with the WRF.

DR PHILLIPS: I understand that there wind roses are similar no matter where you've got the data from, but then I have a question related to your wind roses. When looking at that you have a number of sectors and you have different colours for different wind speeds. Now, I'm just trying to understand those. Does each coloured segment represent the percentage of time where the wind was blowing at a certain rate from a certain direction; am I correctly interpreting that?

DR SWAMINATHAN: Okay, so I can get more definite information from David Sullivan who has collected that information and I can present that at the end of the day.

DR LAING: Well, it comes back to when you look at the isopleth data I need to understand exactly what the wind rose is telling me and how that relates to the isopleth data that is modelled later.

Now, I have a question that goes back to the area in instantaneous release. I assume that what is feed in as input to the model is both the concentration and the quantity of gas that is present over that rectangular area?

DR SWAMINATHAN: Yes.

DR LAING: That's right?

DR SWAMINATHAN: Yes. Like, what we use is we use the permeable information for emission during fumigation and

at the end of the ventilation period we use Plant & Food end point concentration to determine the ventilation period, and it was around one hour. That was used in the modelling.

DR LAING: Okay, now the next bit I'm trying to understand is you've got numbers in there for a one hour average and a 24 hour average. Can you explain in simple terms to me, because I'm a simple person, what constitutes the one hour average?

DR SWAMINATHAN: Again, this is more in a definite modelling, like they run comparing the weather data, and they run like 40 cycles on that one for using the each scenario, using that one. Based on my understanding, like 24 hours they categorise the whole thing, like including fumigation and also ventilation. That's for 24 hours. But for one hour they pick up the big one. Example, like ventilation, that's also included in the modelling are any one hour during fumigation, and the modelling shows only the worst case scenario during that whole fumigation period including ventilation. That's for one hour. In the 24 hours it's covering the whole statement period.

DR LAING: Okay, and I guess my question would have been to somebody who undertook the modelling that Bruce obviously found the 24 hour average being higher than the one hour average surprising, and put forward a theory as to why that might be, and it was really a question to the modeller; did they find that result surprising?

DR SWAMINATHAN: I will have to check with David Sullivan.

DR LAING: Okay. Now, if I then look at your isopleth data, and I think Bruce has made a comment on that, that it actually represents input data for hourly information spread over a year, or whatever it may be, so it's sort

of averaged out what you might call worst case scenarios and gives you an overall picture.

But if I look at each of those isopleths, my understanding is that Tauranga, anyway, the logs are stacked, the 60 metre length is on the east-west axis, and the north-south is along the port, and although there's only a grid reference rather than anything else on the isopleths, they basically seem to be that it is north-south at the top and bottom of the page. And, if you look at the isopleths, by and large the highest concentrations are in to the north of the pile, whether you look at an individual pile or a number of stacks, and not greatly where the prevailing wind is.

Now, if I looked at the release from those stacks I would think that because they're relatively close together on the north-south axis, that actually there would not be much migration to either the north or the south, and particularly the south is the lowest quantity of slow speed winds; that in fact there would be a much greater bias in the west-east direction, but it's not there?

DR SWAMINATHAN: Okay, with those specific things I can check with David Sullivan and get back to you with the response, because he was the modeller used on that one, but I can get more of the response from David Sullivan regarding that one.

DR LAING: Okay, and then I guess the basic question is it's been argued that what was modelled was the worst case scenario and the only reference you've made so far to a worst case scenario is to have used 10 degrees rather than anything else. But in terms of other factors that might be considered worst case, instead of in terms of wind speed or direction, or anything, I'm just not clear as to what was a worst case scenario that was modelled?

DR SWAMINATHAN: Okay, so it's also the wind and also slow wind speed/high wind speed, that's also included in that weather scenario. I can get more information on the weather parameters regarding the worst case scenario. But in regards to the dose rate and end point concentration, we use 150 grams but the dose rate we will be proposing is 120. And, for in the permeation study we used 164, but the modelling was conducted around 150. That's the worst case scenario we used in the modelling.

In regards to the weather data, I can get more information regarding the wind speed from David Sullivan.

DR LAING: Okay, I'll move away from the air dispersion modelling, I guess, and it's just a general question.

There is a photograph in Appendix 7D, or whatever it was, of piping being put in place for the fumigation, and I guess we might see that if we get to a site visit. I'm just trying to understand, is that piping that's inserted along the length of the logs, or it's just across the face of the logs to -

MR McCONVILLE: So, there are a number of, there are a couple of different ways that you can do it. You can either have multiple injection points where you have a cylinder, or multiple cylinders, sitting in one location and they run multiple pipes out, and it's inserted in underneath the water [snape]. So, you have the tarp coming down, it's sealed by water [snapes] on to the asphalt or concrete surface, and then they are literally inserted underneath there. Usually they've got a probe such as a piece of steel tube which allows them to insert it in underneath. Alternatively they do insert the tubes before they put the tarp on, that's another method. So, they actually put the tubes into the stack, and then they cover it with the tarp from there. But

basically it is a basic network of either polyethylene tubing or stainless steel tubing in order to deliver that product.

DR LAING: Okay, thank you. That's all, thanks, John.

CHAIR: Thank you, Kerry. The only question I would like to ask relates to measurement, both in the science, in the experiments described by Dr Hall, and in the port-side measurement. The instruments you showed us, how are they calibrated and by whom, and to what standard, and how frequently are they recalibrated in use?

MR McCONVILLE: Yes, no problems. So, what we have, it depends on whether you're dealing with a safety detector or whether you're dealing with a monitoring device. So, a monitoring device, there is no standard to which that is calibrated in terms of frequency but we recommend that due to the nature of the chemical, that it is calibrated once every three to six months. Again, it depends to what level you want the scrutiny on that detector.

So, for this one, for example, this is for the high level detection or the high level monitoring, this one we recommend three to six months. This can be calibrated by us. We can do the calibration on that using cyanogen gas. So, we actually use EDN gas, we have a calibrated mixture. We have three different calibrated mixtures that then we do three points and then it is certified based on that, based on measuring those three points based on a GC measurement of those same concentrations.

CHAIR: So, you don't use an independent reference laboratory who might calibrate your equipment to a reference standard?

MR McCONVILLE: Yes, so we can. So, in New Zealand - at the moment we're only commercialised in Australia so we are doing them ourselves, but there is no reason why this

cannot be done independently in New Zealand by a third party. We supply EDN mixtures in nitrogen air to many different suppliers around the world in order to do that calibration. Drager, for example, Drager do calibration of detectors, MSA do calibration of detectors. So, for this one, for example, MSA will actually certify and recalibrate this detector on your local standard. So, basically at the moment the standard is saying I believe it is once every 12 months, but we recommend more frequently than that, we recommend once every six months.

MR BRUZEK: If I can add, basically there is, as Kade was trying to point out, there is a big difference between our recommendation of safety detectors. So, personal hand-held safety detectors are being calibrated independently by the producer, because they are coming with a safety certificate that is in compliance with local regulations. We are not giving the local regulations, however if it's in here it's once every 12 months and we recommend more frequently to make it done by the external party.

In terms of this one, this we call like a process analyser or process monitor, and that's being used to monitor what is the concentration under the tarp in order to be sure that what we are releasing to the atmosphere is actually below the limit that we basically are imposing on ourselves, which is 700 ppm after 24 hours. So, if it's below that the recommendation will be basically to remove the tarp but not before that, before we reach that 700 ppm limit. That one is being calibrated by us but it's not a problem to let someone do the calibration. Because this is being rather seen as a process device than a safety device.

CHAIR: All right, thank you. So, that concludes questions from the Decision Making Committee. I would now like to

offer an opportunity for any of the submitters to ask questions of clarification, using the microphone please. Oliver.

DR SUTHERLAND: Yes, just a comment first and then a question. I wanted to congratulate Draslovka, and Helen in particular, for the extent of the Maori consultation that they undertook. It was very comprehensive and I've stood before the Decision Making Committee just not long ago saying the exact reverse to an Applicant. These guys did it right. But, Helen, there's a question that, I know you had a series of meetings with Bay of Plenty and Tauranga Moana, and the other Iwi at Napier and Whangarei. To me the outcome seemed to be a bit inconclusive, am I right?

MS GEAR: Yes, we went to Whangarei and actually the story we got from Whangarei, and which we've actually included in our Maori - or in the documentation, was actually they didn't like forestry, they felt that it was having a negative environmental impact on the Whangarei environs. We said that we would take that message back to Wellington but we could do nothing more for them than actually include that in our documentation. They didn't want to talk about EDN, they weren't interested.

We went to Napier and we talked with the Iwi there. They have just settled their Treaty of Waitangi, they have their settlement. They were, they basically said, we really haven't got time, this is not a high priority. We trust the EPA process and we are looking for a replacement for methyl bromide. We don't like the fact that it's used on our local port. We would be more than happy to sit with any recommendations that come out of the EPA and we would be confident in their decision.

In terms of the Tauranga group, we did, we went to them and we met with all of them. The comments they made to us were that they want a replacement for

methyl bromide. Based on what we talked with them about they felt it looked promising but they obviously wanted it to go through the process.

We then went to the local marae, to the Whareroa Marae and stayed with them overnight, and Pavel and Peter, one of the other co-owners of Draslovka, came with us. They were very interested. They offered to do a cultural assessment for us to, basically to reinforce their support for us to go ahead. At that stage we were a month out from submitting the application. There wasn't enough time for them to actually complete that. If I had known that we were then going to take the next seven or eight months to actually finalise that, we would have gone ahead with that, and so we left that meeting feeling that we had, they were very interested in EDN. They do want a replacement for methyl bromide.

DR SUTHERLAND: Okay, thanks.

CHAIR: Okay, if there are no other questions from submitters we have the opportunity to take a very short break. We'll reconvene in ten minutes from now with the presentation from the EPA staff.

(Hearing adjourned from 11.18 a.m. until 11.29 a.m.)

CHAIR: In the interests of keeping to the schedule I will now invite Teresa Vaughan, who is the staff lead for the Environmental Protection Authority, to make her submission.

***

SUBMISSION BY THE ENVIRONMENTAL PROTECTION AGENCY

DR VAUGHAN: Tena koutou katoa. As mentioned, I am Teresa Vaughan. I am the application lead from the Environmental Protection Agency on the EDN application. So, today I'm just going to run you through a higher level summary of our assessment and I just note going into it that this does not take into account the new information received from the Applicant and from STIMBER in the last 24 hours.

So, as already mentioned, the Applicant has applied for approval to import or manufacture EDN in New Zealand. EDN contains Ethanedinitrile and it is intended as a fumigant for ports and timber prior to expert. It is noted that Ethanedinitrile is a flammable toxic gas and in the atmosphere and in the body when it comes into contact with the water it reacts to form hydrogen cyanide and its toxicity is considered to be mediated through this process.

So just quickly we wanted to acknowledge at the beginning of the presentation that this application represents sort of the first step of being able to use EDN to fumigate logs for export. The next step will be getting acceptance from New Zealand's trading partners of this phytosanitary treatment. So, currently Malaysia and Australia already accept EDN fumigation as a treatment for logs entering their countries, but I note that China and India are New Zealand's major trading partners when it comes to New Zealand's export logs, and they currently do not accept EDN fumigation as a treatment option. So, were this application to be approved, the next step would be that acceptance would have to be gained from our trading partners.

So, the EPA has reviewed the available data and classified EDN as a highly flammable gas, acutely toxic

by inhalation and very ecotoxic to the aquatic environment. We note at this stage that it has not been classified for the soil environments, terrestrial vertebrates and terrestrial invertebrates. It is considered likely that even though there is no appropriate data to support classification for these end points, that EDN will most likely pose harm to these organisms.

So, this application was publically notified as it was considered there would be a large amount of public interest in it, and 43 submissions were received.

As you can see from this table the submissions received covered a range of viewpoints on this application. Over the course of the three days of hearings for this application we are going to hear from a representative sample from those different range of viewpoints. Given this, and in the interests of time, I will just present a high level summary of the key issues that were brought up in the submissions.

So, firstly, the importance of the forestry industry to New Zealand was covered extensively. It is acknowledged that the forestry industry employs a large number of New Zealanders, both directly and indirectly, and that it is forecasted to reach a value of $6 billion in 2018.

Next, EDN was discussed as an alternative to methyl bromide, which has already been mentioned by the Applicant. This is important because, as mentioned, methyl bromide is a ozone-later depleting substance and Ethanedinitrile is not. So, obviously moving from methyl bromide to Ethanedinitrile would be beneficial. Also, it was mentioned that if EDN were approved, this would just provide another phytosanitary tool to operators. This is considered a benefit and many of the benefits of EDN will discussed in the submission and

will be outlined later in this presentation. The permeability of EDN was mentioned in the submissions and the consequences of this were also discussed. Also, in STIMBER's submissions they mentioned that at the end of a large scale trial logs were reported to smell differently to what they did going into the trial. Basically this was accounted for by saying that there was ammonia present at the end of the fumigation as Ethanedinitrile is known to break down to eventually form ammonia and carbon dioxide. However, no data was provided that quantified the amount of ammonia present at the end of the fumigation or supported the rate at which this reaction occurred. As such there is concern at to what level of risk this would present because we do not know how much ammonia will be present when that tarp is removed. Also mentioned was a history of non-compliance with methyl bromide fumigations with the controls placed on methyl bromide fumigations. Also some submitters felt that there was insufficient information available to fully understand the risks associated with fumigation using EDN. And finally, several submitters requested that the controls placed on any potential approval be unambiguous, easy to follow, and easy to enforce.

So, EDN is intended to be a fumigant used on timber and logs prior to export to control insect pests in exposed timber. The proposed application rate in the application form is 150 grams per cubic metre for 24 hours with one application prior to export. It was noted in several submissions, and has already been mentioned today, that the actual rate used in the real world may be lower than this because it will be based on efficacy studies that were not carried out prior to application, and also will be based on those discussions with New Zealand's trading partners. It is noted in the

application form, it is submitted to the EPA they applied for application of EDN under tarpaulins in shipping containers, in fumigation chambers, or similar structures, and in shipholds.

So, the flammability of EDN has already been covered by the Applicant and will be covered further by WorkSafe in their presentation, but it is noted that EDN is a highly flammable gas and presents risk from fire to both human health also, and then the potential for damage to property in the surrounding environments were a fire to take place. It is recommended that the prescribed controls and requirement for a 2.1.1A flammable gas be placed on EDN. It's also noted, as mentioned by the Applicant, that a flammable atmosphere when the application rate is 150 grams per cubic metre, exists at the beginning of fumigation.

Also mentioned was the fact that there is concern about EDN being used in shipping containers and shipholds as they may potentially contain non-intrinsically safe ignition sources, but this will be further covered in WorkSafe's presentation which will follow this one.

So, the EPA's human health risk assessment was based on toxicity study data and air concentration dispersion modelling. So, just first a couple of comments about the air dispersion modelling.

The inputs for the modelling were based on a dataset for the Port of Tauranga, thus the results of the modelling are considered generally applicable to other ports in New Zealand with the caveat that there is some concern around smaller ports or ports with significantly different weather. As mentioned by the Applicant, we propose to manage this potential uncertainty and potential risk through the application of a permission control where the Applicant would be required to provide

a site specific risk assessment for the port, the location that they were applying for. It is also noted that the modelling provided modelled releases from log piles under tarpaulins and no exposure estimates were provided for the other use patterns provided for, and as such the other risk from these activities are unknown.

So, to assess the risk towards workers. The exposure modelling provided and the exposure estimates provided were compared to the WES values proposed by WorkSafe. So they proposed a 3 ppm value as an 8 hour time waited average and a 5 ppm value as a ceiling value. The modelled exposures were below both WES values, so this represents a negligible risk to workers. However, it is noted that workers will be exposed to high concentrations of EDN when that tarpaulin is removed, as has already been discussed by the Applicant. So, it is considered that this risk could be potentially managed through the use of scrubbing or recapture and/or appropriate personal protective equipment.

Next, the risk to bystanders and the general public were assessed and two different types of exposure were considered. There was a short-term exposure which was anywhere between 10 minutes to 8 hours, and that was considered to pose negligible risk to the general public, and then a longer-term exposure was considered and this was considered to be more representative of somebody who was living in the vicinity of the port. In order to do this the modelled exposure was compared to the total exposure limit proposed by the EPA. Unacceptable risks were identified because the modelled exposures were found to be higher than the proposed total level exposure limit. So then controls were identified that could potentially manage this risk, including the application of buffer zones.

It is noted that Ethanedinitrile commonly has some hydrogen cyanide present as an impurity, and given the high toxicity of hydrogen cyanide, it was considered appropriate to propose an impurity control that limited the amount of hydrogen cyanide present in Ethanedinitrile to less than 1% per volume. It is also noted that WorkSafe has the jurisdiction for the effects on human health from workplace activities, so the EPA's risk assessment was provided to WorkSafe and they have provided advice on this application and will cover that in their presentation following this one.

So, next we assess the risk to the environment. Firstly, modelling provided by the Applicant indicated that Ethanedinitrile was more likely to stay in the atmosphere than move into water, soil or sediment. It is considered reactive and is not known to persist in the environment. The most common reaction that occurs is it reacts with water to form hydrogen cyanide and cyanuric acid, both of which can then break down further to eventually form ammonia and carbon dioxide. As mentioned before, no information about the rate at which this occurs in the atmosphere has been provided to the EPA, nor have the amounts of ammonia or carbon dioxide formed been quantified. But based on this information, Ethanedinitrile is not expected to bioaccumulate.

So, firstly we looked at the risk to aquatic organisms. As already mentioned, Ethanedinitrile is expected to stay in the environment with only a tiny amount, if at all, moving into water. As such, it is considered that there is no exposure pathway to aquatic organisms. However, it is considered that still conditions are likely to increase the possibility of EDN moving into water, and given the fact that water bodies are highly likely to be in the vicinity of fumigation activities, we are proposing a control that outlines the

atmospheric conditions under which EDN can be vented to manage any potential risk of EDN moving into water. We also propose imposing a control that prohibits the application of EDN on to or into water, and it is considered with the proposed controls in place that the risk to aquatic organisms are negligible.

Next, earthworms, other soil organisms and non-target plants were considered. It is considered highly unlikely that soil organisms or non-target plants will be in close proximity or present at the sites where fumigations are going to take place, given the fact that these are highly, like, they're mostly going to be carried out on impermeable surfaces. Thus, exposure to these organisms is considered to be low and thus, with the proposed controls in place, the likelihood of any harm to these organisms is considered negligible.

As mentioned already, the EPA has identified that there is potential risk to birds from the use of EDN as a fumigant. There is no reliable estimate of exposure to birds of EDN from fumigation activities. As already acknowledged by the Applicant, ports are considered undesirable locations for birds except we do consider that there is likely to be sea birds present, at least in the vicinity of a port. Given this, a control is proposed that requires fumigations to only occur at locations where sea bird colonies are not known to exist, and it is noted that a precautionary approach could include the use of a permission control that requires the location and types of sea bird colonies in the vicinity of a port where fumigations are going to be taking place to be outlined before a permission can be granted.

So, as I mentioned earlier, while we have not classified for pollinators and other non-target terrestrial invertebrates, it is considered highly

unlikely that EDN will pose risk to these organisms as it is intended, its use pattern is intended to kill insects in logs. However, it is considered that the likelihood of exposure of these organisms to EDN from fumigation activities is low when you take into account the use pattern. As such to bees or other non-target terrestrial invertebrates is considered negligible with the proposed controls in place.

Next a cultural risk assessment was performed. As already discussed, EDN is acutely toxic by inhalation and that there is some concern of the exposure of the public to EDN and the effects of this, particularly vulnerable groups such as the elderly or children who may gather at community locations in the vicinity of the ports such as schools and/or maraes. It is also noted that Maori have higher levels of respiratory illnesses than non-Maori do, and that they are also well-represented in occupations where they might come into contact with EDN. As such they are considered to be a high risk or potentially vulnerable group. However, the risk to human health is considered to be able to be managed with appropriate controls and requirements put in place.

As already mentioned, EDN is highly toxic to aquatic organisms. So, if it enters harbour waters it has the potential to pose a high level of risk to important cultural species. However, as already noted, only small amounts of EDN would be expected to be absorbed into harbour waters, even under conditions ideal for absorption. So, therefore, with the proposed controls I have already outlined, it is considered that the risk to these culturally significant species is negligible.

As already mentioned, EDN is registered as a soil fumigant, so it is considered that it would pose harm to soil organisms and could potentially pose harm to

culturally significant earth-dwelling organisms. However, as mentioned, the fumigations will take place under tarpaulins on hard impermeable surfaces, thus it is considered that the likelihood of exposure of EDN to the soil would be low, and on top of that indigenous species are not considered to be likely to be present at port locations where fumigations are going to be taking place.

As mentioned, EDN is intended to kill insects. However, it is noted that most of the target species are exotic species of insects. The most vulnerable insects from the point of view of EDN fumigation are those that like to spend some of their life-cycle in the bark or wood of trees. Aotearoa has a number of species of insects that like to burrow into trees or stumps but it is noted that these generally prefer dead or dying wood, and thus are unlikely to come into contact with EDN on newly harvested logs or timber. It is also noted that any winged insects living on pine plantations would be disturbed by harvesting activities and would be likely to move away from this location, and thus also have low likelihood of coming into contact with EDN. So, as already mentioned, EDN has the potential to pose risk to culturally significant species of birds living in the vicinity of port locations. As the Applicant has mentioned, the fumigation sites, so ports generally aren't favourable locations for birds as there is a large amount of activity that would disturb them and then also the food sources are likely to be negligible. So, we have proposed a series of controls to mitigate the risk to culturally significant birds as well.

A range of benefits to Maori were identified. So, the log export industry and the forestry industry in general employ a large number of Maori. The availability of EDN would support opportunities for

Maori living in rural areas, and it is also noted that the availability of EDN would support the ongoing productive use of Maori land in forestry and growing pine plantations.

Okay, so there are a couple of New Zealand's international obligations that are relevant to this application. Firstly there is the Montreal Protocol. So, under the Montreal Protocol the use of methyl bromide has, under New Zealand's obligations under the Montreal Protocol, have meant that we have phased out the use of methyl bromide for everything except quarantine or pre-shipment purposes. Now, it is noted that with the increase in the production of forestry and the increase in the size of the export forestry industry, our use of methyl bromide has actually increased, much to the consternation of the OECD. So, the potential approval of EDN means that there is another option, a potential alternative to methyl bromide and could help phase out or decrease the amount of methyl bromide that is used. So, therefore the approval of EDN for this use could be considered to be consistent with New Zealand's obligations under the Montreal protocol. I also note that the convention on the prohibition of the development, production, stockpiling and use of chemical weapons and their destruction is also relevant. So, while Ethanedinitrile is not listed under this convention, it could be considered to fall underneath the definition of a toxic chemical, thus any potential approval of EDN will just need to be mindful of New Zealand's obligations under this convention.

So, the approval of EDN could have potential costs associated with it. There are obviously going to be set-up costs setting up fumigations using EDN. A number of the submissions stated that EDN could be used as a

drop-in replacement for methyl bromide, and thus that there wouldn't need to be a large amount of money invested into different hardware in order to be able to carry out fumigations with EDN. And, it was also noted that they predicted that EDN fumigations could be carried out at a similar cost to the current methyl bromide fumigations. In this scenario, the costs associated are not considered significant. However, as already noted, WorkSafe may require scrubbing or recapture, and there may be significant costs associated with this. However, there's currently uncertainty regarding what the costs of this would be, and I would also note that there are potential indirect costs given the fact that any scrubbing or recapture may affect the ability of the ports to throughput the logs. It is also noted that there is uncertainty regarding the costs of potential monitoring requirements, so that's both the health monitoring and potential air quality monitoring requirements.

So, a number of benefits have been identified both by the Applicant and the submitters. The first major one would be the continued viability of the forestry industry. As I have already mentioned, this is a large industry and it is important to New Zealand in terms of employing a large number of people, it is New Zealand's third largest export earner and it also provides a number of environmental benefits or productive use of land. It has already been noted that EDN is not ozone-depleting, and thus any use of it is consistent with New Zealand's obligations under the Montreal Protocol, and I note that it is a potential alternative for methyl bromide, as has already been mentioned. It has also been noted that it does not readily enter water, soil or the sediment, dissipates quickly in the atmosphere, doesn't bioaccumulate and breaks down to

eventually form ammonia and carbon dioxide. Based on this, it is considered an environmentally sustainable - it has been proposed that it is an environmentally sustainable fumigant and poses low risks to the environment. I just note that there has been no data to quantify the rate in which EDN breaks down in the atmosphere.

So, it could also be noted that EDN has a lacrimatory response at a concentration of about 16 ppm. This is being proposed as being a benefit because it provides an early warning system or a monitoring system so that people can register when they're exposed to a high level of EDN. I would note that 16 ppm is higher than the WES value proposed by WorkSafe, and thus we do not consider this an acceptable means to determine exposure and would much prefer that people use the monitoring equipment that is available.

It is also being proposed and obviously inherent in any benefits of EDN, is the fact that it controls a range of wood-boring insects. So, while the EPA has not reviewed the efficacy data, the Ministry for Primary Industries have reviewed this data and in their submission they state that it is an effective wood fumigant for wood-boring pests and they highly support this application. So, overall, it is considered there are a range of non-negligible benefits associated with the approval of EDN and these have been assessed as having a range of low to high level of benefit.

So, I just want to outline the points of uncertainty associated with this application.

Firstly, we note that the human health risk assessment is based on the air concentration dispersion modelling, and as I have already stated there is uncertainty whether the results of that modelling is generally applicable to other ports. Also, there is the

issue of whether scrubbing or recapture will be required. How effective this will be, the effect that this has on the residual risks, and then what the controls need to be, what controls need to be applied once those residual risks have been taken into account. So, for example, if we have highly efficient recapture, then we're going to release a very small amount of EDN, if any at all; then there would be no need to put a permission control in place to protect birds because they would not be being exposed to any EDN. There's also uncertainty regarding the costs involved in any scrubbing or recapture requirements that may be put in place. I also note that there is uncertainty regarding the amount of ammonia present at the end of an EDN fumigation, but it is considered that if scrubbing or recapture is required, that this is unlikely to be a significant issue.

So, a range of controls were proposed, as already mentioned. Exposure limits, a tolerable exposure limit of 0.034 has been proposed by the EPA team, while WorkSafe have proposed two WES values. I note that a number of the requirements or controls that have been discussed fall under the jurisdiction of WorkSafe and so they will outline the potential WorkSafe requirements in their presentation.

So, the EPA have proposed a range of additional controls or variations to the prescribed controls, the first of which is the maximum application rate that limits application to 150 grams per cubic metre. Next there is the control requiring that the substance not be applied on to or into water, and also limiting use as a fumigant on logs or timber prior to export under tarpaulins. Then there is a control that outlines the atmospheric conditions under which the EDN can be vented and a potential control stating that fumigations can

only be undertaken where water bird colonies are not known to exist. Additional label requirements, label controls will be required to communicate all of these use controls to any user. We've got the maximum impurity control for the hydrogen cyanide, and then a potential permission control.

So, overall, it is considered that there are non-negligible risks to human health from the use of EDN as proposed. There is uncertainty regarding the WorkSafe requirements and therefore there is uncertain residual risk. The risks to the environment are considered to be managed by the proposed controls, and it is noted that if scrubbing or recapture is required, some of those controls would need to be revisited. EDN is not considered likely to pose significant risk or impacts on Maori interests if appropriate requirements and controls are put in place, and it is noted that there is uncertainty regarding the costs of using EDN. There are potentially significant benefits associated with the approval of EDN and these have been assessed as having a high level of benefit.

So, overall, it is considered that the benefits outweigh the risks to the environment so long as the appropriate controls are put in place. It is noted that it is uncertain whether or not WorkSafe will require scrubbing or recapture, and the effect that that will have on the residual risks and what controls will need to be applied. So, overall, it is considered that there is insufficient information to be assured that WorkSafe and the EPA will be able to put in place the appropriate controls and requirements to manage, to mitigate the identified risks of EDN.

CHAIR: Thank you, I think we'll move straight on to the WorkSafe presentation and then I'll invite questions for the EPA and WorkSafe jointly.

***

SUBMISSION BY WORKSAFE

MS COLLIER: I'm Susan Collier from WorkSafe New Zealand, I'm a hazardous substance workplace specialist. I will be starting off the presentation and then I will hand over to Philippa Gibson who is an occupational hygienist and a specialist in health exposures in the workplace.

This is a new role for WorkSafe, being involved in the process of developing the controls that will be applied to new substances, so I'm just going to outline what the story is for the future, how this works between EPA and WorkSafe, what our roles in that application process is. I just want to talk about hazardous substances and risk management under the Health and Safety at Work Act, a little bit about upstream duties, then I'll talk about the requirements from the hazardous substance regulations that will apply to EDN if it's approved, based on the classifications, and then we'll talk about some of the issues we have with the risk management for Ethanedinitrile.

So, as of the 1st of December last year there is a new legislative framework in place for hazardous substances. So, under HSWA, so the Health and Safety at Work Act, we have regulations for hazardous substances, and they apply based on what your substance is, what classifications they have, the controls apply automatically from the regulations. We also have what we call Safe Work Instruments where we can apply conditional or modified controls, and I'm going to talk about that later.

So, under HSNO you have the EPA notices, regulations and individual substance approvals. So, what that means is some of those controls for individual substances that

EPA have put on in the past, actually now sit under HSWA. So, they cannot be put on by a 77A control that the EPA normally does, so that's the basic difference.

Why is WorkSafe particularly interested in applications that are coming through the EPA? Well, we have a big focus on work-related disease. So, every year ten times more people die from work-related disease than actually from accidents. So, you hear a lot about accidents that happen but in New Zealand 600-900 people a year are estimated to die from work-related diseases. So, we want to make sure that we can decrease this number by making sure that there are controls in place to manage the risks from Ethanedinitrile.

So, in terms of the applications. We work with EPA on these applications so we review the applications to determine if the risks associated with using the hazardous substance can be managed adequately by the existing regulations, and if we don't think they can be managed by the existing regulations, that's when we might set additional or modified requirements in a Safe Work Instrument.

I didn't actually put on the slide, we also set re-entry intervals and I think there's a bit of confusion about what a re-entry interval is. It's just a period of time where you're not allowed into the area unless you're wearing the appropriate PPE. So, you can actually go in there if you're wearing the appropriate PPE. And the one other thing we look at is the upstream duties. In the Act there is a number of duties for importers, manufacturers, and suppliers and designers of plant, equipment, and substances.

So, it is likely that if EDN is approved we will need to put additional controls in place, and you've heard about some of the additional controls we may be looking at. So, section 227 and 228 of the Health and Safety at

Work Act allows us to put in place these Safe Work Instruments. So, they are approved by the Minister, they can be revoked or amended by the Minister. So, I guess what I'm trying to get at is we actually have to go to the Minister to get these signed off. So, there is quite a high bar to actually set these things. So, they're developed by WorkSafe and a Safe Work Instrument's purpose is to determine, prescribe matters and make other provisions in relation to any activity, including the control of substances, and in section 228 of the Act, a Safe Work Instrument only has legal effect if it's referred to in the regulations. So, what that actually means is we have to have a hook in the regulations that allows us to do it, we cannot just change any control or modify controls, or add any additional controls under any circumstance. It is very specific where in the regulations we can do this.

Okay, so this is where it gets a little bit confusing for a fumigant because we do have a part in the hazardous substance regulations for fumigants. The only Safe Work Instrument hooks in part 14, which is the section on fumigants, are not relevant to what we may need to do for EDN. So, what we would have to do is use Part 13, which is the Class 6 and 8 controls section. So, under Regulation 13.46 additional and modified requirements for a Class 6 or 8 substance can be set. So, I'm just going to tell you exactly what the regulation says so you understand how we are allowed to actually set these controls.

So, a Minister may approve a Safe Work Instrument for the purposes of this regulation if satisfied that compliance with the provisions of the regulations that apply to a Class 6 or 8 substance will not appropriately control risk associated with the substance. So, in deciding whether to approve a Safe Work Instrument the

Minister must have regard to the following matters. Whether compliance with the provisions of these regulations being considered will eliminate or minimise relevant risk so far as is reasonably practicable; whether it is practicable for relevant duty holders to comply with those provisions; whether compliance with a modified form of those provisions, or with additional or alternative requirements would be more practicable and no less effective in eliminating or minimising risks; and whether a modified form of those provisions, or additional or alternative requirements, would be more appropriate to the nature of the hazards and risk being considered.

So, we have to make sure that the controls we're going to put in place are reasonably practical, are going to do what we need them to do because the Minister isn't going to sign off something that we don't think will work. So, we need to work together to actually come up with what these controls are. So, in our report we have put a whole lot of issues that we want to find out more information about. So, I think the critical thing is we need to work together to make sure that we can make sure anybody using EDN or people living in their houses nearby the ports are not adversely affected in their health, and I think that is the aim of all of us here.

So, I just want to be clear about the process for developing a Safe Work Instrument because, as you can imagine, if it has to go to the Minister it's not a simple process. So, WorkSafe would develop a draft Safe Work Instrument. It would then go out to public consultation for four to six weeks where the public can make submissions, so WorkSafe would then consider those submissions and revise our Safe Work Instrument as appropriate. We would publish our submissions summary.

Then we would present our final draft to the Minister, who would then consider the Safe Work Instrument. And, actually, I should say, it may be more than one Safe Work Instrument, because currently our Safe Work Instruments cover Parts 6 and 8 controls, I think we're also proposing health monitoring that may be a Safe Work Instrument that may be a separate one, but we would do it as a group when we do the consultations, so.

And so once the Minister has considered the Safe Work Instrument, if it's approved it's then published in the New Zealand Gazette and I'm thinking that as it's gazetted there will be 28 days before it comes into effect.

So, when we are considering what controls would be appropriate for Ethanedinitrile, putting controls in place we aim to provide workers with the highest level of protection that is reasonably practicable. I heard the term "hierarchy of controls" before. Thanks, Kade. So, in our legislation we have a hierarchy of controls set down. The first step when anyone is considering work they may be doing in their workplace is to decide, actually, do I need to do this, this job in this way? I think it's probably clear that they will need to use Ethanedinitrile, so eliminating it is probably not an option if they need to do fumigation. But if you can't eliminate something, then you must go to the next step which is minimisation, and in the regulations, in the general risk and workplace management regulations, this hierarchy control is set out.

The first minimisation step is to substitute for a less hazardous substance. For example, if we decided that Ethanedinitrile was less hazardous than methyl bromide, that may be a substitution someone could do in their workplace. So, then going down the hierarchy; got substitution, isolation and engineering

controls as the best types of minimisation. So, if risk remains then we will put administrative controls in place. An administrative control might be training or keeping records, and those sort of things are administrative controls. They don't actually minimise the risk but they give people an understanding of the risks so that they may take more care in what they're doing. So, then if risk remains, then we look at personal protective equipment and I think Pip is going to talk more about personal protective equipment and the hierarchy of controls when she talks a bit later.

In terms of the importers, suppliers, designers, manufacturers, sections 39 to 42 of the HSWA Act set out duties for these people. It effectively says you're not supposed to manufacture, import, design, supply a substance that's hazardous where practical. You'll notice that "where practical" and "reasonably practical" come up a lot in the legislation, so we realise that you do have to have some risks, and obviously with fumigation you're trying to kill things so there are going to be some risks associated with that, we just need to make sure we minimise those risks.

As part of the upstream duties there's also a section on providing adequate information. So, obviously the purpose for which a substance was designed or manufactured, that might be quite obvious in some cases but not in others. The hazardous properties of a substance, and EPA has defined those well and they will be on obviously the safety data sheet and all that information. The other one I find quite interesting is any conditions to ensure the substance is without risks to health and safety when used for the purpose for which it was designed or manufactured. That "without health risk" is an interesting point. So, I think that comes back to the highest level of protection you can provide.

In terms of controls for Ethanedinitrile. Well, you've seen it has various hazardous classifications. So, that means if it's approved, the regulations will apply, the hazardous substance regulations. So, that means that Parts 2 to 5, which has generic requirements like you need to have an inventory of hazardous substances, you have to label things properly, safety data, packaging, emergency management, signage, information and training, and managing risks in general, those requirements will automatically apply. Also, because it's a flammable gas, Parts 8, 10 and 11, the relevant parts of those will apply, and I think one of those you touched on before was hazardous areas. There is a regulation if anything is hazardous that you have to comply with, set up a hazardous area, and generally there's a standard that they need to comply with for that, so I think, in general, that implies intrinsically safe electrical equipment. So, there will actually be controls already in place for flammables.

So, then Part 13 is for toxic substances, so any requirements there that are appropriate to the classification of Ethanedinitrile will apply.

And, then there is a specific section for fumigants. So, it's not just the fumigants section that applies, that is in addition to all the other parts of the regulations. I just want to make that clear.

I had a real battle with MBIE to get that put in the regs because they just said fumigants, these things. And I thought, well, maybe people might think that's all that applies, so actually all the other sections apply as well. So, in that section there's a requirement to have certified handlers, controlled substance license for fumigants, there are notification and signage requirements, operational requirements which include supervision and ventilation, and record-keeping

requirements. Previously those were set under 77A control under HSNO. Basically they've been shifted, those controls, into HSWA. So, those will automatically apply so we don't need to add those as extra controls.

So, now I will hand you over to Philippa Gibson and she will talk about Ethanedinitrile specifically.

***

MS GIBSON: In terms of risk management for Ethanedinitrile there are a number of uncertainties that make it difficult for WorkSafe to really determine what would be the appropriate controls, and there are a fair amount of gaps in the data, and with any health and safety risk management it's absolutely critical to consider what your uncertainties are and your limitations are, as well as the things that you do know.

Some of those limitations are around the use of respiratory protection which affects the ability to manage risk, around the use of the gas monitoring data which affects your ability to assess risk, limitations on the understanding around the dispersion of the gas from the modelling, plus also the potential acute exposures or high short exposures very close to the stack, limited data around that. The effect of temperature on the residual gas and what would the residual gas concentrations be in the middle of winter or at a port that's in a colder part of New Zealand. And, also issues aren't the permeability of the tarp and whether or not there is risk for people working around the tarp.

Just going straight on to personal protective equipment in terms of respiratory protection. Bruce Graham's report indicated that there could potentially be very high concentrations of the gas very

close to the tarpaulin where obviously workers are working to do gas leak checking or to check the tarp et cetera, or to go and remove the tarp potentially. The level of, the IDLH level for EDN, the immediately dangerous to life and health level is 50 parts per million, so this is a concentration that could cause immediate serious risk or would seriously affect a person's ability to escape or leave the contaminated atmosphere. And, it's just a blanket rule that you never ever use air purifying respirators, as suggested earlier, in areas where there is potentially an IDLH concentration, the whole point being that you've got to provide the highest level of control which is in line with the objectives of the HSWA Act, and the most reliable respiratory protection which would basically preclude anything but the use of SCBA where you're potentially IDLH above 50 ppm. Even though, as it was mentioned earlier, that certain respirators can actually perform above say, like a full face air purifying mask can potentially perform up to 10,000 parts per million for cyanide, that's irrelevant to some point because you go back to the basic rule that you never use air purifying respirators in a potentially IDLH atmosphere. So, unless there is clearer data around potentially exposure for workers, then that would probably be a serious concern that you couldn't use air purifying respirators, and that takes you back to the purpose of the requirement under the Health and Safety at Work Act to apply the hierarchy of control in the management of substances.

In terms of dispersion, there are a number of uncertainties that were outlined in Bruce Graham's report, and one of the critical things for me is that there is a lot of data, well, there is some data around the one hour and 24 hour TEL exposures at some

distances, but that doesn't in any way relate to workplace exposure standards or the exposure for the workers working beside the tarps. So a one hour TEL for example, so that's an average exposure over a one hour period, because the data is averaging over that period of time, you can have a high acute, very high exposure level followed by the rest of the hour there is no exposure, and you average all those out so your average is much lower than that acute value. Given the acute risks associated with this chemical, that acute very very high quick peak is of particular concern to WorkSafe in terms of management of workers' exposure during removal of the tarp or working around the tarp. So, the modelling data doesn't really relate to worker exposure for people working in the very highly risky areas.

There seems to be some uncertainty around how much is lost through permeation through the tarp. There are variations in the residual gas levels at the end of fumigation. And, yes, I mean I just did a quick calculation before where if you had 50 parts per million over a 6 second period as you're releasing, as you're pulling the tarp off, 50 parts per million which is that immediately dangerous to life and health level, and if you have that for 6 seconds, and the reason I say 6 seconds because the gas meter brought up earlier, takes 6 seconds to respond, so basically that's the shortest period of time that you can take a reading. So, if you had 50 ppm, a dangerous level, for 6 seconds, and the rest of the hour you have nothing, that results in a concentration of less than 0.1 ppm, which is considerably lower than the workplace exposure standard. But again, like I say, you're comparing apples and oranges, and because you're averaging that data, you're not looking at that really high peak at the beginning

which is really critical in terms of risk assessment for workers working close to the gas.

Other uncertainties are around exposure monitoring. A new gas meter measuring higher concentrations was introduced today but the Ultima gas meter, which is the personal one that they're doing their ongoing dynamic risk assessment while they're doing the fumigation, that can only read up to 50 parts per million which is the immediately dangerous to health and life level. At that point it gives you a reading that says you've got a failure, so that failure could potentially either mean that you've got a concentration higher than 50, but who knows what that concentration is, or that potentially you do actually have a fault in your meter. Those limitations around knowing those numbers and being able to respond appropriately to those numbers, whatever they may be, is another serious limitation.

In terms of WorkSafe exposure, all workplace exposure standard, all exposure standards have some uncertainties around the number and how it's derived. I think generally speaking we're probably, everyone is fairly comfortable with the numbers that WorkSafe has adopted. For WorkSafe, probably the really critical number is the ceiling limit which is a peak or one-off level that should not be exceeded, and the reason that that's going to be critical is because that's designed to, around risk management for the workers working close to the tarp where you have those high immediate peaks after the tarp has been released.

Some of the other exposure standards around the world, for the ATR exposure standard, which is an ATR average for a worker, the values range from 1 to 10 ppm, but for the most part the 10 ppm that is used by the majority of people around the world, I would expect is extremely likely, based on my experience they will have

adopted that from the old ACGIH standard, the ACGIH is the American Conference for Government Industrial Hygienists and they set exposure standards. They set that 10 ppm in 1969 and I expect most countries haven't changed it since then. ACGIH, they did review that number in 2016 and came up with that ceiling level of 5 ppm, which is what WorkSafe has adopted.

So, in determining controls there are a couple of really critical things that must be considered. The law requires that a PCBU must have regard to the highest level of protection for a worker. You must have regard to the highest level of protection. There is also a legal requirement for the management of substances hazardous to health and hazardous substances, that the hierarchy of controls must be applied, and you can only drop down that hierarchy if it is not reasonably practicable to do something at a higher level of control.

It is also really important to consider as well when determining controls the limitations around monitoring, risk management, etc etc.

And just in terms of the hierarchy of control, we have elimination at the top and then we go into minimisation where we have either substitution of the substance for something less hazardous, isolation to keep it away from workers or workers away from it, and engineering controls. And, just to point out that while the tarpaulin or sheet is in place, in effect it is isolation because it's keeping the person away from the hazard, but as soon as you remove it, which is obviously a critical part of, remove it and release the gas, it's no longer an isolation control. So, you're falling straight back to that bottom of the hierarchy, that very last thing that should be done, which is management

using respiratory protection which, as I've pointed out, has some limitations.

In terms of whether or not recapture could be used, again, that recapture would be much higher up in the hierarchy of control than protective equipment. There are a bunch of questions that we don't know, it wasn't addressed in the application, around - or extensively in the application, around recapture. A bunch of variables that make it very difficult for WorkSafe to know whether or not it's feasible to do that, whether it would be reasonably practicable for the person controlling the business or undertaking to actually do recapture, and some of those issues have been raised earlier as well such as hazardous waste et cetera.

In terms of re-entry periods and buffer zones, so the re-entry period, like Susan said, is that period of time where nobody is allowed to re-enter that area unless they are appropriately protected. Again, that would require consideration. It would depend on whether or not there were things like recapture in place, and clearly there's also phytosanitary requirements around how quickly the cargo needs to be moved after it's been fumigated which, you know, obviously getting a crane in there, or one of those big things they use to lift up logs, to get that in that area to lift it up and put it into the ship, that if there was a re-entry interval, that will impact on the ability to move the stuff, to move the logs.

And in terms of buffer zone, again, that would require consideration. There seems to be a little bit of a variation around buffer zone in terms of what the purpose of a buffer zone is and who it is intended to provide protection for, and there does seem to be sort of variable options or offerings on what the buffer zone

should be, which again sort of points us to there is some uncertainty around this.

So, just my last slide here. There are other risk management measurements to consider, such as the flammability issue. And, in terms of managing a flammable atmosphere, it is a requirement under the hazardous substance regulation that a hazardous area meets the New Zealand Standard 60079, and given that this has only just been raised this morning, WorkSafe - I would need to go back to my colleagues at WorkSafe who specialise in flammable atmospheres to determine whether or not merely switching off the power to the light in a ship's hold, or to the fan on a refrigerated container would actually be sufficient to meet the New Zealand Standard.

In terms of health monitoring, it is actually already a legal requirement to do health monitoring where reasonably practicable and as far as WorkSafe is concerned, it is. And, I acknowledge the Applicant has agreed to this, it is reasonably practicable to do appropriate health monitoring which would be lung function testing given the respiratory irritation effects, and also it's an ototoxic, in other words the substance can cause hearing loss, even if that person is not exposed to noise. So audio in which it would be appropriate. And also biological exposure monitoring whereby you're measuring the levels in urine or blood as appropriate to whether it's a long-term exposure or an acute exposure are reasonably practicable to do, so therefore the law already requires it to be done.

So, yes, in summary there are a number of uncertainties which makes it quite difficult for us to determine just exactly what would be the appropriate controls and how they would work, so we need to have some more information. Thank you.

CHAIR: Thank you very much. Okay, so now we have an opportunity to ask questions of both the EPA and WorkSafe and we'll begin with the DMC. Kerry?

***

DR LAING: Thank you, John, I only have a couple of questions. First one, Teresa, is around the point that the application was to cover shipholds and containers as well, and you've said that you've undertaken no risk assessment because no data was provided. Now, in spite of Helen telling us this morning that, yes, there is some shiphold information available should we wish to see it, it would be my understanding, and you might want to take legal advice on it, that we could not make a decision covering those other modes of fumigation without it being a separate process.

DR VAUGHAN: Yes, so we would need to get some legal advice, but, yes, this particular application we're recommending to limit to fumigation under tarpaulin, with the note that if they would like to extend it to the other use patterns, they are welcome to, were this to be approved, apply for a reassessment where they could provide the appropriate data.

DR LAING: Okay, I just wanted to clarify that. And, one other question, you've written a control around atmospheric conditions must be continuously monitored. You might want to revise that after what has been presented in the last 24 hours, but just based on that, how extensive were you considering atmospheric monitoring to be? I mean, it can be a whole range of factors.

~~MR~~ DR MO~~HAO~~N: I guess we would be sort of thinking around the sort of controls that already apply to methyl bromide, that you are required to - I can't

remember off the top of my head - to record the wind speed and wind direction, and stuff like that.

DR LAING: Okay, so just wind speed and wind direction.

~~MR~~ DR MO~~HAO~~N: Yep.

DR LAING: I just have some thoughts about that in terms of low wind speeds and inversions, as to how much they actually apply in particular port situations, and particularly during venting during the hours of daylight, 7 am to 7 pm, most often they would not occur. Through the night they might. I mean, I was working on the assumption that the information we had was that the majority of EDN would be released during ventilation rather than any permeation through the tarp. So, you would need to consider nighttime concentration, or nighttime conditions if you were concerned about permeability through the tarp, but I guess we've heard some information this morning that says well, the tarp permeability was done without any logs there and without any reduction in concentration. So, in fact the concentrations that may come through the tarp over the night may be smaller, but we need to look at it again. That's just a comment, really. Thanks, John.

DR PHILLIPS: I've just got one question for Teresa although I don't think you can answer this question. It just relates to the potential release of ammonia and that conversion to ammonia, and whether you can make any comment at all about what the likely risk to humans or the environment could be, especially the aquatic environment, I guess, because ammonia is quite toxic to aquatic organisms, but you might not be able to answer that one.

DR VAUGHAN: Yes, no, I can only sort of answer it generally because we have nothing to quantify how much is there. So we just wanted to identify it as a potential risk that hasn't really been quantified because we don't know

how much is produced. We do know, there was study data provided by the Applicant that said a significant amount of hydrogen cyanide was not produced during log fumigation, so now we're wondering is that because EDN converts to hydrogen cyanide and then continues on and forms ammonia and carbon dioxide in that 24 hour period? But, we actually don't know. So, yes, it's just a flag that it's an unassessed risk at this stage.

DR PHILLIPS: Okay, thank you.

CHAIR: There are no questions from me so I will invite questions from the Applicant, and I would like to remind the Applicant that these are restricted to questions of clarification on the presentations you've heard, not refutation with your own points.

MS GEAR: Do you mind if I go first? A couple of facts, really, around the WorkSafe presentation as much as anything. Susan Collier gave us a very good description of the process once a decision has been made and the approach they need to take in putting in place a Safe Work Instrument. What I would be interested in hearing is what advice they will take from this process, whether at the end of this process the controls that you put in, that the EPA puts in place, is effectively the beginning for them to then do their assessment; whether or not they do need to take notice of what the EPA staff and the DMC provide them as advice?

MS COLLIER: In terms of our process, ideally we may have come up with what our proposed controls were for this process as well but because we've got so many unknowns, we're really asking for you to help us figure out what those, you know, reasonably practicable controls that will protect people are. So, as this is a new process, I'm sure we're open to working with you and the decision-makers on how that works out.

MS GEAR: Could I then just ask them that we have clarity around the way that we interact. Whether we can have instructions going forward as the best way to interact with people. To date there's been a lack of clarity in that direction and we would be very keen to make sure that we are working appropriately and we can fairly and openly share information.

CHAIR: Yes, I think I can only add, reiterate that this is a new landscape in terms of how both the EPA and WorkSafe interact to define the conditions upon which our mutual approvals of a process can be worked in. So, both agencies are working in that area. But if the EPA wish to comment further at this point, or maybe that's something we can address further on. Are there any other questions from the Applicant?

MS GEAR: I have personally one more question. I would really like to understand how the IDLH was calculated?

MS GIBSON: That IDLH was taken from the American CDC, so the National Institute of health I think it is, the CDC, so they determine the IDLH, it's their process and we haven't reviewed that value, we've taken that value that they've proposed.

MS GEAR: Thank you.

MS GIBSON: There isn't a great deal of information on how they've derived that.

DR SWAMINATHAN: What's the time of exposure on that 50 ppm because in your presentation you mentioned that it's -

MS GIBSON: Yes, that's immediate. Immediate, yes.

DR SWAMINATHAN: But like, the other data shows that it takes, the - data source shows that it's like 30 minutes or one hour, it's not like instantaneous.

MS GIBSON: And that's exactly my point about exposure standards and guidance values, there is a lot of uncertainty around them. You know, and the best we can do is take a reliable source which is CDC, a very

reliable source in terms of what value that they've placed on the IDLH. But that is the fact, that with human exposure it is not black and white. What affects one person in one way is not necessarily going to affect somebody else in that same way. So, you do have to consider that there are always uncertainties around exposure standards and exposure levels, and to deal with uncertainties. Unless you have very very good exposure data and a very good handle on the actual exposures that are occurring, the best approach would be a conservative approach around assessing risk based on data and the application of exposure standards.

DR SWAMINATHAN: Like, in my presentation I have mentioned that with the - meters there is also the risk which is close to the fumigation chamber, and you always use personal protective equipment to protect that risk, that's the one we have recommended, but beyond 10 metres that risk is not there. So, it's based on our -

MS GIBSON: Yes, but your modelling data at 10 metres is based on 1 hour and 24 hour TELs isn't it? It's not actually instantaneous readings which is a different way of assessing the risk. It wouldn't be appropriate to apply a 1 hour TEL to a worker and their short-term exposure within say 10 metres or 20 metres of a stack. It's kind of comparing apples and oranges almost. So, the 1 hour TEL does not represent risk for a worker from an immediate high exposure, that might last the 10 seconds or 1 minute for example. And, what I was saying earlier is that you have to keep in mind that we don't, there doesn't seem to be a great deal of data, or there doesn't seem to be much data at all around the risk, very short high exposures as the tarp is being released, for example. Then you add that to that the gas meter can't necessarily read at the really critical values,

then you do have a fair amount of difficulty around risk management there.

And, I was going to actually ask earlier just around the trial at Tokoroa, was there any - I did see some data showing gas levels beside the tarp and immediately after release which were quite high, but then I was told that that gas data was flawed so I just wanted to check, it was flawed?

MS GEAR: It was flawed and the other problem we had was that actually most of the release happened in the first 15 minutes and we didn't have detailed data for that period of time. So, again, we had problems that at the of release, the time of greatest risk, it didn't have the intensity of data collection that would be useful.

MS GIBSON: And that for me is a critical thing. It's all very well to focus on the 1 hour exposures, or the exposures 10 metres away, for me it's that really high short release immediately after removal of the tarp is actually a really critical question that hasn't been answered for me.

MS GEAR: I think the other thing about that trial, it was a fairly short fumigation. So, we weren't doing the 24 hour fumigation so we were releasing concentrations that would be higher than we would expect to release with what we now know.

MR BRUZEK: I just want to point out, reply to your comment that we are exactly on the same plane, this is the first like industrially viable application because - and please don't look to - when we took over the process in 2014 exactly for the reason that the science was not done in Australia so we took over the application from the former multi-national that was leading the application. So, we are going exactly for the same thing which is the protecting workers, protecting the bystanders, and getting a reasonably applicable and

practicable limits. However, we need to say that for us, like, scrubbing doesn't add too much value because the biggest purpose or the biggest idea behind EDN is actually that it's a self-decomposing chemical and therefore, like, it doesn't require scrubbing. So, like, letting nature doing the job is one of the key things and we need to work around that to protect people without the use of scrubbing, because scrubbing for us - I'm coming from the chemical factory -

CHAIR: I think at this point, if we're on to scrubbing we're really beyond the questions for WorkSafe and the EPA. Does the Applicant have any more genuine questions?

MS GEAR: No.

CHAIR: All right. Are there any questions from any of the submitters? Oliver.

DR SUTHERLAND: I have a couple of questions. In the ENR report you refer three times to Picton as being a geographically constrained location where risk assessment modelling may not be appropriate, but I talked to the port manager at Picton and he says they don't do any fumigation there anyway.

DR VAUGHAN: So, as far as I know they don't do any methyl bromide fumigation, but when we're approving something, unless you put a permission control in place you're approving it for use on any port and so you need to make sure that the risks at any port are managed. So, that's why it referred to the fact that those smaller ports may want to in the future use EDN fumigation and we just wanted to outline that potentially the modelling doesn't account for all the risks at those more constrained locations.

DR SUTHERLAND: Yes, that's good, that clears that up. The other thing is, in section 3.8 you list the sources of information that you took, you used for producing the report, but I note that there's no mention of the report

of the Maori Reference Group. I was a member of that group and we produced a quite substantial report and I'm just surprised that it's not mentioned, although it does get a passing mention in the appendix.

DR VAUGHAN: I would just note that when I listed the application form I considered that to include all of the information provided in the appendices, the extensive appendices provided by the Applicant, and that included the Maori Reference Group report explicitly, and then also the Applicant's summary of their view of what actually came out of that reference group. So, I would consider that Maori Reference Group report to fall under the application form.

DR SUTHERLAND: The MRG report was an EPA report.

MR JACKSON: No, the MRG report is actually a Draslovka report, they funded it.

DR VAUGHAN: So, it's not actually considered an EPA report. EPA provide administrative services and facilitate the process, but it's actually the Applicant's report that was provided back to the EPA in the application.

MR JACKSON: The EPA provides secretariat services for that Maori Reference Group but the report was funded from Draslovka as part of their suite of documents.

DR SUTHERLAND: Okay, it would have been helpful probably just to have listed that you took it into account, because it stuck out to me as though it had been overlooked. Thank you.

CHAIR: Any further questions from any of the submitters?

MR GLASSEY: Ken Glassey from MPI. Probably for both parties I'm just curious that through this process there's been no mention of the current use of hydrogen cyanide fumigation in New Zealand and the current controls around that, and it's a flammable gas that we use in the banana ripening rooms, and the fans need to be non-explosive et cetera, and it's similar circumstances

as to what's being described but there's been no reference to those being used already.

CHAIR: I think in the interests of expediency, given that you refer to a substance that's not under consideration today, we'll forego that question. I'm happy if you want to explore that off record with WorkSafe and the EPA and if necessary we can bring this to light later on, but I'm concerned that we keep the focus on the application today. We're running ahead of time as it is. I would like to thank everybody for the submissions that they've given this morning, it's been an information-dense morning. We'll reconvene on time at ten past 1, so there's a shortened period for lunch and I'll see you back in here.

(Hearing adjourned from 12.43 p.m. until 1.11 pm)

CHAIR: Welcome back to the afternoon session and without further ado we'll have the first of the submitters presenting, Dr Oliver Sutherland on behalf of Ngai Tahu.

DR SUTHERLAND: Kia ora tatou, and thank you, Mr Chair. I just want to say at the outset a word about Ngai Tahu's approach to this hearing. Normally Ngai Tahu doesn't comment on issues that, where we're not the mana whenua and so I just wanted at the outset, since they're not here, appearing here or in Rotorua, I just wanted to acknowledge the tangata whenua of Tauranga Moana, particularly in Ngai Turangi, but also the Iwi of Whangarei and Napier, because they haven't put in a submission and they're not appearing and though we have got a feeling for their thoughts about the application from the Applicant's consultation with them.

But, in fact, Ngai Tahu does have an interest in this application for a couple of reasons. Log fumigation is important to Ngai Tahu because it happens to some extent in the Ngai Tahu Takiwa in Bluff and in Timaru, but also Ngai Tahu has a major interest in the forestry sector.

Just to put a figure on it, in 2017 the export sales of Ngai Tahu logs totalled $12.7 million. So, it's an industry which is important to Ngai Tahu.

And I suppose the other interest that we have in this is the fact that we were represented on the Maori Reference Group, as I've referred to before, and I took part in that and I'll come back to that a little later.

Ngai Tahu or Te Runanga o Ngai Tahu supports the 1987 Montreal Protocol on substances that deplete the ozone layer and to that extent Ngai Tahu certainly just wants to reiterate its support for the phasing out of the use of methyl bromide by 2020. We see that as a target that has to be met, but if we're going to maintain the export log industry, then obviously an alternative must be found.

Before I get on to the actual application, Mr Chair, I noticed that you said that you were possibly going to undertake a site visit. Well, as one who did that, the Maori Reference Group spent a day in Tauranga and can I just say if you do get the opportunity, please do get yourself to Tauranga. I was astonished by the scale of the operation there and there's nothing like seeing these great tarpaulins and things, just seeing the whole set-up. But I've been in touch with the people of Whareroa Marae, that Marae adjoins the Tauranga Port and of course Helen Gear has met and spent time with them.

I got a little bit of an ear-bashing because the Maori Reference Group didn't stay with them and didn't visit that Marae, and it would seem to me if I can give you a bit of advice, that if you have an opportunity to pay your respects to the people of Whareroa Marae, because it does adjoin Tauranga and I know that they've got a real interest in this even though they haven't made a submission, then if I could advise you to do that as part of my swan song, then I would do that. But

certainly, visiting Tauranga will be really important for you, as it was for us.

Looking at the risks of EDN, we, Ngai Tahu - actually we find ourselves in an unusual position. We tend to oppose applications but today we're supporting this one for reasons that are partly mentioned, and also that we find that the risks can be managed, we believe, and that the benefits certainly are very substantial. As far as the aquatic environment is concerned, which is always an issue which we look at, certainly we agree that the risks to the aquatic environment are negligible. And, as far as the birds are concerned, I as an old ornithologist myself, I'm sure that we won't be seeing nesting seagulls in and around those ports in which fumigation has taken place. So, I don't think those risks are serious.

The human health risks are obviously the critical ones and they are of interest to us in a general sense, but also because our people are workers in and around the ports at which the EDN could be used, and certainly those human health risks, as we heard very well and comprehensively outlined by the WorkSafe people who are here today, we do think they should be manageable but it does strike me that you - and I hadn't actually quite realised the complicating factor of the new legislation that came in just whatever it was, a few months ago, and so I think it's disappointing that the staff and I think WorkSafe have concluded that it's not possible yet to be able to determine what the controls should be, or the ways in which the human health risks can be managed, and that more information and that more data is needed. And, I accept that that could be the case but I also accept that 2020 is not far off and getting any of this in place before the deadline that we've set, or that the EPA has set, is going to be very difficult indeed.

I want to just talk briefly about the risks to Maori culture and values and about Tauranga Iwi, and we've read the STIMBER account of their hui in Tauranga and, as I said before, we don't see a clear consensus emerging. I spoke on the phone with the people that Helen had spoken to and they're holding their fire, I think, is what they've said, and she said that they were considering coming into the process a bit later on. But I think we would say that the, as far as Maori culture and values is concerned, perhaps EDN is seen by at least the tangata whenua up there, as the best for their job. But in any case, as far as Ngai Tahu is concerned we certainly support the conclusion of the Maori Reference Group and the staff who've produced the cultural risk assessment, that the use of EDN is not likely to raise serious concerns regarding potential risks and impacts on Maori values.

I do worry about the fact that for some reason those Iwi that are affected are not participating in this process, and you'll remember I raised that at the last hearing. There may be reasons for that and, as I said at the last hearing, if it's money that's stopping the tangata whenua from Napier or those from Whangarei from coming down and participating in the process, then something should be done about it because it does diminish the ability of these hearings to fully address what the Act requires when Maori are absent with the exception, as so often, with the exception of Ngai Tahu.

So, that's pretty much all we want to say. We support the Applicant and we appreciate their application as being probably one of the best that we've seen in a long time, and we hope that you do take a look at the Maori Reference Group's report. It is buried deep in the appendices of the application but it would be nice to see it lifted to a bit of a higher profile.

Four of us spent a day in Tauranga and a lot of time on that report, and it didn't seem to have got much traction.

So, in conclusion I just want to congratulate Draslovka on an excellent application and wish you all the best, and hope that the logging industry in New Zealand is not hindered by the inability to fumigate logs for the export sector. Tena koutou, tena koutou, tena koutou katoa.

CHAIR: Thank you Oliver for that and for all your other submissions over your time representing Ngai Tahu. Do you have any questions?

DR PHILLIPS: No.

DR LAING: No questions.

CHAIR: No questions from me either. Please remain there. Are there any questions from the Applicant?

MS GEAR: Not at this stage, thank you.

CHAIR: Any other submitter? Thank you very much. Okay, we'll move on and the next submitter we have this afternoon is Philip Taylor.

***

SUBMISSION BY PORT BLAKELY LTD

MR TAYLOR: Mr Chairman, panel, submitters, attendees, my name is Philip Taylor, I'm the Managing Director of Port Blakely. Port Blakely is a forest owning and management company that is predominantly based in the south of the South Island of New Zealand. I'm here in support of the application for EDN to be used across all ports in New Zealand, subject to the appropriate health and safety controls to ensure its safe and harmless use.

As I say, I'm here principally in my capacity as the Managing Director of Port Blakely but I'm also on the New Zealand Forest Owners Executive Council, I'm on the Forest Leading Trust Board and I'm also Chair of the New Zealand Forest Owners Forest Research Committee. Having said that, I don't pretend to have a great deal of technical knowledge, if any, on EDN and I'm not particularly familiar with the registration application.

Later submitters, particularly STIMBER this afternoon, and the New Zealand Forest Owners at the Rotorua hearing will talk about the broader impact of the reduction in the use of methyl bromide - which Port Blakely supports - on the export industry in the wider New Zealand. I'm here specifically to talk about the potential impact of the withdrawal of that and the lack of a suitable replacement on Port Blakely's business.

Port Blakely has been in New Zealand since 1994. As I say, the majority of its timber lands are in the south of the South Island of New Zealand. It's a family company based out of - American family company based out of Seattle in the United States. It currently exports to Asian markets approximately 600,000 cubic metres of logs. That represents around about 5% of the New Zealand export volume. Our preference would be to do more in New Zealand processing, but given the

location of our forests and the lack of domestic processing in our region, we have limited opportunities for domestic processing, hence why an efficient export supply channel is critical to the success of our business[], and also 350 contractors who rely on our business being profitable.

As I say, Port Blakely supports the registration of EDN as a need to replace methyl bromide, provided it is done in a self-harmless way. Of that 600,000 cubic metres that Port Blakely exports, approximately 30% of that is from what we call small third-party forest owners in the Canterbury/North Otago region and they too are reliant on an efficient and safe supply chain into the export markets up into Asia.

In terms of current fumigant usage and market requirements, I'm not sure to what extent the panel is aware that currently we are very dependent on the use of methyl bromide for two of our major export partners, those being particularly China and India, at this stage two of our other export markets who are a significant scale lower than India and China, Korea and Japan, fumigate onshore, at point of arrival. There is some potentiality some stage in the future, although it's not known at this stage, that they may require fumigation at point of loading, ship loading. So, we can't rely on the fact that currently Japan and India - sorry, Japan and Korea don't require fumigation in New Zealand. So, you can appreciate that the removal of the opportunity to fumigate with methyl bromide is a significant threat to those potential markets as well.

While the majority of our export volume is shipped out of the ports of Timaru and Dunedin which don't currently fumigate, we do rely on a supply chain that provides or allows for fumigation of logs to supply above-deck cargoes into China and Korea using

methyl bromide, particularly out of the ports of Tauranga, Napier and Whangarei. So, while we don't currently use fumigants in Timaru, we are very dependent on the use of fumigants in those three ports, and certainly having the ability to fumigate in Dunedin and in Timaru would add some significant improvements to our supply chain efficiency, so hence why we would support the use of EDN being registered for use across all ports in New Zealand rather than just simply the existing ports.

What are the implications to our business if there is no replacement for methyl bromide to be found, and no doubt STIMBER and the Forest Owners will talk about the extensive level of research that has gone into looking for a replacement and the fact that EDN has been one of the, the only fumigant that's been found available. Clearly they have identified other options around debarking and heat treating of logs, but again, for Port Blakely, given our scale and our location, those are not options that will work for our company simply because of the need to accumulate sufficient scale to justify the capital costs of looking for non-fumigant replacements for methyl bromide.

So, I think that's about it, Mr Chair. As I say, in conclusion we are supporting the registration of EDN as a use as a fumigant across all ports of New Zealand.

CHAIR: Thank you very much for your submission. Kerry, any questions?

***

DR LAING: No questions, thank you.

DR PHILLIPS: I was just interested to know what fumigant they use in Korea and Japan?

MR TAYLOR: Again I'm not familiar - I understand it is methyl bromide.

CHAIR: Kind of the same question, maybe asked slightly differently, and STIMBER may have more insight on this later. Do you think if Japan and Korea currently accept fumigation on arrival, is that something that could ever be negotiated with China and India do you think?

MR TAYLOR: You will have the opportunity to talk with Don Hammond from STIMBER, I understand, later in the Rotorua, and he is much better informed on that. My understanding, although he can confirm it, is that there is a reluctance from the Chinese importers to fumigant in China using methyl bromide. Clearly EDN is not registered or approved for use as a phytosanitary treatment in China at this stage. I think their attitude to that is that that would just simply be pushing our problem on to them.

CHAIR: Quite. Thank you very much for your submission. Okay, I'll now invite Wil Grullemans to speak on - quite right, any questions of the previous submitter by any of the other submitters, or indeed the Applicant?

MR COATES: Kia ora, I wasn't aware of your company and I just wanted to know what species of timber you export?

MR TAYLOR: We're exporting a real pot pori of timber. Our predominant species is radiata pine, but we're also exporting Douglas Fir, principally from our own forests, but a multitude of small species, particularly emanating for those small forest growers that have, farm foresters who plant a wide range of species.

DR COATES: Thank you, that clarifies that.

MR OLSEN: Just a comment more than a question. Shane Olsen here from MPI. Just to answer your question around methyl bromide on arrival in other countries, like China and India, MPI has previously raised that topic with in particular the Chinese authorities and Indian

authorities, more recently with China last year, and that is completely off the table in regards to being able to fumigant on arrival with methyl bromide. So, for China in particular.

CHAIR: Okay, thank you. So, Mr Wil Grullemans of Nordiko Quarantine Systems.

***

SUBMISSION BY NORDIKO QUARANTINE SYSTEMS

MR GRULLEMANS: Good afternoon everybody and, Mr Chair, thank you very much for the opportunity to talk briefly about recapture, because I think it's a topic that's getting a fair bit of discussion, and hopefully we can add a limited degree of clarity around that as this is a relatively new area for recapture but one which we're optimistic will be technically and economically feasible.

Just by way of background to Nordika. Some of you will know Nordika, many of you may not. We're a company that was established in 2000. We have the first commercial systems to recapture fumigant emissions in Australia, New Zealand, and now we're doing that in many other countries around the world. We began with methyl bromide recapture, that's probably the most widely used quarantine fumigant, but we've extended that now to phosphine and the with the installations we can show you EDN recapture as well.

So, the general business area is to remove and recapture toxic gases from shipping containers and large-scale fumigation applications, which would include log stacks but other structures as well such as grain silos, large fumigation chambers, et cetera.

The end result of recapture is an improvement in the environmental and health and safety impact of using fumigants, and we now have equipment we supply to over 30 countries around the world.

What's our viewpoint in terms of the registration of EDN? We definitely support EDN, it has so many benefits but we think that it's a sensible precaution to recapture residual EDN at the end of the fumigation period. I think that it's difficult to be absolutely certain of reaching a safe level of EDN at the end of

the fumigation period due to a lot of uncertainties which can arise through the whole process, and recapture would minimise that risk and lead to a better engineering control for the whole process.

We certainly support the establishment of appropriate WES/TWA/TEL and PES values for EDN. Buffer zones and entry restrictions also are best practice and should be followed, and I think there's so far been general consensus that regular health monitoring of those workers in the process is definitely a valid requirement that we should work towards.

An important point to bring up is the distinction between recapture and liquid scrubbing. Recapture is recapture of the fumigant on activated carbon. It's a very fast process, it's a very efficient process. Liquid scrubbing is an alternative way of dealing with the destruction of the fumigant and scrubbing of the fumigant. When we did the initial trials for EDN scrubbing in Western Australia and for the Plant & Food system, it has a two-stage liquid scrubber followed by a carbon scrubber. The liquid scrubbing process is a much slower process than capture on carbon and this is because you're trying to get a gas to combine with a liquid and that is a very slow process and hence the flow rate is very slow. Capture on carbon can be done at a much better flow rate and hence you improve the time period and the efficiency of recapture. And with carbon recapture systems, you can scale that up with larger filters, multiple filters, and obtain the turnaround times you need in order to meet shipping deadlines and logistical requirements, and the log industry is a very busy industry and we can only expect that the growth will continue over time, and having an efficient recapture system improves the logistics significantly.

Here's an example of an under-tarp manifold. The under-tarp manifold is basically this device here. It's installed prior to the tarp being put on to the log stack. Ducting can be placed at different locations around the log stack to ensure you're getting a fast and efficient recapture from different parts of the log stack. You can attach more than one system to the under-tarp manifold. This is an older system we installed in Victoria in 2010 but basically it has three lines coming out from the tarp going through three primary secondary carbon filters, and that allowed a recapture period of about two hours, which is a good time requirement and important, I think, if you're going to have a good turnaround of log stacks in a busy port.

You can see here, here is a recapture curve showing concentration of methyl bromide over time. There is more data available from the APVMA website for EDN but when we recently applied to get that data, it was restricted under commercial confidentiality so we couldn't access that data. So, hence we're putting up the methyl bromide data in this slide.

This is an example of a very large scale recapture system that we installed in the Port of Newcastle in Australia. Basically these two large filters and another two primary secondary behind them, are recapturing from grain silos as large as 25,000 cubic metres, so a similar size to whole ship fumigation. So, the important point here is that it is definitely technically and economically feasible to recapture from very large scale fumigation applications.

A technical point that may be worth just mentioning briefly. The very low residual EDN concentrations that have been mentioned at the end of the fumigation period certainly can, according to the Plant & Food research, arise from the breakdown and absorption of EDN on to

logs, but there is another mechanism whereby you can get a low residual concentration at the end of a fumigation period and that could be from losses around and under, as well as through the tarp. So, there's an expectation that log stacks under tarp are perfectly sealed and do not leak gas; I think that's worth checking in terms of the efficacy of that.

It has a further implication that if you're not sure how much gas is being absorbed and how much is being lost to atmosphere, how sure can you be that you've had the required concentration kill for the pest over the time period?

There's been quite a bit of talk about the cost of recapture. It is being used for methyl bromide recapture in very many places. The amount of methyl bromide at the end of the fumigation period is considerably more than any of the EDN concentrations we've been talking about, and this is an important point because the amount of fumigant left at the end of fumigation period is directly related to the cost of capturing and exposing of that fumigant. So, if it's really the case that there's virtually a very small trace of EDN available at the end of most of the fumigations, the cost of that will not be that high. If there are occasions where they could have an unsafe level of residual fumigant, then having a capture system in place would seem to be prudent so that you're not inadvertently admitting a large amount of fumigant to atmosphere.

This is the picture of the scrubbing system at Plant & Food. It's a three stage scrubber. The first scrubber is liquid and the other two are carbon. So, there's a chemical breakdown of EDN in the first scrubber. Any residual is captured on the carbon. The carbon is very efficient at capturing EDN. For future

installations we question the need for having a liquid scrubber and that would mean that you could increase your flow rate and achieve a very good turnaround time in large scale log stack fumigations.

This is some of the initial research work done by the predecessor to Draslovka in Western Australia, and we developed a scrubbing recapture system for EDN at that time as well.

Because of the limited time we have to talk about recapture, the final points I wanted to make was that recapture has been demonstrated in trials in Australia and at Plant & Food at Palmerston North, and at the New South Wales Department of Primary Industries who are using a Nordiko EDN scrubber as well. It is a requirement to recapture and scrub EDN in Australia. We're not sure that accurate monitoring of low level EDN emissions is proven with the technology that's available today, and I'm talking down to 0.034 ppm, having the actual equipment that can verify that is a real challenge.

Plume modelling is another area that has raised a lot of questions and concerns, and I think there's a number of uncertainties around that which can be addressed by recapture. When we did have readings for EDN fumigations in Australia, that showed that the spread of the gas was considerably more than any of the plume modelling that we had done at the time. So, plume modelling is not perfect I guess is the message.

Odour threshold, I think Pip has described that in detail I don't need to go over that.

But, in essence the risk of accidental exposure is much higher without recapture and if you want to minimise the risk of any accidents, it would seem a logical thing to do, to consider making recapture a requirement when using EDN for fumigation applications.

CHAIR: Thank you very much, I'm sure there will be some questions on this submission.

***

DR PHILLIPS: Thank you, I just had a couple. It seemed to me like you were - well, to my simplistic interpretation, you were suggesting that recapture was the more efficient system in terms of - because it worked faster --

MR GRULLEMANS: Yes.

DR PHILLIPS: -- and it was quite adaptable. So, under what circumstances would you use scrubbing over recapture?

MR GRULLEMANS: I think the use of liquid scrubbing is to reduce the cost of the carbon that you have to use, activated carbon comes at a cost, and the disposal of that carbon. It depends on your local situation. Even the liquid scrubbing solution has to be changed as it is used up, but it's a matter of economics and they will vary from location to location.

DR PHILLIPS: Okay, because that was going to be my next question, was what happens to the recaptured material?

MR GRULLEMANS: Okay, well the recaptured liquid waste --

DR PHILLIPS: Well, in both cases.

MR GRULLEMANS: -- and activated carbon is handled as a controlled waste and it is disposed in an approved landfill. The advice we're having from experts on EDN is that EDN breaks down very rapidly and therefore I think the same pathway should occur on the activated carbon.

DR PHILLIPS: Okay, thank you.

DR LAING: I had initially written a number of questions but they were mainly related to the APVMA report and various things that came out there and I must say it's not really your business but I was interested to know what

might have been behind some of their decisions but that's not really what our subject is about.

You made some reference to the liquid scrubbing being a slow process. I guess there are a number of other factors you can bring in there to make that a more efficient process in terms of counter-current flow and towers and acid rings, or anything to increase the surface area in contact and various other things.

We've already covered the disposal of the waste and I guess I'm really interested in the couple of photographs you put up of equipment that was being used, and you've got one there where you've got your manifold and three pipes going into a log stack. If, in fact, they were doing 30 stacks at Tauranga at whatever it was quoted, six an hour, you would need six of those and be able to move them at appropriate times, or you would need more than six to do 30 stacks?

MR GRULLEMANS: We would have to make the appropriate number of systems available to do the scrubbing job and you are talking about a significant investment in equipment and there's a trade-off between I guess the capital cost and the turnaround time at your port. So, I think, yeah, certainly would get a faster turnaround with multiple systems.

DR LAING: That's right but I mean it ultimately will come to a trade-off in terms of cost for what you're actually trying to reduce and what that risk is, and is that cost, or the cost to risk benefit sufficiently great that you do that.

I guess one of the other things that I'm interested in, and there may be a number of parties that I ask the question of, there are several submitters who believe that there should be a dedicated scrubbing facility created. Have you given any thought to what that, envisage what that might be?

MR GRULLEMANS: Yes, this is sort of beyond the scale of this particular hearing but I visited Taichang Port in China, it's one of the major ports for Shanghai, and they have a dedicated log fumigation facility for methyl bromide, and they have multiple concrete base and they're recycling the methyl bromide from bay to bay and they have provision for a scrubbing facility at the end of that operation. It's a massive scale operation and I think we can learn a lot from China in terms of how to better manage the control of fumigant emissions.

DR LAING: You just confirmed my thoughts, that whatever you need to deal with the volume of logs of going through somewhere like Tauranga is a massive facility --

MR GRULLEMANS: Yes.

DR LAING: -- and it's very easy to say, hey, we should have a dedicated facility but once again what's the cost relative to the risk you're trying to manage. Okay, that's all. Thanks, John.

CHAIR: My question would be, you referred to the use of your system in 30 countries, and in any of those countries is it being used on a scale similar to that which we've heard about applicable to the New Zealand log industry?

MR GRULLEMANS: In Australia the grain silo fumigation recapture system for methyl bromide volumetrically is on a similar scale, but the way the log stacks are spaced out at the ports presents an extra challenge, but it certainly is doable. We've installed log stacks recapture systems in Victoria and Australia, and fumigation recapture systems and container recapture systems from Nordiko have been used ever since the original Environment Court hearing in Nelson many years ago. There's Nordiko recapture equipment here at port here in Wellington where log stack fumigations used to occur at the port facility, but nothing directly comparable with the New Zealand situation today, but in

our opinion certainly it's a feasible operation to undertake.

DR LAING: Just a further question on that. I look at your submission and you've done some air modelling on stacks and shipholds. Any experience on using scrubbing systems on shipholds?

MR GRULLEMANS: Yes, we did some preliminary work in the Port of Portland in Victoria where the community is quite close to the port and the venting of shipholds is an area of concern. We've modelled and scaled up and designed a recapture system that can work on a shiphold fumigation, but we haven't had the opportunity to implement that because we haven't had, or I should say the industry hasn't had the environmental directive to undertake that operation. So, it's a bit chicken and egg but in our view, again, that is definitely, it's technically and economically feasible.

DR LAING: But that would also be a large scale system?

MR GRULLEMANS: Definitely a large scale system, yes.

DR LAING: Okay, thanks.

CHAIR: Any questions from the Applicants?

DR SWAMINATHAN: Just I want to start recalling that Western Australian fumigation, I was involved in the development of that trial and we used Nordiko scrubber. So, what we did is basically, the size of the log was around 220 metre cube, that's the size of the volume used at the top and we did six hours of fumigation, and after the end of the fumigation we did like 12 hours of scrubbing, but after three hours - we use liquid and carbon scrubber, what was mentioned, but after three hours it reached a state of equilibrium and it never like reached zero ppm or something light that. That was a high level. I measured the concentration inside the top after four hours, after 12 hours, the level remains the same. And we submitted, this is the GC data we

collected from top, middle and bottom, and the level after four hours, which is similar to the end point concentration we are reporting, that's 24 hours. And yet we have submitted this data to the APVMA and even after scrubbing we are releasing the same concentration what we are getting on the 24 hour fumigation. So, my question is do we need a scrubber, that's the question?

CHAIR: Sorry, what was your question in the last part?

DR SWAMINATHAN: Like do we need - like after scrubbing, the level of EDN concentration at the end of scrubbing is similar to the level we are finding by extending the treatment time to 24 hours. So, it was around 400 ppm and the same level we are getting without scrubbing by extending the treatment time. So, I just want to know what is the benefit of using a scrubber? Still it's not zero level after using scrubbing, there is an EDN concentration. Like, I have experience with the scrubber and without the scrubber and we are getting the same concentration, but by extending that treatment time from six hours to 24 hours, and we have data to support that case.

CHAIR: Okay, I appreciate what you've said. I think in the absence of that data we can only take your comments anecdotal. Your reference to the value of good data on the efficacy of your scrubbing is not lost on us, I'm sure, and we would want to have that data or consider that data, but in the absence of that data at this point I think we'll just let that rest.

DR SWAMINATHAN: And that was the data submitted to the APMVA.

MR HALL: I've just got a question, Wil. I would also like to make it known to the DMC that I also provide services to Nordiko but that that doesn't influence my question now.

So, the PFR scrubber is, we've got two, as the image showed, two carbon IBCs and then a liquid scrubber for EDN, and what we've found there is we get a lot of crystallisation in that solution and that the vacuum pump can't, just can't push the air fumigant mixture through the liquid, and we're dealing with very, you know, very small volumes of EDN in that instance.

So, have you had issues with that in any other areas, or are there other areas where this EDN scrubber has been used and just any comments that you may have on that?

MR GRULLEMANS: That's a good question that. It goes towards our experience with scrubbing EDN. We think liquid scrubbing is not the ideal way to handle scrubbing EDN, we think capture on carbon is much more straightforward. You avoid any issues of low flow rate, crystallisation, et cetera, remembering that there aren't - until recently there have not been many EDN fumigation operations around the world to go and work on and certainly our knowledge base has improved and we would design a very efficient carbon capture system for EDN and bypass those limitations of liquid scrubbing.

MR McCONVILLE: As you can tell, scrubbing is quite a contentious issue so we'll try to get to the point. I just want to raise a couple of things. First of all some of the data you've printed is a little bit off, particularly in relation to comments about odour threshold, you've made some comments about the WES in TEL which are inaccurate based on what you wrote, so just wanted to bring that up -

CHAIR: I'd just like to remind you again that the process we're in today dictates that your opportunity now is one to ask questions of clarification and not cross-examine or put forward your own data which you've had a chance to do already.

MR McCONVILLE: No problem. Do you know how much carbon is necessary in order recapture 1 kilogram of EDN, and therefore how is this disposed of and how will you manage the large disposal rate in New Zealand?

MR GRULLEMANS: Okay, we need to do more work in terms of getting definite numbers in terms of those capture ratios. We know those very accurately for methyl bromide and for phosphine, but for EDN, because it's a new gas, we have to do more work on that and I think that that is part of the process that would be undertaken if we find there is support for recapture of EDN to optimise that.

CHAIR: Questions from submitters?

DR SUTHERLAND: I think you said in Australia they required both scrubbing and recapture, didn't you?

MR GRULLEMANS: Yes, that's the APVMA.

DR SUTHERLAND: That's right, and then this morning we heard that Australia isn't using this EDN to fumigant logs, and I'm just wondering if the technology you're talking about, or the requirement of the Australian regulators makes use of recapture and scrubbing just too difficult for the export log industry in Australia?

MR GRULLEMANS: Well, the export log industry in Australia is principally using methyl bromide, as it is in New Zealand. Recapture is undertaken for logs. In Tasmania recently, the TasPorts made it a requirement to recapture methyl bromide, and log exports are continuing through the Hobart and other ports in Tasmania. I can't comment on EDN use in Australia because, I stand subject to correction but I don't think it's used on log fumigations in Australia at the moment.

DR SUTHERLAND: Yes, but that was my point. Is the reason that it's not used the fact that the controls are too difficult, too expensive, too something?

DR SWAMINATHAN: Yes.

MR GRULLEMANS: Perhaps I could comment on that. Methyl bromide in those ports where recapture is required is still used in preference to EDN. So, if you're just releasing methyl bromide to atmosphere, there would be no incentive to move towards another fumigant, EDN, which had a controlled measure, ie scrubbing.

CHAIR: Question at the back.

MR COATES: Perhaps I could ask a further question on behalf of Ngai Tahu?

CHAIR: Yes, sorry Marree. Carry on, Gerry.

MR COATES: Your slide there talks about the spread of gas over considerable distances. Can you be more specific in terms of the buffer zones that are being proposed here are 60 metres, up to 60 metres. What sort of distances are you talking about?

MR GRULLEMANS: In our submission we made use of the limited data that we did have from the Western Australian trials and I think there were measurable amounts of gas measured at 100 metres or more from the point of origin.

MR COATES: Thank you. Just in terms of the costs of recapture, these are all adding on to the costs of shipping and so on. There must be a point in which that becomes uneconomic. Have you found that there is a disincentive to use it because of the economics?

MR GRULLEMANS: The economics is a very important factor. I think you have to look at the whole supply chain in terms of whether or not it's the critical factor, as to whether or not an export continues or doesn't continue. It does vary from location to location. In North Carolina recently, the State air quality control has made recapture of methyl bromide a requirement taking into consideration the economics there. So, I think it varies from location to location.

MR COATES: And finally, Shanghai, you talked about large scale fumigation. For what purpose are they fumigating on arrival?

MR GRULLEMANS: I think this is from other countries which haven't already done fumigation onshore. So, they're taking in logs from Siberia, from Canada, from other countries which, maybe due to the presence of insects or other pests, require fumigation on arrival.

MR COATES: That's interesting but New Zealand is not included.

MR GRULLEMANS: I'm not an expert in that area. Maybe Ken Glassey knows more about that.

CHAIR: We had a question from STIMBER.

MR GEAR: Please tell me Wil, the utilisation of the facility from Taichang that you spoke about, what is the utilisation of that in the throughput of logs?

MR GRULLEMANS: I don't have an exact figure for that. I could find that out and would be happy to share that information with you, but it is a very significant facility. I walked around it with the local CIQ representatives and it's a large scale operation but I don't know the actual throughput rates et cetera.

MR GEAR: Second question, could you please tell me the countries that have granted permission for Australia to use EDN on exported logs please?

MR GRULLEMANS: Sorry, I don't know the answer to that question either.

MR GEAR: It might explain why there is no use in any of the ports even with the restricted conditions that are there.

And thirdly, you make in your second bullet refer to recapture and scrubbing is a requirement in Australia. Could you please tell me the way in which your equipment is applied to the field use of EDN which was approved in March this year?

MR GRULLEMANS: That was not a requirement for the field use for EDN for soil fumigation, I think probably because it was impractical to recapture from soil fumigation.

DR ARMSTRONG: For my own edification because I've been reviewing the worldwide scrubbing and recapture technologies, and when you said that you have recapture systems all over the world, how many of those are EDN?

MR GRULLEMANS: The EDN scrubbing recapture systems are Plant & Food, New South Wales DPI, and the original Western Australia log trial systems. The other systems are for other fumigation applications.

DR ARMSTRONG: And how much would each one of these units cost per lag for each log stack recapture of EDN?

MR GRULLEMANS: That would have to be calculated. I don't have a figure off the top of my head for that, Jack.

DR ARMSTRONG: Okay, and last question, the scrubbing of EDN, recapture and/or scrubbing of EDN, what is the percentage efficacy at the end of the, of your scrubbing technique?

MR GRULLEMANS: We would design any scrubbing system to meet the required EPA or WorkSafe efficacy target. When we put in recapture systems in Europe when they were still using methyl bromide, before they banned it completely, the target efficacy was 80% of the available fumigant to be scrubbed. In Tasmania for methyl bromide, now it's 95% of the available fumigant to be scrubbed. We can achieve higher efficiencies in our system design depending on what the target parameters are.

DR ARMSTRONG: And as you increase the efficiency does not the cost go up?

MR GRULLEMANS: Yes, that's correct.

CHAIR: Okay, one more question from the Applicant.

MR HALL: Wil, just an additional question about the potentially higher concentrations being released. You compared lab studies versus field studies and how you

came up with the assumption that there may be a higher rate of release under the tarpaulin as opposed to controlled laboratory studies where the chamber is very well sealed, and that's the information we presented this morning. So, the question is, how did you come up with a higher rate of release under commercial conditions where there may be other losses versus what's occurring under controlled conditions.

MR GRULLEMANS: From our experience of methyl bromide, tarpaulin fumigations there are often gas releases around the perimeter of the tarps. We don't have that direct experience with EDN because it's not being used for that application, but it's certainly not a hundred percent gas tight chamber as you might have in a laboratory situation.

CHAIR: All right, thanks Wil. If there's no further questions we'll move on. The next submission is from Ministry for Primary Industries given by Shane Olsen.

***

SUBMISSION BY MINISTRY FOR PRIMARY INDUSTRIES

MR OLSEN: Tena koutou katoa everyone, my name is Shane Olsen. I'm the Manager of Facilities and Plant Products Team in the Ministry for Primary Industries. I would just like to acknowledge I have got several of my colleagues in the room, such as the interest on this application for MPI. So, Ken Glassey, Emmanuel Yamoah from our Plants and Pathways Directorate, my colleagues from that Directorate, as well as Ivan [Valcovich] and Felicity [Velour] from our Market Access Directorate within MPI.

Thank you to the Decision Making Committee and EPA and WorkSafe for all the time and effort you've put into hearing submissions, and also to the Applicant, and the submitters, because there's obviously a considerable amount of information that's gone into the works of to where we get to today.

The Ministry for Primary Industries' purpose is to grow and protect New Zealand. In achieving that we will provide the strongest possible platform for various sectors, primary sectors, to grow the value of its exports and achieve the Government's objectives. Our ambition is for New Zealand to be the most trusted source of high value natural products in the world.

As by our name, we work across various primary industries, from primary producers to retailers and consumers, and various systems from fisheries, food safety, biosecurity, and forestry. Of most relevance to this hearing is our MPI are providing whole system leadership of New Zealand's biosecurity system through our biosecurity New Zealand Business Unit. That's covering our system from pre export to post border, and then for exporting goods around the world.

I also acknowledge that we have recently set up Te Uru Rakau, our Forestry New Zealand Business Unit, and that focuses within the Ministry on supporting New Zealand's planting of forests and promoting sustainable forestry.

Amongst all those functions MPI has some core roles which myself and my colleagues contribute significantly to, and relevant to this hearing MPI New Zealand's national plant protection organisation and that sits under in New Zealand being a signatory to the International Plant Protection Convention.

As part of that responsibility we set import and export standards for products coming into the country and going out of the country, in particular plant and plant products, and that's to manage the risk of pests and diseases from moving from one country to another, and primarily to protect ourselves from harmful pests and diseases that exist around the world.

We also negotiate new and improved market access conditions for our primary products.

Our main interests and through our submission, and for the hearing is - we've got three main interests really in the submission. The first one is to maintain and enhance New Zealand's forestry exports, particularly logs, timber and manufactured wood products, and I'll get more into the details around the volumes and value shortly. In this regard EDN is a promising fumigant or phytosanitary for plant health services to meet requirements from overseas countries to manage the risk of New Zealand's pests being transferred to New Zealand's forestry export markets.

Our second major interest for this submission is protecting New Zealand's environment and economy from harmful pests and diseases. While noting it is outside the intention of the current application of EDN, we see

EDN as useful fumigant, particularly to control many insects, nematodes and fungi on forest products but also other non-edible products, and thirdly the ability to use EDN into the future will assist New Zealand in meeting our obligations under the Montreal Protocol by being able to reduce and replace methyl bromide use.

Just looking quickly at our forestry export revenue, I think it was quoted earlier today that this year we will reach $6 billion for forestry exports. I can confirm that the year ending March 2018 and we reached $6.22 billion. Forestry is a significant part of our New Zealand primary production in the export sector, forms 15% of our total export revenue, and China being our largest markets. As you can see, this graph shows the significance of Asia to our forestry export markets, and I'll talk a little bit more about the significance from a log export point of view.

Of the $6.22 billion revenue, 3.24, so over 50% is log exports currently and then followed by sawn timber at 873 million. So, you know, when we're talking about logs here, we're talking about a significant revenue earner for the country.

Treatment to meet overseas country requirements, so that's not requirements set by New Zealand, it's to meet overseas country requirements, is required for two of our main four log export markets. We've just mentioned those four main export markets being China, India, Japan and Korea, but two of the four, China and India, require treatment as described below in our graph. That incorporates approximately 80% of our export logs at the moment or accommodates $2.5 billion of export revenue. So, the significant one is obviously China. At the moment 72% of our logs are going to China the latest data shows, and obviously they require treatment, either methyl bromide, phosphine, or debarking.

India, the requirement currently is methyl bromide. Obviously heat treatment is mentioned but it's not feasible given the amount of throughput or exports, at the moment there's no feasible way of doing that heat treatment.

These are the requirements for those countries, however, and it was mentioned briefly before, we cannot assume that treatment requirements won't change, we're talking about Korea and Japan. Now, these are the markets currently for 99%, or over 99% of our log exports, four countries, but we cannot assume that those won't change, that new markets will not appear into the future. Internationally we know that expectations are increasing for all aspects associated with imports into another country. Other countries are realising, as New Zealand has long done so, realising the damage imported pests can do and therefore treatments such as methyl bromide or an EDN fumigant, or phosphine fumigant, or some other way of treating, is going to be required to maintain market access for our products and our forestry products in particular, and that's for the foreseeable future. And so while we have the data and requirements currently, that does not mean that tomorrow we will not get a change in requirements and meaning that there will be more fumigation and more treatment that will need to be applied if we are going to access those markets.

Just looking at the projections. In 2018 log exports are forecast to reach 20 million cubic metres, the highest ever export volume from this country. It is estimated that 75% will be exported to China. This graph shows the growth in log export volume since 2004, including a forecast for the next five years that MPI has completed today. So, 75% estimated to be exported to China with growth also into India as well.

We expect very shortly, it's currently 79% but very shortly that will increase to over 80% of our volume of logs will go into China and India, so particularly in these next five years, at least that's what we've forecast anyway.

The additional volumes of logs will, at this stage are expected to lead to an increase in methyl bromide use unfortunately given our commitment to try and reduce and replace. So, it does show the importance of having effective, available, and feasible treatments into the future, into the short-term as well as the longer term.

I would also note that MPI is also committed to the new Government's 1 billion trees programme, which hopefully you've all heard about, we're all contributing to in some way, shape or form, which will have implications in the longer term in terms of our planting for us.

Just for the Decision Making panel, MPI has invested several millions of dollars into the research primarily done by STIMBER and Plant & Food for finding alternatives to methyl bromide. That includes the supporting work that has led to the identification of EDN as the most promising alternative to date. It's already on record in our submission that we consider EDN is a really promising alternative phytosanitary treatment, in particular an alternative to methyl bromide use. Approximately 90% of current methyl bromide use or just over 500 tonnes, is fumigation of log stacks. And also noting it's outside this current application but we believe it could be used to fumigant either non-edible products and particularly to reduce the threats of incoming pests and disease on incoming goods such as the Brown Marmorated Stink Bug. We're spending a lot of time fumigating lots of goods at the moment with methyl bromide often for things to

reduce the risks of potential pests such as Brown Marmorated Stink Bug from damaging our horticultural sector.

From a treatment progress we have been working really hard to get our treatments in line with overseas markets, including working on EDN. As noted previously by the EPA today, Australia has approved EDN, particularly approved the forest product exports from New Zealand. Malaysia is also approved for logs and timber, the use of EDN to meet phytosanitary requirements.

China we've been working hard and presented some interim efficacy data with support from our science providers in STIMBER in 2017, and further discussions on potential approval are ongoing, including submitting a full data package to our Chinese counterparts when it is available, and we're expecting that shortly which will be good to see.

From an India point of view, we've highlighted EDN as a potential logs treatment, and further discussions are planned for later in 2018.

So, MPI is working really hard with the support of our industry to get approvals of new treatments online as alternatives to current ones. This process is a longer game. We have no guarantee whether it is months or years that will be needed. It is the decision of the importing country under the WTO and SPS agreement. So that's something that certainly the more information we can provide to them, the sooner will help support our case, and we note that New Zealand registration and potential use is always useful in aiding supporting ongoing discussions. Often countries will ask, well, are you using that treatment and it would be good to answer "yes" at some point.

Just to look, we acknowledge that there are potential risks to environment health and safety from use of EDN as a fumigant, but the application we note appears to show that EDN will be an ideal fumigant, particularly given it's absorption in wood, the low emissions from the data we've seen and the limited environmental exposure.

While we acknowledge that the proposed controls seem reasonably suitable, we do encourage the EPA and WorkSafe to ensure that controls are able to be as practically implemented as possible, and especially we don't want to get into the situation of having some controls in a similar way to what seems Australia put in where it's not actually being used, and I think that would actually be a detriment to all the work that everyone in this room has provided already. But also those controls will also, practical controls that can be implemented, will also aid smooth transition into our primary sectors to using EDN where possible.

I certainly would encourage the Decision Making Committee and anyone else to attend a field visit. Having attended personally most of the ports around the country, it is a particularly ports eviron. Particularly Tauranga, but others as well, but it's really good to see it's a restricted environment, yes, it's a really unique place and that's where the fumigant will be used and it would be good to understand the challenges faced in working in those environments.

MPI also has a substantial treatment programme. All our official export and import treatments must be conducted by MPI approved organisations. Those organisations are audited regularly to ensure high level compliance and operators. Those operators also are used to conducting activities in a high compliance

environment. So, that's certainly something that is ongoing as part of our MPI treatment system.

So, just in summary, MPI strongly supports the application. We understand from information received to date this treatment will be effective on pests associated with New Zealand's forestry products, in particular our bark beetles destined for export and very likely to be useful for enhancement of our trade conditions, particularly when methyl bromide recapture is fully in force in 2020, and particularly to enable us to reduce and replace methyl bromide to meet our obligations under the Montreal Protocol.

While we understand, again to repeat, there are restrictions in the current application, EDN is likely to be a very effective fumigant for managing risks in other non-food products going into the future and it is desperately important from a biosecurity point of view that we keep enabling having tools available to protect ourselves from pests and disease that may come into the country. So, thank you.

CHAIR: Thank you very much.

***

DR LAING: Thanks very much, Shane. I have a question and I don't know if you're the most suitable person to answer it.

MR OLSEN: I have many colleagues in the room.

DR LAING: It might go to STIMBER or somebody else. I just noted in some of the information, particularly when you were talking about China and India as being the major export markets that their requirements as far as methyl bromide go are markedly different between China and India, and there is also a variety of treatment rates within each country. Do you know the basis for

the differences? I'm only looking at it in terms of, okay, we might get EDN approved, and what have you, and we've talked about a potential maximum application rate of 150 grams per metre cubed, but are we likely to get a variety of responses out of the countries you're talking with that go outside that range? Just what's outside that range of numbers that already exist?

MR OLSEN: So under the WTO SPS agreement, countries have sovereign right to regulate to see fit to protect their country but that must use technical based evidence. However, with uncertainty, countries seem to acknowledge uncertainty in different ways and also probably have different science, data at their fingertips. So, what you see, you're absolutely right, we have remarkably, well, some differences in rates and so it's really up to the country to decide that, and we obviously provide - when we are negotiating those conditions we obviously want to encourage them to use rates that we see as feasible and technically justified, but there is certainly room for countries to make individual decisions based on their, the risks they pose.

Also they're worried about different pests. So the pests that we're worried about coming into our country are different to the ones that other countries will be worried about, and so that also can lead to a difference in treatment rates because they need a higher rate for certain pests.

DR LAING: Okay, thanks very much.

MR OLSEN: I'm sure if any of my other colleagues might want to help with anything that I've missed.

MR YAMOAH: At the moment India requires 72 grams for 24 hours but China requires a higher dose which is 120 but for 16 hours fumigation.

MR OLSEN: For methyl bromide.

MR YAMOAH: Yes, for methyl bromide. But whatever rates they set, like Shane said they have right to set their own rates, it must be technically justifiable. So, MPI also has the right to challenge if they set a requirement that is not technically justifiable. It must prove to us whatever data we are submitting to them is not effective, so we can challenge rates they set.

DR PHILLIPS: I have a question. Being pessimistic here, what happens if China and India don't accept EDN?

MR OLSEN: If they don't accept EDN we'll have to continue using the treatments that are available as per their current requirements.

DR PHILLIPS: I guess I'm talking about in 2020 and if this was approved.

MR OLSEN: So, in the end, well, it's up to the commercial players to decide which treatments, which options are available to them. Obviously for India the only feasible one is methyl bromide, so that's going to make it particularly challenging I guess in terms of obviously there's going to be the recapture be fully in force which adds cost to the primary sector. So, what you're probably going to see is a significant rise in costs which may make things more commercially challenging from an export point of view. That's not really my port of call, kind of answer from an export and an industry point of view and they may have a different opinion and you might want to get their opinion as well.

DR PHILLIPS: That's okay, thanks.

CHAIR: Okay, no questions from me. Does the Applicant have any questions?

MS GEAR: Shane, I would just like to ask. There was some discussion about the difference in rates that India and China put in place for methyl bromide. Has an efficacy

data set for methyl bromide ever been provided to India and China?

MR OLSEN: I don't think so, according to my colleagues and I, from an historic point of view I don't believe we've provided that previously. Obviously it's got a long history of use over 50 years of quarantine use and widely recognised around the world, and sometimes that is seen in a significant light in terms of providing the necessary comfort for countries to require that as a treatment.

MS GEAR: But could it also mean that they interpret at different levels because they don't have that firm scientific evidence that they would have, say, with EDN where we can give them quite a dedicated efficacy data set.

MR OLSEN: Yes, potentially. Not sure if any of my colleagues would like to provide input?

MR YAMOAH: I think what we need to consider is the risks for each country is different. India may have tests which they consider as a major concern which China may not consider that places a major concern, and it depends on how difficult that risk, that pest is being able to be managed effectively. So, for India, for example if you take Sirex, with the position it takes they may require more, you know, concentration to, models to kill it. But China may have that pest already in their country so it's not a risk to them. So we have to consider that there's a variation based on the risk each country sets.

CHAIR: Further questions from the Applicant?

DR SWAMINATHAN: Like in your presentation you mentioned Australia - biosecurity treatment. Do you know what is the treatment time? And the second question, if EPA approves, whether MPI will encourage timber people to use EDN for Australian export?

MR OLSEN: So we've got - first question, Australia are concerned about a pest called [oreophilus ferris] which we have a lot of data around for EDN efficacy. And we have a collaboration with Australia over how we manage the risks on exported timber to Australia. As of end of last year, I believe October last year, September/October last year, we in consultation with Australia have put EDN as one of the available treatments. I can't quite remember the exact dosage rate that was approved. I think -

MR YAMOAH: I think it's 50 grams per cubic metre.

MR OLSEN: No, it was lower than that but maybe something around 20-24 grams per cubic metre for four hours I believe. I might have it in my notes.

MR YAMOAH: Australians have approved 50 grams per cubic metre but we approve 25 grams per cubic metres for three hours.

MR OLSEN: Yes, thank you Emmanuel. 25 grams per cubic metre, that's for our timber, New Zealand's timber going to Australia, and we know that Australia have also got a 50 gram per metre approval that I know that applies internally within Australia. So, that's the current approved rates that I'm aware of. And so, second question, remind me what the second question was?

DR SWAMINATHAN: Whether, like if EDN is approved by EPA, whether MPI will encourage timber people to use EDN which supports the approval by China and India, because when you start to use between Indian and Australia, that gives some confidence with China and India - of the EDN fumigant?

MR OLSEN: Certainly EDN, as soon as it is approved for use in New Zealand it is ready to go for timber to Australia and logs and timber to Malaysia. So, we would certainly encourage exporters to start using that because it would help enable the reduction and replacement of

methyl bromide, in particular, but in the end it's ultimately up to an exporter to decide what, what treatment is used, and I'm sure the industry and exporters can speak in terms of there's significant cost implications depending on what treatments and that dictates often what treatments are used in the current China situation at the moment, so.

DR SWAMINATHAN: And just I also want to point out that the dose rate we are using is 150, but for Australia it's 25 grams. So, like WorkSafe and EPA has to consider that risk, like, it's a very very low dose rate which is approved by MIP for use on timbers exported to Australia, so that's a difference.

CHAIR: Thank you, any questions from any of our submitters? Gerry.

MR COATES: You mentioned earlier that debarking was accepted by China as an option. Is there any economic disincentive to using that, or does it have to be used in addition to chemical treatment?

MR OLSEN: No, so that's a separate option to meet China's requirements. I understand the costs of using debarking are higher than what is currently the cost for both phosphine and methyl bromide, and therefore it is potentially limited in use. However, I know that there has been, there is a shift and an increase in debarking over time. I'm sure if you asked the industry submitters that question, you'll probably get a more clear answer in that regard, but it is available, you know, it's an option there that people can choose to use for whatever reason. But there is some cost implications associated with that currently.

MR COATES: Even allowing for the fact that it might produce a higher premium product, a debarked log?

MR OLSEN: Yes, I couldn't comment on that.

MR COATES: Thank you.

CHAIR: One further question from the Applicant.

MS GEAR: Thank you very much. Could I just check, Shane, when you talk about debarking for China, is it a phytosanitary measure or a risk reduction measure in terms of the Chinese opinion with regard to that?

MR OLSEN: It's a phytosanitary measure, it's also a risk reduction measure basically but it is a phytosanitary measure ultimately. So, you either have to debark, fumigate with methyl bromide, or fumigate with phosphine currently. You could do both but the costs associated with two or doing all three of them seem a bit ridiculous probably.

MS GEAR: And do you have an efficacy dataset to show that debarking is effective?

MR OLSEN: Not in the way that we would look at efficacy datasets now. In terms of those questions, obviously historically things were put in place but obviously time moves on and now people would certainly we're pursuing - and the efficacy datasets are really to prove to an overseas country that this requirement is suitable to manage the risk from transfer of pests and disease into their country, or to reduce that risk.

MS GEAR: Can you tell me what requirement there is around the amount of bark on a log to fulfil the Chinese requirements?

MR OLSEN: So, it's - geez, you're really testing me but off the top of my head it's 2% on a log stack but 5% on an individual log. So don't quote me on that though, it feels like a test.

MS GEAR: My point is, I think, through this question, is it easy to achieve that level consistently throughout the year?

MR OLSEN: Oh look, I'm not involved in the debarking but obviously from an output point of view, you know, we have that as a requirement and people meet that because

there's about 78% of our logs going out of the country to China are debarked, so obviously the ability is there to meet it but I can't really comment on how onerous that requirement is.

MR YAMOAH: Apart from the debarking at the moment it's only China that accepts debarking as a phytosanitary measure. So, even though it exists, it's very restricted to just one market, so we have to bear that in mind. India does not assert it.

CHAIR: Just if I could follow up with a final question. Just remind me the relevance of the Chinese market again in terms of proportion?

MR OLSEN: Geez, again it feels like a test but if I refer back to my notes - 72% of logs, and growing by the way.

CHAIR: So just that one market it's 72%?

MR OLSEN: Yes, so 72% of the logs, and growing.

CHAIR: All right, thank you very much, Shane. I'll welcome now Don Hammond and Dr Ian Gear on behalf of STIMBER to give us the presentation of the industry body up.

***

SUBMISSION BY STIMBER

MR GEAR: Tena koutou, tena koutou, tena koutou katoa. I'm Ian Gear and I speak on behalf of STIMBER, and loosely translated that means all of the log exporters of New Zealand and their forestry clients. I would like before I start to recognise a few people in the room, particularly Oliver and Gerry. Thank you very much for your attendance today and your recognition of the work that STIMBER has been involved with, with working with Draslovka to ensure that we had a good engagement with Maori, and we are pleased and thank you both very much for recognising that. We set out to do our best, just as STIMBER also has set out to do its best to ensure that Draslovka presented to the EPA the best possible application that the industry could be involved with and be proud, and we are proud to stand here today after seven and a half years of work with the one alternative to methyl bromide that we have been able to identify.

I want to take you for a walk this afternoon as we look at some of the things to do with that.

So, STIMBER has, it has a mandate to lead and promote and coordinate and support research effectively, and related activities. Our task is to provide sound science that is defensible going forward to MPI to use in those market access negotiations that we've all heard about to date, and thank you Shane.

We have recognised, and I don't need to repeat, the importance of forestry to the New Zealand economy at the moment, and it is growing as you've seen with MAF's very high expectations that were put on the board just before. We do know that beyond there, there is likely to be a decline in the amount of wood available for export and use locally, and that all goes back, 25-30 years ago when plantings occurred.

We also know that now Shane Jones has the putea, he has the billion trees, and he has the ambition to address some of the issues that we face in the environment about planting forestry. The volume I've spoken about will expand over the next five years, some of us have the reservation that we're going to reach those levels that MPI set, but let's wait and see what hindsight tells us about later.

We have a changing global environment in which we are operating and that environment is the one wrought by climate change, it is also the one that is wrought upon us when we move through the precautionary principle and we look at the 17 or so different models that are out there and touted, and some of them erring so on the side of precaution that things become impossible. And I have a message for everyone in this world, and Kerry, you've heard me say it before, don't take away the necessary tools for production from the primary industry. We are working very hard to develop good products that we can use active ingredients that we can target specifically, and EDN is one of those that I bring to you today.

The science I've spoken about, it speaks for itself. There was a question came from the table around that science before, and there was another question that was asked around efficacy data for methyl bromide. Methyl bromide use in the world is long-standing and the treatment rates, and we have some of the highest in the world for incoming - are what I call POA, plucked out of the air in the absence of a hell of a lot of good efficacy data and good science, and we've heard various explanations. But what we've done with methyl bromide, and I don't want to dwell on that, is we've produced an efficacy dataset which shows that we can heavily reduce the amount we've used and we've produced an efficacy dataset for EDN which is being analysed right at the

moment which is so robust other countries will have a difficulty in arguing for great variations in the treatment rates.

We have worked very hard over the last 18 months to two years, in fact even longer with MPI, to inform the trading partners as to what is happening. We opened the conversations last year in the flesh in Beijing, I was there and, yes, I can confirm "don't bring treatment on arrival to us, you have an obligation, New Zealand, to bring us pest free product. We don't want your methyl bromide problem on our books". So, we have to find things that will work in the marketplace and that is my message. We have gone to a lot of effort to breed insect species the two bark beetle species, the [oreophilus ferris] that are fit for purpose in the science we deliver you. So much so that in the case of those two bark beetles no-one had been able to breed colonies in the land to give us fit individuals that heavily reduced the mortality in the controlled treatments. We now produce those on demand at Plant & Food from the lab, 500 eggs lava, pupae, adults of either of the species as we need them. That is good science and I thank the scientists and teams of technicians for what they did there. We were told we couldn't do it. We have.

We've touched on trading negotiations with MPI, a very important part of where we are now in the ten year cycle we had set ourselves from January 2011. So, we're looking at future-proofing our industry. We want robust science, we want to develop cost-effective solutions, we want to ensure that they're socially responsible, and importantly we want to know they are safe, and that's very high on our agenda. I don't want to be using a product myself, and I've used methyl bromide since I was 12 years old, it's a precarious situation, I don't want

to be using products that I don't have faith in. I do have faith in EDN, and I didn't initially but I do now.

We turned many stones as we looked at the alternatives when we started and the different work streams, the investigations we could do. We completed in 2014 a major review which took 15 major fumigants and 18, Jack, I think from memory, minor fumigants. We were told by other people around the world, including the EPA here, that here's a list of major fumigants that you probably use on logs. Only one of them came through the screening process and that one fortunately has come through the efficacy testing in the lab. Our programme, as we have gone on, has become more and more focussed and we are just in the final stages of the science there for EDN. The focus as we move forward from here is getting approval with reasonable and fair and appropriate controls in New Zealand, and getting approval from our trading partners, and I'm hell bent that we're going to do that and we're going to do it in record time. Come back and see me if I'm wrong.

We have some other things that we've put out of the programme. EDN we've been discussing. We've looked at physical alternatives. Debarking has been mentioned. It's accepted by the Chinese and it was accepted at the time when we needed to start exporting logs in volume and there was a recognition that we might not be able to fumigate them all at that time so the Chinese accepted debarking with no efficacy data to back it up, it's a risk reduction measure. We've also looked at dual heating which is hot dogging, and you take a log and you slap an electric current through it and you literally cook it and you control the temperature. We can do that, we can lift the log temperatures internally to whatever temperature we want. But unfortunately we need five of those rigs to fill one ship taking a whole week

and the capital cost is extremely high, but it works. And we have in our process looked at the ecological approaches because there are some in this room and most of us being Kiwis want to see soft approaches if we can find them. Sadly, folks, they don't work. Insects eat wood. They are present on the wood somewhere in the forest throughout the year in some numbers. Those numbers vary, yes, but we've got a system there that won't show us promise at the moment. Maybe in the next 15 to 20 years we might find some niches.

Well, I've dwelt on the safe issue. It's very important for us, sustainability and sustainable solutions for the forest industry despite its recent bad press about slash et cetera, it's the mainstay of what STIMBER is about. We don't want to be leaving pollutants for our grandchildren or the children beyond, nor do we want to be taking them in the supply chain or the usage chain and putting them in another place, hidden, buried in a landfill where things are given off and we haven't accounted for the processes that happen around there and the effects on the soil microbes, or whatever. Things need to be workable I've suggested. Importantly, they need to be viable. I need to know I can look my exporters in the eye and say, this is not going to carve a hell of a lot more money off your bottom line. Because we're not talking about a value add project or process here, this is off the bottom line, and if the price of logs fall, as they did two weeks ago, US$15 a tonne down and, yes, they were at highs, they've only got to do that two or three times, caput, we can't afford it.

So, we have to have processes that are close to where we are now. Debarking was mentioned before. It's an added cost, anywhere between $7 through to about $16 a

tonne to our reckoning. Add that on to the price of the log, or take it off it and there's not a lot left.

The other thing we want to make known and we appeal, and can't do a lot about it but we want to be heard, that we do want consistent rules throughout the country and it's the EPA that can give us that, these people that do the good work, do the analysis and write the good report they've written. It's a good report guys. A few things I disagree with. It's been very thorough and I was pleased to see it, but I do have some disagreements.

We want to ensure as we go forward we see a balanced risk. We want to focus on the science, we want to focus on safety, and I welcome the opportunity that's been extended by WorkSafe to work with you. Key words "work with you". Means together. It doesn't mean being apart and making another "we're different, we sit here". We will work with you, we give you that pledge, and I want you to remember that while we look and seek to provide things that provide the safety we're after from the protection, as we said before we underlined, it is reasonably practicable. And, I've heard some answers today from Draslovka that get us a long way along that track.

So, look at life through the lens of commonsense. We need to temper our decisions with that, STIMBER seeks that and, for instance, in the control there is one that says we can't apply or remove the covers in less than 5 kilometres per hour winds, and there is something that is in there that refers to inversions. As a long-standing horticulturalist, I will accept the inversion, I have no problem with that, have that in the controls. I do want to question the wind speed and whether or not that's relevant or whether or not it

should be lower. I believe it should be lower or possibly removed.

So, our concerns. The buffers that I'm reading about by and large I don't have a problem until we get to the TEL and the 120 metre buffer. I do have a problem, I do have issue with that. I would like the opportunity just to discuss it if it is necessary as we go down the pathway.

We also have questions, grave questions, about the continued reference to, we may have to consider scrubbing. No, you don't. We have heard evidence today and I have seen it in the lab from the $22 million that I've been responsible for finding and investing with my Board, that has said to me nature herself is providing a solution. Our efficacy data tells us, and I may get the timing wrong a wee bit, but I think in about 21 hours or thereabouts we achieve the efficacy we want if we look at the curves. We were doing a 24 hour fumigation, running out to 24 hours we found that we had very low levels of EDN. That suits me, that suits the industry, we'll accept that. You don't need scrubbing. I haven't been convinced at any of the arguments I have heard over the last ten years.

We do need consideration for containers. We mentioned those, and shipholds. It is very significant for the industry that I represent that we can have an alternative to methyl bromide for use by 3 to 5 tonne in fumigating a log ship. Capture that onto carbon, probably going to have 25 to 30 tonnes of carbon to dispose of. Try capturing it onto CN or carbon as it's been suggested. It's not necessary, the hold is sealed, we fumigate for 24 hours, the fumigant certificate is signed, the ship leaves port, the hold is still sealed, we don't have an issue. It can be vented as other fumigants are when the ship is in transit.

We had an issue that arose in the trials when we had a bit of a pong from the logs and I reported that in my submission because I want everyone to know that the stacks smell different after fumigation. They do smell different, we picked it up and we said we would have a look at it with Plant & Food, and we have had a look at it in preliminary research. We can't detect and, Ngaire, I think you asked the question before about ammonia, we can't detect any ammonia there and we've been trying to see if there was anything there. So it indicates to us that less than 11 parts of a million there's nothing there, or there could be at lower levels but we think it's probably something else. So, I've tabled for you this morning a paper which just details, So difficulties that we're faced with when we look at the smell. I could invest another 22, 44, 66, 88 million dollars over the coming 20 years and still not be able to tell you what that smell is, and there's a paper that I've quoted that actually highlights the difficulty with that.

Other uses, I just want to talk to quickly here. We've got a few things. Buffers I've covered as we've been talking. We'll deal with that post this if we need to with you. We've just dealt with the issue of scrubbing. Shipholds, we need to consider it. Post fumigation. Smell, we've dealt with.

Then we want to talk about the other issues. Now, there's a number. Shane has talked about biosecurity issues for border protection but no-one has spoken about the need to be able to fumigant for potato scab when we get the odd occurrence in Invercargill city, and for umpteen dozen decades we've been controlling that pest in Invercargill by using methyl bromide. If it's EDN, MPI can then have a tool in their box that they can use for that.

And the other one is the looming significant one we're not dealing with at the moment, and that is as a pre-plant soil treatment. Great promise. Globally when I go to conferences and talk to tomato growers, capsicum and eggplant growers, strawberry growers in Florida. For every dollar they invest in the moment using the alternatives to methyl bromide, they get 95 cents back. They should be getting $1.10. With EDN coming on the market at some stage in the future there is light on the horizon for them again to get control of the problems they have had or are having now with the so-called alternatives.

So, with that I just want to stress that we have a product that we believe in as an industry, and there was a lot of doubt before we undertook a techno economic investigation which Jack and I were involved in, and Barbara, and we looked really hard at EDN because some of the initial research didn't look too promising, but thank you Matt and Adriana, you've cracked it and we now have again great promise ahead of us.

So, I want to remember, we've got an alternative, we're proud to be able to bring that to you. The controls that are being proposed by Draslovka I believe are real, they are evidence-based and they will stand scrutiny. So, please work with us, hear us out and let's move forward.

Science does not support scrubbing following fumigation, for what reason I just don't want to go there but there is nothing that tells me we need it. We do want to reconsider that TEL as the calculation we heard this morning please, and we want to look at this buffer out of 120 metres, and I do want you to remember, if you put a ruler out of the ports of New Zealand, if you go to Lyttleton, let's take the worst case, you will find a house 26 metres from the boundary of the port,

but if you look at the real places where you might have a log yard where fumigation may occur, or would most likely, then we've got 100 plus metres. If I go to Tauranga I've got 900 metres from the port boundary before I get to residential properties. If there are people living in those industrial buildings, they're contravening the local bylaws, someone else can sort that out.

So, let's temper everything we're doing with a little bit of reality please and I do want to consider and I want to talk with you again at some stage that re-entry restriction. Yes, we know you can put something on your face but is it necessary? That's the question I leave you with. We believe it's not.

Thank you very much. I look forward to your informed decision in time and we accept that there may be some delays, John, in that, and that is relevant. We have tried to answer the questions as Draslovka have, that has arisen from the various documents we've seen, the staff reports, the science memo, WorkSafe report, we've tried to address those today and we truly hope that we've given you most of the answers you need. If you've got others, please come to us, we'll help. That's what we're here for. Thank you.

CHAIR: Thank you, Ian.

***

DR LAING: Thanks, John. Thank you, Ian. Very pleasant to hear your presentation and your strongly-held opinions.

My first question, you referred to the efficacy data report still being worked on. There was another report that was referred to also due in June which was about the composition of quantity of gases at the end?

MR GEAR: That's what we've spoken about, the preliminary report investigation, and I've given you that paper this morning which was a short note, technical note effectively.

DR LAING: I guess I have some questions here around your submission which you haven't really referred to.

MR GEAR: Sorry, I assumed everyone had taken it as read, as we were instructed.

DR LAING: That's okay but you made some suggestions to us about uncertainty and putting together a control matrix which we may work on, and I guess my concern there was, and I don't know anything about the history of compliance or otherwise with methyl bromide, is if we were to give an approval that had a controlled matrix in there, we have no way of knowing anybody operating in any port, whether they're operating at that dose rate or that dose rate or anything else, so that would be a difficult thing to write into a control.

MR GEAR: It may be, it may be not. There's no such thing as impossible. Where there's a good will, there's a way, if it's needed and justified. Certainly, and we may not have, other than the winter differential versus the summer, you know, the 5 to 10 degree treatment rate and the 15 above toward 20 and beyond, the current regimes have been designed around winter and summer treatment rates effectively, different temperatures. But I'm picking, and I may be proven wrong, the conversations that we have had with the Chinese so far last year up in Beijing for three days, and Ivan [Valcovich] was there and I was fortunate to be invited along, the preliminary conversations that have been had with the Indians and Felicity most recently, they are all aware of the intense amount of work we've done to produce the efficacy data, and it's about building confidence in what we are doing. Those people are very good number

crunchers, in both countries, and if we can put good science in front of them, I think we are going to take away some of the variability that we might have otherwise had.

So, I'll come full circle. If you need it and you think it's appropriate, we'll work with you. I hope we don't even need to go that far but I put it back in February when I prepared the submission.

DR LAING: Okay, another question just to satisfy my curiosity. You talk about timber treatment as well as log treatment, and I know the volume of timber that goes through the ports and exported is very small. I know you did trials at Tokoroa using timber. I just have a query, was that log stacked timber -

MR GEAR: That was log stacked. It was actually logs and they were about 700 cubic metres, so the volume, and they were 398 tonnes, 402 tonnes, and about 400 tonnes, or whatever, under each of them. So, represented commercial scale at that time what was an average log stack.

DR LAING: It wasn't actual timber?

MR GEAR: No.

DR LAING: But I know we've got a submission from Greg Charleston who is concerned about his export timber. My understanding is that would be block stacked and plastic wrapped, how would that be fumigated?

MR GEAR: If there is a need for fumigation, and there is during [oreophilus] season which is a hitchhiking insect, that's why the rate and the height is so low, Tim is very concerned to have alternative treatments for them for that sort of market. And, on other occasions when timber is being exported to other destinations and it does go pretty wide and far when you start looking, but relatively small volumes, we do need to have other tools in the toolbox and EDN has in place.

DR LAING: But it wouldn't be block stacked and plastic wrapped to put through the fumigation process?

MR GEAR: If it was plastic wrapped as it was processed, it probably wouldn't need that, but if it was bare and we have to talk with MPI around those timber conditions, and Tim knows better than I do, we can bring him into Rotorua if we need to.

DR LAING: No, I'm just curious.

MR GEAR: But he is available.

CHAIR: I'll ask the next question. Ian, you were quite emphatic I think in your statement about the need for workable, viable controls, one set of rules you said that are applicable throughout the country that work for the industry, and I think the public themselves are also entitled to believe that those set of rules that may be applied on the use of this fumigant are also from their perspective workable and viable and work for them. Given you're representing the use of the current fumigant and you've been using it for some years, what can you say on your ability to comply with any set of rules, what's your history of compliance with the current set of rules that you work under with a fumigant?

MR GEAR: STIMBER is not a service provider, John, we are actually an investor in research. I would ask if you'd address that question to Genera on Wednesday of next week. They are the fumigator.

CHAIR: I did think there might be other parties that the question could be asked but -

MR GEAR: I'm not the fumigator, I am the facilitator of cajoling money out of people's pockets on a monthly basis in the case of the exporter, and at regular quarterly intervals out of Government departments and industry. Draslovka, thank you Pavel, and your Board came on board and they've invested over a million bucks

with us thrown in beside our money. So, my role is actually to be out there interfacing and a facilitator, if you like, of making things happen for the industry.

CHAIR: I appreciate that.

DR PHILLIPS: Mine follows a little bit on from Kerry's and you mentioned the efficacy data and how valuable the data - it's more a comment than a question actually - efficacy would be very useful data for us as well in regards to our decision-making for what we have to consider. So, I don't know where that data is at?

MR GEAR: It's sitting at the moment with three of the most brilliant statisticians that we have in the country actually starting to process it.

DR PHILLIPS: So it'll probably be another six months then?

MR GEAR: No, they're not like the ones you used to work with.

DR PHILLIPS: I do work in the science field.

MR GEAR: I know you do. I've got them under the pump and we're working as fast as we can through that. The last treatment was just completed and the insects counted from that. I can tell you, as is recorded in the documentation, that at 5 to 10 degrees we have a rate that looks like it's going to be somewhere near 120 grams and at 20 degrees it's looking like about 75 grams.

DR PHILLIPS: But anecdotal at this point in time?

MR GEAR: No, trust, trust -

DR PHILLIPS: No, we don't have that information, it's anecdotal I'm afraid.

MR GEAR: You could confirm that's the case, couldn't you?

DR PHILLIPS: Anyway.

MR GEAR: I'll give you all the raw data if you like when we've finished, to sit down and have a look at it. You're welcome, but there are elements of trust in this and we've got Plant & Food doing this for us as quickly

as they can, as well as Ralph Turner from Auckland University and also John [Mangold].

CHAIR: Would the Applicants like to ask any questions? Any of the submitters for Ian Gear?

DR SUTHERLAND: Well, it's partly for Ian because he's raised the issue but also for the Committee. Ian mentioned that he gave you some documents last night and he's talking that he could provide further statistical data when it comes to hand. Just wanting a comment from you, Mr Chair, that how is this material that certainly the submitters have never seen, going to be handled?

CHAIR: I didn't refer to the material that was provided by STIMBER also at the eleventh hour, I referred to the additional material provided by the Applicants. All material that the Decision Making Committee takes into consideration will be publically available, that includes any material that is provided subsequently upon a further assessment of the latest data by the Applicant, and its process by which that material will be assessed will be detailed in the direction that follows the proceedings of the hearing, as I've outlined earlier today.

The material that's provided by STIMBER will be made available, whether or not that's going to be of direct relevance to the consideration of this Decision Making Committee, we will invite the EPA to address that material and consider that in the same way that they do the extra material from the Applicant. And submitters, all submitters will be given an opportunity to re-engage with the agency, with the Authority if they feel the significance of that material warrants their engagement. If indeed they feel that they need to be personally represented at a subsequent hearing, then EPA will arrange a subsequent hearing. So, there will be no attempt to hide any material or suppress the opportunity

of any party or member of the public to re-engage in the process once they've had time to digest that material.

DR SUTHERLAND: Is there a deadline on all this? Sort of statutory or -

CHAIR: I'm not aware of any statutory deadline. Our main concern at this point is that we allow sufficient time for all parties to evaluate the new material, given that it's quite a substantial change from material that was provided before. I think any questions on the statutory timeframe are probably best addressed to the EPA staff themselves, Gayle Holmes, who is sitting at the back of the room. Gayle, do you want to say anything?

MS HOLMES: There's no statutory timeframes at this point but what we'll do is once we've had a chance to look at new information, we'll give an indication of a timeframe at that stage. So, we'll include as much information on the timeframes and the direction that the Chair has made this morning, which will go up on the website, ideally tomorrow we'll be looking to put that out.

CHAIR: Any other questions of STIMBER before we adjourn for a short recess? No, thank you very much. Okay, I'd ask if we can be back here at 3.25 to resume for the final session.

(Hearing adjourned from 3.13 p.m. until 3.27 p.m.)

CHAIR: Okay, welcome back to the last session. We have one more submission from the submitter and then the follow-up questions. Just to follow up on the question from Oliver Sutherland before we took a break, it's the intention of the EPA to make available online the detail of the direction which will specify how we'll deal with the new information, that that direction will be available within 48 hours of today and participants at the subsequent hearing in Rotorua will be notified by email of the availability of that information and the process by which it will be dealt with. So, I hope that

addresses some uncertainties and concerns. All right, the final presentation, we have Mischa Davis from The Soil and Health Association of New Zealand.

***

SUBMISSIONS BY THE SOIL & HEALTH ASSOCIATION OF NEW ZEALAND INC.

MS DAVIS: Kia ora, and thank you for the opportunity to speak to our submission today on the application to import EDN. My name is Mischa Davis and I'm the policy advisor for The Soil & Health Association. Soil & Health is a charitable society and is the largest member organisation supporting organic food and farming in New Zealand. It is also one of the oldest organic organisations in the world established in 1941. So, we work to curb pesticide use and provide information on the effects of pesticides on human health and the environment.

EDN, like methyl bromide, is a highly toxic gas that is used for treating logs and other primary seeker products to control quarantine pests in its exported and imported goods. It is effectively a toxic pesticide with serious health and environmental effects that just as with methyl bromide should not be released into the atmosphere - and it should be strictly controlled and it should not be released into the atmosphere, sorry.

Soil & Health in 2010 submitted to the Environmental Risk Management Authority, which is now the EPA, for the reassessment of methyl bromide and has campaigned to have that fumigant better contained and recaptured or stopped in New Zealand. Our National Council Member, Stephan Browning, has as a section 274 party, won an Environment Court case which was *Envirofume Ltd v Bay of*

Plenty Regional Council. The case exposed significant risks of methyl bromide fumigants for the health and safety of workers in their wider communities.

We consider that due to it's known toxicity, EDN would be no better off for those people potentially exposed, both at the fumigation workplace and further away. Fumigation workers may be exposed to EDN just as with methyl bromide when opening fumigant cylinder valves, removing tarp covers for ventilation, opening and entering shipping containers, through leakage from damage, damaged fumigant delivery lines, or when handling fumigated timber.

EDN, just as with methyl bromide, will also pose a risk well beyond the fumigation areas due to drift, inversion layers, and the inability for its whereabouts to be adequately monitored by those responsible. Boundary monitoring is ineffective if at head height when a fumigant plume passes above it and then descends or drifts into other areas. Trials and demonstrations have shown it travels long distances from the point of release. EDN will pose exactly the same risks of exposure for workers and communities as methyl bromide does.

Plume modelling conducted by Nordiko shows the extensive spread of EDN, effectively endangering bystanders, the community and adjacent nearby work forces.

Another concern is that there have been numerous recorded incidents of accidental ~~inspontaneous~~ instantaneous? release of methyl bromide at various log stack fumigating ports around New Zealand. Log stack fumigation under tarpaulins can be subject to strong wind events, and accidental tarpaulin puncturing and tearing which has occurred with both Genera and with Biofume, fumigation operators. These suggest that there

needs to be dedicated facilities particularly for bulk fumigation.

MPI have stated that treatment organisations are audited regularly to ensure a high level of compliance. However, there have also been consistent breaches of methyl bromide approval in monitoring conditions. For example, there was an incident in March this year that WorkSafe investigated and what they found was that the monitoring was fine, when the Regional Council investigated they served abatement notices on Genera because the monitoring wasn't up-to-scratch. The report produced by the Bay of Plenty Regional Council has shown that Genera has a history of breaches of compliance. Consistently there are failings at meeting the conditions and the monitoring requirements.

In the Environment Court decision the Court found significant shortcomings in the current methyl bromide fumigations. EPA - and the EPA and WorkSafe requirements are either impractical or frequently breached.

The EPA has an obligation under the HSNO Act to protect the health and safety of people and communities by preventing or managing the adverse effects of hazardous substances and new organisms. While EDN is known to be lethal at high concentrations, no studies have been reported on the carcinogenic genotoxicity, reproductive or development toxicity of EDN. We consider that a precautionary approach should be applied. That until such studies are conducted EDN should not be approved for release without recapture.

In Australia EDN can only be used with scrubbing, a recapture technology, as part of its label use after being assessed by the national regulatory body. We consider that New Zealand should follow suit and should be applied with the exact same standards in New Zealand.

So, unless EDN is contained in a dedicated facility with recapture of remnant fumigants, then we think that - if that does not occur then we think that the application should be declined. That was all, thank you.

CHAIR: Thank you Mischa. Questions, Ngaire?

***

DR PHILLIPS: Yes, I guess I was just interested in your thoughts on going through the EPA assessment report, there's some suggestions that with appropriate safety equipment and the like, that the reduced, that the exposure and the effects on humans can be mitigated. I mean, is that something your - obviously there's some questions that you can see from today, there are some questions about exactly what is needed but, I mean, if those, if the risks to humans can be mitigated to allow the use of EDN, I mean is that something that your organisation would consider as part of -

MS DAVIS: I think what Nordiko's plume modelling was pointing out though was even if it's released, it still travels quite far. So, I guess it's not just the workplace effects but also the wider community effects and the environmental effects beyond just mitigating within the workplace.

DR PHILLIPS: Yes, I guess I was talking about the whole suite of things, they were suggesting including buffer zones which are obviously designed for longer-term residents and that sort of thing.

MS DAVIS: Yeah, yeah, I'm not sure. From my understanding it's just that the recapture is the only one that's really going to work to mitigate it fully.

DR PHILLIPS: Okay, thanks.

CHAIR: So, Mischa, one of the things we've heard today in the context of recapture is that this stuff doesn't go away. It might change in the environment that it's in but if it's recaptured in carbon or into a liquid it's still around and that material has to be stored or disposed of in some way. How do you reconcile that issue with your stated position on recapture?

MS DAVIS: Yes, from my understanding it's disposed of, could go buried deep in landfill. But I'm not sure because that's not being presented to us and I guess you would have to reassess it, those options then when they become available, and the technology is always changing and yes, you're right, but I guess in terms of what we've got in front of us with the application in front of us, we're assessing the human health effects and the environmental effects right now. So, that's what we're pointing out, that if you just release it into the atmosphere as is, then that's going to have an adverse effect. So, yes, I don't know if that answers your question.

CHAIR: All right, no more questions from me.

DR LAING: Okay, thanks, John. Thanks, Mischa. I guess - this is not a question, this is a comment, you've made comment on Genera's performance in Tauranga and I guess we will have an opportunity up in Rotorua to talk to both Regional Council and Genera and get some greater clarification around just how non-compliant they may or may not have been. You haven't been present all day and heard some of the stuff which went on this morning but you have been present this afternoon. You will have heard the response to my question about dedicated fumigation facilities, I mean obviously it's been described as something that would be massive in scale and probably massive in cost as well. It's very easy to say, hey, it should be done in a dedicated

fumigation facility but have you really given consideration to how practical and economical it might be?

MS DAVIS: No, I haven't but, I mean, what other option is there? Do you just keep letting it out into the atmosphere and putting humans at risk and -

DR LAING: No, no, I think Wil was giving us an alternative that you would deal with stacks individually in a small unit rather than having a massive fumigation facility that you put everything inside and that there are those two alternatives, and I just wondered whether, rather than just saying, hey, there should be a dedicated facility, whether any more thought has gone into it?

MS DAVIS: Yes, again, like that hasn't been presented so it's hard to assess that, but I think more thought should go into it probably in terms of what's being put forward and presented.

DR LAING: I'm sure it will, in terms of what final position we get to in terms of some of these things, stack sizes, treatment rates, how long you leave it there for and what the ventilation processes are and whether you need to do anything --

MS DAVIS: Yes.

DR LAING: -- depending on the resultant risk. You've also made reference to certain conditions for non-release related to inversion and possibility of plumes going further than head height and then suddenly ducking for ground. I think in the information we heard this morning, and Ian referred to it as well, and we agreed it shouldn't be done when inversion conditions aren't there so there isn't a problem. I think the other scenarios which you talked about, particularly with low wind speeds, have got a very low probability of occurrence. That's all. Thanks, John.

CHAIR: Questions from the Applicant to the submitter?

MR McCONVILLE: Mischa, you've compared, you've done a direct comparison between methyl bromide fumigation and EDN fumigation and said that basically the issues are the same basically between the two. We obviously don't want to be discussing other fumigants here but I suppose my question is, have you looked at the data to see exactly what the emissions are from an EDN stack compared to a methyl bromide stack when you relate that back to the TEL and the buffer zones which we've been describing?

MS DAVIS: No, I can't say I've looked in that much detail but from, I mean from what I have looked at and what I've talked about today is the fact that it is a highly toxic, it's known to be lethal, it is known to have an adverse effect on aquatic life et cetera, and so to that extent it needs to be addressed in the same way as methyl bromide which is equally as toxic. So, yeah, it needs to be recaptured rather than just released into the environment and posing risk to human health.

MR BRUZEK: May I also have one question. Like, we heard that these two chemicals are the same. Actually my question is what would be the good alternative from the point of view of your organisation to the current use that is currently on the market, if it is not EDN that contains only carbon and nitrogen and no protochlorides, no like complex organic chemistry, and it's a fumigant so it needs to kill; so what would be like the solution for your organisation to the problem of New Zealand forestry industry?

MS DAVIS: Well, I think with methyl bromide, it should - we've got an obligation to recapture it by 2020 so why don't we just do that? I just don't see why not, if that's the obligation.

MR BRUZEK: Well, no, I agree with that. I mean like methyl bromide, if it's going to be used, it should be

recaptured. The point is that the bromide molecule or the bromide atom doesn't disappear, so like -

MS DAVIS: But neither does the EDN disappear.

MR BRUZEK: Well, actually it's a carbon nitrogen, so yes, it actually retransforms and that's why it's a great soil fumigant, because it's actually been transformed to the like very well-dissolved, hardly - ammonia based oxygen and oxymites that are eaten by the plant. So actually like, from our point of view that was the good alternative and the risk factors are quite strict that are already put in place that are several times below the standards. So, it's almost equals to eat like 20 almonds that is currently being imposed in the EDN TEL.

CHAIR: So, now we've definitely entered the era of cross-examination. I appreciate your question but the submitter is entitled to their presentation as well as you were, and questions of clarification are still welcome.

MR McCONVILLE: One more question from my side, if you've been assessing the plume data from Nordiko, where did they get their raw data from, what source?

MS DAVIS: I'm not sure, you would have to ask them that. That was just me reading the submissions, so.

CHAIR: Yes, Nordiko can comment.

MR GRULLEMANS: The plume modelling we put in our submission was based on the data that we had available in terms of the estimated fumigation concentrations that were put into an under-tarp fumigation and an assumption of the residual concentration. Since that time we've heard that the residual concentration is even lower than we originally estimated, so we would redo our plume modelling but we haven't seen the new data yet.

CHAIR: Any further questions from any of the submitters?

DR ARMSTRONG: You mentioned earlier about carcinogenicity and teratogenicity, or other tests that have been done on EDN?

MS DAVIS: No, that's what I was pointing out is I don't think there has been any. So, we are saying that until this has been done, then we should apply a precautionary approach.

DR ARMSTRONG: But you're not aware that they have been done.

MS DAVIS: I'm aware that they have not been done.

CHAIR: I think perhaps the staff team might want to comment there?

MR DEYO: Yes, they've done genotoxicity assessments with EDN but there's been no carcinogenicity essays.

DR SUTHERLAND: I was just wondering what's your organisation's position on the 1987 Montreal Protocol?

MS DAVIS: That it should be followed. That New Zealand should follow that by meeting its obligations, because we agreed to it.

DR SUTHERLAND: And that includes the decision to phase out methyl bromide --

MS DAVIS: Mmm mmm.

DR SUTHERLAND: -- by 2020?

MS DAVIS: Yes.

DR SUTHERLAND: Okay, so if you support that, then after 2020 what's your position with respect to the export timber industry?

MS DAVIS: Well, as I said before, if methyl bromide is going to be continued to be used, then it should be recaptured.

DR SUTHERLAND: So, you don't see any position for EDN at all?

MS DAVIS: I say again, it's only been proposed because of the benefit that it provides in not being an ozone depleter, but other than that I don't see what the

benefit is because it's still a highly toxic gas that has human health and environmental adverse effects.

DR SUTHERLAND: Last thing, so do you think it's important that it is, that it's not an ozone-depleter?

MS DAVIS: I think it's important, yes, it's important it's an ozone-depleter and we should do something about that by recapturing it.

CHAIR: I think I understand the position of the submitter which is that the supportive use of EDN, then the preference is for it to be recaptured. I think that's clear.

MS DAVIS: Thank you.

DR SUTHERLAND: I thought they were declining it.

MS DAVIS: It could be approved provided it's recaptured, because it also has adverse environmental and human health effects just as methyl bromide does.

CHAIR: So, I'm happy that DMC are aware of the submitter and we're pretty clear of the issues around that.

MR YAMOAH: On the basis of the recapture you said because Australia was recapturing we should also do that, what if Australia is wrong, should we follow?

MS DAVIS: What about where sorry?

MR YAMOAH: You said Australia is recapturing and we should follow, what if Australia is wrong?

CHAIR: I think this is not really an appropriate question. This is pure speculative cross-examination. The submitter -

MS DAVIS: I'm not really in a position to say whether Australia are right or wrong.

CHAIR: The submitter has made her position fairly clear to us and I don't think it serves our purpose to invoke speculative what-ifs.

MR YAMOAH: My next question is you mentioned Genera are consistently failed or they are not kind of following their rules, you know, so do you know how many times

they have been found through audits that they are not complying with the rules?

MS DAVIS: I know that they currently have eight abatement notices on them.

MR YAMOAH: Eight?

MS DAVIS: Mmm mmm, and I think it's leading to, it's going to go to the Environment Court.

MR YAMOAH: Thanks.

CHAIR: No further questions, thanks Mischa.

MS DAVIS: Thank you.

CHAIR: At this point in the proceedings we have scheduled 30 minutes for the Decision Making Committee to ask any final questions of the Applicant or the submitters, or indeed of the staff, and I've consulted with my colleagues in the DMC and we don't wish to ask any further questions at this time.

So, the final piece of the programme today is to allow the Applicant up to 30 minutes to address anything that they've heard since their submission. They don't have to use this time but you have up to 30 minutes to address any of the points that have been raised subsequent to your initial presentation.

MS GEAR: I believe Kade is going to address on behalf of the Draslovka team.

***

CLOSING REMARKS BY THE APPLICANT

MR McCONVILLE: Okay, so I have a whole part dedicated to final remarks based on everything that we've heard today. So, I suppose from our perspective again, we really appreciate the work that's gone into the EDN assessment, both from the EPA, from WorkSafe, we also want to thank the DMC and I suppose what we've seen today is a number of different factors, a number of different people have come forward with different points of view, different opinions and we take those all on board.

I suppose from our perspective, to take you back one step, one of the things that we want to make very clear is that there were a number of complicating factors in actually doing this submission from a regulatory process point of view, very much based on the new legislation and bringing that in, and trying to feel our way through that process. It's been quite confusing, it's been quite complicated, and having a clear view of exactly what we want to, exactly what we're being asked to achieve and what we're trying to achieve.

I think one of the big things is a disjointment in communication and I think that's one of the things that we really want to work towards based on the discussions that we've had today, with WorkSafe, with the EPA, a more open and transparent form of communication between everybody so that we can give an informed, informed science and informed data in behind some of these choices which are made.

I suppose there's been lots of information, there's been lots of Power Point presentations, and lots of fancy pictures and everything, but what comes out is three main points.

The first point is we want to raise that TEL level because we believe that the current TEL level is based on a very conservative approach and we believe that by looking into the science and into the data in behind that, and looking into the justification Adam Jonas, we can realistically raise that TEL and still be well within acceptable limits.

The second one is reducing buffer zones based on modelling. Now, understandably most of the comments today have been around that you haven't had time to reassess that data, that you haven't had time to look at it. Our suggestion is to go back, have a look at it, try and understand it, and by all means ask questions. Because that's the only way we can have a transparent approach, because the data or the positions that we've been given have been very difficult to put into inputs into that modelling. So, it's been a Chinese Whispers process all the way through and I think that's very clear to us when we're now in a position where we have a good stack size, we have a representative stack size, we have a, again, based on averages rather than based on maximums, so whether that is something that you want done, we're willing to provide data. This is what we continue to say.

And the third point, and again the most raised one, is removal of the scrubbing or recapture. I do like the definition between "scrubbing" and "recapture" because in Australia, I want to be very clear, it is scrubbing in Australia, and it particularly says "liquid scrubber". Now, liquid scrubber is based on data which was presented to the APVMA in the past. What we've found was that a lot of the assessment which was done for this assessment instead of being based on the data which was provided, was based on historical data coming all the way through this process. So, what we want to

make sure is that the data we're presenting now is assessed fairly, is assessed in a way that the inputs and the data that we're providing are adequately and fairly assessed.

We want to review the process and working again with WorkSafe and EPA, we want to review the process of how we can work together, how we can work with WorkSafe and with EPA to come up with a realistic set of controls which means that this product can be used commercially. There's a very fine balance between conservatism and definitely safety and commercialisation. Commercialisation and safety definitely go hand-in-hand. We're not going to ignore that fact. But there's a commercialisation aspect in there which means that we do not want to cut corners but that if the data supports the restrictions that we propose, that those should be looked at in a fair way rather than putting conservative multiplying factors on top of those.

In regards to the exposure data, again, we discussed before around IDLH, we discussed around TELs, around TWAs around PELs. So many acronyms I have no idea what most of them mean, I'm not a toxicologist, but from my perspective I look at it that we need to understand exactly what is required, exactly what you need from a data perspective. We have been presenting data and the data comes back to us with even more questions, but don't give us more questions, give us guidance on what you actually require.

When we look at, a question came up around ammonia and ammonia levels. Ammonia is very easy to monitor. If it is a concern for the EPA, if it is a concern for the DMC, ammonia is a very easy molecule to detect. Even in New Zealand, I even looked up a couple of acronyms, the TWA is 25 ppm the STEL was 35 ppm. You're nowhere near those levels, you're in probably ppb levels

in terms of ammonia, if there is any that even exists, and as we've said already, that the data does not support that.

What we found, one of the questions was, or one of the statements was that came from Philippa, I believe, was around the ACGRH data, again I totally agree with her, it was from 1969 and it was 10 ppm. In 2016 that 10 ppm was reduced to 5 ppm. We approached the ACGRH and said under what reasoning, under what data did you use to support the reduction from 10 ppm to 5 ppm, and they said, in the absence of any new data we lowered it. So, they have not based that on anything apart from a lack of data. So what we're trying to do is, in the background we are actually working with ACGRH, we're trying to make them aware of the factors behind these chemicals, in behind these substances.

Another point that came up was around Korea. We are registering EDN in Korea for exactly the same reason, they are facing exactly the same issues and we are nearly at the point of registration in Korea as well. When we look at other chemicals, I understand, and John, you can stop me if you want, but when we look at New Zealand, hydrogen cyanide is already registered here. Even Teresa came up with a, you know, you said that a 1% impurity as a maximum limit. We already use this product, as a matter of fact we supply the product to New Zealand. We know how this product is used. SCBA, and there is no SCBA and there's no buffer zone, and there is definitely no scrubbing. So, these are some of the things that we need to understand is necessary.

When we look at the scrubbing solution, or the scrubbing or the recapture, as we've seen from Nordiko's presentation and, again, Swami and I, we both worked for the previous Applicant, we both worked for BOC a number

of years ago and we saw the data gaps there. When we went or when we were there, we asked for more data and it was never provided, it was never funded. That's why we're now with Draslovka. So, from that perspective what we saw was a lot of the data which was used, again through the APVMA submission, even from what I can see from Nordiko, a lot of this old data was coming through the system and filtering down, not with direct reference but enough so that we know where that data comes from in our minds. So, for us it's about reassessing based on the actual available data. You know, draw a line in the sand and say, where are we up to now and what can we assess, because for me looking at anything from the past is just going to muddy the waters and it's going to make it that nobody, everyone is not comparing apples with apples, you're comparing apples with oranges or probably banana, or some other fruit because it's so far apart from each other.

When we say that, you know, there was a comment around not being able to measure consistently in the field, especially under tarp. We know that we can consistently measure in a field base scenario. Understandably that Riken FI-8000 was not in the submission at the time but we hope that you can take that away as new data. We can present you the GC correlation data with that to say, we can accurately measure to within 1% of the actual concentration underneath that tarp using the [optoferometric] monitor.

In the end we are scrubbing, we're scrubbing by extending the duration from 6 hours to 24 hours. That additional 18 hours under tarp makes sure that product is gone. Yes, there is a residual ppm level, there always will be, but that residual ppm level is exactly the same as the output from the scrubber, from the Nordiko scrubber which was used in Western Australia

after a 6 hour fumigation. So again, what we're trying to do is we've worked on this data, we've worked on making sure that end point concentration is basically the product working for itself. Let nature scrub it, there's no better scrubber.

Remembering as well that it is registered as a soil fumigant in Australia. Me personally, I'm applying 50 tonnes of this product this year directly injected into soil. I'm there, I'm in a mask. I'm there, I'm driving the tractor, so I know how this stuff works. I've been there, I know what exposure looks like, you know I've been there when, I don't know, there's been a crack on a valve, or something like that, but we are in the personal protective equipment. You're standing there and you know how to handle that situation because you're there with well-trained people who are working under standard operating procedures. So, we know how to handle that through engineering controls and also administration controls, as we were saying before around hierarchy of controls.

Again, you can't eliminate this. I think based on Mischa's presentation, this is not something - we can't just eliminate the need for a timber fumigant. The New Zealand industry, the New Zealand GDP is so reliant on something like this that in the end there's no such thing as an organic pesticide, really, apart from a fly swat. So, you need something that kills.

I think that, you know, again coming back to that detector. We know that we can measure accurately underneath a tarp. We know based on the admission data, on the data or the concentrations which we believe are going to be released to atmosphere, we know that we can measure those accurately every time before that aeration takes place.

In reality we appreciate, again, what you guys are doing and the conservative approach that you are taking, Pavel's computer turned off, but basically Draslovka are in a unique position. Draslovka have been manufacturing this product for over a hundred years, 113-114 years. They're producing 12,000 metric tonnes of liquified hydrogen cyanide every single year. We're not new to this. But in the end we're not a Bayer or a Dower, or something like that. It's a family owned company with family values, and that's the difference. You know, we're not out there to take over the whole market. We're there to provide a solution and I think that's where, even Pavel said, Draslovka and BPD Partners are very focused on, not just on applied science but basic science. We're very much following this process through from raw material, and this is again why Draslovka Services versus Draslovka exists, because we wanted to see this product all the way through from raw product, all the way through to point of use.

We've started to apply this product. This year commercially in Australia, again one of the comments was why was this not used in Australia, and the rebuttal was correct, because there is no biosecurity approval, and we don't have a timber export market to Malaysia, for example, or it's not big enough to warrant the use of EDN.

When we look at the use of scrubbing. Yes, it exists but to what cost? To what cost of not just the actual product - not the actual equipment itself, but it's basically the printer and ink model. You've got a piece of hardware but you've got a huge amount of consumable, and it's an expensive consumable, not only to buy but to dispose of in the end.

So, from our perspective we look at it that EDN is an honest chemical, it's a great chemical which is

providing a good solution from an efficacy perspective, from an environmental perspective, and we believe that by having this registered in New Zealand, that we can really be in a forefront position to go for the timber market and make sure that it's a sustainable practice moving forward. Thank you very much.

***

CLOSING REMARKS BY THE CHAIR

CHAIR: Thank you, Kade. So, that concludes events for today. I would like to thank everybody who's contributed, all the presentations from the Applicant, from the EPA, from WorkSafe and from all of the submitters. This is day one of three days of public hearings. Next week we'll move to Rotorua on the 28th and 29th. There will be a certain amount of repetition of today's events from the Applicant and from the EPA, but new submitters obviously.

So, at this point I would like to adjourn until we reconvene in Rotorua, thank everybody again and I wish you a safe trip home tonight.

(Hearing adjourned at 4.05 p.m.)

***