REPORT ON PROCEEDINGS BEFORE

SELECT COMMITTEE ON PFAS CONTAMINATION IN WATERWAYS AND DRINKING WATER SUPPLIES THROUGHOUT NEW SOUTH WALES

INQUIRY INTO PFAS CONTAMINATION IN WATERWAYS AND DRINKING WATER SUPPLIES THROUGHOUT NEW SOUTH WALES

CORRECTED

At Jubilee Room, Parliament House, Sydney, on Wednesday 5 February 2025

The Committee met at 9:00.

PRESENT

Ms Cate Faehrmann (Chair)

The Hon. Greg Donnelly
The Hon. Aileen MacDonald
The Hon. Taylor Martin (Deputy Chair)
The Hon. Cameron Murphy

PRESENT VIA VIDEOCONFERENCE

The Hon. Scott Barrett

* Please note:
[inaudible] is used when audio words cannot be deciphered.
[audio malfunction] is used when words are lost due to a technical malfunction.
[disorder] is used when members or witnesses speak over one another.

The CHAIR: Welcome to the fourth hearing of the Committee's inquiry into PFAS contamination in waterways and drinking water supplies throughout New South Wales. I acknowledge the Gadigal people of the Eora nation, the traditional custodians of the lands on which we are meeting today. I pay my respects to Elders past and present, and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of New South Wales. I also acknowledge and pay my respects to any Aboriginal and Torres Strait Islander people joining us today. My name is Cate Faehrmann and I am the Chair of the Committee.

I ask everyone in the room to please turn their mobile phones to silent. Parliamentary privilege applies to witnesses in relation to the evidence they give today. However, it does not apply to what witnesses say outside of the hearing. I urge witnesses to be careful about making comments to the media or to others after completing their evidence. In addition, the Legislative Council has adopted rules to provide procedural fairness for inquiry participants. I encourage Committee members and witnesses to be mindful of these procedures.

Mr ANTHONY AMIS, Land Use Researcher, Friends of the Earth Australia, before the Committee via videoconference, affirmed and examined

The CHAIR: Welcome, Mr Amis, and thank you for making the time to give evidence. I assume you have a short opening statement for the Committee?

ANTHONY AMIS: Yes. There has been a lot happening since I sent in the submission in November. The first point I'd like to make is that I've carried out a lot of FOI and GIPAA requests since that time. I want to let the Committee know that the highest levels of PFAS recorded in Victoria in a domestic water supply were found at Lake Mulwala in July 2023. It was quite a serious incident. Lake Mulwala supplies Yarrawonga on the Victorian side of the river, but has Mulwala on the New South Wales side of the Murray River been tested for PFAS? The New South Wales EPA is supposedly monitoring Mulwala munitions factory for PFAS. I understand there has been some PFAS contamination that has been found in the groundwater there, but I'm wondering where this PFAS came from and why such a high amount was found in the Murray River at this location.

The other update is that Cowriga Creek, west of Blayney, appears to have possibly the highest PFAS loads, based on four EPA detections in October 2024, in New South Wales. The highest detections appear to be downstream of a composting biosolids facility. Ourimbah Creek, in January 2025, recorded some of the highest levels of PFAS in New South Wales. WaterNSW has recently published test results from numerous locations across New South Wales. The highest levels were detected in Burrinjuck Dam, which is 45 kilometres downstream of Canberra. Local governments have also been testing drinking water, with the highest levels recorded at Warialda, Tarcutta, the Blue Mountains, Narrabri, Bungendore, Narromine and Marulan. Some of those, particularly Warialda, were quite serious. I've also just received GIPAA requests from WaterNSW and Sydney Water regarding total PFAS detections in water systems throughout Sydney Water and WaterNSW areas. I've asked for total PFAS detections because, generally, WaterNSW and Sydney Water are only reporting PFOA, PFOS and PFHxS.

What has been interesting with those GIPAA requests is there seems to be spikes in a number of New South Wales water supplies, particularly in Sydney, with the PFAS chemical PFBA. I was first alerted to this—it happened in the Blue Mountains in December. We got a spike of PFBA up there following some rainfall events that happened in the Blue Mountains in December. The GIPAA request from Sydney Water also reveals high levels of PFBA at Macarthur Water Filtration Plant, Illawarra Water Filtration Plant, Woronora Water Filtration Plant and Nepean Water Filtration Plant.

To put this into some context, if you look at the total amounts of PFAS that have been reported, for instance, at Illawarra, 98.59 per cent of the PFAS detected at the water filtration plant hasn't been publicised. They've only mentioned three PFAS chemicals, but they haven't mentioned the spike in PFBA. A similar problem occurs at Nepean, where 98 per cent of the PFAS detections haven't been publicised. Macarthur is about 98 per cent. Woronora is about 98 per cent and North Richmond about 66 per cent. Even Prospect Water Filtration Plant, which is the most important filtration plant in Sydney, we're looking at about 47 per cent of the PFAS detected there hasn't been published by Sydney Water or WaterNSW on their websites. That's about the updates since I put my submission in in November. I'm still wading through a lot of the Sydney Water data, actually.

The CHAIR: Thanks very much, Mr Amis. We'll get on to questions just because we've only got 30 minutes with you. That was very interesting. Thanks for your extensive submission. Your opening statement kind of leads quite nicely into the first question I was going to ask you anyway, which was that your first recommendation states that the New South Wales Government should coordinate a statewide PFAS drinking water survey testing at multiple locations, and you make the point of at least 30 PFAS chemicals. Could you explain to the Committee two things: firstly, why it's important to test for a wider range of chemicals than the three that the New South Wales government is testing for at the moment; and what other jurisdictions, including international jurisdictions, are doing in this regard in terms of testing for and treating PFAS as a wider range of chemicals than just those three—PFOS, PFOA and PFHxS?

ANTHONY AMIS: The water authorities are only obliged really to publish the results of PFAS chemicals that are listed under the *Australian Drinking Water Guidelines*. That's the reason they're only honing in on those three particular chemicals. Even the new review by the NHMRC, which should be out April or May this year, they're not even looking at PFBA, which seems to be the highest frequently detected PFAS chemical, at least in New South Wales. The other question—I can't really answer that at the moment. I'm not too sure on what's happening overseas. I know that there's an environmental working group in the US that recommends a guideline level for all PFAS chemicals of about one part per trillion. That's even under what the US EPA is recommending

for PFOS. I think England is way behind even where Australia is at. I'm not au fait with a lot of the international stuff, I'm sorry.

The CHAIR: That's okay. Do you have any knowledge of PFBA, for example, or any of the other kind of PFAS chemicals? Have you looked into, in terms of your research in this area, why it is important to go beyond those particular three chemicals that we're currently testing for and that are currently in the *Australian Drinking Water Guidelines*?

ANTHONY AMIS: I think you need to capture the whole host of PFAS chemicals, or at least the 30 that Sydney Water are testing for. Part of the problem with the NHMRC, and I've been tracking pesticide pollution also, is that a lot of the guidelines that they've set up—for instance, for pesticides—there's a lot of stuff that's used throughout Australia that has no drinking water guidelines at all. I think the drinking water guidelines for pesticides haven't been updated since 2011. I'm seeing a similar issue with PFAS in that we might end up with drinking water guidelines for only four or five, but there could be literally up to 50 that have been detected across Australia. So we could be in a scenario in 10 years' time where, yes, we've got drinking water guidelines for the three, four or five chemicals, but it's still going to be missing the majority of PFAS, which might be in the environment and might actually be in tap water.

The CHAIR: I think the US drinking water guidelines include the GenX chemicals, but our draft *Australian Drinking Water Guidelines* continue to say that there's not enough evidence or research in terms of the human health impacts of GenX chemicals. Do you have anything in particular to comment on about the GenX chemicals, Mr. Amis?

ANTHONY AMIS: No, I haven't seen any testing for that in Australia. The other one I'm worried about is TFA—trifluoroacetic acid. I was talking to an analytical chemist a few months ago and he said there's no lab in the country that can actually test for it. That is being picked up right across Europe and I think even in the United States as well. It's sort of a transformation product of PFAS chemicals, so it's a bit alarming that this stuff's being picked up in high levels in Europe, for instance, but not in Australia because no-one can even test for it.

The CHAIR: I know you've done a fair bit of work on biosolids. Would you care to give the Committee your opinion about the upcoming regulation—we think—of biosolids in New South Wales, what that is going to mean and what has been happening historically with biosolids?

ANTHONY AMIS: It's a huge question. In terms of Sydney Water biosolids, I did a GIPAA request back in June last year. What I found in that was about a quarter of all the biosolids produced by Sydney Water are above the restricted guideline level that has been proposed by NEMP. My question was what happens to that 25 per cent of Sydney Water biosolids that exceed the guideline levels. Anything below the guideline levels are diluted through the addition of clean soil. The PFAS levels are supposedly diluted, but I've got issues with that. The other big one that no-one is really looking at is past use of biosolids. I think there definitely needs to be some sort of audit by the State Government, EPA—whatever—about where biosolids have been applied in the past.

I've heard anecdotally that there have been biosolids from Sydney Water applied on pine plantations. Well, which ones and where are they located? Are they located in water supply catchments? Mine remediation. What mines around the State have had these biosolids applied to them? I want the Committee to know that these biosolids are problems for 50, 60 years. An example is in Adelaide, a place called West Lakes, which was constructed with biosolids from a decommissioned Port Adelaide sewage treatment plant back in the 1970s. PFAS has been detected in waterways there recently, 50 years later. They've recently just found that the ground water at Royal Park, south-east of the water treatment plant, is also impacted. So the groundwater is polluted. This is from 50 years ago. So have we got a thing happening across New South Wales where we've got these ongoing, unmonitored pollution issues from past use of biosolids?

I've also got an issue with farms where these biosolids are being applied. I don't think there's any monitoring going on downstream or even monitoring of the soil for PFAS. I know in South Australia that SA Water has conducted some surveys—only a few—and they found PFAS residues in soil where biosolids have been applied. Are neighbouring farms being impacted by the use of biosolids on farms? It's a whole can of worms. I think it's quite a serious issue that no-one has been paying much attention to. Are PFAS from biosolids ending up in waterways? I think the issue at Blayney is a really interesting one. There's a big composting facility west of Blayney. Highest levels of PFOS in the Belubula River seem to be coming from the creek, which is very close to a biosolids facility.

The CHAIR: That leads on, as well, because in your submission you talk about the ecological impacts. We haven't focused on that that much in this inquiry, yet. You make mention in your submission about research from a fish hatchery at Wagga Wagga. We know, of course, Wagga Wagga is one of the places that has got PFAS

contaminated water as a result of the RAAF base there. Could you just talk to the Committee about that research and your concerns about the impact, the uncertainty I suppose, of what PFAS chemicals are doing to the ecology?

ANTHONY AMIS: Most of what I've got to say to that is already in the submission. Yes, that fish hatchery was seriously impacted. There have been studies in New South Wales—impact on platypus. We've had big problems in Victoria; some of the highest PFAS loads are in dolphins. There have been productive fisheries that have been shut down, particularly Fullerton Cove, I think, near Williamtown. That was at least a decade ago. So there's a whole range of ecological impacts that we're not looking at.

I should also say that those PFBA spikes that have been found in the reservoirs around Sydney, there seems to be a connection there with rainfall. It seems to be happening when there are high rainfall events. I'm worried that there could be PFAS coming down in the rain ending up in reservoirs, waterways. It seems to be at higher levels around the urban environments, which makes sense because that's where the majority of the PFAS is being used. But if we've got it coming down in rainfall, well, you can imagine the ecological impact of that across wide areas of New South Wales, particularly that urban area around Sydney. We've got PFBA happening in these reservoirs which have got largely closed catchments upstream, so how the hell is this stuff getting into the reservoirs?

The Hon. AILEEN MacDONALD: Mr Amis, thank you for your submission. In your submission, you've called for audits of locations where firefighting foam has been used in the past 30 years. Have you put that to any government agency or perhaps the Rural Fire Service or anything? If so, what was their response?

ANTHONY AMIS: No, I haven't approached any authorities. It's beyond the scope of what I can do. I think it's something that a State agency—the Blue Mountains is an example of a truck fire and it has contaminated the water supply in the Blue Mountains. What I'm theorising is that there would be a lot of other truck accidents or areas where this firefighting foam is being used. Is this located in domestic water supplies? I don't think it would take that much for a government department to seriously look into where these incidents have occurred. I don't think that class B firefighting foam has been used in bushfires, but I have heard rumours in Victoria that there are stockpiles of class B firefighting foam that is used occasionally. But I can't confirm that either. If you're looking at truck accidents or vehicle accidents where this foam has been used, particularly along highways, and that has washed off into waterways, it could be a big source of contamination.

The Hon. AILEEN MacDONALD: You say for bushfires you wouldn't apply the order to the Rural Fire Service?

ANTHONY AMIS: I think it's only the class B foam you've got to be worried about in terms of PFAS, but who knows. There could be stockpiles of stuff at these firefighting areas. If we've got a stockpile of foam, we should use this somewhere, maybe. I'm not too sure.

The Hon. AILEEN MacDONALD: Following on from Ms Faehrmann's questions with regard to biosolids on, I think, pages 21 and 22, you've called for water testing in locations where biosolids have been used, particularly in farmland, where they've used it from Sydney Water. Can you expand on why you're particularly concerned? I know you went into it a little bit, but could you give us a little bit more detail on that?

ANTHONY AMIS: My concern was raised with what I found at Bathurst. Bathurst shire council instigated PFAS testing in about 2017. They did find quite high levels at times that were detected at the water treatment plant and upstream. I got thinking and I thought how the hell is this stuff getting into the water supply at Bathurst? It's a farming catchment. I think in the submission I've also written that there could be recycled water being used. I think the committee should be having a look at Bathurst council and just asking those questions: Has recycled water been used along the farmland of the river there or have there been biosolids applied? I think you've got to be part of a detective here and go back in time and try to link what has actually happened in those catchments. Part of the reason why I got interested in the biosolids issue was what came up in Bathurst. Also, we did FOIs with TasWater and in Victoria and we found that there were high levels of PFAS in biosolids in almost every water authority that we've looked at, and Airsafe water as well for that matter.

The Hon. AILEEN MacDONALD: Short of banning PFOS or PFAS, what other specific regulatory changes do you think should be introduced?

ANTHONY AMIS: That's the $64 million question. I think it needs to be banned and it should be banned immediately. It's not a sustainable outcome that the water industry has to deal with this problem, which they haven't created. But they've certainly got to deal with it. At this stage, for regulations, I think we really need to get more information about what's happening out there and where the hotspots are. Once the hotspots are identified and we can look at remediation, I think that there needs to be some sort of legal enforcement of drinking water guidelines so that—there's got to be some legal recourse. Water authorities, if they end up providing dangerous

drinking water to communities, there needs to be some sort of legal stick that can be used to make sure that they don't do that again and that other authorities—because, at the moment, the drinking water authority's guidelines are guidelines only. There's no real legal teeth.

The Hon. AILEEN MacDONALD: Real standards.

ANTHONY AMIS: Yes. The other thing is, I think we need to roll out a lot more work on PFAS pollution potentially from fluorinated pesticides and also the pharmaceuticals. I don't see that there's been much attention placed on pharmaceuticals that are fluorinated, and some of the breakdown products of the pharmaceuticals include TFA. I think Prozac and Lipitor are two of the most commonly used fluorinated pharmaceuticals. It's a huge issue and it's going to be really difficult for regulators to actually capture the entirety of the seriousness and the enormity of this problem. As I mentioned before, how do you stop it if it's coming down in the rain? How are you going to legally protect rainfall?

The Hon. GREG DONNELLY: Thank you, Mr. Amis, for your submission. I am just wondering if I could press you on the statement you made in answer to a question from the Hon. Aileen MacDonald to ban this chemical immediately. I am just wondering, how does one go about banning the chemical immediately, given its manifest appearance in a range of so many products that we have heard over the course of the hearing? We heard, for example, yesterday—and I am sure you are familiar with this—that it is found in consumable items like toothpaste and shampoo et cetera. I understand the position of ban immediately, but how does one conceptualise introducing a ban like that—to ban PFAS on everything in Australia?

ANTHONY AMIS: It won't happen overnight, that's for sure. This stuff is entwined in the very fabric of our society, and the question I'm asking is how did that actually happen. Why did it happen? And why weren't regulators and all the agencies that we have looking after the environment and the health of people—why haven't they picked up on this? In terms of the question, I think what you really need to do is look strategically at what are the biggest uses of PFAS chemicals. We need to maybe start looking at it industry by industry, but also looking at easier options like if it's found in cosmetics or items that can be easily banned. I think there should be a ban enacted, but what we really need to get at is the breadth of where the PFAS chemicals are and then look strategically at what are the easiest ways to stop this stuff from entering, at least, wastewater streams?

One of the questions that, in terms of—we've got a huge import trade, for instance, in PFAS-treated mattresses, carpets, you name it. It's enormous. I haven't got any easy answers to that. There are going to be experts that you could probably call to try to work out a strategic plan about what items out there would be easiest to be banned and then how we go about that. A first thing should be that we shouldn't have trade waste agreements where people can release PFAS-treated water into the sewerage. That that should be a starter.

The Hon. GREG DONNELLY: Thank you for that. That's helpful evidence. Just so I gather this clearly in my mind, is it the evidence of Friends of the Earth Australia that the only acceptable level of use of PFAS chemicals here in Australia or the importation of anything that contains PFAS in it is zero?

ANTHONY AMIS: Yes, I'd agree with that.

The Hon. GREG DONNELLY: No, is that the submission? I'm trying to gather clearly in my mind, is the submission of Friends of the Earth Australia that there is no tolerable limit at all with respect to anything that's got PFAS in it? Therefore, the position is zero PFAS for everything?

ANTHONY AMIS: Yes. The other issue to consider is that industry is already moving away from PFAS but they are creating other PFAS chemicals. Part of the problem is that we have a system in place that isn't looking at the immediate impacts of the chemicals that are allowed to be used in the Australian society. Like I mentioned before, why is it that we've ended up in this state? If we've got such a great regulatory system, why on earth have we ended up with these chemicals that are potentially coming down in rainfall? We've got to look at the whole regulatory system. We've got understand why this has happened, what are the loopholes in the system and the laws that have allowed this to happen, and how do we resolve this for the future? I can guarantee now that there are other emerging contaminants that are out there that we're probably not even testing for.

The Hon. GREG DONNELLY: Can I just follow that up with respect to the matter of at-source identification of PFAS? That has been submitted by a number of witnesses as being pretty important. In other words, take your submission that we have the manifestations in so many places, in so many ways. What are your thoughts about that at-source identification of where this is coming from in the first place? Do you have any particular views about that?

ANTHONY AMIS: Offhand, like I said, what you're going to have to put in place—somewhere in the New South Wales Government, we need a really good audit of what items actually contain PFAS. I think

I mentioned before, once that audit is done and we can look at all the products this stuff is in, we can do a strategic review of what the easier tasks are to stop the major pollutants from at least ending up in the waterways. I can't offer any more specifics.

The CHAIR: Thank you, Mr Amis. We are out of time. Thank you so much for appearing today. That's fantastic. The Committee will get in touch with you if you agreed to take anything on notice—I'm not sure whether you did—or if Committee members have any further questions for you. I appreciate all of your work on this. Thanks so much.

(The witness withdrew.)

Dr BRETT MOLONY, Science Director, Environment, CSIRO, before the Committee via videoconference, affirmed and examined

Dr JASON KIRBY, Group Leader, Contaminants and Mitigation, Environment, CSIRO, before the Committee via videoconference, sworn and examined

Dr JENS BLOTEVOGEL, Team Leader, Remediation Technologies, Environment, CSIRO, before the Committee via videoconference, affirmed and examined

The CHAIR: We welcome our next witnesses, from the CSIRO, who are appearing online. I assume they are all hearing me okay. There are nods all around, so that is a good sign. Does one of you have a short opening statement for the Committee?

BRETT MOLONY: Yes, I do, Chair. I'll read it, and we'll also provide it to you in written form. I'm coming to you from the Wadjak lands of the Noongar nation here in Boorloo—Perth. I pay my respects to Elders past and present and, of course, extend my respect to the traditional owners of the lands on which we're all meeting. We've met the team, and we really appreciate the opportunity to provide information to this Committee. I note the CSIRO has provided a submission to the inquiry that is similar to our submission to the Federal Parliament's Senate select committee inquiry relating to PFAS. In line with our areas of expertise, CSIRO is focused today in our submissions primarily on detection, ecotoxicological assessment and monitoring, and effectiveness of treatment technology and practices for PFAS remediation.

Per- and polyfluoroalkyl substances, known as PFAS, and the compounds they break into are considered contaminants of critical concern due to their persistence, widespread distribution in the environment and the potential for adverse impacts on human health, animal health and the environment. Since the 1940s, thousands of PFAS have been used worldwide in consumer, commercial and industrial products and applications. At present there are more than 14,000 PFAS compounds identified. This provides the Committee some idea of the scale of the challenge.

We have a broad portfolio of research and technical expertise relevant to PFAS issues and a track record of defining the scale and breadth of such problems and devising remediation and management strategies. CSIRO provides evidence-based research used by stakeholders such as government, industry and community to inform regulation and risk assessments. It is not our role to comment on policy matters. It's important for the Committee to note that the focus of our PFAS research has been on the environmental fate and behaviour of PFAS and their remediation and treatment. We have not been undertaking research into potential human health impacts of PFAS, and we know that others across the innovation network are.

What we are currently working on is to ensure better measurement, prediction, risk definition and risk mitigation of PFAS. We're collaborating nationally and internationally to do so for the benefit of Australia and our region. In particular, we have advanced research on PFAS distribution in the environment and mobility through soils to groundwater and surface waters; PFAS retention and release in infrastructure materials, including concrete and asphalts; leaching and immobilisation of PFAS in soils; predicting PFAS mobility in groundwater; PFAS uptake by plants and affects on organisms; and remediation technologies and site management scenarios.

Our tools range from PFAS sensors and profiling, fingerprinting, and revolutionising ecotoxicology through systems biology and multiomics or genetics-based approaches. We also assess the efficiency and efficacy of PFAS mitigation approaches for rapid response using sealants and absorbents. We explore disruptive technologies through thermal electrochemical processes and are developing nature-based solutions using phytoremediation in plants; through insects, using ento-remediation; and with microorganisms. In summary, addressing PFAS issues will require a combination of science, policy and management solutions. CSIRO is engaging across our innovation system with government, industry and agencies to progress science outcomes and create solution options. We're happy to answer any questions the Committee may have. Thank you, Chair.

The CHAIR: Thank you very much for that, Dr Molony. You did make specific mention in the submission that it's a potential problem that most research on PFAS distribution and scale is focused only on known contamination sites or point sources and that, in fact, probably what you're trying to say is that there's PFAS in many other parts of the environment now. So why is that problematic, potentially? Could somebody answer that? I'm not sure who to direct my question to; I'll leave the three of you to work that out.

JASON KIRBY: I'll probably start there, if that's all right, and then I'll pass on to Jens. I suppose our initial research, like a lot of areas, is trying to find those hotspots that are adding a larger amount of contamination to the environment that can have a larger impact. Our initial focus, like a lot of other people in the world, was

trying to identify those hotspots where we knew PFAS was used, and also the potential to go into the environment or a pathway into the environment.

Our initial work was very much around the AFFF containing PFAS—areas such as concrete areas, firefighter training areas, spills, aviation areas, airports and things like that, and then understanding their leachability, their mobility from those areas into the environment and then their potential impacts. As we've actually developed over the last 10 years, I suppose, it's really the realisation, as you probably know in this Committee already, that PFAS is found in a lot of things. It is a very versatile, very useful group of compounds or substances that have now been found in a range of textiles or been used in textiles and plastics et cetera.

As our understanding of those compounds has actually developed, we've understood now that there are hotspots around landfills, wastewater treatment areas and areas such as, like I said, AFFF areas that have been used. From our point of view, I suppose it's about trying to get the techniques to be able to measure these compounds and then actually trying to help in identifying these hotspots, and then understanding where their mobility, transport and toxicity can occur.

The CHAIR: I also wanted to ask about the types of chemicals that we're testing for, including in the draft *Australian Drinking Water Guidelines*. We've already had a bit of commentary about that from different witnesses, but you also mention in your submission that there's likely an underestimation of the future impacts of PFAS in Australia. You make the point that that's because our monitoring programs are really focused on those three—PFOS, PFOA and PFHxS. How big a concern are the other chemicals? Should we be doing more to monitor for those?

JASON KIRBY: The information around a lot of those chemicals is unknown, and I think we know that—so their toxicological or their ecotox, their bioaccumulation potential. We do know a lot of them are persistent. We are still developing our knowledge around a lot of these chemicals. An example is, even when we talk about AFFF PFAS, it does not just consist of one or two chemicals. We know there are up to 100, maybe more. Jens would be able to tell you a bit more around the numbers than that. But we know there are a lot more chemicals in there, and we don't really understand their potential within the environment or their potential risk within the environment. We very much target, at the moment, the regulated chemicals. As you can guess, once they're regulated, we target heavily onto those areas. We do do a larger sweep within our targeted PFAS analysis—up to about 32 or 33 chemicals, I think it is, at the moment.

But what we're trying to say also is there are a lot of chemicals in there that we don't know about. What we in CSIRO have been spending a lot of time on in the last five or 10 years is developing the methods to allow us to identify these unknowns or the chemicals that we don't target within the environment. The reason we do that is because we use it really as an early warning system. We're trying to actually develop the technologies now for high-resolution fingerprinting or profiling of these chemicals as well as other chemicals, so things that are associated with plastics et cetera. We're trying to develop these high-resolution techniques that allow us to now identify these unknown chemicals and then use either predictive technologies or other technologies to actually determine their risk within the environment. But I'll throw that on to Jens as well. Have you got anything there, Jens, to throw in?

JENS BLOTEVOGEL: The only thing I may want to add is that we're still working on identifying PFAS. It's a large group of compounds, as Jason said. We're talking about thousands, possibly tens of thousands, of different compounds. We're finding new classes of PFAS still, and so for all of those, obviously, we would have to look into what's the relevance, what's the bioaccumulation potential and what's the toxicity. But we can certainly say that there are more than three or six of regulated PFAS that occur in the environment. Again, for most of those, we really have no information on their environmental fate and transport.

The CHAIR: You mentioned something about 20 or 30 chemicals then. That is what a range of other jurisdictions are doing, or testing for. They have expanded the range of chemicals. I understand there are a lot of unknown chemicals, but there is that number of 20 to 30 where a reasonable amount of research and detection have been done. Those 20 to 30, what is it that the CSIRO is doing with those? Are you able to provide a list of those chemicals that you are working on?

JASON KIRBY: Once again, I'll start with that. Yes, there's no problem with us giving the names of the chemicals that we actually detect. It's a general suite now in a lot of laboratories across Australia, with some incredible scientists who are able to measure those. A lot of those chemicals are not easy, I should say as well. We're talking about low detection limits, however, with a lot of these chemicals. So it is a challenge, I think, to still detect some of these PFAS within the environment, even though we all talk about how we're finding these things now. There is still a challenge around accurate and precise results around PFAS analysis. Back to the original question, yes, that information is being collected now. How it's being collated and then actually used,

transparent and given out to the community or to government organisations or to the general public is another question. A lot of it has been reported at the moment in different matrices across Australia, but how it's being reported, a lot of that information is not easy to get your hands onto.

What CSIRO is doing at the moment, I suppose within that, is with our detection work we're trying then to actually put it as part of our modelling capability. We're actually trying to use our modelling capability to say how, based on the properties or groupings of these chemicals, what would their potential fate be within the environment, how far can they be transported et cetera. Then also as part of our toxicological work, we're trying to predict the potential bioaccumulation potential, their toxicity potential and things like that at the moment. As you can guess, the toxicity work takes a long time to get that information. What we're trying to do now is rapidly develop those tools—machine learning, AI kind of approaches—to allow us to predict better what they won't do within the environment.

The Hon. GREG DONNELLY: Thank you, gentlemen, for agreeing to appear today. Thank you for CSIRO's valuable submission. My questions are quite general ones, so forgive me for being so general. I note, of course, that the CSIRO is a national organisation of some repute and obviously looks at things from a national point of view—at least in part of the work that it does. But this is a New South Wales inquiry, as I know you appreciate. If you take the State of New South Wales, what are your views or your comments about how does a State Government, through its agency, systematise testing of the possible presence? That presence might be from a high level through to either zero or a low threshold of potential PFAS contamination. The reason I ask that is that there has been evidence to the inquiry, quite on a regular basis, that because this manifests in so many places through so many products, it's everywhere. So the idea of a State Government being able to test for everywhere is impossible, it seems to me, from a budgetary point of view. How does a State Government go about systematising where it should focus on its testing?

BRETT MOLONY: I'll use examples in Western Australia, if you don't mind, for the Committee, being parochial. There are regulated chemicals and chemicals that are already on a list. Jason said he'll provide what we can test, but within each State there's also a list of chemicals which are restricted or at least identified for testing. Some of the work that we're doing in WA flows through a State agency known as the ChemCentre, where they do the forensics for police, for example, and others. They have a certified lab and can test these approaches. There are obviously places where it is obvious to start. Jason and Jens have listed airfields and firefighting places. There are some other facilities which are obvious. ChemCentre is now looking at setting up and testing approaches to monitor leakage from asphalt and concrete, given the amount of building that's going on throughout Australia and the State. So it's about starting where you know there are risks and lining it up with national standards of detection limits as a first pass.

The other part that CSIRO is working in the background with a growing list is can you fingerprint not only what the chemical is—and there are early stages of testing and development there—but also the more delicate matter of where it's coming from. In some places it's obvious. In other places it's—if you can imagine an industrial strip, say, in Newcastle, identifying the source may be more problematic. As Jens and Jason said, it'll go through groundwater. It'll come through surface water. And while it may start off as an individual type of PFAS, it may break down into several. So it's a bit of a vexed issue, I think, to consider that. To consider where your sites are most likely to be and also, based on those sites, where communities are likely to be at risk, would be a good first pass, I suggest. Jens or Jason, do you want to add anything?

JASON KIRBY: I'll throw in there as well. This is something that we've been pushing for a while here. PFAS is a global issue. It's a national issue within Australia and, you're right, it's just not a New South Wales issue. I think there is an opportunity here, especially around such a—this is a once-in-a-generation kind of chemical here. It's a chemical of large concern for our future within Australia. This is an opportunity for us to better coordinate our approach to contamination research, as well as the funding, also the way that we actually understand what's coming into our country and also how do we manage these things moving forward.

From my point of view, it's always a struggle to do research around contaminants in the sense that you've got to wait usually until there is something that's been regulated and then you can actually start pushing ahead with the research around that. There's an opportunity here. We're a little bit behind the ball. But in the sense that we can actually coordinate better across those jurisdictions including New South Wales, DCCEEW and also AICIS—the Australian Industrial Chemicals Introduction Scheme—about what comes into our country, about how we actually standardise our approaches to understanding what's coming, in the sense of chemicals coming into this country. What do we do once they're in there? Where do we actually target and prioritise Australian research around PFAS? We are a different world compared to the rest of Australia. We have unique challenges here that we have to deal with. We should be able to coordinate better around contaminant research within Australia and definitely around PFAS.

The Hon. GREG DONNELLY: On the matter of the knowledge we have of the content, starting from either zero through to whatever level it might be on imports into Australia that contain PFAS—so we're looking at what enters this country from overseas—what is the regulation around that and what is the base knowledge we have that presently exists? Or don't we, in fact, have that knowledge?

JASON KIRBY: CSIRO provides science. Around the regulation, that's probably a better question for DCCEEW or for the Australian Industrial Chemicals Introduction Scheme. But I will say, from my scientific understanding, our knowledge of what's coming into Australia is very lacking, and that's across the world. We do not understand a lot of time if PFAS has been introduced into a lot of products, or is it actually a contaminant associated with a lot of products coming into Australia. It doesn't mean every product has got PFAS in it, but I think our understanding of what is coming into Australia is limited at this point in time, I would have thought. We know it's associated with certain products, but we haven't got an understanding at the moment of a lot of things that have PFAS in them. Jens, do you have anything to say around that as well?

JENS BLOTEVOGEL: No. I think that was a good response.

The Hon. CAMERON MURPHY: I wanted to ask about one of the issues that you raised in your submission about the destructive and non-destructive technologies for dealing with PFAS. I've got a couple of questions. First, you described technologies like plasma and electrochemical destruction—those two destructive technologies—as niche and say that only incineration is really the commercially available technology at the moment. How far away are we from having alternatives? Are things like plasma and electrochemical destruction commercially viable? What are the issues with those?

JENS BLOTEVOGEL: I'll take that question. There are two answers to this question. Destruction of PFAS generally is something we can do. We have the technology and the knowledge to do it; it's just excessively expensive. The other thing you can do is removal. You remove PFAS from a more diluted waste stream. You concentrate them and then you destroy that waste stream. This way, you can save costs. The advancements that we can make are to develop these treatment trains to make the overall treatment costs cheaper and more achievable. With that, we don't need large plants anymore; we can use smaller plants, mobile plants and different technologies. The technologies to destroy PFAS are basically emerging from two sides. Number one is the maturing destructive technologies that are in development, and then also making the removal technologies more efficient to concentrate the PFAS.

How far are we? As our response said, incineration is mature. There aren't that many incineration facilities in Australia. In fact, there is probably no country in the world that has enough incineration facilities to deal with all the PFAS and PFAS-impacted materials that are being produced. Again, it needs to be concentrated. There are a lot of demonstrations going on for destructive technology. You mentioned electrochemical treatment. That's something that you can get at the moment, let's say, on a trailer base, and doing maybe thousands of cubic metres a day on that order. There is sonolysis. There is plasma treatment. There are other temperature-reliant processes too. But everything, I'd say, is at a pilot scale. Most of them are being demonstrated through the US DOD in North America at the moment, some of which, at the smaller scale, you can order tomorrow. Others will probably take another two, three or four years until they become commercially available.

To the last part of your question: What are the problems? Any time you destroy something, you will likely not just generate what you want—so the much less harmful degradation products—but there are often intermediates that are being generated. When you develop these processes, you don't just look at removal of the parent and generation of the end product—which, in the case of PFAS, is CO2 and HF or fluoride—but you need to have the analytical support to make sure that you're not generating intermediates that may be more toxic than the parent. There's a lot of research being done in incineration and thermal processes because there's potential for that, but that is true for all destructive technologies. For some of them, we know this better, and for some of them, we still don't really know what these potential stable intermediates are.

The Hon. CAMERON MURPHY: Those non-destructive technologies, that's effectively the collection of PFAS out of waterways and other areas. Are those technologies, at the moment, covering the field? As you said earlier, we're discovering new varieties of PFAS amongst this enormous family of variants. How good are those existing technologies at collecting not just PFAS or PFOA, or the main ones, but all of the others in that broad family? Do we know enough about that?

JENS BLOTEVOGEL: That's an excellent question. For the PFAS that we are currently targeting—we talked about this list of 20 or 30 PFAS roughly. Those are somewhat larger molecules—not polymers and not the real big ones. Those are molecules that we can remove quite reliably from water, treat down to current guidelines and supply people with safe drinking water, if you will, going by those concentrations. There is a lot of talk right now about TFA. I think we heard that in previous questions. Trifluoroacetate is one of the very short ones—the

ultra-short chain ones—whose significance, I'd say, is only just emerging. There are cases and sites where this TFA represents the largest mass of PFAS in the environment.

For several of the removal technologies—adsorption, like through filtration; activated carbon; ion exchange; dissolved air flotation; or foam fractionation—those processes appear to not work very well or very reliably for TFA for that. At the moment there is one technology that we can apparently reliably use, and that is reverse osmosis, or membrane filtration, with very tiny pores. This technology is available at large scale but, as always, the more challenging a problem gets the more expensive it gets. It's doable, but we certainly need to learn more about how to remove these very, very tiny molecules—the ultra-short-chain PFAS.

The Hon. SCOTT BARRETT: On those technologies, I think you touched a bit on the collection and the destruction in that answer. Can we throw the detection in there as well? In the research you're doing, how quickly are things moving in that space? What are we going to look like in five to 10 years time? Is there some light that we can look towards there?

BRETT MOLONY: I'll start and then Jason and Jens can come in. Some of the work that's being considered and looked at, last week I saw a specific prototype sensor. If you can know what you're looking for, this can give a quick swab—a bit like having a mouth swab, if you like—on sight, but you have to know what you're looking for. The advantage is it's easy to use. Ideally, if we're looking a few years in the future, it can be handheld. Anyone can use it and you can get a presence or absence above a certain level. There is work looking at can we modify microorganisms to—if we know what we're aiming at—treat in situ? Think of how beer is fermented—breeding up a microorganism with the right enzymes and then actually treating it on soils. That's something that's being looked at at the moment. It's in early stages. We have people that are working on those points. There are also people working at the next scale up looking at insects. Again, you've got to know what you're looking for and to modify. They're having success with insects breaking down certain types of plastics. Can we use that same approach to break down certain types of PFAS?

JASON KIRBY: I'll jump in quickly. There is a lot in the last couple of years around high-resolution fingerprinting or profiling of contaminants. It has taken significant step changes around the detection of a range of different PFAS within the environment or of a range of other contaminants within the environment. The technology is rapidly advancing around that opportunity to profile better within the environment. CSIRO has just invested a large amount of money into one of the largest high-resolution instruments in the world to actually do that. We know that's about PFAS, but also about that early response and early management of contaminants. Once you know they're there, you can actually do something about them. We're investing heavily into that.

JENS BLOTEVOGEL: Going back to what Brett said, I want to emphasise that I think we're really on the verge of getting real-time sensor-based PFAS measurements in the next few years. That's an exciting development. I think you will see a lot of that coming out of the CSIRO. The other thing I wanted to mention is, if you think of petroleum hydrocarbons—asphalt and bitumen and all these natural mixtures of chemicals—those are mixtures of tens of thousands of compounds. We have done this before. We have worked with the appearance of these or occurrence in the environment before. We're looking for individual compounds which we know are bad, such as benzene—for instance, benzene toluene, ethylbenzene and xylenes. We have individual indicator compounds, but we also do bulk parameter measurements, so total petroleum hydrocarbons or diesel- or gasoline-derived hydrocarbons.

For PFAS at the moment we're focusing on a few, of which we don't know if those are the most relevant. That's where the research is still unsettled. We know they are relevant, but maybe not the most relevant. That we don't know. But, let's say, if we do research projects, if we develop technology and we want to make sure that we're not generating bad stuff, then we also use bulk measurements. They are our estimation methods for total PFAS. These are not used in any regulatory context. I'm not implying it should—because, again, we don't comment on regulation—but there are certainly other ways that could be used to inform what the amount of PFAS in the environment is.

The Hon. SCOTT BARRETT: It's probably a simplistic but almost utopic view that we could just ban PFAS from coming into the country. I'm gathering from your submission and some of the needs for PFAS—some of the uses of it—that it's not quite that simple.

BRETT MOLONY: You're right there. I think there are a couple of considerations. One, there's a large number of chemicals. And, as Jason and Jens said, we're not even sure what is necessarily coming in. That's the first challenge. The second one is that PFASs were designed for specific reasons and for good reasons. Think of firefighting foam. Finding a replacement—some exist but some don't, so we have to consider what we would actually replace it with. We also have to make sure that we're not just creating the next PFAS challenge in the future by whatever we're replacing it with. We're trying to, if you like, get ahead and find solutions or alternatives

which won't create the next generation of people sitting around a committee discussing how we're going to deal with it. Jason or Jens, would you like to add something?

JASON KIRBY: There is an international push at the moment to remove fluorinated chemicals. I think we can say that now. The EU and America especially are really pushing heavily towards removing all fluorinated chemicals if they can. It is going to be a challenge, yes. There was a recent paper that showed that out of the different applications for PFAS at the moment, there's about 20 per cent they know PFAS can be substituted for with other chemicals. For about 40 per cent they think there are substitutions, but that's going to take years of testing to actually do that. Then there's still about 40 per cent they know at the moment that they don't have a substitution chemical to do what they need to do, and that is for vital applications such as in the medical industry, around oils and lubricants, and for certain types of jets and heat-resistant textiles and things like that.

So it is still a real challenge to remove all PFAS, but I think there is definitely a push internationally, and within Australia I believe as well, to remove what fluorinated compounds you can. We know there's an issue, so remove those chemicals the best you can, especially those fluorinated surfactants: things like PFOA and PFAS et cetera. I want to highlight what Brett said as well: We've got to be so careful about unwanted substitutions for chemicals. A lot of the chemicals we want to substitute, we have little understanding of their toxicity, their persistence and their bioaccumulation potential, so there is that worry as we move forward as well.

The Hon. SCOTT BARRETT: I have one more that I hope means we can come back if anyone has a final question. I can't remember who made the comment that we don't know what products PFAS is in. How do we not know? Someone must know. They physically put this chemical into a product somewhere along the chain. How is that not registered? I'm assuming from that answer that there is no record of that, that no-one is required to say where they've put it in. That could have been worded better, but I think you get the gist.

JASON KIRBY: I assume there is a pathway for where PFAS was introduced as part of an industrial process, but a lot of the time PFAS can be introduced as a contaminant within a system or within an industrial process it moves through as well. Around labelling and things like that, I can't really make a comment on that. But I think in a lot of cases you will know that PFAS is in there if it's labelled on a product coming in. That's probably a better question, once again, for the Industrial Chemicals Introduction Scheme people. But what I was trying to highlight there as well is that a lot of times we don't realise that PFAS has been introduced along that processing chain or along that manufacturing chain. We don't really understand a lot of times where it has been introduced or how it got in there, and a lot of times it's depending on where it's coming from.

The CHAIR: I'll just jump in with an extension of the question around phasing out the chemicals. It's an issue of not knowing what comes in. Dr Molony, I think you mentioned about the EU and the US being quite advanced in this area. It's also an issue, isn't it, that Australia hasn't signed the Stockholm Convention when it comes to persistent organic pollutants or forever chemicals, and there's an issue. Quite a few witnesses have suggested that there's a fear that if we don't match what the US and EU do, we could become the dumping ground for some of these products—let's just say cosmetics—if other countries move on a whole suite and the class of PFAS chemicals and we don't. Is that a live discussion? Is that a possibility?

BRETT MOLONY: Again, this is at a higher level above us. We've seen in the past some examples where, I won't say dumping, but think of fuel standards in motors and efficiency standards, that sort of model. I have no oversight of where the discussions around the Stockholm Convention are, so I'm not sure if Jason or Jens want to add anything there.

JASON KIRBY: I think that's a better question probably for DCCEEW, who is actually looking at that. From my point of view, I think being pushed by the EU and also by the US is going to set pretty much the standards for how we have to move forward around this PFAS and fluorinated chemicals. They're a large trading partner, of course. Products coming in the US and also into the EU, I assume, are going to start being looked at for PFAS chemicals. So Australia will have to go along the pathway of the international area around PFAS, I would assume. Like I said, internationally fluorinated compounds are going to be more and more phased out as we move forward over the coming years.

The CHAIR: I want to make sure we touch on PFAS and wildlife because of the research that CSIRO did on turtles, which is very concerning. Would you care to give just a quick summary to the Committee about that research and also, importantly, what future research is being done in terms of the impacts on wildlife or other current research?

JASON KIRBY: That research was done by David Beals' group in Brisbane where they monitored turtles near an AFFF PFAS contaminated site and found that there were population declines on turtle populations, or that's actually what they hypothesised from their findings around that. That is very persistent, I think, across the

world in the sense of impacts on contaminated areas around PFAS. We're still understanding, really, how the toxicity works around PFAS chemicals in the sense of what metabolic pathways et cetera are being impacted by the different chemicals. It's still debatable at the moment and the information is still being gathered around what levels of PFAS and mixtures of PFAS as well—so it's not just one chemical you've been exposed to; you've been exposed to multiple ones—those are the levels that we should be regulating on.

The NEMP has regulation levels but we are still adding information as we move forward, especially around chronic and long-term impacts of PFAS as well. We know concentrations that give impacts on certain organisms on short-term exposures, but I think where PFAS is very unique is its persistence. What effect does it do in the long term to multigenerations and to populations. That's the information that we're trying to supply at the moment. We're trying to focus a lot on our native species, especially—a lot of our areas are around frogs and turtles and things like that. We're trying to add more information around that. Like I said earlier, David's work especially is trying to find those early warning markers within those metabolic pathways, so things that can give you an indication of fitness and health and reproduction or population decline. Can you do that through their pathways earlier rather than waiting for things to die and be in population declines et cetera? We're trying to develop those early warning tools, as well as add the information around native species as we're moving forward.

The CHAIR: That information I assume goes to the Federal environment department in terms of the results of that research?

JASON KIRBY: Exactly. All our information, especially within our group, is publicly available. We work closely with most regulators in supplying our science. We try to line our science up around areas we think add the most value. For us, I think native species in Australia is one of those hotbeds that we really need to get a better understanding of, in the sense of what PFAS can do to these unique organisms in Australia.

The CHAIR: Thank you. We're out of time. Thank you very much for appearing, all of you, and for the excellent work you do. That was incredibly interesting. The Committee will be in touch if you agreed to take anything on notice or if we've got any supplementary questions for you. We really appreciate the time you've given to the Committee today.

(The witnesses withdrew.)

Ms GAYLE SLOAN, Chief Executive Officer, Waste Management and Resource Recovery Association of Australia, affirmed and examined

The CHAIR: Do you have a short opening statement for the Committee?

GAYLE SLOAN: Yes. I will look to my submission and add to that. We are the national peak body for the waste and resource recovery industry. WMRR has over 2,000 active financial members representing 400 companies and over 750 individuals across the entire waste and resource recovery supply chain. Forty-odd years ago, the industry made a call that it needed a body that represented the entire sector, given that it is a supply chain industry and it's important we understand the material management across the entire chain. So we come to you with an informed and thoughtful view of how all the sectors and parts work together—everything from avoidance through to recycling, landfilling and energy from waste. The goal is—and obviously it's a complex system and the more you spend time in it, the more you realise that it's really important that we give a well thought through view to government about issues impacting us.

We wrote to the Committee because PFAS is one of our many obsessions. As often, the sector, like water, at the end of the supply chain receives this material, a chemical that we cannot see. Yet we have these crazy expectations at times from government about regulators, around levels that we should be managing onsite. Again, we can't see it. We don't see it in a truck. It's highly mobile; it bioaccumulates. The scientists have given you information way above and beyond what I can ever give you. But we find ourselves in a situation where we're being told, through things like the NEMP regulatory intervention, that our products that we are making to address issues like climate change and keep materials that we receive circulating can't have levels of PFAS in them. That is well and truly known in the broader community. We get levels put on us in organics and other products that we can't possibly meet, given the presence and levels that are on the shelf.

I want to give you a view away from water. Our concern as an industry is that this material continues to be placed on supermarket shelves. I can take you down to Priceline, Chemist Warehouse or any other shop and show you how make-up has it at 10,500 parts per billion. I can take you to a supermarket and show you that microwave popcorn has it at over 18,000 parts per billion, and it's readily being continued to be put out on the shelves. As an industry, it's very confusing for us. I think also, as a community, it's very confusing for us. Is it a concern? Is it not a concern? If it's a concern, why does the ratifying of the Stockholm Convention to add these POPs take years? We've had it foreshadowed as 2025 in iChEMS. I would agree the approach being taken by iChEMS is wholly inadequate because, as a consumer, I have no labelling or advice to know whether I'm even purchasing PFAS. Yet we regularly hear in the media it's a concern when it's in drinking waters at levels that don't come close to what we're putting on our faces or in our mouths. Dental floss is at 15 parts per billion, and we put it in our mouths every day.

We don't really have a really clear picture as an industry or as a community as to the impact that PFAS has. Is it a concern? What is the safe level of exposure? That's what we are constantly grappling with. The ladies who are coming after me are far smarter than I am, and they've done a lot of work for us as an industry about what a safe level of exposure is through compost and other products, because PFAS is everywhere and we need to manage it. That's the information we have. It is possible to have safe levels. We recently tested a whole pile of people in our industry, and we all have it in our blood and we're okay. I guess we're looking for help from you guys to say to Federal government probably as much as State government, if it's an issue, do something about it and do it now. And if it's not of concern, can we find a realistic approach to the management of it whilst it's out there? We're not making it; we're simply taking it.

The CHAIR: Thank you, Ms Sloan. That was very succinct and valuable. With your submission, you mentioned the Stockholm Convention. I asked that of the CSIRO and of course they didn't want to comment politically in terms of what the Federal Government should be doing. I know it's Federal government, but it does obviously impact in terms of products and everything else. What's your view in terms of where Australia is at compared to the EU, compared to the US, in terms of dealing with PFAS chemicals? There's obviously the Stockholm Convention, but we're also only dealing with the three—the PFOS, PFOA and PFHxS—while other nations seem to be addressing it a little more broadly. What's your kind of general view in terms of where we're up to?

GAYLE SLOAN: Generally when it comes to policy in our area, Australia is way behind the European Union, and I do need to correct my submission. Australia did join the Stockholm Convention in 2004, but what we haven't done is ratify the addition of the other POPs. I just need to make that clear. I went and checked the DCCEEW website this morning and it clearly states that we don't automatically, as these POPs and other things go onto the Stockholm Convention, adopt those. We have to go through a treaty making process, and we haven't

done that. At this stage, we don't have anywhere near the restrictions that other jurisdictions have. We're also really bereft, in our point of view, around how we deal with both the design of products and the management of products as they go through the supply chain. I am personally obsessive with waste directives of the European Union, and one of the members, Scott Barrett, was saying before about the registration project approach.

Europe has, under the waste directives, both the REACH and CLP programs, which have a registration of what goes in products, because you're designing it, placing it on market and if we want to recycle it for future times, we need to know what's in there. You also have a consumer labelling program so you know what you're buying. We also have no sustainable design guidance in Australia despite talking about going circular in 2030 or 2035, depending upon the latest document. We can't actually recover products that are not safe for recovering, and that's our greatest challenge. We have a phenomenal amount of hazardous and problematic materials out there that we're trying to recover as a sector that were never designed to be recovered, and this is a classic example when you have a POP in there. Bromides—previously we saw with plastics BPA, it was not meant to be ever recovered but probably as a chemical had a really good purpose.

We strongly believe that, from a regulatory point of view, Australia is way behind making safe products, having sustainable design guidelines and really giving us an opportunity to go circular and use less virgin material for longer. We've got a great opportunity to pick up. I would say that New South Wales in the last year has really grappled with some of this really well, particularly its plastics plan. It has moved away from being more green and trying to eliminate materials and places in other problematic materials. WA and SA saying, "Please don't use recyclable plastic but go to compostable plastic that contains PFAS" is not a good outcome. We're replacing what is seen as a problematic material with what we know can be a problematic material. We really need to get away from populism in our sector—I realise I'm naive when I say that—towards evidence-led research and policy development so that we're making safe products that can be both placed on market and recovered.

The Hon. AILEEN MacDONALD: Thank you for your submission. In terms of the Industrial Chemicals Environmental Management Standard, you've said in your submission that it's wholly insufficient. Could you just outline what your concerns are with these standards?

GAYLE SLOAN: One is the timing. It's been foreshadowed for a number of years that PFAS would be placed on it, so there's not the urgency or alacrity if it's of the concern that it's supposed to be for some. Secondly is the lack of comprehensive nature. As I said just previously about the waste directives, you're not registering your products. You're not labelling your products to let people know. You kind of have to realise you're importing it and you're looking on a database somewhere in the aether to know whether you can or can't. If we were to join the far more comprehensive waste directives approach, which the vast majority of multinationals and global already operate under because a lot of them are domiciled in EU, we'd have a far better catch-all rather than having to set up our own separate Australian-specific system. I think one of the big challenges is the lack of labelling for consumers around what they're actually purchasing. At the moment, they don't have a choice. They don't know if they're purchasing PFAS because we know from all the research that, whilst we've focused on firefighting foams, there is actually a lot of this material in homes, and we don't know we're purchasing it.

The Hon. SCOTT BARRETT: I had a few questions, Ms Sloane, but you actually gave a very thorough submission, and your opening statement has covered off a lot of what I wanted to ask. But do I pick up a fairly high level of frustration from you on this point?

GAYLE SLOAN: You mean my poker face isn't working? Yes. It's very confusing. Our sector is very confusing because you do get mixed messages, dare I say. We see a very strong response to the presence of PFAS in water, and yet we're receiving it all day, every day, unknown. Then we're told we've got to make products at certain levels, and now we don't make it, I'm at pains to say. We do take it unknowingly and unwittingly. The action on stopping—literally turning the tap off on placing this product on market—just isn't occurring. I listened to the hearing yesterday and got made aware of the enHealth report and looked at that closely. That report says that the health impacts are not sometimes what you would be led to believe via the media. Maybe we don't know enough as yet, but we do get a very strong regulatory impact on our sector, often about what levels we're supposed to produce at, which just don't bear any sense of reality given the products that are circulating on the market. So we are very vocal in our cries to government at all levels for many years on this. We've watched the NEMP 3.0—our consultation stopped on that in 2023. We're now officially two years later and we still don't have the output, so we're not seeing from the Federal Government any alacrity when it comes to the presence of this material coming onto market.

The Hon. SCOTT BARRETT: I understand a substantial amount of waste from Sydney, for instance, is then trucked and trained into regional communities and dealt with in waste management in those communities. How much of a concern should this be for those regional communities?

GAYLE SLOAN: I wouldn't agree with your opening premise that we moved the material. Material moves around. That's the nature of it. I'm not sure if you've tried to build a waste and resource recovery facility recently, but it's not an easy feat, so we have to move waste to where we do have facilities. I think in some ways this material going to well-managed, lawful, licensed facilities is one of the ways of genuinely managing any perceived risk. Landfills, if you're talking about residual, are lined and managed and are leachate ponds and all that, so I don't think that we pose a risk per se. However, we do know that this material moves very easily and very quickly.

The Hon. SCOTT BARRETT: Okay. Sorry, that was not meant to be a swing at you guys at all. I'm just trying to get a picture of it.

GAYLE SLOAN: That's all right. I'm so used to it that I'm defensive.

The Hon. CAMERON MURPHY: I wonder whether you could comment on the importance of CLP—the classification, labelling and packaging. In this inquiry, we've clearly seen the level of alarm when people find out there's PFAS in the water that they might be drinking. But, equally, people could be getting just as much PFAS out of cosmetics, out of things like carpet in their home, and that ultimately ends up in the waterways through wastewater. It seems to me that it's just vitally important that people know what's in things so they can exercise their consumer choice, and we can manage the chain from production through to waste disposal, recovery, and ensure that we're dealing with PFAS. I just wanted to see if you could elaborate the importance of it and just comment more about that.

GAYLE SLOAN: I think, just like all things, knowledge is power. If people realise that they could choose to or not choose to purchase this product, that would be half the battle. We're going to have to manage this product as it goes through circulating and it continues to circulate. However, if we're able to not purchase it and, equally, know the genuine risks of exposure and how much—we talk about zero as if it's easy. We heard earlier that substitution might be worse. It does play a strong role. None of us could cook an egg without our non-stick frypan, to be honest, if you want it fried, so it plays a vital role. The question is, how much exposure is problematic? So we need to have an informed discussion, rather than always freaking out, for want of a better term.

The Hon. CAMERON MURPHY: I know parents that will steer clear of non-stick because they're frightened about it and yet they'll use microwave popcorn when they've got a film night several nights a week.

GAYLE SLOAN: Because they don't know.

The Hon. CAMERON MURPHY: I'm quite sure they'd be frightened to hear what you've just said about it, because they don't know that there could be PFAS in a product like that.

GAYLE SLOAN: I think it's really important that we're given the power of choice. This is an area that we do know. We've got lots of studies. I think yesterday it may have come up, the UQ study—and I'm very happy to provide a copy of that—that goes through the proliferation of PFAS in our home, because it does serve an important role when it comes to fire safety and other products, other reasons.

The Hon. CAMERON MURPHY: What role do you think the State can play? For a lot of these things we're talking about international treaties, we're talking about Federal Government's responsibilities over labelling and so on, but what role do you think the State can play in pushing towards that outcome where people know what's in their products?

GAYLE SLOAN: I think that the State has a clear role on the information provision around the risk and consequences. There was a piece I think Mr Beaman and Mr Chappel touched a bit on around the contaminated sites, but I think there's a larger piece to go on that around the consumption piece. We need to educate. We've got the vehicle coming up with the plastics plan and also the packaging reform. New South Wales has actually really put its head up recently in a good way to say, "Federal leadership is not working and we're not prepared to continue the way we have been," with, say, a packaging covenant which committed to voluntarily design our PFAS packaging by December 2023 and—oops—missed that target again.

So New South Wales has gone, "We've got a hook in our legislation that we can drive forward some of these product stewardship pieces," and I think that's a great example: the chemicals, the green list, the red list. And we've seen recently with batteries that Ministers have started to look at Fair Trading and standards. I think it's really incumbent on government to show leadership around here and go, "We're going to work to make sure that our communities are safe and have knowledge". We've got some really tangible examples in the last 12 to 18 months that have really helped us with that. We can go further and we can go faster—I don't deny that—but we also balance that with the science and the medical information that's saying there are safe levels of exposure to this product, from how I read that.

The Hon. GREG DONNELLY: Thank you very much for your submission and for coming today. My question builds somewhat on that of my colleague. You've touched on this already, about the importance of communication and explanation. I also want to take it to the level of the public at large. There's an issue here which continues to receive, for good reason, exposure to the public at large, and there's probably an argument there's an increasing understanding of the issue. But it is a complex matter, as you've described in your submission and your oral evidence today.

My question goes to, are you able to point to—and perhaps you want to take it on notice or make some general comments and then also take parts on notice—about the way in which you think, or the organisation thinks, there can be a comprehensive explanation that can be understood and processed by the average citizen about a complex issue like this? Because there is the risk—we've seen this in other issues—where there are large claims made which become embedded as really the position that needs to be taken. But it is far more complex than that. This is not in substitute for what you've said about the particular needs you've got but, in terms of ensuring the public at large are able to comprehend something like this, do you have any particular views about how government needs to go about communicating that?

GAYLE SLOAN: That's a very big question. I think, clearly and accurately. I do agree it is confusing because different arms take different approaches. We've seen that with the water standards that have come out that appear to indicate that it's of greater concern than need be at the levels that are being now proposed and the testing approach. We went through a process with BPA and fluorocarbons and we managed to grapple by breaking it down to look at understanding the science but also the impact and the community change behaviour, because we are talking about behaviour change too. I think there has got to be more transparency about what has been placed on market from producers. This is a lot about extended producer responsibility too. That's part of our challenge. We are left with the cost of clean-up or management of these products. I would say it's about having clearer rules around what can be placed on market and having clearer rules about design for recovery as well. It is about being more transparent, I think, and the information that's out there to help with that behaviour change.

The Hon. GREG DONNELLY: I remember—and I was much younger—the issue around CFCs and the ozone layer. This is not a strict analysis in terms of a comparison but, nevertheless, obviously that built up over a period of time and reached a point of almost no return. In other words, there was—I was a very young man, so I probably wasn't appreciating what was happening globally.

GAYLE SLOAN: I wasn't that young. I remember it too.

The Hon. GREG DONNELLY: But then it appeared to move—and, once again, this might be just my faulty memory—relatively quickly to place that ban. Forgive me, I don't know whether it's an absolute and complete ban on the use of CFCs, but it must be a very substantial ban. I'm just wondering whether there are lessons from that that we can draw on.

GAYLE SLOAN: Absolutely. I think that's a great example—again, with the BPA—because we're working on multiple levels, which is how policy normally works, with banning, designing differently and understanding why. You've got to move across all those—having that education of the public and choosing not to buy it because of the impact, but also implementing changes to regulation and legislation and also investing, I'm assuming, in research that says, "Here's a feasible alternative that doesn't have the same impact." And we did shift. We have great examples of how we've done that. Europe is more consistent—the EU—in how it does it. It's far more holistic in its policy with the waste directives, the reach, the sustainable design guidelines, circular economy policy adopted at scale, and the Green Deal. They have integrated everything from science, research, economics.

The Hon. GREG DONNELLY: Holistic, yes.

GAYLE SLOAN: We haven't got that yet in Australia. We've got some great framework documents with pretty pictures. But, as far as enforceable regulation to drive some of these changes and the transparency and the information, we're not quite there yet.

The Hon. GREG DONNELLY: Is that part of what might be described as the curse of the Federation? Federation is wonderful, but this issue between the States and the Commonwealth? A number of witnesses have commented about the challenge of movement here and not there, and vice versa, and what a State can do. Do we have to crab-like go and progress that way as opposed to—

GAYLE SLOAN: From my sector's point of view, and from many sectors, we are one common market. It would be far easier if we were doing it as a whole. However, we all know—and you're the politicians, not me—about competing priorities. Sometimes, for example, for container deposit systems, Federal said no and States went one by one and then we realised we align. We've done that with road rules and other things.

The Hon. GREG DONNELLY: That's what happens, yes.

GAYLE SLOAN: Maybe that's what we need to do, based on impact. When it comes to importation, which is one of the great challenges that we have—it was one of our submissions that talked about being a dumping ground for products that you couldn't get into other countries. We have real concerns about that as an industry because it's not just PFAS; it's e-waste and other products—batteries. We don't have battery directives, and yesterday we had yet another fire. We've got real challenges because we don't place the same obligations on generators when it comes to design, how they make products, the chemicals they include and how they manage at end of life that other jurisdictions have. So, as a sector, we're very much in the front line trying to provide a safe environment with almost one hand behind our back at most instances.

The CHAIR: Ms Sloan, what is the association's view about the proposed changes in terms of biosolids that I think you've referred to a couple of times—

GAYLE SLOAN: The NEMP.

The CHAIR: —in terms of biosolids, the treatment of PFAS in biosolids, which, of course, at the moment, isn't regulated. What does it mean for your sector? I assume, potentially, the management of more biosolids going to landfill? Is that a concern?

GAYLE SLOAN: We haven't seen the final NEMP, and it is was foreshadowed in that that, again, there would be, I think, a lower level of testing. So it will have an impact on that recovery, which will be, again, a cost and a management challenge for us. That did go to EM at the end of last year, but we haven't seen it as yet. But yes, it will affect our recovery rates and, again, potentially, it's got a level that can't be achieved and is inhibiting resource recovery.

The CHAIR: What is the practicality? This is where the State Government does have jurisdiction over licensing landfills and what have you. You do explain it in quite a lot of detail in the submission around the fact that PFAS has to be tested—this is in terms of generators of waste. But we have heard a number of witnesses say—in fact, one earlier this morning—that PFAS was chemicals potentially coming from a landfill site by a solid. This is near Blayney, and we've heard a number of other suggestions that that is the case. There's a testing of PFAS, but then containing it when we know that for water, for example, the treatment and the filtration of PFAS chemicals out of water, the State Government is only currently now grappling with that. Is it a situation that is almost impossible for landfill operators to deal with? The PFAS contamination in the products that they're receiving, is it almost impossible to prevent them going into the environment around those landfills?

GAYLE SLOAN: Again, I think it would depend on levels. I think, because it is highly mobile, it is challenging to do that. But we modern-lined sites with the liners they have. Clay and other things do all they can, I think, to do that. We are hearing about the challenge of destruction of it, and we—

The CHAIR: What about the landfills—I'll be a little bit more specific—that deal with and produce compost? The sites that are actually receiving biosolids, creating soils and compost for other applications. That's a particular concern, I would assume, and, potentially, they may be the ones that are more greatly impacted by the changes at the Federal level in terms of PFAS being regulated in biosolids. Are you hearing concerns about that?

GAYLE SLOAN: I think that comes back to our threshold. We do not want PFAS-containing material coming to us, and the reality is, because of the process flows and the material flows, we end up with PFAS potentially contaminating material. We can't see it until we test it. So non-biosolid organics—I'll start with that. We've done a lot of work, down the east coast in particular, to try and eliminate the presence of PFAS, but it's not possible to even test for zero PFAS. That's the reality, and I know EnRiskS will talk about that later. Laboratories can't even tell you if there is zero—it's below the level of reporting. We try to de-risk products as often as possible, but we can't see what we're receiving. Anything that's applied to land, generally across Australia, is tested before to make sure it's within the appropriate levels of the contaminants and inclusions. We do that as a sector at large, generally. We don't have the same testing obligations on those that are, I guess, making it or disposing of it to us. We're trying to do our best to manage what we get and containerise it and make sure it doesn't spread or leave our premises at a level that's unsafe.

The CHAIR: Is it a legislative requirement here in New South Wales that every truckload, for example, is tested for PFAS? If you've got a truckload of biosolids—as fertiliser—that's about to go somewhere, is that required to be tested for PFAS? I didn't think it was.

GAYLE SLOAN: It's not. The way it works in New South Wales—and, again, it might be better for the ladies on my left to talk about this in more detail—is that we have the resource recovery orders and exemptions frameworks. Within each of those, depending on the product or the agreement you've reached with New South

Wales, if you're applying to land, you have to test for the contaminants for the inclusions in each of those orders. I'm not sure that all of them have PFAS in them. In theory, what's supposed to happen is, like other products, under your licence you're, in theory, not supposed to receipt certain materials. PFAS may be one of those, for example. We had that happen in South Australia for quite a while. There was no landfill that was legally allowed to take PFAS, for example. But we were getting it all the time in trucks because we can't see, right? It's a complex process of the licence determining what you can accept. In theory, to take PFAS, you would need a certain licence, but it's that inadvertent receipting of a material that you can't see that makes it more complex. Then there are specific orders and exemptions determining the chemicals you've got to test for the purpose of what it is.

The CHAIR: Thank you. We might put some detailed questions to the department to get some of that. We are out of time. Thank you so much for your extensive submission and the evidence you've given today. We've found it really valuable. We will get in touch if we need to in terms of anything you agreed to take on notice or supplementary questions. The Committee will now break for morning tea.

(The witness withdrew.)

(Short adjournment)

Dr JACKIE WRIGHT, Director/Principal, Environmental Risk Sciences Pty Ltd (enRiskS), affirmed and examined

Ms THERESE MANNING, Principal, Environmental Risk Sciences Pty Ltd (enRiskS), affirmed and examined

The CHAIR: Welcome to our next session. Do both or either of you have a short opening statement?

JACKIE WRIGHT: Yes. Thank you very much to the Committee for having us to present and also answer questions. EnRiskS is a speciality consultancy. We undertake human health and environmental risk assessments and reviews of toxicology for lots of different chemicals, and PFAS is just one of those. PFAS are a group of chemicals, like all other chemicals that we deal with in contaminated land, in water and so forth. One of the things that we want to make really clear, and this is a really good reminder, is the world is made of chemicals. It's not possible to have this concept of chemical-free. There is no such thing as zero. You can't measure zero.

Australia has extensive guidance on how we assess the risks that are posed by different chemicals in the environment. For people, that's in soil, water, food, air—all those sorts of things. That guidance works really well for chemicals, but also for PFAS. We do have that guidance and we can apply that for PFAS. When we do develop guidelines, it's really important that we take the most robust science and approaches, and that we develop those well and can communicate those well. If we are looking at other international organisations about what they have done with their guidance, it's also important to understand what have they done that might be different, but what have they done to develop those guidelines as well. So it's important that we undertake those reviews.

When people are exposed to very high concentrations of PFAS, there is good evidence that these effects are likely to have occurred in people, as is the case for most chemicals. If you're exposed to high concentrations of other chemicals, there's the potential for adverse effects, but the community is rarely exposed to such high concentrations. When we're talking about the environment, we're talking about low levels in the environment. We don't have evidence that exposure to low levels in the environment has any effects. When we're talking about chemicals and how we assess them, it's the exposure that's also very important. It's actually a key part of how we do the assessment. And we also need to think about dose response. What dose causes what effects? The old adage "the dose makes the poison" has been around for centuries. We apply that to all chemicals, and it equally needs to be applied to PFAS. We just need to make sure that we undertake that.

With PFAS, one of the things that is a bit different with these chemicals is it seems to have been given various different labels, such as things like "forever chemicals". All chemicals are forever; the atoms don't go away. There are things like metals that are naturally in our environment that are always there as well. We deal with them all of the time. But when we put these types of phrases out in the community, it creates stress and anxiety and fear of these particular chemicals. Creating fear and stress and worry in communities about just being exposed to PFAS, without any context about whether that has the potential to cause any harm, creates a lot of stress, and we know that stress causes health problems. We need to make sure that how we're dealing with PFAS is commensurate with what the actual harm is. That's the end of my introduction.

The CHAIR: I'll start with the work that enRiskS does with, say, water utilities or for the Government when it comes to PFAS. What work has the company done?

JACKIE WRIGHT: I can answer that. We're engaged by a range of different groups. We have been engaged by government to assist in reviewing, for example, concentrations in organic products of PFAS and assessing potential risks to human health and the environment. We have been engaged by various different companies, including waste companies, to look at the concentrations that are present in different waste streams, but also what might move from those and move into the environment where people and the environment might be exposed. So we are engaged by a number of those different companies. We're also engaged by other consultants to do similar types of assessments where they don't have our level of expertise.

THERESE MANNING: We also did the human health and ecological risk assessment for MWOO for the NSW EPA. MWOO—mixed waste organic output—is the organic materials that come out of red bin waste. We did the detailed review that then meant they changed the regulation about the acceptability of using that material. They changed the rules and you could no longer use that material and apply it to land. For water utilities, we've calculated risk-based criteria for a range of uses, for both treated effluent and biosolids et cetera, what could be in their material and be subject to use for different purposes. Sometimes they want the most conservative number, so what's the worst case situation? For these sorts of chemicals, it turns out to be applying it in dairying situations. But what about if you're just putting it on a wheat crop, if you're just adding some organic material to the land so that the wheat crop can grow well? What numbers could be in it in that situation? We've done all of those calculations.

The CHAIR: I have seen your work quite extensively in some of the reports on biosolids and FOGO and what have you. What's the research, then, that you said led to a change in policy at a State level around the use of waste in—was it household?

THERESE MANNING: MWOO? The mixed waste organic outputs was a material that people wanted to re-use because we're trying to be better with our resources. The EPA issued one of those resource recovery orders and exemptions that Gayle Sloan was talking about a long time ago. They then instituted an extensive research program. Then, at the end, we put together the detailed risk assessment that explained whether the research showed that there was any problem. The main chemical groupings that were in the material that could cause problems were polybrominated diphenyl ethers, which are part of the brominated flame retardants group, and PFAS. We did detailed calculations based on the rules for using this material on agricultural land to work out whether you could get to concentrations in the food people eat that would be of concern. Given the levels that had been measured in these materials over the research program, particularly for brominated flame retardants, there was a potential for a problem, so after they received our work they changed the rules.

The CHAIR: I was just wondering if you could summarise as best you can the research that you did in terms of the risk assessments for the application of biosolids—restricted or unrestricted, but maybe say restricted—onto agricultural land and the different pathways for human consumption. You said dairy, and I'm aware that that's the highest risk. But if you could summarise as best you can, simply, for us, that would be great.

THERESE MANNING: Sure. As part of NEMP version 3.0, the government agencies did a set of calculations. A number of water utilities asked us to do calculations in support of understanding what the government agencies had done but also to look at the whole variety of uses to which biosolids are put. The government agencies looked at the most conservative scenario; we call them exposure scenarios. How does the chemical in this material get to the place where we care about it? They'd done the dairying calculation, so we did the calculation for the dairying but also for beef cattle, other livestock, but also what goes into eggs, what goes into fruit and veggies, and things like cereal crops.

But we followed the same approaches and the calculations are well understood. We do them for every chemical. Most of the time we don't need to do some of the ones about uptake into plants and animals, because those chemicals don't do that, but in PFAS's case we need to. But those calculations have been around—the first time the US EPA wrote about all of that was in 1989. We've been doing these calculations for a long time. To make sure we're not missing anything, we make an assumption about how much might move from the soil into plants, for example. We choose the worst-case number. There's a factor that says if you've got one in the soil, you'll have 0.07 in the plant.

We use that maximum value, the worst case. We're assuming everything will go at the maximum case into the plant, and then we calculate the maximum the cows might eat. We're assuming they're exposed all the time, every day. We assume the cows eat half a kilo of soil incidentally, when they're grazing, every day of the year. We assume the grass they eat is going to have the maximum amount of PFAS in it et cetera. We followed the same approach that the Government did but we did it for more types of uses, because some things don't take it up as much as other things, and then we provided all of that information to them. We did come up with a similar answer in regard to dairy. We were all pretty similar, but the other numbers come out higher than that.

The CHAIR: When you're saying the number in relation to dairy, could you just explain what that is?

THERESE MANNING: The criteria that can be present in the biosolids for it to be used for that purpose. We did what we call a back calculation: If this is the maximum people can have, what can be in the meat or the milk or the eggs or whatever and not cause harm—not cause exceedence of what the Commonwealth says is a tolerable number in people on a daily basis? We generate the limits that can be in that material.

The Hon. GREG DONNELLY: Thank you for your submission and evidence. I suppose this is a technical question and may not easily be explained rapidly, so take it on notice if you have to. You spoke about the methodology of the risk-based approach used with respect to PFAS having a robust, understood framework. Just for my own knowledge, is that framework that's used for PFAS used for other chemicals as well? In other words, is it a generic, if I could use that—

THERESE MANNING: Yes.

The Hon. GREG DONNELLY: And that's accepted globally as a framework to be used?

THERESE MANNING: Yes.

The Hon. GREG DONNELLY: Within that framework, I take your point—and it has been raised by other witnesses—that it's not possible to test for zero. How far down can it test for, in 2025? Is that something that can be easily explained, or do you need to take that on notice to explain it?

THERESE MANNING: No. The limits for biosolids, for example, are probably just around the maximum sensitivity that the labs can achieve, and some labs will do it better.

The Hon. GREG DONNELLY: With current technology.

THERESE MANNING: With current technology. You can't keep going lower and lower and lower and lower and lower, because then what happens in the laboratory and in the sample containers and all sorts of other things is they overwhelm the signal. We might be able to go a bit lower than where we are now; I would have to check with some laboratory people. But there is a limit to how low you can go, because the way the machine works is there's an electrical signal and you need to be able to pick out the electrical signal from the background. The background is—the world is full of low-level noise from electrical things. There are also materials that get used in laboratories that contain these chemicals, and managing them well enough to not see them in the samples due to the sample handling becomes an issue when you go too low. So there is a limit about how low you can go. But that's true, yes, there are lots of chemicals.

The Hon. GREG DONNELLY: It's a background amount.

JACKIE WRIGHT: Yes.

The Hon. GREG DONNELLY: So the measurement was one stage. In terms of working out the impact of a synthetic chemical like the PFAS family of chemicals, that is a separate exercise, is it? That's essentially work done by other scientists, using the scientific method, to conduct experiments over time to reach conclusions. I'm talking in general terms here because part of this challenging area are claims that are made and restated and restated and restated—some of which may be true, some may not be, and some might be partially true. But ensuring that the politicians and policymakers, people working in the agencies and the public at large have an understanding that grasping the results of this research work is done to show the effect—that's done separately, isn't it?

JACKIE WRIGHT: Yes. The effect side of things is a separate exercise. Whenever we look at risk, there's the exposure side and then there's the effect side. That's effects or toxicity. The information that's considered when looking at those effects comes from lots of different types of studies. Some of those studies are epidemiological studies, so they're the big population studies. They all have their limitations, and they aren't really the gold standard for establishing effects or doing tox assessments because they're so easily confounded and have bias. So they're not the gold standard, but we do have a lot of those for PFAS. What we do also look to and we more heavily rely on are studies in animals to look at what types of effects we're finding in animals for different types of exposure, to establish that dose response. We then need to understand are those effects that we're seeing relevant to us, because the animals that we use in the studies aren't people. So we need to make sure that we understand are they relevant to us, at what levels do we see effects and are those effects actually relevant to our health?

Sometimes you might see a small change in a biomarker, for example. But does that mean we're actually going to end up with an adverse outcome in people? We do have Australian guidance on how we look at our studies that are generated—usually overseas or whatever—so how we combine all that information, how we collate it together and understand how that might occur. One of the other things that's really important to understand when doing this is what is the mechanism of action. How does an exposure to PFAS—what changes happen in the body to result in adverse effects? That mechanism of action is actually one of the key things when doing any chemical to be able to understand are we seeing something that makes sense in those studies, based on what we expect to see?

With PFAS, we still don't actually really understand how it can cause effects in people. We don't have a good understanding of that mechanism of action, which makes it complicated to review the studies to go, "Does that make sense? Does that not make sense?" We have to consider all of that together. One of the things I just would touch on—and it's something that maybe your question is prompting—is this concept of cancer. Cancer is an effect that is looked at for all chemicals. For PFOS, we also look at, "Is there the potential for cancer to be one of those adverse effects?" and there is some information that came from IARC. Now, the IARC review is not out in detail, so we can't tell you all the specifics of how they got there.

Certainly we deal with cancer-causing chemicals all of the time. One of the things that's really important to understand is how it might cause cancer. There is consensus amongst the scientists that it doesn't cause cancer by a genotoxic mechanism. I won't go into detail about that, but what it means is when we do an assessment or

when we look at the potential for cancer, it's not just a small bit of exposure that can result in your increased cancer risk. That's not what this means. It means that there actually has to be enough exposure for some other damage to occur to the cells or some of the processes within the cells before cancer can be initiated. So there's a threshold for cancer to occur.

Just having exposure to PFAS does not mean you will contract cancer. It's about the threshold above which there's the potential for cancer. Cancer is one of the health end points that we look at—of many—but it's important to understand how that mechanism or how that health effect might occur. Just calling PFAS "cancer causing" is, like we say, very alarmist. It's not helpful because at low levels of exposure it would be below a threshold where it has the potential to cause cancer. We need to be clear about that, and we need to be able to understand that and communicate that well.

THERESE MANNING: The other thing to say is, one of the tasks we need to do is check the quality of the studies and have they done those studies well. Not all studies are equal when we look into these things.

The Hon. AILEEN MacDONALD: In your opening statement and in your submission you referred to chemicals being everywhere. From a public perspective, what misconceptions about PFAS risks do you often encounter?

JACKIE WRIGHT: Many. People forget that everything is made of chemicals and we are in contact with chemicals all of the time. We're made of chemicals. Chemicals are everywhere. Some of the stuff that Gayle was talking about, about it being in all those consumer products, people forget about all these things. Yet they worry about a report that says that Defence space or that fireground over there had some PFAS in it and there might have been some of that came off and went into a local creek or a waterway. They're very stressed about that. But again, they don't understand that it's actually in so many other things that they come into contact with every day. We don't talk about chemicals and we don't talk about those things very well in our community.

The Hon. AILEEN MacDONALD: How can New South Wales better communicate the health risks and possibly the remediation efforts to not only affected communities but also people in general, so that we don't just throw our arms up but we want to be more informed?

THERESE MANNING: We try very hard in our reports to make them accessible. We try and put introductory information in—like the world is made of chemicals, and we are et cetera. Often the responses to media situations or community concern situations, where somebody from, say, the EPA or Health usually only have a few seconds to say something, it is very difficult in that circumstance for them to properly situate the information. It might not take that much longer, but it's longer that they don't get the opportunity to do. So it is difficult. It's one of those things that drives us a bit nuts, because these were things that were explained in school—there are atoms and molecules, and that's what the world is made of. There are lots of other things we get taught in school too, but there were some fundamentals about the world. It would be nice if just those little things get—because we don't want to scare people. The fact that we do measurements and find things seems to be scaring people. Often there is no need to be scared. It would be good if there were some ongoing education materials out there.

The Hon. AILEEN MacDONALD: Just on not wanting to scare people, should the New South Wales Government publish real-time PFAS contamination data for public access? Or is that going to lead to—

THERESE MANNING: First of all, you can't do real-time PFAS measurements. The samples have to go to the lab, and the lab takes however long the lab takes. It's always difficult to put numbers out there without context. There are a lot of people who think any value more than zero is a problem. That's not the case. So it is tricky to have that sort of reporting without putting stuff in context. There was a regulation passed a long time ago about reporting things for licensees and putting things online on a monthly basis and stuff, but there was always a requirement that they give some context to the numbers.

The Hon. AILEEN MacDONALD: In your opinion, is Australia's approach to PFAS regulation too industry-friendly?

THERESE MANNING: It's not that much different from our approach for all chemicals. It's not particularly industry-friendly or not. It tries to be with the science.

JACKIE WRIGHT: I would agree. It tries to use the science to establish guidelines to allow industry to continue. I suppose one of the tricks with PFAS is that it seems to be getting caught up with the community wanting to achieve zero but industry still wanting to be able to do their job. There's a lack of understanding between the two that PFAS is present and is it something to be worried about? We just need to make sure that we

follow the guidelines that we have—established, robust guidelines—and provide good context for those so that everybody can understand what information they're being given.

The Hon. AILEEN MacDONALD: Just on that, if New South Wales doesn't strengthen its PFAS regulations, what do you believe the long-term risks for public health and the environment are? You might take that on notice.

THERESE MANNING: The quick answer to that is that PFAS is being phased out in many things, so what we have now is probably what we will have into the future.

The CHAIR: When you're saying that PFAS is phased out in many things, what exactly are you referring to? Are you talking about international efforts?

THERESE MANNING: Both. With firefighting foams, the largest amounts of PFAS came from training. They don't train with PFAS-containing foams anymore, nor do the airports or Defence, and haven't for a long time—the fire brigade. People like McDonald's and many of the fast food places, the international ones, have committed to phase out materials in their packaging that contain PFAS. These chemicals are not going to be increasing. There are newer, different ones that are in things like batteries and stuff, but they're quite different to the ones we're talking about.

The CHAIR: When you're saying McDonald's at the international level, there are other jurisdictions in other countries that are actually legislating to phase out or stop packaging containing PFAS—pizza boxes, microwave popcorn, chips and a lot of things. New York City could be one. That's not happening in Australia, though, is it?

THERESE MANNING: No, not that I'm aware.

The CHAIR: I just wanted to ask one question about your submission in the time remaining. You state that guidelines are not available for PFHxS for the protection of terrestrial and aquatic environments. That's surprising, because that is one of the very few PFAS chemicals that the Federal Government and the State Government are regulating. Firstly, who sets those guidelines? Is that a State Government thing? It's the Federal Government, is it?

THERESE MANNING: Yes.

The CHAIR: This is for just PFHxS in terrestrial and aquatic environments. Is it unusual that that guideline is missing even though we're trying to regulate it in drinking water and elsewhere?

JACKIE WRIGHT: It's not unusual. The Commonwealth process for developing guidelines has a very robust process that it goes through. It does take time to do that. It also relies on having good, robust studies on the effects of those specific chemicals in the various different species that they need to look at. If that data is not available, it does limit what they can do. I suppose it comes down to whether they have been asked to add that to their list of chemicals that they need to establish a guideline for and if they've done that detailed review. Certainly I can say when we do risk assessments, and if we're required to look at PFHxS in the environment, we would go back and look at what studies are available to look at can we assess the effects? That's from a site-specific, risk-assessment perspective. That's part of our guidance that we follow. We have guidance that says if we don't have a guideline value we still would do an assessment of that chemical in the environment to see if there's potential for adverse effects to those species. It's part of our normal process that we would normally follow even if we don't have a guideline, so it would be assessed.

THERESE MANNING: We do the same calculations that the Commonwealth do when they set an official number, but we do it on a site-specific basis. We use their methods to do the calculations once we've got the data out of the US and European databases.

The CHAIR: Thank you both very much for attending. I'm sure we could keep asking you questions, but unfortunately time is up. The Committee will be in touch if you've agreed to take anything on notice or if there are any supplementary questions from members. We really appreciate you giving your time today.

JACKIE WRIGHT: Not a problem. There's just one thing we'd like to table to the Committee. This is just our detailed response to the NHMRC on their proposed draft drinking water guidelines so you can see the technical details on that effects side of things, which is what it's talking about.

The CHAIR: That would be very useful. That's great, thank you.

(The witnesses withdrew.)

Mr DAVID REYNOLDS, Chief Executive, Local Government NSW, sworn and examined

Councillor DALLAS TOUT, Board Director, Local Government NSW, sworn and examined

Councillor TIFFANY GALVIN, Country Mayors Association of NSW, PFAS contaminated water member representative, and Mayor Gwydir Shire Council, before the Committee via videoconference, affirmed and examined

Mr ALEX EDDY, Country Mayors Association of NSW, PFAS contaminated water member representative, before the Committee via videoconference, affirmed and examined

Mr JOSH BLACK, Executive Board Member, Country Mayors Association of NSW and, Mayor, Dubbo Regional Council, sworn and examined

The CHAIR: We'll go to opening statements.

DALLAS TOUT: Thank you, Chair and Committee members, for the opportunity to appear before this inquiry today. My name is Councillor Dallas Tout. I am Mayor of the City of Wagga Wagga, but I appear today in my capacity as a board director of Local Government NSW, the peak body for local government in our State. Our president, Councillor Phyllis Miller, OAM, extends her apologies as she is unable to join us today for the hearing. Representing all council-owned local water utilities, LWUs, in New South Wales, Local Government NSW appreciates the opportunity to address the Committee on some of the challenges posed by PFAS contamination in New South Wales. We acknowledge the community's growing concerns about PFAS contamination in drinking water supplies.

Widespread media coverage and the increasing awareness of the potential health and environmental impacts of PFAS has heightened public scrutiny on the safety of drinking water. Local water utilities play a critical role in ensuring the delivery of safe and reliable drinking water, in compliance with the *Australian Drinking Water Guidelines*. With guidance and funding support from NSW Health, all local water utilities have undertaken initial PFAS screenings on their water supply systems as a precautionary measure to safeguard public health. It is important to recognise that local water utilities are not responsible for PFAS contamination. As research and studies have shown, there are different sources of potential PFAS contamination, including firefighting foams and everyday consumer products, such as food packaging and cosmetics.

Addressing PFAS contamination requires broader government action and regulation to restrict its use in consumer products. Without regulations to limit the sale and import of products containing PFAS, controlling contamination in water will remain challenging. It is important to make the point that local water utilities are committed to safeguarding drinking water quality and managing PFAS risks, but they cannot do this alone. The draft *Australian Drinking Water Guidelines* proposed significantly lower PFAS limits. LG New South Wales welcomes changes supported by evidence-based health recommendations. However, any tightening of standards will place greater pressure on the local water utilities to manage PFAS contamination, despite having limited control over its sources. As a result, all local water utilities will face additional costs associated with increased testing, increased monitoring and remediation of PFAS. This financial burden is a significant challenge, especially for smaller water utilities in rural and regional New South Wales.

In our submission, we make clear that the New South Wales Government needs to provide financial assistance to LWUs to: one, meet stricter PFAS standards; two, upgrade drinking water treatment systems to address PFAS contamination; and three, undertake PFAS clean-up measures. It is critical that the New South Wales Government continues funding and working in partnership with local water utilities to address the issue of PFAS contamination.

TIFFANY GALVIN: Madam Chair and Committee members, thank you for the opportunity to present Gwydir Shire Council's recent experience regarding PFAS contamination discovered in the Warialda township reticulated water supply. Gwydir Shire Council participated in NSW Health testing for PFAS in local water supplies. Due to some irregularities in the initial samples, there was follow-up testing. On 9 Dec 2024, Gwydir Shire Council was advised that the Warialda water supply recorded positive results for PFAS in excess of the current PFAS guidelines. The council, in conjunction with the relevant State authorities, promptly took the action to sample each of the five operating bores in Warialda to identify the source of the PFAS contamination. The council also sourced bottled water and arranged for its distribution to the Warialda residents. We also put out town flyers the next day and media releases.

Gwydir Shire Council is extremely grateful for the prompt support that it received from the area health service and other health-related agencies from the outset of this contamination having been identified. This level

of cooperation and support has continued. Two of the Warialda town bores are contaminated and are now offline. This places great strain on the remaining bores and will require the sinking of additional bores. The initial source of the contamination remains unknown, and this is a concern due to the many private bores in operation through the Warialda town boundary. The contamination appears to be isolated in the northern part of Warialda, which was the location of the two compromised contaminated bores.

The CHAIR: Thank you very much. We have not been able to get Councillor Black back online successfully, so we will wait to see what happens there. I will go straight to questions from the Opposition.

The Hon. SCOTT BARRETT: Councillor Galvin, you're down to three of five bores?

TIFFANY GALVIN: Two of five bores.

The Hon. SCOTT BARRETT: What would have happened if this had happened in 2019?

TIFFANY GALVIN: I'll let Alex speak.

ALEX EDDY: If this had occurred in 2019, we would have been looking at immediate level 5 water restrictions. For clarification on the bores that are down, two of our five bores were tested as contaminated for PFAS. One of the five was already offline due to very low recharge.

The Hon. SCOTT BARRETT: Can you tell me more about the stress of not knowing the source of this contamination and where that's up to investigation-wise?

ALEX EDDY: Not knowing the source is of considerable concern for a few reasons. One is the number of private wells and bores that are in the township of Warialda and the extent of contamination across those bores and throughout the aquifer is unknown. In a sampling that council has done on primarily council-operated bores, It has been identified that it seems to be located largely on the northern side of Warialda, but there does seem to be, or there remains, some concern about private use of water on the northern side of Warialda and indeed the southern side on the large number that have not been tested. Council doesn't have the resources to be privately testing private bores within the township.

The CHAIR: I'll just interrupt. Councillor Black has just joined. We can see him and hopefully he can hear us. Do you have a short opening statement for the Committee?

JOSH BLACK: Very short. Thank you for your indulgence. The evidence that I'm going to give covers the majority of the 87 Country Mayors Association member councils and the five associate members, but particularly focuses on the Dubbo Regional Council area and that pertains to lots of other areas west of the Great Dividing Range. The presence of PFAS in the aquifer around Dubbo gravely impacts council's ability to supply enough water to the residents of Dubbo and the surrounding villages, so PFAS is now a very real threat to the future water security and drought resilience of Dubbo and the surrounding villages.

I will mostly focus from the terms of reference on (c), (h) and (n) to do with historical firefighting practices and New South Wales Government agencies providing adequate infrastructure and resources, and also the impact of taking contaminated water sources offline on water security. Dubbo is directly impacted with some of the water supply bores being contaminated with PFAS, one above the current threshold and at least one would be impacted under the proposed new thresholds. There is also a historical firefighting area, a training area, that is impacted by PFAS where Fire and Rescue NSW is sort of saying that they're not to blame for that when there's no other source of contamination. They're the sort of areas that I'll talk about later, but I'll allow the hearing to go on and happy to answer any questions as we go.

The CHAIR: Thank you. Very interesting, Councillor Black. We'll go back to Mr Barrett, but I'll just check with Mr Reynolds and Councillor Tout. Had you finished responding to the question about the bores?

DAVID REYNOLDS: Yes, Madam Chair, I think it was Gwydir council who had finished.

The Hon. SCOTT BARRETT: We were just talking about Gwydir council and talking about the fact that the source at this stage is unknown. There's a concern, obviously, because there's a number of private bores. I'm guessing there's also a concern of is this something that's spreading and is at risk of getting into the other bores?

TIFFANY GALVIN: Another concern is that it is quite dry up here at the moment. There are scattered storms, lightning strikes and fires. That could be a problem on its own—needing water for those sorts of things. We're about to start children's sport on ovals, which we can't. We haven't got the water to water the ovals where these kids are going to be playing sport. It's not just a small piece.

The Hon. SCOTT BARRETT: When we look back at 2019 and 2020, I remember—it sounds like a trite issue that we can't water the grounds, but it's quite a big deal in those small communities not to have green spaces.

TIFFANY GALVIN: Yes, exactly.

ALEX EDDY: If I can add to and expand on your previous question regarding what would have happened if this had have occurred in 2019, in 2019 we were already investigating a location for a new bore. We were experiencing drops in the recharge of the five bores that we were operating at the time and, in the interests of improving the drought resilience of Warialda, we considered that an additional bore was necessary in 2019. Now that we are down to two bores, it's absolutely essential that we expand on the network we have. The largest supplier to the town of the two bores we have operating is pumping for 23½ hours on average every day. It has become the most critical piece of infrastructure the town has. A failure in that bore—be it in a pump, be it in electrical supply or be it in the casing—is an emergency situation.

The Hon. SCOTT BARRETT: I'll come to you, Mr Tout. I understand the cost of the testing that you did do in Gwydir was at your own expense. You talked about how great an impost this would be. Where would the testing and remediation fit in relation to the overall budget of, particularly, these remote councils?

DALLAS TOUT: From the water utilities themselves or the councils who are part of the water utility, the testing at this stage—I'm on the Riverina Water County Council board. That comes out of budgets for our own local water utility. I'm not aware of all the local water utilities' situations, but I would imagine it would be coming out of their existing budgets. I'm not aware of any other funding coming in to help with that.

The Hon. SCOTT BARRETT: I'm guessing you don't have that sort of money sitting in reserve in these water utilities?

DALLAS TOUT: No. That comes out of any unfunded or unallocated reserves that we have. I'm speaking on Riverina Water County Council's behalf right now, but I would imagine for most local water utilities it would be a similar situation. They would have been unfunded and unknown, particularly the testing and all of the other investigations. On your question about funds and testing, Riverina Water County Council have already allocated $20,000 in the last month or two just to investigate a new reading in Tarcutta. I can expand on that further if I get a question on it. Anything that anyone is spending is unknown and unfunded. They are having to pull it out of reserves or out of their existing budget.

The Hon. SCOTT BARRETT: Is it a case of, "If we take this in, it would be tough", or simply, "We just cannot take on this added expense"?

DALLAS TOUT: I'll do one opening sentence, but I'm getting the look from Mr Reynolds as well. As I said in my opening statement, it's not them or us. We have to be in this together, whether it's the State, local government, local water utilities—of which local governments are part—and also Federal in some cases, particularly for Wagga. We're all in it together. Part of the recommendations that LGNSW has put up is assistance and working together in supporting funding and money to assist with the readings, because these testings are going to go for a long, long time. The plume that's around Wagga may not hit us for 20 to 50 years. This isn't a short-term thing. What Gwydir is talking about, it's around the whole State, and we don't know what we don't know. We're not sure where money will be required, so we need assistance from State government particularly in this space. Mr. Reynolds?

DAVID REYNOLDS: Thanks, Madam Chair, for allowing me to add to that. Some initial support from NSW Health last year in terms of supporting council with some of the testing costs, but clearly whilst standards are changing and precautionary approaches are probably correctly being taken in terms of what a safe level might be, that leaves open the question of how much remediation or how much treatment local water utilities would actually need to put into play practically to continue to provide safe drinking water. As the standards continue to move, councils and local water utilities do have asset management plans and funding strategies. But there's probably a window where ageing infrastructure could be helped in terms of capital renewal by funding from other sources, so that you can fix a remediation problem at the same time as doing a bit of futureproofing on ageing infrastructure as well.

The local water utilities are well managed; they're set up to run well. There are other processes happening within and around government at the moment. You've had IPART look at pricing structures. You've got the Government thinking about how local water utilities should be collecting and setting charges, but that's on the basis of continuing to do the same thing. If the standard shifts and shifts quickly, capital is sometimes slower to follow, and so that becomes a challenge for a council or a local water utility. They're not trying to make money; they're just trying to serve their community in terms of getting them an essential service, which is water. We've

heard from our friends at Gwydir about direct impacts there and from Councillor Tout in his experience. These are not luxury items. This is life-giving stuff that we're trying to just maintain in communities.

The Hon. CAMERON MURPHY: Councillor Black, can you just take us through the situation on the ground in Dubbo in a bit of detail? For example, what upgrades are going to be required to meet the new standards? What's the estimation from local government about the cost of that? What really is the capacity of the council and the local water utility to meet that? What sort of assistance are you likely to need from the State Government?

JOSH BLACK: Just very quickly, the Dubbo water treatment plant—we supply the 44,000 residents of Dubbo and there's five surrounding villages. The capacity there is roughly 80 megalitres a day. We source water. We've got 8,700 megalitres licensed from the Macquarie River for surface water. From the upper Macquarie alluvial aquifer—groundwater—there's a 4,000-megalitre license there. But we need 7,500 megalitres a year to sustain the current population, and that's at level five water restrictions and not with no restrictions. We don't have enough groundwater to be sourced there. I don't know that people realise how close in 2019 the Macquarie River came to a no-flow event where, frankly, water trains and trucks wouldn't have been enough to supply the population of Dubbo and the industry—the zoo, fletchers, abattoirs and all those sorts of things. It would have been a catastrophic event.

Council were lucky enough to get a $30 million grant from the State Government, and we've drilled eight new bores, so we've gone from seven up to 15 bores, but we do need more because the current number is not enough to provide full supply with PFAS contamination of some of our bores. We've already turned one really high productive bore off, and with the new proposed thresholds, there's a possibility that another bore or two may have to be turned off as well. In a drought and with changing climate, like 2019, that really does become a catastrophic event for the town and surrounding villages.

We really need State government assistance and probably Federal government assistance as well in providing some of those units with the reverse osmosis that are able to filter out the PFAS from the bore water. With the bore that is impacted by the Ollie Robins Oval, the Fire and Rescue firefighting foam, we really do need the State Government to step in and pay for the remediation there. That's very interesting, that one, because Ollie Robins Oval is actually named after a firefighting captain. They used to do a lot of the firefighting games and training at that oval right beside the Macquarie River. There's a large plume of PFAS there.

A couple of months ago I wrote to Fire and Rescue and got a letter back where Fire and Rescue sort of said that they know about this, they've investigated it, but they're sort of not really taking responsibility for the PFAS contamination. It really is up to Fire and Rescue to find another source of that contamination, so that's something that we could highlight there. But the PFAS contamination of the bores in Dubbo really does place us in a future drought like 2019: in a catastrophic position. The cost for council to develop more bores along the southern bore field, back along the Macquarie River, towards the back of Geurie and Wellington way, would be into the many, many tens of millions of dollars to secure those licences without State Government assistance.

That would be a huge impost, but it's something that is going to have to be done without being able to treat the bores that we currently have that are PFAS affected. We're looking at a major, major, major investment needed. And this is not just Dubbo; this is replicated throughout, especially western New South Wales. The investment into water infrastructure that's required to futureproof the future drought events is into the many hundreds of millions of dollars. Councils don't have that money, quite frankly. It's going to have to come from the State and Feds. The PFAS issue is something that we really should deal with now in order to not wait until it's in the middle of a drought.

The Hon. CAMERON MURPHY: There's no real capacity for local water utilities to come up with the money to pay for this, is there?

JOSH BLACK: No, not at all, really. Everyone you talk to, all the councils around, lots and lots of them are looking at special rate variations, and that's just to maintain the current water supply, the current sewer and all of the current activities of council. Putting an extra 10, 20, 30, $40 million onto many councils is an impost that they wouldn't be able to cover. We're really looking for investment from State and Federal governments into securing the water security needs.

The Hon. GREG DONNELLY: I'll address my questions to all the witnesses, and you can pick and choose who answers as you wish. I thank you for the submissions that have come through and the evidence provided this morning. With respect to the submission from Local Government NSW, and specifically the recommendations on page 9, I have a question about a couple of points. With the first recommendation, "Support for PFAS screening: That NSW Health continue to support all LWUs in screening for PFAS," could you please

elucidate on the words "continue to support", to provide information to the community about what the level of support is? Is it an absolute cost-recovery or cost-covering support, or is it a mixed model?

DAVID REYNOLDS: My understanding at the moment is that NSW Health have been funding the testing. I'm not sure that that extends to remediation and follow-up activities. Simply at the moment in relation to the screening they have been working with councils to cover the front end of that. But obviously the issue is, as we've heard, this is a very long-term problem. Councils really need some certainty about how that support will be continued so that they can engage properly with setting up good programs of long-term testing and then work on actions that need to follow from whatever levels are found as part of that testing. That support needs to continue both in terms of officer-to-officer engagement so that there's shared professional expertise—because I feel this is an area where understanding and learning is growing, and that needs to continue—but also very deliberately in terms of the financial coverage that supports the testing.

The Hon. GREG DONNELLY: I'm particularly keen to understand the scope of the testing that's being done. Is it done when there is, dare I say, an emergency situation that arises and there's some publicity about it, or is it more systematic and done on a rolling basis?

DALLAS TOUT: I can speak for Riverina Water as an instance. Others—Josh or someone—may correct me if Dubbo or Gwydir are different. That's done I think on a bi-monthly basis from now on in. We just test all of our bores every couple of months now. It won't stop, because we have that many bores. We have to know what the readings are continually so that we can be aware of what the situation is. It also goes into the second recommendation, which you'll probably hit on in a minute—but being aware of what the situation is, because things change rapidly. We've had a bore change in the last week in Tarcutta. Because of the regular testing that we're doing, it's changed.

TIFFANY GALVIN: We do ours monthly.

The Hon. GREG DONNELLY: When you say you do yours on that basis, NSW Health undertakes it. Is that what you're saying, or the council itself?

TIFFANY GALVIN: The council itself.

ALEX EDDY: The council itself, yes. Facilitated by NSW Health, but council does the sampling and the coordination of the testing.

The Hon. GREG DONNELLY: Sorry, just to be clear, does the cost of that fall to the council, or the tab's picked up by NSW Health? That's what I'm trying to understand.

ALEX EDDY: The cost to date has been picked up by NSW Health.

The Hon. GREG DONNELLY: Right, okay.

The CHAIR: We'll just go to Dubbo then. Councillor Black?

JOSH BLACK: In Dubbo, I'd have to take that on notice, but I would just note that, prior to November 2019, there was no analysis of PFAS in the groundwater carried out by council. In February 2020, as part of the due diligence process for the expansion of the Dubbo water supply, town water supply bore network, there was sampling of existing bores done then for the first time. All of the tests showed PFAS in several of our bores. One of the bores, which was a really highly productive bore, had levels that were beyond the current *Australian Drinking Water Guidelines* values, and that was immediately disconnected from the network. So we know that there's a couple of bores that, with the new guidelines, would probably be just above those or very close to them. I'll have to take that on notice. I'll find out and inform the Committee.

DALLAS TOUT: If I can just throw one more sentence in. The comment I made earlier about Tarcutta is exactly what Mayor Black was just saying. There's only two bores that service Tarcutta. One was under the existing but above the proposed, and the second one was okay, in the last couple of weeks. The other bore now is above the proposed but below the existing. So if the new proposed levels come in, at the last readings, both of those bores would be out—if the proposed levels come in. As Mr. Reynolds was saying before, the moving around of the thresholds will change the whole landscape in this space. As the levels drop, then more bores will be reading higher or triggering action. So, there are two bores in one town. If those new thresholds came in, they'd be both out.

The Hon. GREG DONNELLY: You are right. The public education issue is an important one. I'll put that one on notice, if you don't mind. But with point 3 about the ongoing investigations, is it a top-down exercise of the investigation programs that take place within the council areas, or is there an opportunity for the councils themselves to—from the ground up, so to speak—raise potential areas that they may have concerns about with

the EPA, and then through some internal process, have that followed through with testing? I'm just interested in what the process is in terms of, is it from them down, or yourselves up, or a bit of both?

DALLAS TOUT: It's a bit of both, I think, is the honest answer. With this latest Tarcutta thing, our county council has put $20,000 of our own money in straight away to try and investigate the cause of those two readings in the bores, in advance of thresholds possibly coming down. That's not a position a lot of water utilities want to be in, or can be in, financially. We can't do that in an ongoing way, but we're also there for the community, so we've committed to do that. But we're also in constant discussions with the EPA and Health anyway. So again, as I said at the beginning in my opening statement, it's more about partnerships and working together, and escalating up if you need to. So it's a bit of both, in answer to your question.

The Hon. GREG DONNELLY: Does any other witness want to comment about the matter of the satisfactory relationship with the EPA, or not, as the case may be, about dealing with investigations in your local government area?

ALEX EDDY: The financial burden of ongoing testing is of serious concern to council. Since the discovery of PFAS in Warialda in December, we've expended somewhere in the region of a quarter of a million dollars of unbudgeted money from an annual budget of $2.8 million for our entire water services across three towns. The talk of plumes moving—and what we've just heard about Tarcutta—is of concern to council. If there's a possibility that we have a plume in the aquifer that is moving, ongoing monitoring is obviously a necessary measure to ensure that our bores that we're currently operating are completely PFAS-free or, if there is PFAS, it's below the detectable threshold. If we are to have some surety regarding the low levels of PFAS remaining in those bores in the future, the exercise, from council's perspective, looks like regular monitoring of not just our own bores but some of the private bores within Warialda. The financial burden associated with that is something that council could not take on.

The CHAIR: What support is being provided? I'll go to Local Government NSW for this one at this point. What support is being provided for the remediation of PFAS—the treatment, successful filtration, disposal of the chemicals? Is there any support that is being provided across the State in terms of economies of scale? If all of the water utilities, or many, are going to have to deal with this, what's happening at the statewide level in terms of supporting the remediation of PFAS contaminated water?

DAVID REYNOLDS: I'm happy to come back to the Committee with some more information on the remediation support. I think that primarily the support at the moment is at the front end and the screening and the testing process. It seems to be about gathering that information and then working with water utilities from there. In my earlier comments around opportunities to then look at what remediation and what expenditure might be needed to then help the water utilities recover, I think that's probably the next phase that we're moving into once the standards settle and we know what the goalposts are for where we need to remediate to. I think that's probably the start. But I'm happy to take that on notice and come back with some more detail around the support there.

DALLAS TOUT: Can I just comment on lived experience? I know I keep going back to Wagga and I'm sorry, but we cover all bases with PFAS there. With the Forest Hill air force base, there's a working group that includes Health, EPA, Defence, the climate change department, Wagga council and the water council. That works well. At the beginning, we all had to find our feet and who was responsible for who and for what, but that works through. But there's not one answer to PFAS. I'm not a scientist, but there are different PFAS. What's happening from Forest Hill is basically firefighting-based but Tarcutta we don't know what the cause is. It's hard to talk about support for remediation. It needs to be there in the future, but we need to identify the causes first across the State of what's causing each one as to know what remediation to do. But the answer at the end of the day is—I keep going back to it—we need support for the county councils and local government can't afford to do it on their own. We need support from State and/or Fed, if Fed also are in the mix, like they are with Forest Hill.

The CHAIR: I'll go to Gwydir and Dubbo for this response. Building on my question that if you're in the business now of having to shut bores because of PFAS contamination, unless our work is being done quickly, particularly if we're talking about aquifers being polluted, cleaning up that PFAS out of that water at the source when it comes out is surely something that needs to be supported at a State level. I can imagine that for most councils, financially, the option would be keeping the bore shut as opposed to treating it because of the expense with that. That's one of the things I was asking in terms of economies of scale, if there are multiple councils having to deal with this. This is something that needs to be looked at very soon before the next drought hits. I will go to Gwydir.

ALEX EDDY: We've investigated filtration for PFAS based on the test results that we've had to date. The capital investment is somewhere in the region of $1 million. Warialda's supply is only in the region of a megalitre a day. It fluctuates throughout the year, obviously. The ongoing costs regarding the filtration—I don't have an

answer to that question. I'd have to take that on notice. However, the situation simply is that, yes, we have two bores that have water that could be of very good use in drought that, without assistance to provide filtration or treatment of, are effectively useless.

JOSH BLACK: As I said earlier, one of the principal concerns that, as a council, we have at the moment in Dubbo is Fire and Rescue NSW trying to spread the responsibility for PFAS contamination that council's investigations show could only be due to the use of the firefighting foam extensively by Fire and Rescue over many decades at that site. That's something that we would really like to see Fire and Rescue NSW take responsibility for—remediating that area and stopping further ingress of that PFAS into the aquifer, which then gets dragged as a plume into our very highly productive bores along the river in that region. That's something that I'll be following up further with the Minister, now that we've got a response from Fire and Rescue.

Also, I think there is a real opportunity for the State Government to provide the plants like they've provided up at the Blue Mountains. I noticed there, where they had the firefighting foam when a tanker was on fire—and that PFAS has now got into the water supply. I've seen a photo of the little drop-in plant there, and that's something that I'll call on the State Government to provide to Dubbo as well, for our bores or bore that's currently offline and possibly another one. We really can't afford that ourselves, and we really need some State Government help. And I've explained the critical situation in another 2019 event.

The Hon. AILEEN MacDONALD: Both to LGNSW and the Country Mayors Association, what funding model would you propose to ensure long-term PFAS management for local councils?

DALLAS TOUT: I hope you're not after a percentage share off me! Again, I will keep repeating what I'm saying: It's a partnership, but we do need State government and Federal government because the capacity of local government—we've been through financial sustainability reviews and, as has already been mentioned about SRVs, local government can contribute part, but I think the load needs to be carried by the State government, essentially, and Federal government, as I've said before, if they're involved in a particular plume or outbreak or if it's to do with further things down the road as far as getting it out of consumer products et cetera. So wherever that responsibility may lay—I think my honest answer to that is that the majority would come from State government and the portion of Federal government and local government where they can. Local government aren't trying to get out of this responsibility. They're our communities and we're there for them, but we just can't afford to do this, as some of the figures you've heard already—they're in the millions and millions—for the infrastructure that may either have to be upgraded or cleaned up or replaced entirely.

The Hon. SCOTT BARRETT: Gwydir, what do you need to return to a comfortable level of water security for Warialda, and how urgently does that need to happen?

ALEX EDDY: Two options we can pursue—one is filtration or treatment and, as previously said, that would be a capital investment of $1 million approximately plus ongoing operational costs. The second alternative, and it's the alternative that Gwydir is proposing, is the seeking of an additional bore upstream in the aquifer in an area that, on the advice we have received, is unlikely to be subject to the movement of a PFAS plume or any other contamination that is in the aquifer. In order to get that across the line, the investment is somewhat less—in the region of half a million dollars. On the question of how urgently, with the water restrictions we have in place at present, the town is serviceable. The fear that we have is that if the one bore that is supplying the vast majority of the town's water goes out of action, we are down to about 10 per cent of what the town is consuming at present available in supply of uncontaminated water. The potential for it to be extremely urgent is very high.

TIFFANY GALVIN: The other thing is, if we don't get rain and it becomes drier, that also affects it. If there are fires around, that also affects it. We've had lots of dry storms lately as well.

The Hon. SCOTT BARRETT: We have heard evidence that one of the big impacts of PFAS contamination is the psychological impact on the community. What has been the impact on your community?

ALEX EDDY: There's an element of mistrust. There is a concern among the community that the levels of PFAS are responsible for a number of health ailments and that we are talking about forever chemicals, there's a perception that there's a forever problem.

The CHAIR: Thank you, Mr Eddy. With that, unfortunately, we are out of time. As always, we would have liked more time with our councils and local government reps. But thanks so much for the work you're doing. We really appreciate the time you have given us today. The secretariat will be in touch if you committed to taking anything on notice or if we have any further supplementary questions for you. Thanks so much.

(The witnesses withdrew.)

Mr BRAD WITHYMAN, Founder, River Guardians, before the Committee via videoconference, affirmed and examined

The CHAIR: Good morning, Mr Withyman. It's good to have you with us. I will just get you to start with an opening statement. I will interrupt if the connection isn't great. Have you got an opening statement for the Committee?

BRAD WITHYMAN: I haven't scripted anything, but I would like to just say a few things before we start because I want to give the Committee as much time as possible to ask me questions. Just quickly, my background. I've been associated with this river; I have a very strong connection with the Nambucca River and the surrounding estuaries. My great-grandfather was a mariner in this area back at the turn of the last century and started a family here. I don't know why I ended up back here, but I was drawn back here about 10 years ago and basically just reconnected with the river. [Audio malfunction]

The CHAIR: Mr Withyman, we may need to get you on the phone. We heard you up until "reconnected with the river".

BRAD WITHYMAN: Sorry, you're dropping in and out.

The CHAIR: Just one second. We're going to call you on the phone. You are now literally at the table coming out of a phone. Mr Withyman, can you hear me again?

BRAD WITHYMAN: Yes.

The CHAIR: Excellent. That was very swift, secretariat. Well done.

BRAD WITHYMAN: I'll speed things up here. I've had several discussions with the secretariat before I presented to the inquiry. I just wanted to make sure that the Committee understands that there is a fair bit of evidence that I submitted as attachments that I would prefer not to be discussed, but I'm happy to speak about the chemical drums—the blue drums—and I'm happy to talk about my reporting work with the EPA.

The CHAIR: The Committee understands that, and anything submitted confidentially is submitted confidentially.

BRAD WITHYMAN: I just wanted to give a very quick brief about an experience that I had dealing with the EPA about a reporting matter. In 2020-21, this area had quite severe flooding. In 2021 I assisted the EPA with their cleanup recovery efforts, which didn't go very well at all. I reported all my concerns all the way through. In fact, I ended up having to make a complaint to the Minister at the time. But after many complaints and inquiries, EPA confirmed to me in writing that they investigated and researched my claims about these used chemical drums and found no evidence that there were any toxic residues or anything to be concerned about. As far as they were concerned, their efforts and investigations were complete.

Some many months after that in 2022, in September, I'd been recovering these blue drums from the river for years and years but, handling them so often, I obviously wanted to work out what was going on. It just didn't seem right. I'd taken a tonne of research—did a deep dive into these blue drums. I was concerned, but the EPA confirmed that there wasn't anything really to be concerned about. But one of the things I wanted to do was to try and work out how these drums could be re-used or repurposed, because I was just collecting them and just dropping them off at the boat ramp, and they would just disappear. I was led to believe by council that they were being recovered by themselves.

One of the old timers on the river said, "Oh, you should turn those into garden beds." A lot of old blokes and a lot of people re-use these used chemical drums or used drums into garden beds. And I thought, "That's a great idea." I recovered eight or nine drums and brought them back to my home very carefully. I was still very, very cautious about what may be inside these drums. I put on some protective clothing—did everything correctly—and started to open these drums up—lengthways, as you could imagine. You've probably seen the images there in some of the attachments of how these garden beds look. After the third one I'd cut open, and the third one that had clear chemical residues in it, I stopped what I was doing. I started to get itchy forearms and realised I should stop, and I did. I got the drums and I put them aside. That evening I realised I'd been poisoned. I'd poisoned myself, essentially.

I woke up the next morning feeling really sick—diarrhoea, nauseous and not knowing really what to do, apart from obviously seeking medical advice. But I made a phone call to a recycler who had been dealing with these drums for years and had told me that he'd stopped handling them because his staff in his recycling yard were also getting sick. He described that fingernails were discolouring, fingernails were falling off. He stopped dealing

with these drums. He no longer would accept them. I said to him, "I think the same thing's happened to me." He said, "Absolutely. You've poisoned yourself." "What do I do?" "Seek medical attention," he said, "but you need to get that stuff off your property. Call hazmat and get it off your property." So I immediately took that advice. I immediately rang hazmat Coffs Harbour and they immediately sent down three fire trucks.

They turned up at my property—quite a drama. Their team put on their protective spacesuits, came onto the property, identified the hazard and made phone calls to EPA. There were very long discussions between the lead fire officer and the EPA on my property. He then came to me—by the way, they called me an ambulance as well and I said, "Yes, I will go to hospital, but I will wait till you guys remove this material from my property." That was my main concern. When he got off the phone—actually, I spoke to the EPA. They questioned me. I told them what I'd known and they said, "Okay, we're going to pass this over to Nambucca council. You'll be getting a phone call from them." That was it.

Hazmat left my property without taking a thing with them. They left me with a hazardous waste bin—these are those big, secure hazardous waste bins, the big bright orange things—and put all the residues that I'd actually collected, because I actually thought this is an opportunity to have this tested; we need to know what this is. They put all the residues in this hazardous waste bin, sealed it up, made me sign for it—I was legally responsible for it—and then proceeded to tell me that he had no problem with any of this material and that I could take it down to the local waste tip and dispose of it.

So I'm waiting to hear back from Nambucca council. Two and a half months went by; nobody came to the property. There were lots of exchanges of emails and communications. I was tired of having this on my property. Obviously I was upset and stressed about it. I loaded up my trailer, went down to the local rubbish tip to dispose of it, as hazmat explained, and they wouldn't accept it—hazardous waste or some reason. I then wasn't bringing it back home. I then took and disposed of those drums at a stockpile of drums on the side of the old Pacific Highway along the river, where drums had obviously been collected and placed there for collection. That's where I disposed of the drums. I did it responsibly and carefully. I'd also taken samples of the contents, and I still had the hazardous waste bin from hazmat. I then took the samples. I filled out all the appropriate paperwork from a laboratory—documented everything—and I took it up to EPA's office in Coffs Harbour.

I was waiting in the foyer after I rang the bell and the man appeared, an EPA officer appeared: "Who are you? What's going on?" I explained to him who I was and what I was doing. He threw his hands up in the air and said, "No way, no way. We're not dealing with this." He walked into the EPA office, locked the door and left me standing there. I waited for several minutes. I left the building. I left the material there and left the building.

Later that evening I got a phone call from Coffs Harbour police, investigating what I had done. I also learnt that hazmat was called to the property. The same hazmat team that I had here on my property was called to the building, and hazmat locked the building down and apparently evacuated the entire building. This was, I think, a six- or seven-storey government building. They evacuated the entire building, over material that they knew what it was. Everything was documented and that's what happened. That was my experience, and that was the day that I decided to have no further dealings with the EPA. That is the level of their community engagement and their reporting.

The CHAIR: I'm going to jump in there, because we've only got 15 minutes left with you and quite a few members around to ask questions. I'll just ask one in relation to PFAS specifically. You talk in your submission about the fact that the blue drums have been used in aquaculture by the oyster industry. We know how prolific the use of those big blue drums is. You are concerned that they may contain chemicals with PFAS, but they are even made with some PFAS chemicals, and they're not suitable for that use because they biodegrade. Therefore, the drums leach PFAS chemicals, microplastics and everything into estuaries and waterways. Could you just expand a little bit on your concerns with that particular situation?

BRAD WITHYMAN: My first concern when I started paying close attention to these blue drums—and, like I said, there are thousands of these drums on Nambucca River and tens of thousands spread throughout New South Wales—was the photodegradation. Me being a mariner, I know all about UV inhibitors to protect plastics in the sun against UV damage. These drums were not protected with any UV inhibitors. These drums were all photodegrading. You see that white, chalky substance on these drums, that's essentially nanoplastic, which is a chalking. It's finer than microplastics. That was my first concern and then, obviously, I realised that there were liquids in most of these drums that I had picked up and recovered. I later found out that these liquids were chemical residues.

Whether they are or are not PFAS contaminations, I think there's no doubt that when you look at what these drums are used for—these drums are designed to carry hazardous liquid waste; that is a statement by the manufacturer. I've provided you there with a spec sheet of the Mauser drums, and there is no doubt these drums

contain PFAS. In fact, there's probably all sorts of harmful, hazardous waste there. There's a list there of what these drums are used for, specifically, and hazardous waste. It covers a lot; it's very broad.

The Hon. GREG DONNELLY: Thank you, Mr Withyman, for your evidence and your helpful submission. On page 1 of your submission, in the bottom right-hand corner, you've got a helpful photograph of a structure which involves two rows of drums with crossbeams to keep it all together. Could you explain for me, and maybe other Committee members, what is that structure? Are the oysters placed between the structure and lowered into the water, and this effectively acts as a framework to suspend the oysters as they develop?

BRAD WITHYMAN: That's correct. The floating raft there—the timber structure is the raft, the drums are the flotation and the oyster trays are suspended inside the raft. The trays will be stacked in numbers of eight or nine, and there will be maybe six to eight stacks of those on both sides, so a substantial amount of trays.

The Hon. GREG DONNELLY: And on the river itself, your evidence is, if I remember correctly, that these drums are used as floating devices to suspend the oysters right across the river system, or the Nambucca River?

BRAD WITHYMAN: Exactly right, yes.

The Hon. GREG DONNELLY: You may or may not have the answer to this. Before the plastic drums, did they use or were you aware that they used metal drums to do the same suspension, or you don't know?

BRAD WITHYMAN: No, in my submission there, I state the background—I think it's in the attachment there—to the drums. The catalyst was the oyster industry used to use a rack and rail system, and in some places they still do. These rack and rail systems were made of hardwood timbers, and they would coat them in a toxic tar to prevent marine borers from destroying and chewing the timber, so they would coat them in this toxic tar. After decades, they realised that this toxic tar, which is made of hydrocarbons, was polluting the waterway and damaging sensitive seagrasses, where most of the leases were set up. So they decided in the mid-'80s that they needed to go away from the rack and rail system, so DPI developed the raft, and you can see what they've done. They've gone from a harmful practice to an extremely harmful practice. This is back in the mid-'80s they started doing this. Nambucca started seeing large numbers of rafts turning up in the mid-'90s. But this is now—I think in my submission it says that there are up to 37 estuaries that are using this system.

The Hon. GREG DONNELLY: With respect to the EPA visit to your property, I thought I heard you say that orange drums or an orange bin of sorts was left for you to deposit.

BRAD WITHYMAN: Yes, it was a hazardous waste drum.

The Hon. GREG DONNELLY: So what happened to that? Did you actually—

BRAD WITHYMAN: I took that back to EPA.

The Hon. GREG DONNELLY: But did they request that you yourself place the blue drums into this waste disposal?

BRAD WITHYMAN: No, no. This hazardous waste bin is the size of a large bucket. These blue drums are 210 litres.

The Hon. GREG DONNELLY: Sorry, I apologise.

BRAD WITHYMAN: No, no. I collected—

The Hon. GREG DONNELLY: The liquid.

BRAD WITHYMAN: —the sample of the residue from these drums that I'd opened up. I'd placed them into secure containers, and that's what they placed in the hazardous waste bin.

The Hon. GREG DONNELLY: Thank you. That clarifies that.

The Hon. TAYLOR MARTIN: Have you had any personal blood testing?

BRAD WITHYMAN: No.

The Hon. TAYLOR MARTIN: Are you happy to talk us through a bit more of your incident that you outlined in your opening statement and in your submission?

BRAD WITHYMAN: I went to the hospital. I explained to them what had happened. They monitored me for—I think I was there for about 3½ hours, maybe four hours. They put me on the IV, and they said the practice was to just try to flush fluids through, and provided me with some information. I then went to my GP

straight after that and explained it to him. He was very concerned about it. Basically, I just had to monitor what my symptoms were. Look, I don't know. It's a bad, bad experience. It's a really scary, horrible thing to experience, being poisoned.

The Hon. TAYLOR MARTIN: Yes. To be clear, this event that you've outlined was around four years ago? It was in 2021?

BRAD WITHYMAN: This happened in September 2022.

The Hon. TAYLOR MARTIN: All right. Sorry, I misread your submission there. It references 2021. I don't know if that's a typo. Are you saying it was 2022?

BRAD WITHYMAN: The poisoning incident?

The Hon. TAYLOR MARTIN: That was later on, was it?

BRAD WITHYMAN: I believe—

The Hon. TAYLOR MARTIN: Okay. Have you had any symptoms that you might think link back to it, or have you thought about getting further blood testing? We've heard from firefighters and others who had been exposed.

BRAD WITHYMAN: I get blood-tested every 12 months. A GP lines that up for me, but the laboratories that they're using aren't testing for, I would imagine, PFAS in the bloodstream. I think that has to be sent off to a specialised lab, I believe. But I do get blood tests annually.

The Hon. TAYLOR MARTIN: Thank you for taking the time today, but also for your very detailed submission. I appreciate it. I believe the Chair has some questions.

The CHAIR: Thank you. I just want to ask about the Mauser drums.

The CHAIR: Yes, those drums. They are commonly used. Have you done research into where they're sourced from?

BRAD WITHYMAN: Yes, I did a lot of research. I deep-dived heavily into how these blue drums were being used, acquired—the background. These blue drums are predominantly acquired from recycling yards in Western Sydney. I've provided photographic evidence of how they're advertised. These are big stockpile recycling yards. I spoke to a recycler at one stage during the research and asked them do they clean these drums. They said, "No, we don't clean these drums. But the ones we're offering for sale were used for food." I knew that was completely incorrect and dishonest. These Mauser drums that we're talking about are used for hazardous liquid waste. They have special secure lids or bungs on top. You don't use those for food. There are other Mauser drums that they use. Mauser is a massive packaging company; they have all the appropriate drums for food packaging. These are specifically chemical drums.

I wanted to know who else was using these drums in the industry, and I did speak to the engineer of Huon Aquaculture in Tasmania. I shared with him of what I'd learned about these Mauser drums being used in aquaculture in New South Wales—told him and shared some photos with him. He laughed. He thought it was a joke. When he realised I was serious, he said—and I think I quote in my submission—"If we were to do that here, the Tasmanian community would have us shut down in an instant." He says, "We have to comply with using marine-grade flotation. Everything has to be logged." He said, "How are they getting away with that?" The question you need to ask is how have the relevant agencies here allowed used chemical drums to act as floatation devices in a marine environment?

I spoke to the lead engineer at Mauser packaging. I told her how these drums were being repurposed, and she was shocked. I told her what was happening, and she was very on top of it straightaway. She said those chemical residues would be leaching through the plastic within at least 10 years. She also told me that they do not offer any warranties on these drums after 10 years. That is it: They don't recommend these drums to be used after 10 years. I have so much information. The more I learnt, the more shocked I was at how do our relevant agencies allow used chemical drums in their thousands to be floating in the sun on our precious marine estuaries, not to mention what they're supporting and floating. We all know what oysters are, being bivalves—natural filtration devices.

The CHAIR: Mr Withyman, are you aware of any testing around the Nambucca River area for PFAS, any contamination areas or anything that's come to light in your research?

BRAD WITHYMAN: I haven't done any research since I told you that after 22 September I was done with the EPA. But I did do it when I was just reacquainting myself with the research for these submissions. I did

see a media release by the EPA—and I'm just going to pull it up on my laptop—that they conducted, I think they called it a campaign of compliance. I've found it. So 8 April 2024, "Nambucca waterways not impacted by excessive pesticides"—that's the title. That's just an outrageous title in itself. But apparently they partnered up with Nambucca council and did a campaign on seven farms, tested for 100 different types of pesticides and found that only one of the properties was non-compliant, three were fine and the other three are still being assessed. That report was widely condemned and damned by all levels of environmentalist groups, even councillors.

In fact, they came across an article by Michael West Media that talked about this exact report and the situation with the lack of testing by local authorities and the EPA in regard to the use of pesticides and herbicides. PFAS is one issue, but I don't know whether the Committee realises that PFAS is heavily used in herbicides. PFAS is a performance enhancer. It's why they use it. It increases the performance of herbicides and pesticides. You see local government authorities spraying for weeds on the edges of waterways. I see the department of transport boom-spraying herbicides and glyphosate along the highway—in the middle and on the outsides of the Pacific Highway—with spray drift going everywhere. They're now using herbicides to control plant growth and weeds. They're not using slashers and whipper snippers anymore; they're just spraying poison everywhere. Highways are like drains. If you look on the side of a highway, there are drains and they all lead into small creeks. The creeks feed into the larger creeks and it ends up in an estuary or an aquatic waterway. It's alarming.

The CHAIR: Thank you, Mr Withyman. We are at time. Thank you so much for your evidence, which was very interesting.

BRAD WITHYMAN: It's a shame the video isn't working. I did take a sample of a drum three days ago when I was on the river. I'm holding it here in my hand. You can see the biosolids in the bottom of the jar.

The CHAIR: Take a selfie and send it to us. Thanks so much, Mr Withyman. We'll be in touch if you've agreed to take anything on notice or if members of the Committee have any supplementary questions for you. We really appreciate the work that you do in this space and for making time to speak to us today.

(The witness withdrew.)

(Luncheon adjournment)

Mr PETER RODGERS, Founding Director, Lotsearch, affirmed and examined

Mr HOWARD WALDRON, Founding Director, Lotsearch, affirmed and examined

The CHAIR: Welcome back. We'll begin hearing from our next witnesses. Does one of you have a short opening statement to make?

HOWARD WALDRON: Yes, we do. Thank you for the opportunity to provide evidence as part of this important inquiry. For our opening statement, we'll provide a high-level overview of our business, the extensive research we've conducted to date and provide a series of recommendations for your consideration. Lotsearch was founded in 2014. Our mission is to create a more environmentally aware Australia, and we have pioneered the development of environmental information and insights. We are the leading provider of environmental reports that help clients identify potential contamination risk to land and property. We have spent the last 10 years developing an extensive database of contamination sources. We have identified the location of over 260,000 known and potentially contaminated sites across the country, with 75,000 of these sites located here in New South Wales. By way of a comparison, there are approximately 2,000 sites that have been notified to the New South Wales EPA as being contaminated.

The knowledge gap between what is known and what is potentially contaminated is significant. Further information about our unique services can be found in some of the documents that we've tabled with you today. In terms of recommendations, Lotsearch can help support multiple aspects of this inquiry. Given the complexity and widespread nature of PFAS contamination, it is crucial to identify and mitigate the sources of these pollutants effectively. Lotsearch can help bridge the knowledge gap, having identified over 75,000 known and potentially contaminated sites located across New South Wales. A key area for reform relates to existing government searches. The section 10.7 planning certificate is a mandatory document produced by councils to disclose property and planning information during a property transaction. These are not adequately informing the public about contaminated land issues, and this has been outlined by the New South Wales EPA audit included in the information pack provided to the Committee today.

In summary, the audit found that many of the councils investigated did not provide contaminated land information or have a contaminated land policy in place. Certificates showed inconsistencies or had missing or incorrect results related to known contamination issues. To help the Committee understand the gaps in these certificates, we have tabled an example of one of our contaminated land searches and a corresponding section 10.7 planning certificate for a residential property in Sydney. The Lotsearch report identifies that the residential property is within a PFAS management area. This information is not included in the corresponding council certificate.

Lotsearch have developed a nationwide suite of contaminated land reports to improve the disclosure of key information and close the current knowledge gap during the buying and selling of property, and the planning and development approval process. The use of contaminated land searches like ours is further supported by the Norton Rose Fulbright opinion piece which we'd also like to have tabled today as evidence. It's in your information pack. We urge the Committee to consider the integration of Lotsearch's information services into the New South Wales strategy for addressing PFAS contamination. We strongly advocate that contaminated land searches form part of the mandatory disclosure of information for every property transaction. Thank you for your time, and we now look forward to helping answer any questions you may have.

The CHAIR: Thank you very much, that's very interesting. You've said that your company has identified—let's just stick to New South Wales—75,000 contaminated sites. You noted that 2,000 have been notified to the EPA. How many people work for Lotsearch in New South Wales—roughly?

PETER RODGERS: We have 20 employees. We're based in North Sydney, but our products are nationwide.

The CHAIR: Just to be clear, the way in which you are finding this out is via searching lots of different information.

PETER RODGERS: We pull our data from lots of government departments, including the EPA's and other private organisations as well. But we've done our own research and pulled over 3.5 million business records from old phone books. We also do research from old historical images as well. So we've built up a very extensive historical land use database across Australia.

The CHAIR: Your business model is essentially that developers—people buying the property—want to be very sure about what they're buying and they'll pay for that information.

PETER RODGERS: Correct.

HOWARD WALDRON: There's the buyer beware, where you want to disclose. In this instance and in this example we gave, it's not just us; it's the EPA that have also identified that councils haven't been including key information during that disclosure process. So we're helping to inform buyers particularly but also vendors during transactions to avoid buying a potentially contaminated site and then being responsible for the clean-up and the costs associated with that.

The CHAIR: Maybe it's fair to say that if, for example, a government agency that has far more resources than you do really wanted to find contamination and contaminated sites, it's not that hard and it's possibly a scenario of you'll find it if you look hard enough.

HOWARD WALDRON: Previously to working at and founding Lotsearch, Peter and I both worked for the UK's leading provider of environmental risk reports, so we've been in this industry for over 25 years now. What we've done here in Australia, in particular in New South Wales, is far different to the approach that was taken in the UK. It's really difficult to get access to key information. They're really disparate sources and really convoluted ways in which governments keep registers or information and then choose to report on it. Understandably, things are getting missed in key areas. It would, in our view, be quite difficult to recreate what we've developed over the last 10 years but prior to that 15 years in the UK of our experience and the team's experience now in helping us continue that work, and also this rigorous QA/QC that we do over our database as well.

The CHAIR: This will be my last question before I throw to others. Here in New South Wales, in terms of PFAS contamination, the sites largely that the EPA is investigating and investigated are obviously the firefighting areas and some of the contamination that's come off Defence, even though we know that is the responsibility of Defence. There's a lot of other contamination, obviously. There's a history of manufacturing, for example, in New South Wales as well. No doubt there was—if we just stick to PFAS—PFAS potentially used in some of this manufacturing in the '50s and '60s, yet we don't really hear about that in terms of a contamination legacy, but in the States they definitely have that. Are there lots of things like that that you think the Government is missing? We're a committee that's looking into this. You're both nodding furiously, for the benefit of Hansard.

PETER RODGERS: Yes.

The CHAIR: Manufacturing, to begin with.

PETER RODGERS: The old phone books that we've taken data from go back to the early 1900s in some States. In New South Wales the data we've got goes back to the 1950s. We've taken all of the historical business activities. We've identified from all of those directories that we've captured 40,000 potentially contaminating activities. What we're currently undertaking is linking which ones of those could also be a source of PFAS.

The CHAIR: One more question: Who goes in to do the testing then? Do you or do you just say they could be contaminated?

PETER RODGERS: Yes. We raise the flag and the environmental consultants will do the testing.

HOWARD WALDRON: We're identifying both known and potential contamination. "Known" being what the EPA have and record and actively choose to list on a public register as being contaminated. So it's gone through the rigorous investigation and testing phase. Then the big gap that we've identified is the "potential".

The Hon. TAYLOR MARTIN: This is fascinating. To be clear, a purchaser, or potential purchaser, might engage your services and you'll have—correct me if I'm wrong—a bit of a shallow level of detail as to whether there is or isn't contamination and it'll be possibly flagged. Can you walk us through how this process works?

HOWARD WALDRON: Yes. We use spatial technology. It's a GR system. We're mapping all of this data to a really fine level of detail. Each report that we produce centres in on the property in question and then includes a search radius of the surrounding area. The information is all visually presented on a map so it's easy to determine what is onsite but also what is offsite that may be a potential risk to your site in question, because you might have a service station next door, but the tanks are leaking and it's leaking onto your site. The section 10-point planning stuff, coming back to the key disclosure document that's currently available, only focuses on the lot and the information for the lot and the information that council choose to then include on that certificate. There's a real limitation, we feel, in the amount of information that's being actively disclosed as part of the property transaction.

The Hon. TAYLOR MARTIN: For the next step, does your organisation pass on or leave to the owner or potential new owner to then go and engage with other consultants, or is it something that you do yourself?

PETER RODGERS: Yes. Within our products we have the next steps, so if there are any potential risks raised, they're in the next steps. So they could either get more information from the councils or EPA about the records that we've raised, or they can engage an environmental consultant to see what they would interpret from our data whether there is then a risk, and whether it's worth going onto site to do some testing.

The Hon. TAYLOR MARTIN: I understand my next line of questions might be a bit sensitive, so speak up if need be. Do any New South Wales Government agencies engage your services?

HOWARD WALDRON: Yes. We've conducted some research projects for the New South Wales EPA, discrete projects to identify historical landfills and historical gasworks across the State, and we've also completed projects for 16 regional councils across New South Wales to help them build an internal register of known and potential contamination sites.

The Hon. TAYLOR MARTIN: Are you able to tell us, even if it's high level, as to when these pieces of work took place?

HOWARD WALDRON: The New South Wales EPA, the gasworks projects were probably three or four years ago now—I could have got the date a little bit wrong—but then the landfills were maybe two years ago, the same.

PETER RODGERS: Two to three years ago we did those projects.

HOWARD WALDRON: The council work was done under a particular piece of funding from the New South Wales Environmental Trust through the EPA and it was under the regional capacity building initiative that New South Wales was funding. The 16 councils used the funding then to engage with consultants. Either they hired them and then they were integrated into their regional council group or they were engaged as consultants, and we were engaged to provide our information services.

The Hon. TAYLOR MARTIN: As you mentioned earlier, you said that you used phone books to go back decades and decades to find different activities, so I imagine your organisation mosaics as much as possible, vacuums up as much as possible and then, when you're engaged, you get more detail again and that adds to your process or to your software?

HOWARD WALDRON: Somewhat. We're always evaluating new data sources. We have over a thousand individual data sources already in the database and for the current datasets—like the EPA has, for example, like its public registers, we're regularly maintaining them and keeping them up to date, and also asking them for additional information about the records and about their accuracy so that we can make sure we pinpoint the exact sites that are on their registers. We're also evaluating—we've got 63 categories identified of contamination. We're always looking at how robust is our data in that area, and always looking for maybe more historical insights that we can glean and gather and a process around that for capturing that information—if it needs to be updated, updating it—and obviously put a QA-QC process around it to make sure it's fit for purpose.

The Hon. CAMERON MURPHY: I'm curious about how the risk rating may work for sites that were previously contaminated with PFAS that have now been cleaned up, and in this context: In one of the earlier days when we had public hearings, we heard evidence from witnesses that old fire stations were cleaned up, but only to a commercial standard. Then they were sold and then, after that, they've been repurposed. The evidence was, I think, there was one that was being used as a childcare centre, and it was quite common for them to then be converted into residential premises, which have a very different standard. Do you capture that type of thing in your risk assessment and reporting?

PETER RODGERS: Only where it's available, where that remediation may have occurred. There may be some statistics on government registers that say certain sites have been remediated. But, in general, we'll just keep that full history in our report so that, even though it may be flagged as remediated, people can still see there was an original issue and the original activities that may have occurred on site.

The Hon. CAMERON MURPHY: So over time it will just build up a continuing profile of that particular lot.

HOWARD WALDRON: Exactly. There is also something called environmental management plans that will often be used when they've cleaned the site up to a specific level, based on a certain type of use. There is often an environmental management plan associated with that site. Those actually are really quite challenging to access. The EPA doesn't have a register of them and almost defaults to council to keep that, and often council

don't have that information either. What's happening is, understandably, there's a lot of investment going on in trying to clean up sites to a certain standard, and they're being used for suitable purposes at that point in time. But, after that, they then may be re-used for other purposes, and that environmental management plan may go missing and people will then mistakenly—

The Hon. CAMERON MURPHY: I'm glad you've raised it because it was the next question I was going to ask. Do you think there needs to be a central repository? Should the land titles office, for example, keep that on the registry information about the lot, so it's there for all time, rather than it being at the local council level where, notoriously, there are floods, records are lost and things go missing?

HOWARD WALDRON: Yes, we would recommend that, however there is a register, there is a central register of them, whether it be State or local or both, and that it be publicly available, like other registers that we include.

The Hon. GREG DONNELLY: I have a general question about the definition of a contaminated site. That's a matter that's determined how? If there isn't the exploratory examination deeply into the site itself to reveal the full suite of what the problem might be, how do you structure your definition to be able to state that this is a contaminated site, in general terms?

PETER RODGERS: We've aligned all of the activities in our database. We're aligning them to potentially contaminating activities that are defined in guidelines that have been developed by the EPA. We're doing that to identify that. But then, as you said, it requires that testing to actually determine how contaminated the site is.

HOWARD WALDRON: Also, further to your question, if it's on an EPA contaminated land register, we deem it to be contaminated. Everything else is deemed to be potentially contaminated until the testing has been done. The advantage also of the work we've done is that, if you are to investigate a site and do the testing, you can use the information that we provided on the historical use of that site to do more specific, targeted testing for particular types of contaminants that may be associated with those particular types of activities that took place on that site. There is such a wide range and spectrum of testing that can be done today that you could test a site for certain contaminants and not reveal that it's actually contaminated because you're looking for the wrong things.

The Hon. AILEEN MacDONALD: This is a follow-up to the Hon. Cameron Murphy's question. I understand, from what you've said, that New South Wales doesn't have a comprehensive PFAS contamination map.

PETER RODGERS: No, but, I guess, we have one.

The Hon. AILEEN MacDONALD: You have one, yes. With that map and the data, how do you think it could help in the clean-up of PFAS contamination more efficiently?

PETER RODGERS: It could help in understanding the location of potential PFAS sources. Then our database also contains information around environmental sensitive receptors, such as the waterways or water bodies. That's where the consultants come in or government come in to do the analysis of how the contamination may travel from the source to environmental sensitive receptors.

The Hon. AILEEN MacDONALD: Do you think that this information should be on a public register?

HOWARD WALDRON: I think the public registers are there to record what has been notified as contaminated or has an environment management plan on that site. I think those public registers, there is a little bit more that can be done to improve those. But I think the potential is something that we've just spent 10 years building and continue to build every day and work on that actively, and so it probably comes back to your original point. I think it's incredibly hard to replicate that. We're not proposing to put it in a public register.

We offer a variety of different reports at different pricepoints to be able to engage with the most appropriate people, though, and not just the general public who could come to our site. The majority of people who are coming and ordering our reports are the experts. They're either environmental consultants who are then going to use that information to determine then is there the likelihood of a contamination and do the testing, but also lawyers and conveyancers who are then acting on behalf of their clients during the property transaction and may again involve environmental consultants should they need to, or contact the EPA for further information. We're offering a variety of different services to key individuals and key companies that can then support the general public in making a more informed decision.

The Hon. AILEEN MacDONALD: In the hotspots that are known, are you seeing that the PFAS levels are increasing or decreasing?

PETER RODGERS: I think that's something out of our realm. That's where the consultant would come in to determine the actual levels of the PFAS.

The Hon. AILEEN MacDONALD: Is this how it's used: someone wants to buy a property, so they come to you to find out if there are any legacy PFAS issues, or not necessarily PFAS but others, and you're able to provide them that history. Does that then impact the real estate values? Have you seen that happen in your transactions?

HOWARD WALDRON: We haven't because, again, we're normally providing those reports to key individuals who are then representing their clients. It's normally buyer beware. It's normally something that the buyer takes and then either chooses to proceed or not. We haven't as yet seen that ourselves from the work we've done to date.

The Hon. AILEEN MacDONALD: But if they had that information, they choose to buy the property and there is some legacy issue, they can then point to say, "Well, we know the history. It wasn't us." It could help in legal—

HOWARD WALDRON: It can help because the polluter pays principle applies. What is challenging is identifying who the exact polluter was. Sometimes you can have different people and different companies who have operated on that site, and also they may not be around anymore. The company may have since ceased operations and you can't necessarily get to the polluter anymore. That's the big risk we see, and that's why we're really promoting buyer beware, because you can end up buying a property that is contaminated. Even if you can find the original polluter, you may not be able to successfully get the money back to clean up your site, and you may actually be required to pay the costs for cleaning up the site, as well as the legal costs for going after the polluter.

The CHAIR: If the State EPA or NSW Health approached you willing to pay for it and asked you for potential PFAS contamination sites across the State, would you be able to produce that report for them?

PETER RODGERS: Yes.

HOWARD WALDRON: We would. Like the other projects we've run for New South Wales EPA, for example, we would look at the requirements of that project, the scope of it and then find and work on then providing that information in a format that suits the clients. When you're talking about statewide data sets and information sources, obviously this can be quite a lot of information. So, again, it's working with the appropriate organisation to then work with them on a solution that meets their needs.

The CHAIR: From the work that you've done with contaminated sites—not PFAS contaminated—75,000 sites in New South Wales, 2,000 notified to the EPA. That's contaminated?

HOWARD WALDRON: That's 75,000 known and potential contaminated sites, and 2,000 that the EPA have identified as being contaminated and currently—

The CHAIR: Of your known and potential sites, can you hazard a guess as to how many of those are PFAS contaminated, or how many are PFAS contaminated that aren't on the EPA site?

PETER RODGERS: That's one we'd probably have to take on notice.

HOWARD WALDRON: Take on notice, that one, and try to do some analysis.

The CHAIR: That would be very interesting if you could take that on notice.

HOWARD WALDRON: It would.

The CHAIR: Do we have to pay for that information?

HOWARD WALDRON: Yes. I think we might not be able to answer that, though. There is a bit more analysis that we could do and need to do. I think maybe part of that research project or—if we are commissioned to do that work, I think it would be best to look at that as part of that project.

The CHAIR: Yes, I was hoping I'd get some kind of a rough idea, but I totally understand. But there are others. What you're implying and what you've referred to is that—

HOWARD WALDRON: Of course, PFAS could be used at low levels. Again, there might need to be some sort of risk matrix of different types of activities and which ones an agency then chooses to look at—a bit like has happened to date, where it's the firefighting that has been the main priority. But, as you mentioned, manufacturing, I think we all know, is arguably one of the next ones that could be looked at—maybe should be looked at.

The Hon. TAYLOR MARTIN: All my follow-ups have been covered in other questions. I'm just fascinated again by how far behind we are compared to other jurisdictions. As you said, the UK—leaving aside PFAS and just in terms of contaminated land—have been involved in the kind of work that you do for over a quarter of a century now. I think that's something for us to think about for our final report, Chair.

HOWARD WALDRON: We'd be happy to answer any questions subsequent to the inquiry about what's our experience in other jurisdictions as well.

The CHAIR: We've talked about manufacturing firefighting foam. There have been quite a few witnesses who have also raised the issue of PFAS chemicals in insecticides and pesticides. Has that come out as well? We're a big State. We've got a lot of agriculture. Is that on your radar at all?

PETER RODGERS: We certainly have locations of manufacturing of herbicides and insecticides. We have also done work in the regional councils to identify where there is intensive agriculture, and therefore that may potentially flag that there is spraying happening in the intensive agricultural areas.

The CHAIR: So that is potentially an issue where particular crops—for example, and I'm not saying this is any particular fact, but we have just heard from Gwydir council and Dubbo about contaminated aquifers. There's potential that a contaminated aquifer is not just as a result of, for example, the use of firefighting foam at a fire station in an area that is highly agricultural with intensive cropping and the use of pesticides by aerial spraying. We could need to look further.

PETER RODGERS: Yes.

HOWARD WALDRON: The work we've done to date is to identify sites in these regional councils that are used for intensive agriculture. Then it's up to the councils to take that information and use it to maybe choose to assess certain sites, should they wish to. We don't have any information at this stage. I don't think that it indicates which sites have necessarily applied particular types of contaminants or herbicides or pesticides. We haven't it down to that fine level of granularity at this stage.

The CHAIR: That is the end of the time for this session. I think every session we have opens up a lot more for us to look into. You certainly have, so thanks so much. That was really valuable. Thanks for making the time. We'll get back to you if you agreed to take anything on notice or if we've got any further questions for you.

(The witnesses withdrew.)

Mr ROCH CHEROUX, Managing Director, Sydney Water, affirmed and examined

Dr KAYE POWER, Principal Water and Public Health Adviser, Sydney Water, affirmed and examined

Mr ANDREW NICHOLLS, PSM, Chief Executive Officer, Independent Pricing and Regulatory Tribunal, before the Committee via videoconference, sworn and examined

Ms CHRISTINE ALLEN, Director, Regulation and Compliance, Independent Pricing and Regulatory Tribunal, before the Committee via videoconference, affirmed and examined

The CHAIR: We'll begin with the opening statements by Sydney Water.

ROCH CHEROUX: Thank you for the opportunity to appear today before the Committee and provide Sydney Water's perspective on this global challenge. Before I start, I would like to acknowledge that I am on Gadigal land and I would like to pay my respects to their Elders, past and present. Sydney Water is Australia's largest water utility, providing essential service, water supply and wastewater services to 5.3 million people 24 hours a day, seven days a week.

While up to 15 per cent of Sydney Water supply can be provided by desalination, a majority comes from protected catchments and is stored in dams before being treated by one of our nine water filtration plants before being distributed to customers. As the Committee is aware, PFAS is widespread in the environment and poses significant challenges across the urban water cycle. Sydney Water's approach to managing PFAS is focused on two distinct areas: ensuring the safety of drinking water, and managing its presence in wastewater systems. It is important to distinguish between these two domains to effectively address the unique challenges each presents.

For drinking water, firstly, I want to assure the people of Greater Sydney that our drinking water is safe and meets the *Australian Drinking Water Guidelines*. We conduct rigorous testing and monitoring to ensure this. For testing and monitoring, we identified in 2024 that, while all our plants were producing water that complied with the current guidelines, one of our nine water filtration plants—Cascade in the Blue Mountains—if not modified, would exceed the proposed revised guidelines that are anticipated to come into effect this year. We have already acted by installing advanced PFAS treatment processes at Cascade over the Christmas period. I'm pleased to report that the plant is effective at removing PFAS from the water and the concentration in the treated water is reducing, and the plant will be producing water that is below the proposed new guideline level.

For wastewater, PFAS in the wastewater system presents a more complex challenge. A significant source of PFAS in wastewater comes from everyday domestic activities—showering, washing clothes and cleaning—simply due to its presence in consumer products like cosmetics, clothing and non-stick cookware. We also manage flow from industrial customers, which may also contain PFAS. Wastewater systems were originally designed to address a fundamental public health challenge by treating water to remove microorganisms and nutrients, but they were not designed to handle persistent synthetic chemicals like PFAS.

An unavoidable by-product of wastewater treatment is biosolids, which Sydney Water has successfully re-used as compost and fertiliser for pasture, fodder, forestry and some direct application to some crops such as canola oil. As regulatory guidelines evolve, we are adapting. One example of this is that we are designing our first thermal treatment facility to convert biosolids into biochar, which can destroy PFAS. While promising, this process is energy intensive and comes with significant costs. It's critical to understand that the costs of us managing PFAS are ultimately borne by our customers.

Treating PFAS at the end of the cycle, whether in water filtration plants, wastewater systems or biosolids, is far more expensive and less effective than preventing it from entering the system in the first place. This is why Sydney Water strongly urges decisive action to address PFAS at its sources. Banning or severely restricting its use in non-essential consumer products is the most effective and equitable solution. Avoidance is always more cost effective than treatment, and it would significantly reduce the burden on water utilities and, by extension, on our communities. To close, Sydney Water is committed to playing its part in managing PFAS, but the issue requires coordinated action at a national level. We encourage the prioritisation of policies that eliminate PFAS at its source to protect both the environment and the affordability of essential services.

The CHAIR: Thank you very much, Mr Cheroux. We will go to Mr Nicholls now. Just so you know, Mr Nicholls, I think we're trying to get Ms Allen on the phone.

ANDREW NICHOLLS: Thank you for that, and thank you for the opportunity to meet virtually today. Unfortunately, I have COVID right now, so I thought it best to perhaps stay away from you all. And Christine is tied up in some meetings. We do appreciate it, even though the tech is not quite working for us. Thank you for the invitation today. IPART has specified regulatory functions under the Sydney Water, Hunter Water and

Water NSW Acts respectively. All three public water utilities regulated by IPART produce drinking water under their operating licences and IPART, as the independent regulator, plays a role in advising the Minister with recommendations on their licence conditions.

IPART also monitors compliance with these licence conditions through reporting and auditing, and has enforcement powers in relation to breaches of any licence obligations. Specifically, they each have obligations to manage the quality of drinking water by applying the *Australian Drinking Water Guidelines* through their water quality management systems. Hunter Water and WaterNSW also have some responsibilities in relation to source water in drinking water catchments. IPART develops and audits these obligations in consultation with NSW Health using water experts. The water utilities have generally demonstrated a high level of compliance with the current Australian guidelines through these audits. For the most part, non-compliances have been administrative and not substantive. IPART also sets maximum prices for water supplied by the three public water utilities to reflect the efficient cost of providing safe and efficient services.

IPART also sets prices for Essential Energy, which provides water services to Broken Hill, the Water Administration Ministerial Corporation, the Sydney Desalination Plant, and for the Central Coast Council. IPART does not, however, regulate local water utilities run by councils. These are largely located in regional and rural New South Wales and are primarily regulated under the Water Management Act by the Department of Climate Change, Energy, the Environment and Water. Likewise, IPART does not set water prices for council water services except for Central Coast, as I've noted. IPART also plays a regulatory role for private water utilities licensed under the Water Industry Competition Act. Aside from the Sydney Desalination Plant, as I've mentioned, none of the small private water utilities regulated by IPART produce drinking water, although some onsell drinking water supplied to them by the public water utilities.

IPART recognises that PFAS in drinking water is an emerging and critical area of concern, particularly in light of the current review of the Australian guidelines by the National Health and Medical Research Council. IPART is confident that a swift response will be possible, following any government decisions on changes to the guidelines, because the current water licences are outcome-focused and flexible. Guidelines and requirements can change without the need to reissue a licence. IPART has established a water Regulators Advisory Panel consisting of IPART; NSW Health; the Environment Protection Authority; the Department of Climate Change, Energy, the Environment and Water; and the Natural Resources Access Regulator, which can be used to help coordinate the New South Wales response.

IPART's existing audit framework is well placed to test the adequacy of the public water utilities' responses and monitor ongoing compliance with any new requirements. And IPART's economic and pricing frameworks will allow us to carefully consider efficient costs allocation to the extent there are any cost implications of changes to standards. We look forward to the outcomes of the select committee's inquiry and stand ready to assist in any response. We are happy to answer any further questions. Thank you.

The CHAIR: Mr Cheroux, why did Sydney Water refuse to engage with ABC Radio about the PFAS contamination, as emails revealed that that is indeed what was happening within the agency before Christmas?

ROCH CHEROUX: We've been engaging with the ABC and with many other media channels—TV, radio and print—on many, many different occasions, and this email that was discussed in this Committee was just an example where there was no reason to engage at that point. But the engagement of Sydney Water with different media has been extensive, and I think it can be viewed everywhere.

The CHAIR: Have you made inquiries within Sydney Water as to what this email referred to when it said that the ABC, as well as *The Sydney Morning Herald*, have an agenda, and that the impact of putting someone on air outweighs the benefit as they have their agenda. Firstly, have you made inquiries as to what that agenda is?

ROCH CHEROUX: Not specifically in the recent days. That's a discussion that happened probably some weeks ago—definitely. There was discussion about it at that time. I think the email was worded in a way that is probably not completely accurate. I guess the choice of word was probably not completely appropriate at that time.

The CHAIR: In terms of the agenda of the ABC and *The Sydney Morning Herald* on this issue, they've been the two media outlets that have really exposed contamination in the community and in drinking water, haven't they? That's a good agenda, isn't it?

ROCH CHEROUX: Absolutely. Look, we are all for transparency. I think the information that we've made available on our website, to the media, to the public and to the community demonstrates that we are all for transparency. There is no issue with talking to the media. That is something we've demonstrated. We do it all the time.

The CHAIR: Why was Sydney Water saying that there were no known hotspots in our drinking water catchment? I think you may have said that as recently as last year.

ROCH CHEROUX: Yes. The principle of the drinking water guidelines is risk-based assessments. What the guidelines say is that you do an assessment on the entire value chain, which is basically catchment to tap for customers. This is a risk assessment that we do jointly with WaterNSW and NSW Health. The three organisations will be looking at all the risks that exist along the value chain and work out if there are any hotspots. In the case of PFAS, when we looked at the entire value chain from catchment to tap, no hotspots were identified.

The CHAIR: But it didn't take the community long to work out what a very significant contamination incident was—quite a few, in fact. We had Fire and Rescue present to this Committee in Katoomba and they said they looked at all of their incidents along the Great Western Highway where they'd used firefighting foam historically over many years on parts of the highway that flowed into creeks and that flowed into the Sydney Water catchment. That just came about again after this investigation. Revelations in the media and the community looked at that. It does sound like this desktop risk analysis was very threadbare, to say the least.

ROCH CHEROUX: From a Sydney Water point of view, the analysis that we have done at our plants has demonstrated that we were compliant with the *Australian Drinking Water Guidelines*. That's really the important point here for our customers.

The Hon. GREG DONNELLY: I'm interested in the challenge of communication to the public at large and the way Sydney Water approaches issues when they arise. One of the challenges we've seen as we have progressed through our hearings is the challenge of communicating to the public at large what can be quite complex matters about water contamination in a digestible form that can be readily understood and clear. I'm just wondering, is that a focus for Sydney Water when it does have to report on matters like those that we've seen in the Blue Mountains? Can you provide some insight into how one brings together all the information to communicate as best one can on a matter?

ROCH CHEROUX: It is definitely something that is front of mind. We are dealing with matters that are complex, and that can be on the water side, that can be on the wastewater side, on the environmental side, on all sorts of things. Not to mention, when we are discussing tariffs and things that are even more complex to discuss, we always try to make it as simple as possible so that our customers can understand and can also respond and participate. If you go to our website, we've got pages of explication and explanation and education about what happens in the water cycle. There is a specific page that is dedicated to PFAS where we are explaining in terms that can be understood by almost everyone about what is the situation with PFAS—what is the impact and what the situation is—and we're doing that for every aspect of our work.

This is the engagement with the community, and what we call water literacy is something that we measure. Every month at the executive meeting that we have, we look at what is our performance in water literacy because we know that explaining how the systems—water and wastewater and stormwater—work to the community is absolutely critical. This is something really front of mind. I'm talking about a demonstration plant that we've opened last year at Quakers Hill. That is also really a demonstration plant where we're taking the public to go through the process and have a look at all the technology that we're using to produce the water. Education—we've got a number of vans, a number of teams going to schools, going to shopping malls to explain the water cycle, to discuss with people but also, more importantly, to listen to their concerns. All of this information that we collect is then integrated into the plans that we are doing for Sydney Water.

The Hon. GREG DONNELLY: For that work that you do and have been doing, are you detecting, through your consultation with the community, awareness that may be expressed in concerns or questions over PFAS in water?

ROCH CHEROUX: We have had this. Going back to 2019, in North Richmond, where at that time there was discussion about the air force base and the fact that there was firefighting foam that was used there and the risk of having PFAS going down the river, potentially, and we've got a water treatment plant. The water treatment plant is actually upstream of the air force base. Therefore, the risk of contamination of the plant was very, very limited. We heard the community saying that they were concerned, and so, back in 2019, we started to test for PFAS at the Richmond water treatment plant. We were completely compliant with the regulations, so there was no issue. Again, last year, there was more concern from the community about PFAS. We started to test all the plants and they were all in compliance with the *Australian Drinking Water Guidelines*. We do listen to our customers, and when there is something where our customers are telling us, even if there is no risk, "We want you to test," this is something that we are doing.

The Hon. AILEEN MacDONALD: I'll direct my questions to Mr Nicholls. How should regional and rural communities be supported in managing the financial burden of PFAS remediation?

ANDREW NICHOLLS: I think there are two aspects that I might firstly say. I think it's a little early to tell yet exactly what the level of impact will be to comply with the new guidelines. Our expectation is that the impacts will vary across different water utilities depending on their particular circumstances. Some may face engineering requirements. Some may be able to source their water from another source. Some organisations may be better capable of absorbing those costs within their existing framework. I think at this point there's not a clear view on what the costs will be overall in relation to any change to the guidelines that are being considered.

That said, IPART's jurisdiction doesn't extend to those local water utilities in relation to pricing. Although IPART plays a role in, obviously, the development of council rates and rate pegs, the rates don't cover the water. The water costs are independently set. So I think it's a valid question that you're raising and it exposes some policy questions around what type of support might be required by different entities on a case-by-case basis in the event that the new PFAS requirements do have significant cost implications. We know from our work in rates in local councils that some councils are doing it tough. We're on record in other committees and processes raising concerns about the viability of some of those councils. This would be an additional cost for some of those. But, as I say, it will be case by case.

The Hon. AILEEN MacDONALD: If we can't do that, would IPART support, say, maybe a statewide levy on polluting industries, then, to help cover the costs of PFAS remediation?

ANDREW NICHOLLS: I think that's something that would be probably more of a question for government. It's not a question that we in IPART have been asked to consider or look at. I don't think we would have a particular view on that option at this point.

The CHAIR: Mr Nicholls or Ms Allen, I'll go to you quickly, just continuing that line of query. There have been some submissions that suggest that the issue of monitoring for PFAS or improved testing in the water supply systems really needs to be built into the operating licences of Sydney Water and Hunter Water. That's something I understand, of course, is regulated by IPART. Do you have a say in that, just in terms of talking us through that, or is that something that just comes straight from government about setting the regulations, and then it's built into the operating licences and then changed accordingly?

ANDREW NICHOLLS: It's a very good question. The licensing system as it relates to drinking water quality has two elements to it. The licence itself has components that require compliance with the Australian drinking standards as well as responding to any requirements of NSW Health. Those requirements are written in a deliberately outcome-based way so that those guidelines and requirements can change over time. The licence is not used to establish prescriptive standards but rather to ensure that the outcome, which is public safety and public health, is paramount in the delivery of the licence by the water utility. The work that we do as a regulator is to monitor that performance against the standards and requirements at any given point in time.

Should there be a case to change the monitoring regime, which is the second part of my response, that could be effected without a need to change the licence by simply—it may be through amendments of guidelines or it may be that the Government or NSW Health were to issue instructions in that regard. The licence would not be required to change in order to give effect to that. In terms of the making of the licence, the final thing I'll say is the licence is made by the Minister on the recommendations of IPART. So IPART, when we consider changes to the licences, will conduct thorough consultative processes and get input from all key players, including the health regulators as well as the water utilities. We make recommendations to the Minister, who takes advice from the department. So IPART can't just change the licence; we would need to get the Minister to do that. But I'm confident that the outcome-based approach that we've taken to regulating this space would mean that that administrative step wouldn't be necessary.

The CHAIR: The review of the operating licences, in terms of IPART making recommendations, is that every five years? Is it when you see a need? What's the time frame again?

ANDREW NICHOLLS: We have a formal review process. Ms Allen might be able to help me on the exact time frames, but each licence has a time frame and an expiry, and we commence the process of a formal review of that in the 12 months prior to that expiry. But you have capacity to be able to make recommendations to the Minister, within the term of a licence, to make amendments to the licence should there be a strong public interest reason for doing that. Ms Allen, I'm not sure if you're able to tell them the exact time frame.

CHRISTINE ALLEN: The current Sydney Water licence is operational from 1 July 2024 to 2028, and we just completed a review of that operating licence after a five-year period last year. WaterNSW was similarly reviewed and is now in effect from 2024 to 2028. Hunter Water is slightly behind. We reviewed it in 2022 and

that's in effect until 2027, which is the next—we move into a five-year review process but, as Mr Nicholls mentioned, it is possible to amend an operating licence within that period should there be a need to do so.

The Hon. SCOTT BARRETT: My questions are for Mr. Cheroux. This may be a weird question, but Medlow Dam and Greaves Creek Dam are shut because of PFAS contamination. Are they ever used for firefighting purposes—the water in those water bodies?

ROCH CHEROUX: I'm sorry but I will have to defer the question to WaterNSW, because the dams are operated by WaterNSW.

The Hon. SCOTT BARRETT: I'm presuming you've been there for a couple of years. Given that the Cascade water treatment plant is down to about 30 per cent of its normal capacity, if we had the same circumstances we had in 2019-20 or 2018, how would we be as far as water security?

ROCH CHEROUX: Again, in terms of dam management, I would refer the question to WaterNSW. But there are alternative schemes that we can use or that WaterNSW can use to provide water to the Cascade plant.

The Hon. SCOTT BARRETT: Did you ever have discussions with or receive advice from the Minister's office in relation to those media requests we were talking about earlier or the agenda referred to in the email?

ROCH CHEROUX: In terms of communication, there is always a lot of cooperation between the different departments within government and the different agencies. This is extremely important in this sort of situation, where we're discussing things that are difficult to understand. So, yes, we are discussing all the time, but it's not about issuing or receiving a direction; it's about sharing information and making sure that the information that we discuss is shared and known by everyone and that, when we discuss the information, this is something where everyone is aligned.

The Hon. SCOTT BARRETT: So you agreed with that show of unity by not talking to the media on that issue?

ROCH CHEROUX: No, that's not what I'm saying. What I'm saying is that communication between the different departments and government agencies is something that is absolutely normal to happen. You want everyone to understand the information coming from different parts of government. In the case of PFAS, you've got information coming from the EPA, coming from WaterNSW, coming from NSW Health and coming from Sydney Water. You want to make sure that the information is shared and that everyone is talking about the same base of information.

The Hon. SCOTT BARRETT: I guess what I'm trying to work out is who made the final decision to say, "No, let's stay mum on this one."

ROCH CHEROUX: There was no final decision-maker. That was a discussion about sharing information and deciding when it was the time to disclose, when the information was ready to be made available to the public or not.

The CHAIR: Mr Cheroux, in terms of Sydney Water testing, how many PFAS chemicals are you testing for? What does that regime look like?

ROCH CHEROUX: Do you want to take this one, Kaye?

KAYE POWER: Yes. We run a suite of 45 PFAS chemicals that we routinely test for.

The CHAIR: Sorry, did you say three to 45?

KAYE POWER: No, 45.

The CHAIR: How many are publicly released at the moment?

KAYE POWER: At the moment, we release the ones that have guidelines against them. That is because, as Roch just said, part of that is about community information and sharing that information in a way that the community can actually understand.

The CHAIR: So you're testing for 45 PFAS chemicals. We heard, again, at the Katoomba hearing that over the December period one of the PFAS class of chemicals, families, called PFBA was very high.

KAYE POWER: No, it wasn't very high. It spiked up a slight—it wasn't very high. It went up a little bit, but if you take any analysis and you do sample collection, they will go up and down like this, because they're not dead straight. They're not equal all the time. So you will get it going up and down and up and down.

The CHAIR: With that class of chemicals that you're testing for, are you doing anything with those results? Are you sending them anywhere, notifying any government agencies or notifying anybody? Or are you just sitting on the results?

KAYE POWER: We're reviewing them internally. We have weekly meetings with WaterNSW and with NSW Health to go over those. We don't always present all of that data because all of it is sitting at very low concentrations. We have a lot of information that we can share. Part of what we have to do is decide—rather than overwhelm everybody with lots of information, pulling out the information that's relevant to what we're trying to achieve at a meeting.

The CHAIR: Some of the chemicals that Sydney Water tests for, though, essentially have been deemed problematic in other countries—for example, PFBA. I was in Minnesota just a couple of weeks ago and met with the government there about PFAS contamination in their water. They test for PFBA and, in fact, their fact sheet about PFBA does say that there are concerns, that high levels of PFBA result in thyroid liver effects and what have you. I suppose the reason I'm asking this is that, at the Federal level, the National Health and Medical Research Council is just regulating these three chemicals because everybody's talking about PFOA, PFOS and PFHxS. But if you're starting to test for 45 chemicals and you're finding different spikes and everything else of these PFAS chemicals, don't you think Sydney Water has a responsibility to notify other agencies and notify the NHMRC, "Hey, look, we're getting a few spikes here of PFBA. Maybe it's worth us looking at whether we should be expanding the list of chemicals we're regulating"?

ROCH CHEROUX: Chair, this is exactly what we're doing. We are testing. Our primary objective is to comply with the regulation that is in place—public health, environmental and economic regulation, all the different regulations that are regulating our activity. There are some activities, some components that we're testing outside. This is why they are shared with NSW Health, because they are the health authority. We are openly sharing what we test. If they ask us to test something else, we will do it—that's part of our role—and discuss that with them. This is part of the regular meeting that Kaye was mentioning with NSW Health and WaterNSW.

The CHAIR: When can the public expect, do you think—because probably the public trust is a little bit lacking as a result of the fact that it was a media investigation that uncovered the PFAS contamination in Greaves Creek. It was a result of independent testing, not Sydney Water. Sydney Water assured the community that there were no contamination hotspots. Now they're testing only as a result of that pressure. They're testing for 45 chemicals and only releasing three. Is the community just supposed to trust Sydney Water about the other chemicals that it's testing for if you're not releasing them publicly?

ROCH CHEROUX: Chair, again it's important to say that our water is compliant with the *Australian Drinking Water Guidelines*. This is a really critical aspect of what we do.

The CHAIR: There are 43 chemicals that you're testing for in terms of PFAS chemicals.

ROCH CHEROUX: Yes. This is where our discussion with Health—and NSW Health are the public health experts; we are not. We are discussing and making this information available to NSW Health.

The CHAIR: Just to be clear, you're making every result that—the results you're getting, is it weekly or fortnightly?

ROCH CHEROUX: It depends on the different testing.

KAYE POWER: We do Cascade Water Filtration Plant weekly, the other plants monthly and Richmond weekly.

The CHAIR: And they go to NSW Health?

KAYE POWER: No. We have a meeting with NSW Health where we will discuss unusual—like how the results are going and what our monitoring results are like. We are not actively handing over Excel spreadsheets of data to NSW Health.

The CHAIR: The summary of all of those 45 chemicals, just the bottom line in terms of how much is there each week—not the Excel spreadsheet.

KAYE POWER: No, we're not handing—

The CHAIR: That goes nowhere?

KAYE POWER: We are focusing on the chemicals that have guideline limits to them.

The Hon. CAMERON MURPHY: That's the three of them. That's it?

KAYE POWER: Yes, those three are the ones that we are focusing on. It doesn't mean if NSW Health said, "Can we have all your data?", we wouldn't give it to them. It's just that those are the ones that we're focusing on in those meetings.

The CHAIR: How do we know if there's not an—and, please, any other members, jump in. We've got a few more minutes. For example, the PFBA that is being regulated in some other jurisdictions but not here in Australia—we are behind what other countries are doing. The *Australian Drinking Water Guidelines*, the draft guidelines, are regulating three. Other nations—the US, for example—even have a sum total of exposure. We don't even have that. You're testing for chemicals that there are limits for in other nations that you're not releasing to anybody. How do we know that there's not going to be a spike in these chemicals that other countries have deemed potentially toxic enough to limit? We don't have the limits.

ROCH CHEROUX: Chair, they are available to NSW Health if they want them. Again, I think the public health question is a question for NSW Health.

The CHAIR: Time has expired, shall we say, for this session. Thank you very much. I really appreciate your appearance, Mr Nicholls and Ms Allen. Thank you, Sydney Water, for appearing today. The Committee will get in touch with you if you agreed to take anything on notice or if the Committee members have supplementary questions for you.

(The witnesses withdrew.)

(Short adjournment)

Ms FIONA SMITH, Executive Manager, Strategy and Performance, WaterNSW, affirmed and examined

Mr RONAN MAGAHARAN, Executive Manager, Operations, WaterNSW, sworn and examined

Mr BRENDAN GUINEY, Executive Officer, Water Directorate, affirmed and examined

Dr JEREMY McANULTY, Executive Director, Health Protection NSW, NSW Health, affirmed and examined

Dr STEPHEN CONATY, Director, Environmental Health Branch, Health Protection NSW, NSW Health, affirmed and examined

Mr TONY CHAPPEL, Chief Executive Officer, Environment Protection Authority, on former oath

Mr STEPHEN BEAMAN, Executive Director Regulatory Practice and Services, Environment Protection Authority, on former oath

The CHAIR: Welcome to our final afternoon session with government witnesses. Is anybody giving an opening statement? Mr Chappel, we've heard one opening statement from you. It will be different to the previous one, I'm assuming.

TONY CHAPPEL: That's right. Thank you, Chair. Good afternoon and thank you for having us appear on this important issue. Before I begin, I'd like to acknowledge the traditional custodians of the land on which we meet, the Gadigal people of the Eora nation, and extend my respects to Elders, past and present, and to any Aboriginal or Torres Strait Islander colleagues joining today. Noting our previous appearance, where we did provide an opening statement, I'd like to provide some additional information on our role working with the Commonwealth on Commonwealth-owned sites, consistent with some testimony the EPA provided in January to a Senate inquiry.

In respect of Commonwealth sites, there are a number of challenges. In New South Wales, the polluter pays. The EPA has no legal powers, however, to compel the Australian Government to undertake remediation actions on Australian government land. This includes Department of Defence sites as well as the Australian Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts sites, such as Sydney airport, Bankstown Airport and Camden Airport. Nonetheless, the EPA has pursued the Australian Government, as the polluter, to take actions to protect the community from PFAS contamination, including at RAAF Base Williamtown and other Defence and Federal airport sites in New South Wales. Without legal powers to compel the Australian Government, this has created issues for the EPA in exercising our effective regulatory functions.

The EPA advocates on behalf of the community impacted by Commonwealth activities, such as Defence bases and Federal airports, to ensure they are assessed and managed, even though we do not have the legislative powers to do so. The EPA has also assessed New South Wales sites around Australian government sites to ensure the local communities have access to accurate information. In New South Wales, we've fostered a collaborative approach to the management of PFAS across agencies responsible, including NSW Health, government scientists, water agencies and the department of primary industries. Unfortunately, this has not always been the EPA's experience working with the Federal agencies, and we'd appreciate the opportunity to extend the spirit of collaboration more effectively across jurisdictions.

Recently we have seen an example around Botany Bay, where signs have been erected without communication with our agency, which contradicts the advice the EPA has provided based on sampling and scientific testing. Greater effort from Commonwealth agencies to work with us on matters relating to PFAS contamination in New South Wales would help ensure that local communities receive consistent and accurate information. In New South Wales, we have established a whole-of-government team of experts to support the EPA's investigation program, known as the technical advisory group, or TAG, chaired by the EPA and containing government experts from NSW Health; the Department of Primary Industries and Regional Development—Fisheries, Agriculture, Biosecurity—the NSW Food Authority; and DCCEEW's science division.

The TAG reviews investigations, scientific reports and sampling results to help develop tailored and general precautionary advice on actions impacted communities can take to reduce their exposure. The TAG also assesses ongoing monitoring reports for specific sites, such as those at RAAF Base Williamtown, and undertakes detailed risk assessments used to formulate specific, tailored dietary advice for food consumption as precautionary advice for the community. We also use the experts in the PFAS TAG to review the EPA's approach to sampling and interpretation of data, and help ensure the advice we provide is rigorous and robust. I note the inquiry has had recent commentary that some in the community consider there's a lack of coordination inside the New South Wales government on these important issues. I want to assure the community that is not the case.

The EPA has also established the NSW PFAS Expert Panel under the Protection of the Environment Administration Act. The expert panel is chaired by the Office of the NSW Chief Scientist and Engineer, and consists of senior representatives from the same agencies included in the TAG. It provides the EPA and other agencies with strategic advice on management of risks posed by PFAS to people and the environment. The EPA and other agencies are concerned about man-made chemicals that are persistent and bioaccumulate where they occur in the environment. We've seen the evolution of the science that underpins the setting of national standards, laboratory techniques and assessment approaches rapidly change over the last ten years.

An example of the rapid changes has been the development of the PFAS National Environmental Management Plan. Since January 2018, there have been three iterations of these national standards, and we expect more to come as science continues to become available. I'd like to point the Committee to an interesting piece of work undertaken by the Victorian EPA titled *Summary of PFAS concentrations detected in the environment*. The Victorian EPA undertook soil, sediment and water sampling across a range of different land uses, and the work identified a 100 per cent detection rate of PFAS in urban environments, 75 per cent detection rate in agricultural environment, and 87 per cent detection rates in mixed catchments. Unfortunately, this work highlights the ubiquitous nature of these chemicals.

We live in an environment that has many natural contaminants such as lead, for example, as well as man-made chemicals such as PFAS. A number of these can pose a risk to people and the environment, but there are three important factors that turn these hazards into risks: firstly, toxicity of the contaminant; secondly, how receptors are exposed; and thirdly, the frequency or duration of exposure. The use of risk assessment provides a robust and systematic approach that underpins the development and implementation of contaminant management in Australia. Under our investigation program, we've used the agreed national approach that focuses on the areas of greatest risk, and the degree of potential harm being the activities that have used large quantities of PFAS over long periods of time.

As noted previously, the EPA leads a statewide PFAS investigation program and does so in close partnership with other agencies and regulators such as NSW Health. When it comes to drinking water quality, this is a responsibility of NSW Health and water utilities under the Public Health Act. I understand NSW Health has asked water utilities to ensure they have assessed risks to drinking water from PFAS, and included this in their drinking water management system. NSW Health is supporting local water utilities in regional New South Wales that have not tested with initial screening tests for PFAS. An example of this close work between NSW Health and the EPA has been the recent PFAS testing across 83 local water utilities. The EPA has been working with Health to help identify potential sources and identify approaches to reduce PFAS risks in those communities with detections.

The work the EPA is involved in in the PFAS space doesn't stop there. The EPA assists authorities to comply with New South Wales Government restrictions on long-chain PFAS firefighting foams. Thanks to the recent passage of the Environmental Legislation Amendment (Hazardous Chemicals) Act in 2024, New South Wales was able to adopt the Industrial Chemicals Environmental Management Standard [IChEMS]. We note there has been a lot of discussion about stopping PFAS entering the system in the first place, and I'm very pleased to advise the Committee that, under the new IChEMS framework, the PFAS chemicals PFOA, PFOS and PFHxS will be prohibited from being imported, manufactured, exported or used from 1 July this year.

The EPA is focusing on stopping PFAS from being included in everyday products and packaging, like compostable packaging, because of the risk to water streams. This work includes guidance on how to test and report on PFAS in fibre-based food content packaging and how to find alternative materials. The EPA is also very involved in the development of the PFAS National Environmental Management Plan and other matters relating to PFAS, which are considered through the heads of EPA forum. That is just a short update and summary of actions the EPA is undertaking to manage existing PFAS contaminated sites and seeking to prevent further contamination.

We acknowledge the community's concerns. The issue of PFAS contamination remains complex and the science continues to evolve. We need to ensure the community has the best available information to ensure that people can minimise their exposure effectively to PFAS chemicals. That's why the EPA continues to review and, where necessary, update the measures we're taking alongside other State and Federal government agencies to ensure we protect the environment and human health from PFAS contamination.

JEREMY McANULTY: Thank you for allowing us to appear. I'd like to begin by also acknowledging that we're meeting on Aboriginal land and pay my respects to Elders past, present and emerging and any Aboriginal people at the inquiry today. The community has understandable concerns about their potential exposures to PFAS. NSW Health acknowledges that the community can experience high levels of distress

associated with potential exposure to PFAS. NSW Health is committed to work across government agencies and with stakeholders to help utilities minimise exposure to PFAS, comply with the National Health and Medical Research Council *Australian Drinking Water Guidelines* and communicate effectively with their communities. Together with other government agencies, we are committed to prevent, monitor, investigate and appropriately remediate PFAS contamination to limit a potential impact on health.

Although to date a causative relationship between the health effects and PFAS exposure has not been clearly established, PFAS exposure has been associated with various health effects. The available evidence on the health effects of PFAS is limited, and associations have been generally small and unlikely to be important to many health outcomes. However, the International Agency for Research on Cancer, or IARC, has reviewed the carcinogenicity, or the potential to cause cancer, of PFOA and PFOS chemicals but has not yet published the related monograph which details the evidence that IARC has used to underpin the classification. Whilst PFAS has not definitively been shown to cause disease in humans, the science and our understanding of these issues will continue to evolve. As a precaution, the Australian Government Department of Health and the national Environmental Health Standing Committee, or enHealth, continues to recommend that exposure to PFAS be minimised wherever possible.

Water utilities have responsibilities under the Public Health Act 2010. All water utilities are required to have a drinking water management system or quality assurance program based on the *Australian Drinking Water Guidelines*. Water utilities must demonstrate how they satisfy these requirements. As part of its management system, the utility should assess the risk of contamination of drinking water and also have processes to communicate with consumers about the quality of drinking water. To comply with the *Australian Drinking Water Guidelines*, water utilities need to assess and control sources of contamination in their catchment and/or changes to treatment processes if other processes do not control that risk. NSW Health recommends that all local water utilities report drinking water monitoring results, including PFAS, to their communities.

The NHMRC has a robust process for expert, evidence-based rolling revision of the *Australian Drinking Water Guidelines*. In October 2024 the NHMRC published proposed changes to the guideline value for PFAS. NSW Health will support the implementation of revised guideline values for PFAS when they are finalised. The proposed guideline values are conservative and incorporate considerable safety factors. It's important to note that the NHMRC has confirmed that drinking water that meets the current guidelines remains safe to drink. Sydney Water and WaterNSW have acted to manage PFAS risk in water supplied from the Cascade Water Filtration Plant, including the commissioning of a temporary PFAS treatment system. Hunter Water has also been active in managing PFAS risk in its supply.

Initial screening from the public drinking water supplies in regional New South Wales was reassuring for the majority of drinking water supplies. Of the 83 local water utilities—including 263 drinking water supplies—tested in 2024, only three supplies had initial results that were above the draft proposed *Australian Drinking Water Guidelines*. One of these utilities had a supply with an initial result that was above the current *Australian Drinking Water Guidelines*. In addition to the three utilities that have results above the proposed guidelines, a fourth utility had a result at the proposed guideline, with a subsequent result below the proposed guideline.

NSW Health is proactively engaging to support these utilities to manage PFAS levels in their drinking water. There are broader challenges faced by some local water utilities in regional New South Wales, including managing risks from pathogens, cyanobacteria, chemical characteristics, extreme climate events, ageing infrastructure and resourcing. There are processes underway for the New South Wales Government to respond to the NSW Productivity and Equality Commission's review of the local water utilities funding models, which will consider many of these challenges and the merit of implementing minimum water quality standards. NSW Health will continue to work with other government agencies to support local water utilities to provide safe drinking water to their consumers by supporting the implementation of the drinking water management systems that are based on the *Australian Drinking Water Guidelines*. Thank you.

FIONA SMITH: Thank you for your time this afternoon. I would also like to acknowledge that we're on the land of the Gadigal people and pay respects to Elders, past and present. WaterNSW operates 41 major dams around the State, capturing and storing water and supplying it ready for distribution for use in the environment, agriculture, industry and the community. With responsibility for delivering two-thirds of all water in New South Wales, we take water quality and the health of our communities very seriously. In Greater Sydney, we manage and protect the declared areas of the drinking water catchment, which is around 16,000 square kilometres, so stretching north past Lithgow, down past Goulburn to Braidwood. It's an area equivalent to half the size of Belgium.

The strict legislative protections and restrictions on human activities within this area are in place to ensure raw water supplied from the 21 dams in this catchment is as clean and as safe as possible. In providing water that is then treated for drinking, we believe nothing is more important than a safe water supply. We work closely with Sydney Water and NSW Health to assess hazards to the water supply and ensure that drinking water supplied to customers meets the *Australian Drinking Water Guidelines.* In doing so, WaterNSW closely monitors source water, receiving live quality data from physical in situ instruments and taking around 10,000 manual water samples every year. Those samples are tested for over 180 analytes, including chemicals, bacteria, contaminants, so altogether we perform almost a quarter of a million analyses every year.

Our work is informed by the *Australian Drinking Water Guidelines* and follows the standard for water managers across Australia. It's a risk-based approach in protecting the source water, meaning we focus our time and resources on the water quality parameters that are likely to pose the highest risk to public safety and to providing a safe drinking water supply. Another component of the risk-based approach is regularly conducting catchment-to-customer risk assessment reviews with our partner agencies NSW Health and Sydney Water. Our reviews first identified PFAS as a hazard of emerging concern in 2017 and an assessment was conducted. The outcomes of this assessment show that the risk to Greater Sydney's water supply was low with no major industrial sources of PFAS identified in the catchment area.

In doing these assessments for PFAS, we applied the guidance provided by the National Environmental Management Plans, the NEMP, as the Australian authority. Since then, we have continued to monitor developments of the latest science and changes in risk, including from the EPA's PFAS investigation program. As is well known, following the detection of elevated levels of PFAS in two dams, Medlow Dam and Greaves Creek Dam, WaterNSW took the action to disconnect those from the affected Blue Mountains dams as a precautionary measure. We also commenced regular testing and are undertaking a forensic investigation into the source, including land use mapping and the development of a conceptual site model.

At all times we've sought to keep the local community up to date, including hosting three community drop-ins in the Blue Mountains in September 2024, publishing fortnightly water quality testing results and two community updates. We anticipate our investigation report will be available in mid-2025 and we look forward to sharing the findings with the community. WaterNSW operates around the State. However, in regional New South Wales, we don't have the same catchment management role as we do in Sydney; nor do we operate urban water supply dams or directly supply drinking water. The storage dams, however, are often popular locations for recreational activities, such as boating, swimming and fishing. Reflecting our different role in the regions, we have conducted a screening analysis of our regional dams, supporting the New South Wales Government's work with testing by local water utilities. All our results are within the recreational and drinking water guidelines, and these results have been provided to local water utilities to help inform their own risk assessments, and they're also available on the WaterNSW website. We're happy to take any questions.

BRENDAN GUINEY: I represent the 90 council-owned local water utilities across regional New South Wales. Many are small councils who don't have the scale and capacity to respond on these detailed technical matters, so thank you for your time today. We've always been committed to protecting public health and the environment. The Water Directorate collaborates with government and non-government bodies to produce better water supplies right across regional New South Wales. I think the most important point I can make is it's very difficult to just stop providing water and sewerage services in regional New South Wales. I think you heard from some of our members earlier, including Gwydir shire and Dubbo Regional Council.

There's a complex interplay when we start to have water quality challenges that can also affect water security and the ability to continuously supply water. We support the submissions of many parties about source control of PFAS being the most pragmatic and effective measure, because we don't think we can build our way out of trouble with this particular challenge. We can't test everywhere all of the time. I don't think regional communities can afford that, so we're very much reliant on the State agencies, hopefully the participation and funding of the Commonwealth, to deal with this in a strategic way and support a risk-based approach, because we've got many challenges and many contaminants of concern out there in water. Thank you. I'm also ready for questions.

The CHAIR: I wanted to turn to the situation of the Blue Mountains water supply and the contamination that was there in the water that residents of the Blue Mountains believe they may have been drinking for some time—in terms of PFOS in their water. Dr McAnulty, why isn't NSW Health doing any kind of screening of blood of residents in the Blue Mountains?

JEREMY McANULTY: First of all, we understand the concern that the community has, and there has been a lot of interest in blood testing. The results that we have are that the levels are below the current Drinking

Water Guidelines, so we would not expect there to be ill-health effects from drinking the water, from what we know. Screening of blood or testing of blood for an individual does not provide evidence that either predicts disease outcome or helps in the diagnosis of any health conditions, and that's the main reason for clinical reasons. There may be a role in national health, and the Australian Government has recommended there may be a role for well-constructed, well-designed monitoring at a population level over time to see what happens with PFAS results in well-constructed studies where there is concern, and there has been a number of studies that ANU has been involved in that have looked at different levels in different communities.

The CHAIR: So it's NSW Health's position that there's no point in testing blood? Did you say there was no correlation?

JEREMY McANULTY: There's no evidence that you can take from a person's individual blood test that can be used to give information to that individual about whether they're at increased risk of any disease or condition, or in helping diagnose any condition. For the individual, there is no known benefit with the information we have to date.

The CHAIR: I did meet a woman, who was actually at the Katoomba hearing, who told me that she ended up getting her own blood tested. She went to her GP. Her GP said that they couldn't get her blood tested and she'd have to go to Douglass Hanly Moir. She went there. She had to pay $500 for this blood test of her PFAS levels. Her PFAS levels came back at a level that the figure in the US National Centre for Biotechnology Information has deemed as high. This woman put in a submission to the Federal inquiry into PFAS, so she shared her submission with me.

Her PFAS levels were something like just above the 20 micrograms per millilitre. The US National Centre for Biotechnology Information says here that if somebody comes back with that level, the doctor should conduct thyroid function testing. They should assess for signs and symptoms of kidney cancer. Don't you think that's one of the reasons why people get their blood tested—because there have been associations? NSW Health continues to say that PFAS doesn't cause any disease, but it's the association and the potential, isn't it? That's what the research is showing, that there's a greater potential for somebody to develop thyroid issues or kidney cancer.

JEREMY McANULTY: The evidence as I understand it, based on the evidence available and discussions nationally, is that for an individual, whatever their level, it actually isn't helpful in predicting whether they're at increased risk of those cancers or conditions you mentioned. Without that evidence, it can't be used to assist in what the risk of the person might be and therefore whether other tests are necessary. It's important to remember in the background that PFAS is ubiquitous in the community. People might be exposed in a range of products they're consuming, apart from water. So we all have and can be expected to have PFAS levels in our blood. That level, just as I understand it from expert advice and materials—there is no correlation, at an individual level, between that level and what your disease risk might be.

The CHAIR: Has NSW Health given that same advice to Fire and Rescue NSW in relation to firefighters and individuals who may have historically worked with AFFF, the PFOS firefighting foam? NSW Health suggested that blood testing in that situation has no value either?

JEREMY McANULTY: I'm not aware of that specific advice.

The CHAIR: The assistant commissioner in Katoomba, when asked about blood testing for a firefighter, for example, who would approach the agency requesting to have their blood tested because they've got a particular illness or potentially cancer, said to me, "Prior, the NSW Health advice suggested that blood testing had no current value in informing clinical management of people with potential exposure to PFAS." He read that out. Those were his lines that he had prepared. So that's what NSW Health has also advised in relation to firefighters?

JEREMY McANULTY: Without knowing that specific piece of evidence, but that is consistent with what I was saying earlier.

The CHAIR: But firefighters have worked with the very toxic PFOS foam that was phased out in 2007, Dr McAnulty. You don't see any reason for firefighters to have their blood tested as a result of working with that foam?

JEREMY McANULTY: If the question is about whether that information is going to help that individual know whether or not they have an increased risk of disease, it won't. Given the available information we have, my understanding of the evidence is that it won't help predict that person's risk of disease.

The CHAIR: There are lots of other jurisdictions that are undertaking blood tests, though—for example, in the US, which I visited recently. Minnesota has got a history of quite high PFAS pollution, obviously. But they

undertake extensive testing for impacted communities. Is there a reason why NSW Health seems so resistant to it?

JEREMY McANULTY: NSW Health is keen to follow the evidence and provide advice to the community about what the evidence shows. As I mentioned earlier, there is maybe a role in properly constructed studies using population-based levels of PFAS to determine whether a population or community group, over time, whether blood levels have been changing to reflect—and that can be used to help understand whether policies about reducing exposures to PFAS have been successful or not. I might defer to Dr Conaty here. I understand that the Australian Government has begun a study to monitor that.

STEPHEN CONATY: Yes. My understanding is that the Australian Government has funded the Australian Bureau of Statistics around about $800,000 to add on a component of testing to one of their existing studies. I think it's the intergenerational mental health study. That will give us a good understanding of the population distribution of various ranges of PFAS chemicals in the Australian population. I think that's probably a credible population-based study that Dr McAnulty was referring to. My information is that those results should be become available in 2025.

The CHAIR: What exactly, in terms of the ABS, is the data they're collecting there? Is it blood?

STEPHEN CONATY: Yes, they're collecting blood. Some of the studies that are done at that national level have a component of physical examination, and so it's been added on to one of those studies.

The Hon. TAYLOR MARTIN: Mr Chappel, you began your opening statement by telling us that polluters pay here in New South Wales and that the EPA cannot compel the Commonwealth to pay its fair share in regards to PFAS, for example, around Defence bases, particularly air force bases. Is it fair to say, where the EPA cannot compel a polluter to pay, or cannot identify the offending polluter, that action is not then taken to the same level of remediation where it can otherwise be the case where a polluter can be identified?

TONY CHAPPEL: No. We seek to use a risk-based approach for remediation. When I'm talking about the polluter paying an ultimate liability, or conviction for offences, the Commonwealth Constitution creates some challenges there for the entities. There is an intergovernmental agreement, but I think it would be more effective if we could agree that either Commonwealth entities would submit themselves to the same rules and regulations that apply to every other entity in the State or duplicate or replicate those and try and align. In terms of how we consider remediation, I might invite my colleague Mr Beaman to give you a bit more detail there.

STEPHEN BEAMAN: That's a good question. I think remediation often gets viewed as something that's very narrow in its definition. But the way the national environmental management plan for PFAS thinks about remediation, it's got a couple of things here. It's about source removal. If you can identify the source and the polluter, you can remove the source and you can dispose of that material. It's about source control. How do you limit the material leaving a site? Is there anything you can do to contain it? The other things that we often do is intervention exposure, pathway interventions. They're about changing people's behaviour. Then there's also a thing about receptor management. Where does it go? Where does it end up? Is there any advice we can give the community?

Typically, the way that our programs run in New South Wales is we've done about 1,100 sites that we've looked at, which is probably the biggest sort of analysis in the country. Often we can find a particular hotspot on a site, or a particular source. Where we're now moving, and where this debate around the drinking water has taken it, is around PFAS in the ambient environment. What Mr Chappel spoke about in his opening statement is some really great work that's come out of Victoria about the detections that we see of PFAS and PFOS in the environment. That's a much more challenging one to manage because you haven't got a particular single source or ways to identify where to put those remediation strategies.

The Hon. TAYLOR MARTIN: Sure thing. Are you able to give us a bit more insight into the difference in remediation strategies for different sites—for example, Defence bases? Is it the case that Defence is saying that they will look after some sites? Correct me if I'm wrong, but I know in Williamtown that was the case a while ago—that Defence were remediating some of the water surrounding Williamtown alone.

STEPHEN BEAMAN: We've been pushing Defence pretty hard and we want to stay on the hammer to make sure that if they say they're going to do something then they do it. They've installed three water treatment plants and another one to come on line. There are interesting statistics on this. They've treated 5.2 billion litres of water and they've probably extracted about 60 kilograms of PFAS. It just shows you a very small quantity goes a long way. What they've done on the base is pulled out the contaminated soil on the fire training ground. That's that source control. They're trying to reduce the mass of PFAS that's leaving the site. They're trying to treat the water surface on the site, which they've done. They've got a big lake there called Lake Cochran and they've been

treating that. The thing that Defence has done now, which we're really supportive of, is they've got pumping wells in what we call the primary management zone just outside the base. They're pumping the contaminated water back onto the base and treating it.

The Hon. TAYLOR MARTIN: This is what the locals call the red zone, yes?

STEPHEN BEAMAN: We call it the primary management zone. And then the other thing that Defence is going to do is put up what they call a permeable barrier. They're going to dig down below Lake Cochrane, deep, and then put a trench system in that treats the water as it moves through that membrane. There's a whole range of treatment options that you can use, and Defence has been doing that on those bigger bases.

The Hon. TAYLOR MARTIN: I'm sure we could talk for the rest of the day. I might pass on.

The Hon. SCOTT BARRETT: I'm sure we all could talk for the day, Taylor. Mr Chappel, are we any closer to finding the source of the contamination in Warialda?

TONY CHAPPEL: In where? Sorry, I didn't hear.

The CHAIR: Warialda.

STEPHEN BEAMAN: No. That's one of the three sites that Dr McAnulty talked about, of the 83 that were tested. We're just starting a piece of work with our colleagues in Health looking at what are the potential sources in those three detection sites. That work has just commenced.

The Hon. SCOTT BARRETT: Sorry, so three out of the 84 have tested—

STEPHEN BEAMAN: It was three out of the 83 local water utilities. That was the work that NSW Health paid for. There were three detections. Warialda was one. But, for each of those detection sites, we're going through starting the process of identifying and mapping, looking at what other activities are occurring in that water catchment that may be a contributor to it. The obvious things for those catchments, for us, typically, are landfills. I suspect Warialda has a small landfill. Most country towns, as you know, usually have a small landfill or tip on the outside of it. That's where we'll probably start our work. But we're going to map that so we do it systematically and see if we can identify any sources.

The Hon. SCOTT BARRETT: And the other two sites? I'm not asking you to name them, if that hasn't been rolled out yet. Is the same thing underway? Are the councils aware?

STEPHEN BEAMAN: I might hand over to my colleagues in Health because they're the ones that hold all the info on those water sites. But the answer is yes. We've met with all the councils and we're working together.

JEREMY McANULTY: As Mr Beaman said, we're working closely with the local water utilities in those instances. The local water utilities have communicated with their communities about the results. We've been working to do additional testing with the local water utilities in the case of Warialda to identify—I think there were four—a number of bores that were supplying the drinking water and to test those bores. They were tested. Those that were identified to have PFAS in them were taken off line and then the water cleared through the reservoir so that now the levels have declined and will continue to decline. Further testing is underway and further meetings are being arranged with the council, the local water utility and other government agencies, as Mr Beaman mentioned.

The Hon. SCOTT BARRETT: Are those communities aware themselves?

JEREMY McANULTY: There has been communication with the communities about the results in those instances, yes.

The Hon. SCOTT BARRETT: Sorry, I've missed it then. Are you able to tell me which ones they are?

JEREMY McANULTY: Yes, they're publicly available. They're Tarcutta in Riverina Water county council area and Narrabri in the Narrabri Shire Council area. Those levels were below the current Drinking Water Guidelines—and Warialda.

The Hon. SCOTT BARRETT: Maybe Mr Guiney can answer this one. We've been a little bit lucky that Warialda, for instance, had those—it was a couple of bores that tested positive, but there were still other resources available. For the one in Katoomba, we could pump up from down the mountain. What happens in one of these communities that doesn't have that alternate source? I don't know, but Molong dam might be one of those that is the singular source of water for that community. What happens in those communities if their water source is shut down?

BRENDAN GUINEY: We wouldn't necessarily shut water off, because we do need to provide it 24/7, but working with the regulating agencies, Health and EPA, you would switch those communities on to bottled water immediately. That would be difficult and expensive, and there are a lot of challenging situations like schools, aged care and hospitals, where you need to pay close attention in your community to compromised community members. So it is not easy. The larger the inland city or coastal city, the larger the bottled water challenge becomes. I think, as Health said earlier, we're very fortunate that there are only three to four sites that have challenges with PFAS, because if we had a town that didn't have a second source of water, then those sorts of solutions would have to be implemented.

The Hon. SCOTT BARRETT: How far through this testing are we, Mr Chappel? You say 83. Are there still more to come?

TONY CHAPPEL: I think that's a question for Health.

JEREMY McANULTY: No. All the water utilities have been tested now, with initial screening which covered over 200 individual water suppliers.

The Hon. SCOTT BARRETT: I think I might have belled the cat on this one a bit earlier, and this might be a nothing scenario, but I'm just wondering: Are WaterNSW assets such as Medlow Dam and Greaves Creek traditionally available for firefighting purposes? Obviously this is a question for WaterNSW.

RONAN MAGAHARAN: Yes. I'm not aware of any circumstances where it might have been used, but certainly we can take that on notice and look. But it's not traditionally provided for firefighting purposes. That does not mean—in bushfires, a helicopter may have extracted water from those dams for firefighting purposes.

The Hon. SCOTT BARRETT: I guess my question is—where I'm clearly going is—I wonder if any consideration was given to the fact that, if we did have an incident throughout the summer or even now, we might face a situation where someone, in an instant, has to make the decision: Do we let that country burn or do we put PFAS-contaminated water on it? Has any consideration been given to that decision beforehand—and who would be involved in that decision—rather than someone having to make it on the spot?

RONAN MAGAHARAN: Yes. We work very closely with the RFS and, in fact, throughout Sydney's declared catchment, the RFS and National Parks. We work quite closely with them in terms of firefighting. There is an approved list of chemicals which are used and the RFS is aware of, and then we also have people sit at the control desk, essentially, discussing options for accessing water. So those decisions can be made through the control rooms, fighting the various fires, with the relevant people.

The Hon. SCOTT BARRETT: Would you be able to take on notice for me whether any consideration or advice was given to that situation where there was a potential we could have been putting PFAS-contaminated water onto the land?

RONAN MAGAHARAN: I can take that on notice, yes.

The Hon. SCOTT BARRETT: While I'm with WaterNSW, again, the drought question I've asked before: What would the situation be with something like the Cascade water plant, that's only operating at 30 per cent at the moment, if we had drought conditions like we had in 2019-20?

RONAN MAGAHARAN: As you mentioned earlier, there are a number of options in terms of supply for the mountains. From Sydney Water's perspective, they're able to pump up the mountains to supply water. In terms of WaterNSW, we're also able to transfer water from Oberon through to the Cascade system to help manage water supply. Right now overall in Sydney, supply level is about 94 per cent of capacity. Oberon is a bit higher at 97. Roughly we'd get to 50 per cent supply in Oberon in about two years if there were no inflows—so zero inflows. There is quite a bit of flexibility there, and we have a number of options in terms of securing supply.

The Hon. SCOTT BARRETT: You can just imagine the frustration level of people as we're running out of water, yet there are water sources sitting there that we can't touch. That might put a bit of impetus in the need for some of this filtration.

The Hon. CAMERON MURPHY: I just had a question for Mr Chappel. Following on from the issue raised by my colleague the Hon. Taylor Martin. I think we have heard a number of times in evidence at these Committee hearings that in New South Wales, the polluter pays and you've got no ability to enforce the State law against the Commonwealth. I really want to tease that out a bit. Have you given any consideration at all to suing the Commonwealth in order to recover the costs of remediation? Have you got advice about that or has the State looked at that?

TONY CHAPPEL: Perhaps I might take that on notice because if some of that thinking has occurred, it would precede me. Why don't I take that one on notice?

The Hon. CAMERON MURPHY: Okay. But it's just not right, really, to have this position that because they're the Commonwealth, there's nothing we can do. That seems to be the position, doesn't it?

TONY CHAPPEL: Certainly the advice to me is that with a few minor exceptions, that's the way the High Court has interpreted this issue. It puts significant challenges in front of us. It's not to say—

The Hon. CAMERON MURPHY: I don't think it's quite that clear.

TONY CHAPPEL: I'd welcome that discussion.

The Hon. CAMERON MURPHY: I'm just wondering if you have got any advice. Have you given any consideration to taking action, even if it is simply something to prompt a more honest negotiation, perhaps, over how these things are dealt with?

TONY CHAPPEL: It certainly has been discussed—I understand in some detail—prior to the last few years when I've been more directly involved, but also more recently. But let me take it on notice. As I said, I'd also welcome the discussion.

The Hon. CAMERON MURPHY: If you're taking it on notice, can you also look at whether you've had a look at enforcing common law rights or taking an action in tort against the Commonwealth? Also, I understand the grave difficulties in enforcing State law against the Commonwealth. But there is still some scope there where there are openings and the court has allowed it in the past—the High Court. Could you also look at that issue of whether you looked at enforcing State law against the Commonwealth?

TONY CHAPPEL: Yes.

The Hon. GREG DONNELLY: Thank you all for coming along. I'll direct my next question to the EPA. We've got the omnibus State Government submission and we've got also the Water Directorate's submission. You mentioned in the opening statement—and specifically in the opening statement from the EPA—the reference to the statewide investigation program. I'm wondering if you'd be able to elucidate on its history, what it's currently doing and perhaps some forecast of what work it's likely to do into the future.

STEPHEN BEAMAN: Thank you for the question. This work really commenced in full in about 2016, again, driven by community concern around PFAS. Really, the ground zero for this was Williamtown, in terms of community concern around the use of these chemicals. What we've done over a couple of periods of time is used our own internal data sources. We've also engaged with local government through the appropriate local councils on a number of occasions saying, "Were you aware of these chemicals being used and particularly these types of land uses?"

The development and the release of the PFAS National Environmental Management Plan—you'll hear us talk about the NEMP. Version 1 of that was released in 2018, by memory. From all the EPAs' experiences and what we could see around the world, that generated a list in the back of it, which we call appendix B, which is the list of activities undertaken that use large volumes of PFAS chemicals. It's quite a range of industrial activities—about 29, by memory. We've then gone through and systematically identified, really from the top of the list down, where are those sites and had they used PFAS. The way the national framework works for site contamination—it's called the assessment of site contamination. NEMP sets a framework, and the first step you do is a preliminary site investigation. You do the desktop analysis and you may take some samples at that point, given what the desktop analysis shows. And so we've systematically gone through and assessed those sites, and that work still continues today. As we've looked—

The Hon. GREG DONNELLY: The number of sites that we're working through, what's the—

STEPHEN BEAMAN: We've done 1,100 sites. It is by far the most in comparison to any other jurisdiction. We've sort of almost started at RAAF bases and Defence sites and have worked our way down. The pivot point in that is, adjacent to that program, we've been working with the Rural Fire Service. They have their triage program, so we've agreed with them how they're going to triage their sites, because they use materials—PFAS-containing foams—for training. And the same with Fire and Rescue NSW. They had training facilities. They'd often go out to the back, in some stations, and use the backyard or the paddock at the back to clean their equipment, and do that over a number of years, or do some basic training at the back of the fire station. And so we're working with both of those agencies still today, systematically working through their sites, where their records show that they've used PFAS.

For us, this has been and will be an ongoing piece of work for quite a while. This isn't something that we can declare, certainly, any conclusion that we've completed that work. But we're confident and we're just systematically working our way through that list. The focus on that list is really around what all the literature talks about and all the work that you see overseas from other jurisdictions like the US—it's where the material is used over a long period of time in high volumes. That's the area of the greatest risk. If I use, for comparison—personally, it's not a great comparison—somewhere like Williamtown, they're at 150 micrograms per litre in their groundwater. And then you might get to somewhere else in the State—in Botany Bay we sampled recently 0.0017 micrograms per litre. We're really focusing our effort on where the greatest potential harm is, and that's been those big RAAF defence bases and airports, because that's where a lot of training was done in a very concentrated way.

The other part to this—where we're sort of moving to next, and have been planning for for a little while—is around a type of ambient work, a little bit like the Victorians have done. How do you build a picture for the community about where PFAS is across the State? How do you do that in a robust way? How do you make that information accessible? How do we give people good information in relation to how they minimise their exposure to PFAS chemicals? Part of this is starting to build that picture. We get work in from NSW Health. We get our own work when we require others to do work, like the Department of Defence. We're starting to develop up that database of information across the State and just seeing what that looks like, and is there a particular story we can tell?

The other reason why you might do something like an ambient program is it helps you look at elsewhere in the catchment where there might be potential source sites that may have been missed. I think at last count there were 363 small country landfills in New South Wales. Every town above 1,000 people usually has a little tip on the outside. We know that those locations, where people are disposing of material, end up being sinks for PFAS. How then do you systematically, over time, go back and through those landfill sites and identify them and see whether they pose a risk or not? The program has been a very robust, systematic approach that uses all the national standards and guidelines. That's why we're pretty proud of the nature of the work that the team has done.

The Hon. GREG DONNELLY: This is my final question, and I have raised it with previous witnesses. This is directed across the agencies on the matter of engaging publicly and communicating with the public over a complex issue in a way that is digestible and in plain English and done in a coordinated fashion. Maybe one might speak on behalf of the whole lot, but it's open to all. Is ongoing work being done to look at how that could be done better—because we do face challenges of people misunderstanding or miscategorising what they're looking at as an event or as a situation—to try, as clearly as possible, to present to the public through whatever channels you use—and it'd be interesting to know what channels you do use—to explain the actual situation that we're looking at?

STEPHEN BEAMAN: That's a thing for everyone—and I've been on this PFAS journey for a while now—is that risk communication. How do you turn some very complex science? Some of the data is still emerging. When we say "emerging", there's still debate in the scientific community about that data. If you go and look at the data, the number of journal papers published since the 1990s, there's almost nothing on PFAS till about the mid-2000s, and then the curve just skyrockets in peer-reviewed journals. There was not much being done in the science community and then all of a sudden it piques everyone's interest in about the mid-2000s. That's why, when we say the science is still emerging, there's still work that's actually coming to the fore to really guide the work we do.

How do you get all that complex information about risk assessment and harm where people are feeling quite scared and uncertain? They're looking at things on the internet. How do you give them good information? All the versions of the National Environmental Management Plan have talked about risk communication. That's the bit we're starting to put a—we need to be better at how we do that risk communication and so on. That's a piece of work we're starting to think about how we can do better. What we found in the past works well—and I heard some of the evidence my colleague Mr Gathercole gave yesterday—is we find it's often the personal one-on-one chat you can do with someone.

The thing we've done in the last couple of years—and I'll use an example. It might be the Mullumbimby Fire Station, where it was detected in the soil there. We just find the doorknocking approach, to go and knock on the door and metaphorically have the cup of tea, and have that discussion with the property owner and give them advice for their situation. Because often it's about, "Do you have a bore?" Often some people have some unregistered bores. We say, "That's okay. We don't worry about that, but we'd like to sample it. We'd like to give you advice. Do you grow veggies in the garden?" You can actually have a very meaningful one-on-one conversation—it's not sitting in a brochure or a newsletter or a pamphlet.

We're finding that to be the way that you can actually have that conversation with people. It's very resource intensive, but we find, in those particular communities, that that's the way it's evolved best for us to have that communication one on one. We often do it in partnership with other agencies. We often might take a Health colleague along. I know when we did the fire stations we took a Fire and Rescue colleague along. They're often known in the community and trusted. Really, the challenge is how do we distil this complex information into good risk-based science communication?

The Hon. GREG DONNELLY: It has the bonus of having that fire alarm check while you're having the visit.

STEPHEN BEAMAN: Yes, there's all of that. It's something I've been having a discussion about with Darren Saunders, who is the deputy chief scientist at the office of the chief scientist. His background is risk communication in the cancer area. It's a challenge to get that information into people's hands, but we try.

The CHAIR: With the testing that's being undertaken with all the local water utilities, just to be clear, has every single local water utility said yes? Was that mandated that they be tested?

JEREMY McANULTY: No. We wrote to each water utility, recommending that they do the testing, and then we offered to support them in paying for the tests where they hadn't been able to do a test yet. Through personal communication through public health units and also formal correspondence, local water utilities, who have the responsibility for doing the testing—did the testing.

The CHAIR: Okay, so that's been recommended, and then I understand that NSW Health also recommended rather than directed that they publicly report that information.

JEREMY McANULTY: That's correct. Water utilities have the responsibility to do risk assessment, to do follow-up testing and to communicate with their communities.

The CHAIR: So NSW Health doesn't think that it should direct local water utilities to publicise the results of the water testing? NSW Health can't make that decision?

JEREMY McANULTY: I think that's a matter for government about the relationships between local government and State agencies and about who owns the information. But certainly we have worked with local water utilities to strongly recommend they do that, and those where they have had positive findings have provided that information to their communities.

The CHAIR: I've got an email here from this very extensive SO 52 order that I got passed by the House last year. There are still 130 boxes downstairs, but one of the emails suggests, "At this point, we thought it was decided that NSW Health would recommend rather than direct public reporting". That sounds like the decision does rest with NSW Health as to whether they would recommend local water utilities publish the results, as opposed to telling them they really should publish the results, doesn't it?

JEREMY McANULTY: Again, the water utilities are the owners of the data and the owners of the responsibility to provide safe water to their communities, and we have a respectful working relationship with local water utilities. We, through our public health units, have regular communications with them. I think part of our approach is to be supportive, to be respectful of their ownership. However, if we were concerned that important information wasn't being made public, we would work with those communities' water utilities to explain why they needed to do that. In fact, the approach was successful in making sure that the testing occurred and that the results were reported where they were above any guideline or proposed guideline.

The CHAIR: In the results that have come back, how many local water utilities were there issues with in terms of PFAS, but particularly in terms of the new standards? I assume that there are some local water utilities that won't meet the new Australian drinking water standards. I've got information in front of me for PFOS in particular.

JEREMY McANULTY: Putting aside Sydney Water and Hunter Water, which would be doing routine—

The CHAIR: Yes, local water utilities.

JEREMY McANULTY: There are 83 local water utilities who have 263 individual water systems. Some have multiple water systems at different communities. Those 83 were all tested in 2024. Of those, two had levels above the proposed guidelines. The guidelines aren't yet in force and aren't yet finalised. We're expecting those to be finalised in April by NHMRC. Two had levels above those proposed guidelines, which are much lower than the current ones—they were Tarcutta and Narrabri—and then one, Warialda, had levels above the current guideline. Another water utility had initial screening equal to the level of the proposed guideline but subsequently tested lower. So the majority—

The CHAIR: Do they all go to the same lab—the water?

JEREMY McANULTY: I understand there was more than one lab involved. We use NATA—the National Association of Testing Authorities—accredited laboratories to do the testing. We arrange for the testing to be done. We would often send out specimen jars and instructions about how to do the testing and, where required, pay for that testing.

The CHAIR: Because there were issues, weren't there, that in some of the labs the reporting limit was too high for the new PFOS limits.

JEREMY McANULTY: So we went back.

The CHAIR: Yes, you've repeated that testing.

STEPHEN CONATY: We had to go back to a number of the utilities to arrange further testing, yes, which was initially done.

The CHAIR: Mr McAnulty, just back to the communication that NSW Health and enHealth have been communicating in relation to the health effects of PFAS, in the submission and in enHealth's guidance—we will stick with the New South Wales Government's submission—it says:

> Whilst PFAS has not definitively been shown to be a cause of disease in humans, enHealth notes that the science and our understanding of these issues will continue to evolve.

It also mentions the increased potential associations between PFAS exposure and the increased risk of two uncommon cancers, namely testicular and kidney cancer, being reported. Is there a reason? There's quite a lot of research about cholesterol, though, isn't there?

JEREMY McANULTY: There's a lot of research out there and there's a difference between associations and causality. There are particular outcomes and a range of exposures that people might have had. When you do epidemiological studies, you'll often find associations between a higher level of an outcome and exposure to certain things, but that doesn't mean they're causal. That could be a range of reasons why that is—

The CHAIR: Dr McAnulty, I think people are aware of the difference between actually causing the cancer. I think that is well understood. But people even within your department in an email state, "PFAS and cholesterol" that Kishen Lachireddy sent you in July last year. It states:

> It is well understood that PFAS, owing to their structural resemblance of lipid molecules, may disrupt human lipid metabolism by activating nuclear receptors, such as peroxisome proliferator-activating receptor alpha.

They attached this study, "Per- and Polyfluoroalkyl substances (PFAS) Exposure and Thyroid Cancer Risk", which essentially says:

> This study reports associations between exposure to PFAS and increased rate of (papillary) thyroid cancer. Thyroid cancer risk from PFAS exposure is a global concern given the prevalence of PFAS exposure. Individual PFAS studied here are a small proportion of the total number of PFAS supporting additional large-scale prospective studies…

That's what people within your own department are sending you and you came back saying, "Interesting. Thanks, Kishen. Jeremy."

JEREMY McANULTY: The evidence—

The CHAIR: I am curious to know whether something is going on within NSW Health so as to continually suppress some of the evidence and research. Does that make its way up to the National Health and Medical Research Council and enHealth, because it's extraordinary compared to what everybody else is talking about.

JEREMY McANULTY: It's really important that we—

The Hon. GREG DONNELLY: In fairness, I understand that you're asking the question, but—

The CHAIR: Is this a point of order?

The Hon. GREG DONNELLY: Yes, it is a point of order. I think this is the second time the witness has been addressed from an email that he hasn't had a chance to have before him. You're quoting directly from it. I think it's just courtesy to ensure a witness can see what's being proposed. You then pivot off and make certain assertions. I just think that in fairness there could be a context to that email. I don't know whether you've been asked that question. I think the witnesses do need to be provided with that opportunity to fully understand what's being presented to them.

The CHAIR: We'll just go with the research document because I don't have a copy at this point—this research paper which you're familiar with because one of your people—

JEREMY McANULTY: I might defer to Dr Conaty, if that's okay.

The CHAIR: But it was sent to you, Dr McAnulty.

The Hon. GREG DONNELLY: I note the word "association" was clearly stated in the email that you read from. The association is dealing with the exact issue of correlation just to be distinguished from causality. That's not inconsistent with the evidence that's been provided.

The CHAIR: We'll send it round.

STEPHEN CONATY: Kishen works for me in the Environmental Health Branch and he's a very valued colleague. He's also on the TAG, so he is very familiar with PFAS. It's not uncommon within the health department to exchange papers that we come across. As Steve Beaman rightly pointed out, there are thousands of new papers that are dealing with various associations between PFAS and health that are published every year. It's difficult to be across them all. On the particular point about the association with cholesterol, I think if you look at one of the very good systematic reviews that was done as part of the ANU health study, I think on balance they agree that there is an association between PFAS and cholesterol.

But for the vast majority of other associations in that systematic review, they have considered that the evidence is really inadequate. That goes for a number of the cancers that we've been talking about this afternoon, including kidney and testicular cancer, which are two of the cancers that have been identified, particularly in the large occupational cohort studies in the United States. We haven't seen that at lower levels of PFAS exposure. I think that the evidence is evolving, and I think part of this robust discussion that we have within the health department is a sign, I think, of good health, that we're actually taking some of these potential associations seriously.

The Hon. AILEEN MacDONALD: I'll change direction and direct my questions to the Water director, Mr Guiney. With regard to page 4 of your submission, can you please expand on the environmental and social impacts of PFAS contamination that you outlined? Are there groups which are more at risk when contamination occurs, and how would you address those?

BRENDAN GUINEY: We'd always defer again, in support with the regulators, about environmental risks to EPA and health risks to Health, of course, noting that a lot of our local water utilities we work with aren't highly capable in science and engineering. But to answer your question about what general cohorts, if we have water quality incidents in communities, you would start to worry about aged-care facilities, schools and hospitals. The consequences of having a water quality incident on those parts of the community can be very serious. You can't simply cut water off to a hospital or an aged-care facility, and then what do you do next? That's why we take those sorts of incidents very seriously and we're encouraging utilities to have better incident management plans in place and map out where those community facilities are that could suffer serious consequences from a water quality failure.

The Hon. AILEEN MacDONALD: Have you got an example of where you've done this, just off the top of your head?

BRENDAN GUINEY: In terms of actual examples, no. My career is about 25 years long. I've been in a few water quality incidents myself as a water engineer. We've certainly seen episodes, even in the floods and the fires, where either water quantity or water quality was compromised or cut off and that we need to escalate to the combat agencies and our regulators to get assistance.

The Hon. AILEEN MacDONALD: On page 7 of your submission you state:

> Local water utilities, which are owned and operated by NSW local government, lack the necessary resources, expertise and capacity to independently address the complex risks posed by PFAS contamination to human health and the environment. Effectively managing these risks will require significant funding, coordination and leadership from responsible NSW government agencies.

Do you have a structure in mind, or could you map out what that would look like?

BRENDAN GUINEY: I think the regulating agencies certainly have talked about their investigations and programs, and we've talked about our reliance on open communication and sharing data with the appropriate utilities, which is already underway. If we take it back up a level in terms of risk reduction for councils, there has been a town water risk reduction program in place for more than four years now. WaterNSW, EPA and Health have been coordinating a multi-agency approach with the local water utilities, keeping in mind, when I talk about the capacity to solve issues, that water operators and engineers in regional New South Wales are not specialists.

They have to be very generalist in their operations. We call them a jack of all trades compared to, say, a Sydney Water operator. Having those collaborative approaches alongside the regulators is really quite important.

But I also think witnesses earlier in the day, like Gwydir shire and Dubbo, did allude to where some water supplies are compromised and we need to either increase treatment or we need to find new sources of water. That's extremely expensive, and we don't think we can build our way out of trouble easily. It will take a very long-term strategic approach. That's presently mapped out in the Safe and Secure Water program, which has been about $1 billion every 10 years. Now $1 billion over 10 years sounds like a lot, but we think we've got a backlog of effort of about in excess of $5 billion for regional water utilities. We've got significant challenges and we could use a lot of support from the higher levels of government.

The Hon. AILEEN MacDONALD: Not to put you on the spot, but have your members found it easy to interact with, say, EPA and NSW Health when identifying, testing and then treating for PFAS?

BRENDAN GUINEY: I think in the last six to 12 months there has been a massive increase in communication on PFAS and we've been very grateful—a lot of public-facing information now. I think the councils have played their part quite well, particularly those councils that are affected and are above either the proposed limits or the current PFAS limits. Everyone's doing their best.

The Hon. AILEEN MacDONALD: And you think that's because there's more of it? EPA and NSW Health already know what to do. When someone comes knocking on their door, they've already got a plan of action that they can implement.

BRENDAN GUINEY: Keeping in mind I think that some utilities have had earlier experience, particularly Hunter Water at Williamtown—while Hunter Water and Sydney Water are not our members because they're not local government, we can contact the utilities and look at the lessons learnt. To coin an industry pun, though, a lot of this information flowing through councils, it's like trying to drink from a hydrant. We see our role as trying to distil down and get simpler, concise messages and implementable actions for small utilities.

The Hon. TAYLOR MARTIN: I think it's fair to say from the hearings that we've had and the evidence that we've heard that we have this problem. In different parts of the State it's a large problem and in different parts of the State it's a smaller problem. We can't unscramble this egg. The genie is out of the bottle. My question is more for NSW Health. Should there be a standardised protocol which would then be well circulated and communicated to not only medical professionals and those in the chemical industry or firefighting but also throughout the community with regard to basically a protocol for what to do if you're exposed throughout your occupational life or throughout ordinary life? We heard earlier today from a local in the Coffs Harbour area who has been exposed to PFAS and who has had symptoms through the different types of barrels that he uses and has used in the past. Should there be a protocol? Is there one in place that's just not well communicated? It seems very haphazard that people might see their GP, they might present to a hospital, and they're treated differently depending on the level of education from the medical professional that they see.

JEREMY McANULTY: As Mr Beaman said earlier, we have certainly tried to make sure we've got coordinated communication at the national and State level so there's clear, concise information that's available to the public. I am happy to take on that we can do better in how we communicate to clinicians and the community. We'll continue to work with the other agencies, as the evidence evolves, to try to make sure that people have the right information.

The Hon. TAYLOR MARTIN: Did anyone else wish to add?

STEPHEN CONATY: We have given advice, most recently I think, to GPs in the Blue Mountains area. We actually provided a fact sheet that included the recommendation which is that enHealth recommendation that we don't see that there's a particular indication for blood testing so we wouldn't recommend it. But patients can pursue it at their own cost if they wish, which is not a very kind message in some ways. For those other special categories of people who might be in occupational groups who might be exposed at high levels, I think there might be some sort of case or rationale even to provide reassurance, to provide some testing. But, no, we don't have a particular protocol. Generally, at least at the national level, the advice is still—and this is based on sound grounds—if I test you or I it doesn't provide any particular diagnostic or prognostic information of value, so it can't tell you what's going to happen in the future. But I agree that that's something that we can work on in terms of our communication.

The Hon. TAYLOR MARTIN: I appreciate the answer from both of you to that because throughout this inquiry we have heard that different people get different responses and that's a good point. I think you just said that it's not a kind message to tell people to go stump up for their own blood tests. We've talked a lot, whether it's the EPA or councils or the different water bodies—to get rid of this chemical out of the environment. But we now are in a phase where there are particular people, particularly our State's firefighting service, where they need to get it out of their bodies and there just doesn't seem to be a protocol for that. As I said earlier, Mr Chappel in his

opening statement said that polluters are meant to pay to remove it from the environment. But we're at a point now where people are meant to pay to get it out of their bodies, which is terrible. That's not a question; that's just a comment.

The Hon. GREG DONNELLY: Back to the EPA again, but others may jump in. It's a technical question so you might want to take it on notice. We've had evidence about the identification of plumes in aquifers and the movement of those plumes and the variability of that movement. Is the technology that we're using or that is available for us to use for the identification and the tracking of the movement of plumes of PFAS? If they don't exist, please tell me I'm barking up the wrong tree. Are we satisfied that we are able to do that? If there is some testing and we believe that is the case, or perhaps that may be the case, can the testing of aquifer plumes be done to quite a high standard?

STEPHEN BEAMAN: The answer to that is yes. I'll take you to Williamtown as a good example. If you are able to get enough groundwater monitoring bores in place to get a good spatial coverage of the area that you're interested in, and you can do that regular testing and then develop up plume models—in the EPA we're lucky that we have a couple of hydrogeologist specialists with PhDs and this is their speciality; it is a very specialised area—you can do that plume modelling to work out where the plume is today and where, with the movement of that groundwater, we think it goes in the future.

Williamtown is a good example. Williamtown actually has three zones: a primary zone, which is just outside the Defence base; a secondary zone; and a broader management zone. There's a lot of community debate about those zones, but the zones were developed with an eye to what the plume models were telling us might happen in the future so we could be quite protective early on. When we issued that map in December 2017, we could then say, "It mightn't be in this part of the area now but, if nothing changes, the plume expects to"—if you think of a plume, it's a little bit like ink on a blotting paper; it just spreads out. And so we could model that quite effectively. We do have access to experts within the EPA but also within the broader environment department—DCCEEW. You can do it if you've got really good groundwater testing data.

The CHAIR: Mr Beaman, I wanted to ask you about Central Coast Water, Ourimbah Creek and the platypus that was found there. I think there was a dead platypus in Ourimbah Creek and one in Hunter River at Morpeth. You're aware of the study that was undertaken by UNSW about the PFAS levels in platypus?

STEPHEN BEAMAN: Yes.

The CHAIR: There were very high levels in the ones found in Ourimbah Creek and Hunter River, Morpeth. When I asked the EPA yesterday about the Hunter River, Morpeth one and the high PFAS levels potentially in that river, they said that it's probably as a result of the Hunter Water sewage treatment plant that's there. So there are several things. Firstly, what response has the EPA done to try to find those high levels of PFAS clearly in Ourimbah Creek around there—as well as the knowledge that Hunter River at Morpeth potentially also has high PFAS? Are you doing anything about Ourimbah Creek, firstly?

STEPHEN BEAMAN: Absolutely. The teams have actually been out sampling at Ourimbah Creek. There has been sampling occurring on the upstream section of that creek for quite a few years. But the team—I think Central Coast Council advised us of a detection. And so we've swung into action with council and gone out and done more testing, and the idea of that testing is to see if we can identify sources.

The CHAIR: What about Mangrove Mountain landfill?

STEPHEN BEAMAN: There has been testing at the landfill over quite an amount of time. The first thing you see that pops out of a landfill usually isn't PFAS; it's ammonia. We use ammonia as the signature contaminant when a landfill has leaked into the environment. There has been ongoing testing at that landfill, I understand, as part of a licence condition and we haven't seen that ammonia—

The CHAIR: Ongoing testing of PFAS?

STEPHEN BEAMAN: No, but for ammonia, because you see ammonia first before you typically see PFAS. We haven't seen a breakout of anything from the landfill site as a pollutant.

The CHAIR: Just to be clear, that's because you've only tested for ammonia?

STEPHEN BEAMAN: Yes, but you use ammonia as an indicator.

The Hon. TAYLOR MARTIN: It's the canary.

STEPHEN BEAMAN: Yes.

The CHAIR: Because there's no ammonia you don't test for PFAS.

STEPHEN BEAMAN: We haven't. Nevertheless we've actually been sampling around that upper part of the catchment of Ourimbah Creek. The teams were out this week.

TONY CHAPPEL: Including PFAS.

STEPHEN BEAMAN: For PFAS. We will probably look at a whole range of sources. I understand that part of the community is actually on septic tanks so people have it in their washing detergents and soaps and all that household stuff. We need to actually run that down. We'll also look at the landfill and so they'll be testing down at the landfill and we'll also do further work downstream. So absolutely we take that Ourimbah one seriously. When council came to us we offered, as we've got the technical expertise, to help local councils address these issues when they find them.

The CHAIR: We'll go back to the Hunter Water sewage treatment plant in a second. But for Ourimbah Creek, recognising that the Sydney Water contamination there was potentially from a 1992 petrol tanker crash and Fire and Rescue NSW said to us that they had undertaken a collection of data and evidence of big accidents that had occurred and firefighting foam was used between the mid-80s, right through until 2007 or something in areas that potentially would see foam going into the catchment. Does your investigation extend to that? Are you looking at the types of serious accidents that occurred around the area?

STEPHEN BEAMAN: I think that one I'd have to take on notice. I haven't actually had a chance to sit with the team in detail in the last couple of days, but I know they've been out testing last week. I can take that on notice.

The CHAIR: Have you asked Fire and Rescue to do that, though, because they said they've done this in the Blue Mountains? Has the EPA communicated with Fire and Rescue to assist them? Would it make sense that that happens?

STEPHEN BEAMAN: I'm not sure as evidence I can say they have or haven't. I haven't had a chance to talk to the team.

The CHAIR: Were you aware of Fire and Rescue doing that in the Blue Mountains?

STEPHEN BEAMAN: Yes. In terms of Ourimbah, I haven't actually found out off the team what lines of inquiry they're adopting in terms of other PFAS sources in that catchment.

The CHAIR: Mr Chappel, would it make sense for that to be a line of inquiry across the State? Significant petrol tanker or other fires on roadsides or on highways that required a hell of a lot of firefighting foam pre-2007 to put out could be part of your investigations to establish where that foam then flowed?

TONY CHAPPEL: Yes, I understand that analysis has commenced, but I'm just not sure of the status. I know we've had some conversations at a strategic level about the issue more broadly with some of these agencies like Fire and Rescue.

STEPHEN BEAMAN: Is the question you're asking, "Are we looking at previous motor vehicle accidents to build into our PFAS program"?

The CHAIR: Yes, because at this point your contaminated sites is largely—

STEPHEN BEAMAN: A site?

The CHAIR: Yes, a site. Yet an investigation by the community found this very disturbing footage about the foam going into the catchment and what have you. Is that now an active line of investigation, not just for where it has already been discovered in the Blue Mountains, but other areas?

STEPHEN BEAMAN: The answer to that is yes, but I qualify it on a risk basis. It's a bit like PFAS more generally: You're going to have it applied in hundreds or if not thousands of motor vehicle accidents over the last 30 or 40 years.

The CHAIR: That's the point of the—but it's the massive petrol tanker. I'm not talking every—

STEPHEN BEAMAN: Correct, but even those you're going to have a lot that have occurred over the last 40 or 50 years. The overlay of that is what's the sensitive land use nearby. If it's on the edge of a drinking water catchment, if it's on the edge of a sensitive receiver, that's the work we're starting to think about. How do you get that intersection of the records of the motor vehicle accident data and sensitive land use? That's the thing we're thinking of next. That goes to that idea about—and you're right, our program has been focused on sites and places that used it. Now we're moving more into, for a better word, a diffuse, more ambient application. It's either been

a one-off or one incident. How do we grapple with that? That's the thing where we're starting to put some thinking into what that might look like.

TONY CHAPPEL: We have had some conversations with some of these agencies in that regard as well. But we can give you some more detail.

The CHAIR: We're done timewise, but Mr Martin is desperate for the last word.

The Hon. TAYLOR MARTIN: Yes, we are over time now. But on Monday we were told in the Blue Mountains—if someone can correct me—that there were 200 litres or something of firefighting foam used on that petrol tanker. If there are other spots around the State where there were heavy vehicle fires and there were dozens and dozens of litres PFAS used—

The CHAIR: Because they had to do an incident log.

STEPHEN BEAMAN: Yes. Some of those electronic records are quite easily obtained and then ones for older incidents they might have been told they're still in paper form. That'll be a bit of an exercise to go through.

The CHAIR: Thank you very much. Unfortunately for you all we are out of time, so we will have to let you go. Thank you very much for making yourselves available to this very important inquiry. If you've agreed to take anything on notice the secretariat will be in touch. Members may be in touch as well with supplementary questions.

(The witnesses withdrew.)

The Committee adjourned at 16:50.