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

UNCORRECTED

At Q Building, The University of Newcastle, Newcastle on Tuesday 4 February 2025

The Committee met at 9:15.

PRESENT

Ms Cate Faehrmann (Chair)

The Hon. Scott Barrett
The Hon. Greg Donnelly
The Hon. Aileen MacDonald
The Hon. Cameron Murphy

The CHAIR: Welcome, everybody, to the third hearing of the Committee's inquiry into PFAS contamination in waterways and drinking water supplies throughout New South Wales. I acknowledge the Awabakal people, 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.

Dr MICHAEL WALTON, Local Resident, affirmed and examined

Mr PAUL ROOMS, Local Resident, affirmed and examined

The CHAIR: I welcome our first witnesses. Do either or both of you have a short opening statement to make?

PAUL ROOMS: Yes. Good morning, everybody. I've been studying the effects of PFAS and PFOA and specifically how PFAS travels through the environment. I'm concerned with recent levels of PFAS and PFOA located at the Pacific Dunes golf course in Medowie and its spread outside the so-called red zone. I'm also aware of a similar reading that was recorded at the Salt Ash weapons range. In my opinion this raises concerns regarding the management of PFAS in specific areas, the spread of PFAS, the containment of PFAS, the remediation and eventual deposition of contaminated waste to Newcastle EPA landfill sites. I would also suggest we have fallen significantly behind international best practice in the management of PFAS and PFOA.

MICHAEL WALTON: Thank you, Paul. I would just add very quickly that the level of forever chemicals found at Pacific Dunes with our test result appears to be a much higher or greater quantity than simply being explained by leaching beyond the so-called red zone. Detected levels raise questions whether contaminated material has been deposited from elsewhere and/or raw PFAS and PFOA has been diluted into a watercourse which is an interconnected body. I note that one of the submission reports alleged that PFAS containers were used in aquaculture and for which there allegedly was no reasonable response from relevant agencies.

The CHAIR: Thank you, both. I will just ask your circumstance to begin with to give the Committee a bit of history in terms of why you're here. We hear from government that the groundwater is contained as much as possible within the area of Williamtown and that two bores, as I understand, have been closed as a result. Just to be clear to explain it to the Committee in detail, are you saying that the contamination has spread to particular drains? You've provided a good submission with lots of photos. Would one of you care to explain what you're saying in terms of those drains near your property and what you believe is happening with PFAS?

PAUL ROOMS: Yes, certainly. I was working on restoring a stone coin, and I noticed bubbles hitting up against the wall where I was working on. At first, I just thought it was a child with one of those blowing bubble machines.

The CHAIR: When was this, Mr Rooms?

PAUL ROOMS: That would have been back in winter last year.

MICHAEL WALTON: In June. I think we sent you an email advising it on the twenty-ninth. We'd need to check the time and date of the photos, but I think it was on the Friday before that—but have a couple of days beforehand.

PAUL ROOMS: Then, as it kept occurring, I thought, "This is strange." Then I discovered a drain—a watercourse where the foam was very evident and there was quite a large volume of water going down that causeway and drain. It just seemed unusual because it wasn't raining, so I decided to try to track where this was coming from. I estimate that about 100 metres away I uncovered a pump with a body of water, which still had similar amounts of foam on top of that body of water, so it was very clear to me that this body of water was being pumped, for whatever reason, into other watercourses that were throughout Pacific Dunes.

The CHAIR: When you saw that water with all the foam, and I think from your experience you recognised that the presence of foam can be an indication of PFAS—

PAUL ROOMS: Correct.

The CHAIR: —what did you do? Did you call authorities? Did you try to report it?

PAUL ROOMS: No. Initially what I did was I went to get a sample. I obtained an approved container and obtained that sample. In doing so, I saw golf course management also looking at that foam. I tried to draw the attention of that management but they, for whatever reason, chose not to engage me. So then I just basically went home with a sample and discussed it with Michael. I did not report it to any authorities. My experience with Newcastle EPA has been—at best, I have absolutely no faith in their jurisdiction or interest in environmental damage. Mr Walton might highlight on that a little bit.

MICHAEL WALTON: It's common knowledge amongst residents that the so-called red zone—

The CHAIR: Do you live in that red zone?

PAUL ROOMS: No.

MICHAEL WALTON: No. We're in Pacific Dunes, which is very close to Williamtown air force and airport. It was always surprising that it was never in the red zone. But it's common knowledge amongst locals that PFAS is beyond the red zone and has been for a considerable period. So we had no faith in Newcastle EPA. We have been here before with Newcastle EPA in relation to dumping of illegal material—asbestos building material—at a previous property for which the material wasn't monitored as to where it went. We had enormous problems in relation to that.

PAUL ROOMS: And this went on for at least five years—to try to get it resolved.

MICHAEL WALTON: Yes, it went on for a long time and it was never fully resolved. So we have no faith in calling Newcastle EPA or an authority. And we didn't know that it was PFAS. We thought by the frothing and the agitation of the water that it could be. Paul got some on his hands, at I said in the submission, and it stung but we were as surprised as anyone by the level of—

PAUL ROOMS: Contamination.

MICHAEL WALTON: —contamination.

The CHAIR: Your dealings with government agencies have not been satisfactory, in your regard. We invited the Department of Defence. They are a Commonwealth agency, so they don't have to appear, but they declined to appear. What is your view generally or your experience with government agencies?

PAUL ROOMS: Whenever I've addressed concerns with Hunter Water, they've always minimised it and basically said there's no problem and there are no significant readings. I have spoken to numerous residents who have suggested that Hunter Water are regularly monitoring the PFAS on their properties, so to suggest that there are no significant levels was just, to me, not an accurate description of the area or what was occurring.

If they're regularly testing bores outside the red zone, they're doing it for a reason, and they're telling residents not to use that water. I've suggested many times that they should be a lot more transparent for the residents around the region, because people really have a right to know. If they are living in a polluted environment, they should have the right to either get out of it or be able to address the concerns about getting it remediated. I've always found it extremely frustrating on that basis. It sort of all stems back to the '90s, as well, when the Salt Ash weapons range was used for bombing and then, if there were subsequent fires, they were put out with PFAS foam. This is in a drinking water catchment area and it just didn't pass the pub test to me. It didn't make any sense. Why would you drop bombs on a place that relies on bore water? Everyone just thought that was a perfectly acceptable practice. It never stuck with me.

The Hon. CAMERON MURPHY: Thank you for your submissions; I've read both of those. I want to ask a few questions to clarify my understanding of the concerns that you have. You're living in Pacific Dunes, you were saying?

MICHAEL WALTON: That's correct, yes.

The Hon. CAMERON MURPHY: And that's not in the red zone.

MICHAEL WALTON: No.

The Hon. CAMERON MURPHY: So that's not designated as an affected area. Is that right?

PAUL ROOMS: Correct.

The Hon. CAMERON MURPHY: But your concern really is that you're worried about it and you think it should be tested by government because it possibly could be an affected area. Is that right?

MICHAEL WALTON: Well, the PFAS sample result that we had was by an independent accredited body.

The Hon. CAMERON MURPHY: So you've had it tested yourself?

MICHAEL WALTON: If you read the second submission, you would have known that.

PAUL ROOMS: Yes, we have.

MICHAEL WALTON: The second submission—the test results were—

PAUL ROOMS: Fifty-four times the Australian standard limit.

MICHAEL WALTON: —approximately 54 times the Australian standard for fresh water. We're laypeople; this is the first time we've done a test result. So it was done by an independent accredited body, and we further had the results interpreted by an expert in PFAS and PFOA within the environment.

The Hon. CAMERON MURPHY: Was that from your land? That's what I didn't understand about the submission—

PAUL ROOMS: We live in Pacific Dunes—

The Hon. CAMERON MURPHY: —whether it was your land or it was somewhere nearby.

MICHAEL WALTON: Common property, yes.

PAUL ROOMS: I'll answer the question. We live in a Pacific Dunes community association. Literally about 500 residents pay a levy, and it's a community association land. Within that community association land is the Pacific Dunes golf club operation. So there are a number of precincts and this high-level reading was located within the vicinity of some of those precincts—not specifically in our precinct, but we are all part of this community.

The Hon. CAMERON MURPHY: Right, that's what I was just struggling to understand. So it's not that you're personally affected, but it's nearby.

PAUL ROOMS: Oh, I believe everyone is personally affected because this waterway—all the ponds are interconnected. I'll go as far as to say they actually drain out towards Grahamstown Dam, so there are a lot of people affected.

The Hon. CAMERON MURPHY: How long have you lived there for?

PAUL ROOMS: Coming on six years.

MICHAEL WALTON: We've been there since we purchased it in December 2019 and moved in about the May, so coming up five years, 4½ years. The other concern is the frothing is not an isolated thing. There is bubbling and frothing in other areas. Pacific Dunes has water all the way through it because it was originally marshland and turned into a golf course, but there is a body of water all around Medowie, and this is not the only frothing that's been observed. It's the only test result that we have to date. So this is potentially a problem.

The Hon. AILEEN MacDONALD: Thank you for your submissions. Just for clarity, when did you get the tests done?

PAUL ROOMS: I'll have to take that on notice, I'm sorry. I don't know the exact date. But, if you like, I can send that to you.

The Hon. AILEEN MacDONALD: That would be good.

MICHAEL WALTON: And we're happy to provide the test results because we think it's in the public interest, if the Committee want to put those up as part of their submission for people to interpret. There was a delay in getting the results done because my father—I'm a New Zealand Australian—had had health episodes, so our lives have been upended. We've been backwards and forwards between Australia and New Zealand, so there was a delay in getting that done. We don't know the process in terms of getting accredited testing, so it took time, plus being backwards and forwards with New Zealand. We first reached out—I think it was a couple of days, from memory—with an email to Cate Faehrmann, and copied in Kate Washington, Meryl Swanson and a whole lot of politicians, with the photos. I think, from memory, I wrote that email a couple of days after the initial sample was collected. But it was later on in the year.

PAUL ROOMS: And to be honest, the advice from Hunter Water saying, "We've got no problem, we've got no problem", I honestly thought, "Oh well, it might be a bit above what's the standard." I was totally astounded—in fact, devastated, because children have been playing in these watercourses. It was so gut-wrenching I can't describe it.

MICHAEL WALTON: Paul got the results when he was over in New Zealand, so that would have been in December last year. I remember the results coming through, and we can provide that on notice as to the specifics. But I remember Paul saying he cried because it was the first time we had been validated.

The Hon. AILEEN MacDONALD: When you got the results—I know you said you haven't had a good relationship with EPA—did you undertake to get testing done via Hunter Water or perhaps raise it with Pacific Dunes?

MICHAEL WALTON: No.

PAUL ROOMS: We used an accredited laboratory that specialises—

The Hon. AILEEN MacDONALD: In PFAS and PFOA.

PAUL ROOMS: Exactly. And then, as Dr Walton has already advised, just to make sure we were reading the results right, we had it verified by an expert in the field.

MICHAEL WALTON: Who has attended this Committee, I understand, in a previous hearing. They are an expert. But we are very willing and we will provide the full test results that will contain the details of the accredited agency.

The Hon. AILEEN MacDONALD: Did you raise the concerns with the golf course to see if they would also undertake testing?

PAUL ROOMS: We haven't, because management saw what I saw. Their reaction was such that I believe it showed that they didn't want to engage with me on them, by the reaction of the management individual turning their head away from them when I was trying to attract their attention.

MICHAEL WALTON: After Paul—I was working around the back and he drove around, because he had our car down there where he was working on the stone coin, and he told me what had happened. He said that the manager was in close proximity to Paul, he had a shocked look on his face, he wouldn't speak or wouldn't look and he walked away. Bear in mind Paul didn't know what he was seeing—he thought it could be PFAS but this was all new to us. It looked like it could have been PFAS, but none of us dreamt that it would have been to that level.

PAUL ROOMS: And pretty much straight after that, Michael's father had a kidney failure—shouldn't have lived. I jumped on a plane. I was there for months to try and get him back, and thankfully we did. So things progressed beyond my thoughts about that.

The Hon. AILEEN MacDONALD: What do you believe the impact has been just in your community there?

PAUL ROOMS: I wouldn't hazard a guess to express what that impact could be. I'm hopeful that someone might address the thought of remediation and fixing the problem, but previous experience would suggest to me that it may not be in the interests of the particular government of the day to do so. This is a very expensive exercise, and everybody wants to allocate their money in different areas, even Defence. Quite honestly, I think our only solution is to get an independent body involved in this to make sure that our agencies have the best interests of not only residents, but just the basic outcomes of what we're going to face. Because the costs—international research shows that the costs of not doing anything. The latest study from the EU has estimated it at $82 billion if they don't address the current levels of PFAS contamination that they face now. That's just basically containment, trying to remediate what they can. So I think this is a wake-up call, or it should be.

The Hon. AILEEN MacDONALD: I'll finish there and say that one of your hopes is that there's an independent body.

PAUL ROOMS: Yes, absolutely.

The Hon. SCOTT BARRETT: Sorry, I think it was yourself, Mr Rooms, who said something about PFAS containers.

PAUL ROOMS: That was Dr Walton.

The Hon. SCOTT BARRETT: PFAS containers being used in aquaculture?

MICHAEL WALTON: Yes. In a previous submission—Paul read all the submissions, I didn't, but he drew my attention to one where I understand there were PFAS drums, or alleged to be PFAS drums, in aquaculture. This individual that wrote this submission included a couple of photos—Paul was reading it out to me—and had drawn attention, I think it was Department of Agriculture at least, and alleges that they had multiple contacts and it had fallen on deaf ears.

The Hon. SCOTT BARRETT: Okay. That was in one of the submissions for this review?

MICHAEL WALTON: That's right.

The Hon. SCOTT BARRETT: Okay. You've mentioned these other waterways. I think you mentioned the Grahamstown Dam and some of these things. Are you aware of any EPA testing going on in these areas, outside of the red zone?

PAUL ROOMS: I have been informed by residents that, yes, Hunter Water has been testing for PFAS and PFOA outside the known red zone.

The Hon. SCOTT BARRETT: The results of that testing—is that available to you as residents of the area?

PAUL ROOMS: I don't believe it's been public. They monitor bore water. I was told by Hunter Water they do not test every bore because, at $50 a test, it's too expensive. My concern was, well, you should be at least testing every bore that's used for the Tilligerry Peninsula. I think to exclude any of them is not best practice.

MICHAEL WALTON: In short, have we been informed by Hunter Water, or any relevant agency, about the PFAS levels that could be problematic to inform real estate, business, health? No.

The Hon. SCOTT BARRETT: And more broadly, what are your views on just the communication from Government on this issue?

PAUL ROOMS: Defence has numerous posts about the testing of PFAS within the red zone—in fact, voluminous amounts. I think that should be looked at because it could easily be 95 per cent of them show very, very, very low levels, and why would you keep testing areas that have very, very, very low levels and just have a few tests which are of significant interests? I think that money would be better spent testing outside areas where there may be a spread or a problem.

When I was accessing that information, especially regarding the Salt Ash Weapons Range where I believe there was a high reading pertaining to a particular well—I think it was well 13—I noticed that subsequent testing couldn't be conducted—I believe they used contractors—because either the wells were dry or they were covered by vegetation. When I read that, I felt like lending them my whipper snipper. I mean, this was a site of a significant level and, unfortunately, I couldn't go into further detail because I can't access that site anymore.

The Hon. SCOTT BARRETT: The test results you've got, who have you shared that with?

PAUL ROOMS: Only with the expert that we had verified.

MICHAEL WALTON: Yes, with the expert. If we are to name the expert, I'm happy to do that now. But it was with the expert who has appeared here in an earlier hearing. I think it was in the Jubilee Room. We have forwarded that to Cate Faehrmann and the submission, which is now publicly available. But we are very happy and we will send the results so it can be seen transparently and independently looked at.

The Hon. SCOTT BARRETT: And you haven't sent it to EPA or anything like that, just because you don't think they would do anything with it?

MICHAEL WALTON: No. I would have zero—I think we said in the submission—confidence in NSW EPA. I am wondering why they are not here today. I understand EPA probably from Sydney are here, but—

PAUL ROOMS: Yes, I was wondering why Newcastle EPA is not here and certainly the contractors that are doing the testing for Defence. I would be interested to know why they are not here.

MICHAEL WALTON: It seems as though the game is test, test, test and retest where there is no result. If you find a problematic result, you will find a reason why it's inconsistent with tests supposedly around that area, why you can't access it because of vegetation or a bore is dry, or any manner of excuses.

The CHAIR: I'll go to a question from Mr Donnelly, and I will just say that EPA is appearing later today.

The Hon. GREG DONNELLY: Apologies for my slight lateness. I was having trouble parking. Thank you to everyone for coming along today to provide some evidence. On the bottom of page 4 of your submission—the one that is submission 9—I take you to, Dr Walton, the comment which you have just referred to about the zero confidence. In that paragraph, if I could draw your attention to it, it says:

> … zero confidence in Hunter Water, Water NSW, NSW EPA or Australian Defence …

And then you go on to say:

> … as is the case for local council, state, federal representatives or local media.

So it is quite a broad umbrella that you are covering.

MICHAEL WALTON: It's a strong statement, but—

The Hon. GREG DONNELLY: Sorry, could I just ask a question? Are there any other entities or organisations or groups or bodies that you, in your evidence today, are saying have, effectively, done nothing and there is zero confidence you hold in them or is this essentially the snapshot of what you think?

MICHAEL WALTON: They are the main ones that come to mind. I think, from the inquiry's hearings, this problem is not just with what we have identified at Williamtown. Understanding, monitoring, reporting, containing spread, whether spread has been further caused by transportation of waste, monitoring of PFAS drums, whether they are being inappropriately disposed—these organisations are all responsible for this.

The Hon. GREG DONNELLY: Can I just take you into the next sentences about the communication that has taken place with the Hon. Kate Washington and Meryl Swanson, MP, about the alleged reporting? Is it your evidence that you have zero confidence in them as well? Is that your submission today?

PAUL ROOMS: If I may answer that, because I was the one that had communications with both Kate Washington and Meryl Swanson. I met with Kate Washington at the Medowie markets I would imagine, roughly, somewhere around 12 months ago. I spoke to her in relation to my concerns about the spread of PFAS outside the red zone. As I understood it, Hunter Water would have had some knowledge of that. I just thought it was really important that the residents knew about this. That was my contact with Kate Washington.

The Hon. GREG DONNELLY: At a market, yes.

PAUL ROOMS: And my contact with Meryl Swanson would have been just prior to her last election. It was at a Tanilba Bay Labor meeting hall and, from memory, Giacomo Arnott attended that meeting. Again, it was along the same lines about the spread of PFAS and that I felt residents really need to have an understanding about this and it should be a priority to check with Hunter Water and check about the spread of this PFAS. I might add that I believe Meryl was chairing a committee on PFAS as well, so it seemed to me that obviously—

The Hon. GREG DONNELLY: It's very much in her mind, the issue. In terms of looking at the aggregate of all those organisations and individuals, including the media, obviously, and local, State and Federal representation, it strikes me the argument is being advanced that effectively there's a conspiracy operating here.

PAUL ROOMS: I wouldn't go that far, to say a conspiracy.

MICHAEL WALTON: We wouldn't say that; we'd just say there's organisational failure, systemic.

The Hon. GREG DONNELLY: But across everyone and everybody?

PAUL ROOMS: I mean, "everyone" is a very broad term. We've made it—

The Hon. GREG DONNELLY: It's your evidence.

The CHAIR: One at a time, please.

PAUL ROOMS: I would say Hunter Water, Newcastle—

The Hon. GREG DONNELLY: Forgive me, I'm just trying to get—this is a very broad sweep.

The CHAIR: Mr Rooms, just let Mr Donnelly ask his question.

The Hon. GREG DONNELLY: That paragraph on the bottom of page 4, going to page 5, is a very significant paragraph in your submission No. 9, which essentially is articulating that there is—we're not talking about a little bit about no confidence; we're talking about zero confidence in, effectively, the manifest organisations and individuals here. I'm trying to understand. Your submission is that it's that low—it's zero for everyone.

MICHAEL WALTON: I wouldn't say "conspiracy"; that's your term. I would say there is systemic organisational failure across multiple organisations, and I believe one of the things that stems from this is because the cost of knowing the truth of the spread of PFAS and PFOA—the economic, business, health and environment costs are such that the executive really don't want to know.

The CHAIR: I am sorry, but we have to leave it at that because we are over time. That was a very strong closing remark. Thank you so much, Dr Walton and Mr Rooms, for giving evidence. I'm sorry we didn't have more time for you, but we are under pressure today. We appreciate it.

(The witnesses withdrew.)

Professor RAVI NAIDU, Managing Director, Cooperative Research Centre for Contamination, Assessment and Remediation of the Environment [crcCARE], affirmed and examined

The CHAIR: Welcome, Professor Naidu. Do you have a short opening statement for the Committee?

RAVI NAIDU: Yes. I thought I'd very quickly introduce myself. I have two roles. One is that I am the chief executive and managing director of the Cooperative Research Centre for Contamination, Assessment and Remediation of the Environment. The other role that I have is that I am a Distinguished Laureate Professor of the University of Newcastle, and I have a centre of excellence within the university as well. I am a born Fijian naturalised in Australia. I came to Australia to work for the CSIRO, and my first 13½ years was with the CSIRO, 10 years largely working on contaminants, leading a large team. I was also the youngest chief research scientist within the CSIRO division of soils when I left the CSIRO. I left the CSIRO after 13½ years—largely my keen interest was to establish a national centre of excellence that would focus entirely on contaminants because at that point I recognised that we have nearly 200,000 potentially contaminated sites, and we're not doing much about those sites. Even the policies that we had were not soundly underpinned by sound science.

I was fortunate that, with the University of South Australia, we were able to lead a bit, which led to Commonwealth funding to establish the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment, CRC CARE, established in September 2005. Very soon after we established CRC CARE, we were invited to commence search on PFOS and PFOA. Many regulatory jurisdictions were keen at that time, and the reason why we were invited was because this particular member of CRC CARE had large volumes of firefighting foam in the wastewater. They were restoring that, and they wanted to clean that, so CRC CARE was globally the first to develop the technology to remediate PFAS-contaminated wastewater, which we did. Also, we then did a whole lot of research on PFAS, and CRC CARE gained global recognition for the work that it had been doing on PFAS. Since then we've continued to lead PFAS research. In 2015 I was invited by University of Newcastle to join the University of Newcastle at that time as their global innovation chair, and CRC CARE board decided to relocate CRC to the University of Newcastle. So that's where we are headquartered now as we continue to do work on PFAS and a whole lot of other contaminants as well.

The CHAIR: When you said that you first established the work on PFAS and PFOA—PFAS chemicals. I think it was PFOS and PFOA, I'm assuming. When was that?

RAVI NAIDU: This was in late 2005.

The CHAIR: You said "the first to develop the technology" to treat PFAS in waste? Is that right?

RAVI NAIDU: Wastewater.

The CHAIR: When was that first successful?

RAVI NAIDU: It took us nearly two years. In 2007 we were able to demonstrate that we had the technology. The technology then started operating on sites where we had large volumes of PFAS-contaminated wastewater by late 2008, early 2009.

The CHAIR: Back then, was that technology rolled out to any wastewater treatment plants?

RAVI NAIDU: These were largely with members of CRC CARE, who had brought the challenge to CRC, because, at that time, as you'll recall, none of the State and Territory jurisdictions were all that concerned with PFAS. The concern really started after 2010, 2011.

The CHAIR: I understand we are getting a bit of a tour with you after this hearing, which is excellent. Is your technology now being deployed by governments or industry anywhere across the country?

RAVI NAIDU: Yes. We had a plant operating at a number of sites across Western Australia, for example, South Australia, and we also operated in Townsville. We used the technology to clean water in Darwin. At one stage we also helped remediate contaminated water for the Adelaide airport.

The CHAIR: I understand you've done work in relation to PFAS. You've tested vegetables. This was a study that was published, I think, in 2023. Could you explain to us what that research found?

RAVI NAIDU: Absolutely. The concern that we had was, whenever you have any contaminant present in the environment, we always look at sensitive receptors. Sensitive receptors could be microbiota, for example, animals and humans, when you take one health approach. What are the exposure pathways for human, for instance? One is water, of course, and the other is food that we ingest. Could be meat, could be milk and also vegetables. Our concern was that market vegetables that we have, we actually did not know what sort of nutrients

they were applying and the water as well, because parts of Australia is dry country, and we also use secondary treated water as well. We wanted to know whether we could detect PFAS presence in vegetables. We went to Sydney Markets, for instance, to get vegetables, and also to the supermarket. We were not too surprised that we did find PFAS in a number of vegetables.

The CHAIR: Part of this is that it's difficult to find out what the source of that is, isn't it? This Committee is looking at PFAS in waterways and drinking water, but there is an emerging—well, it has been around for some time—issue of PFAS in biosolids that are applied to agricultural land. Then there is the addition of what the farmer is irrigating the land with, which could be more of that. Does that concern you as a scientist? Do you think, with biosolids as well as groundwater, that we are not really understanding the extent of what we're applying onto crops and food? Then you've got the situation, of course, with cattle and dairy milk. It's a big issue, isn't it?

RAVI NAIDU: Absolutely. It's absolutely very concerning. This always takes me to cadmium in cereal farms, for example. The moment we figured out that cadmium was present in farms that were supporting wheat and barley, which we were exporting as well—so there were trade implications, and human health as well—the Department of Agriculture was very quick to respond. Then we designed a number of strategies that made certain that cadmium wasn't transferred from soil to crops, for example. That's the kind of approach that we need to take here as well to see which farms have been receiving, for example, biosolids, and where we have also been using secondary treated water. Even that would have low doses of PFAS. The challenge is that plants bioaccumulate, so even if the concentrations are very low, plants bioaccumulate, and the concentration could exceed the threshold parameters.

The CHAIR: Yes, that's right. There is so much talk about here. Mr Barrett, we will go straight to you.

The Hon. SCOTT BARRETT: Remediation has come a long way. There have been remediations in the industry since you have been involved. How far have we come and where are we tracking? Can we look into the future for a time where we can pull this out of the system?

RAVI NAIDU: That's a really good question. Leaving aside PFAS, if you look at conventional contaminants, globally we have 10 million potentially contaminated sites. Less than 10 per cent have been remediated in the last seven decades. You can imagine that we are now adding to those PFAS contaminated soils. The constituents present in PFAS are those that are not easy to biodegrade. Nature-based solutions can be a challenge. Once it is present in the soil, you just cannot scrape it, so you put in new soil. Therefore, we have to see how we can manage—because you can't extract. The question is, how do we manage? That is what we are doing with cadmium. We are managing cadmium in cereal farms, but we are not extracting cadmium from cereal farms. Therefore, we still have to invest a lot more.

I think the challenge that we in Australia face is that we always see what others have done from a technology perspective. Our soils are very, very different from soils in New Zealand, for example, or Japan, India, the UK and the US. When we have people who are doing practitioner work here, they say, "We have done it in the US." Then they bring it here. They are looking for quick solutions. There is no such thing as a quick solution. Therefore, investment into research is what can lead to solutions. Just like we were invited to come up with a technology to remove PFAS in fire training wastewater. We developed that; we remediated that. That did well for the member company that joined with crcCARE at the time.

The Hon. SCOTT BARRETT: Is the amount of PFAS in the environment decreasing or increasing?

RAVI NAIDU: That's another very, very good question. When you look at the environment, for example, in soil, it won't decrease because there is no nature-based solution where it's biodegrading, for example. But what will happen is that soils have pores and micropores and the free form of PFAS will start to migrate into macro and micropores. Once it is there it is not easy for it to come out. It doesn't get taken up by plants either. So it will take a long time for that. Where water is concerned, for example, if your source of PFAS decreases, then the concentration in water will start to decline, as well. So source control is something that we have to target and focus on.

The Hon. SCOTT BARRETT: And the PFAS that you found in the vegetables—you're not aware of the origin of the vegetables? They're just things you got off the shelf?

RAVI NAIDU: A very good question again. You are asking good questions. We did ask the market, "Where do you get these vegetables?", and they won't reveal where they get the vegetables from, and therefore it was difficult to get to the source of vegetables. But we do know that some of those vegetables did demonstrate presence of PFAS constituents.

The Hon. SCOTT BARRETT: And at levels that are concerning to you? Would you still feed that cucumber to your kids or me?

RAVI NAIDU: Again a very good question. There were some vegetables that did bioaccumulate PFAS above threshold values, and we did design some model to look at threshold values and total intake for adults and children. Children were most at risk, and those were mostly vegetarians, like I am. We are more at risk, as well. And those who are non-vegetarians tend to consume less vegetables. You do, but not as much as a vegetarian. And therefore you could see that ingesting lots of some of those vegetables could lead to exceedance as well.

The Hon. AILEEN MacDONALD: I was just wondering, with the PFAS, just to understand—it can be removed from water but not soil? Is that what you were saying?

RAVI NAIDU: Yes. To remove PFAS from water, largely it's a filter system that you use. It just soaks up PFAS, and what comes out would be clean water. But, once it is present in soil, you could extract it, but that's very expensive, for example, but you can't degrade it in soil. There's no nature-based solutions. But you can let it sit. If you look at, for example, certain contaminants—that's the total present in soil—over time it'll decline, the portion that is posing risk. But, for PFAS, over time the decline of the portion posing risk is like that; the slope is not as steep as some of the other contaminants.

The Hon. AILEEN MacDONALD: In your opinion, what are the most effective PFAS remediation methods currently available?

RAVI NAIDU: Another very good question. First and foremost, the target is always to come up with a technology that can mineralise PFAS into non-toxic forms. There are not many available right now. That said, high-temperature incineration is something that people are talking about. But, in some countries, they are not going that way because, when you start to incinerate, there'll be fumes that'll come out, and you need to capture those fumes as well, and one of the constituents could be HF, which is quite toxic, as well. That's one technology. The other technology that we have for water is like ion exchange resin, for instance, the granulated carbon. The technology that we have, you filter water through, and it removes PFAS.

The key thing there is that PFAS is not a single chemical compound. It's a whole range of those. The longer chain ones are those that most of the filter technologies will be able to remove. But the shorter chain is something that will fail and just flows through, and that's what we have to focus on. The most efficient technology right now is the filter system that people use, ion exchange resin, and what we have come up with, granular activated carbon. For soils right now, it is basically mixing soil with activated carbon, for example, the material that we have come up with, to lock PFAS. Locking PFAS is similar to liming cereal-growing farms, where, by liming, we are reducing cadmium which is available for plant uptake by converting PFAS into those forms that are locked, preventing it from leaching, removing it from being taken up by plants.

The Hon. CAMERON MURPHY: Thank you for your evidence today. I just wanted to come back to one of the issues that you raised a little bit earlier. You talked about the source of PFAS in wastewater and that being an issue that needs to be considered, in terms of reducing it. The source of that PFAS in wastewater—have you done any research to identify where it is and whether areas are increasing? Is it things like cosmetics, microplastics or clothing? Is it areas like that that are providing that source material?

RAVI NAIDU: Yes, thank you very much. In fact, we've just finished writing our technical guidance document, which we worked on with Water Research Australia, in which we have listed potential sources, and those that you've just mentioned are potential sources as well. It is multiple sources. Where communities are involved as well, it's not always easy to manage those sources.

The Hon. CAMERON MURPHY: Are they increasing as contributors to the wastewater over time? Is there any research that has looked at that?

RAVI NAIDU: The work that we have done thus far, you do not see a steep decline.

The Hon. CAMERON MURPHY: Which suggests that it's increasing.

RAVI NAIDU: Yes, that's right. Pharmaceuticals, for example, you can't prevent, for instance. But, of course, in the house, we have carpets, for example. That itself is a source. In the kitchen as well—and pharmaceuticals.

The Hon. CAMERON MURPHY: You talked about the bioaccumulation in relation to vegetables. Obviously, that would apply to animals also that are eating those vegetables. Is the importance of treating that wastewater because it's one of the few mechanisms where we may be able to pull it out of that system so it isn't

accumulating as the water ends up back on farms and people eat it and so on? Is it because it's one of the few areas where we can extract it and then potentially deal with it?

RAVI NAIDU: Absolutely right. Because I also chair the United Nations Food and Agriculture Organization's international network on pollution, and the Food and Agriculture Organization has this One Health approach where soil health, for example, plays a very significant role where animal and human health are concerned. Where soil is concerned, for example, moisture is quite important, whatever you grow. Australia being a dry continent, for example, we tend to use the secondary-treated water. You are so right that if we are able to remove these potential pollutants from that water, we won't be increasing the loading of soils and hence reducing uptake of pasture, for example, but plants as well.

The Hon. CAMERON MURPHY: Where is this technology that you've developed? Has that been rolled out in wastewater?

RAVI NAIDU: No, we did have that for a number of years, and then we have a number of large consulting companies. They come up with their own technologies, which are similar, and they start to set it up.

The Hon. CAMERON MURPHY: Is it something you would do at a wastewater treatment plant, or is it a technology that's perhaps adaptable to do at a household level with someone's own sewerage?

RAVI NAIDU: We can do it at the household level, and we also have it mobile. That's why in Darwin we just took it on a trailer and then remediated very large volumes of water there, pour it back. We did the same thing for Townsville. We are still storing that. If somebody invites, we can go and do that as well.

The Hon. GREG DONNELLY: Thank you, Professor, for the very thoughtful submission. We look forward to hearing further evidence from you and hopefully see you this afternoon. In terms of the narrative about PFAS, a number of the submissions have said—I don't want to overstate it or understate it—that it's everywhere. It's a generic statement that is made: It's unavoidable, and it's everywhere. Of course, that has the potential to create a sense of, "Listen, nothing can be done because it's so manifest everywhere." At least as we progress forward, it's critical, isn't it, dealing with the matter of the source? The matter with respect to fire retardants obviously is centre-most in people's thinking, particularly in the evidence up here, and in our inquiry more broadly. But other sources that are actually still occurring, are you able to provide any insights into—and I appreciate that you at least, in part, answered that for my colleague. Are you able to elucidate on the sources, particularly those that might be growing or expanding? It raises the issue about regulation.

RAVI NAIDU: Yes, clothing itself, for example. I will give an example. I can't name the place in the US—they did research where they looked at blood serum from firefighters, for example, and they looked at the PFAS constituents in the foam, and they tried to map against what was present in the serum. They couldn't map that. So they basically asked this question: Where are they getting this from? Then they figured out that they were wearing their suits, and because you are sweating as well when you are training or firefighting, sweat also helps release PFAS. They could see one-to-one linkage between what was coming from their suit and what was present in the serum. So that is one example of a source you might eliminate. You have clean water, but you're wearing that, and out there trying to dose a fire, but then you have PFAS that's coming from there as well. So that is one certain example.

The other one is utensils as well. For example, my scientists, when they started working on PFAS, they all had to go and get their blood checked for PFAS. There was one instance where PFAS was pretty high, and he was using non-stick utensils all the time. Clearly the source for him was that, and we said, "No more of that," and it gradually started to decline. The source could be water; it could be food that you're eating, for example; what you wear, for instance. Of course within your house itself, you have carpets, for example, and a whole lot of other things. It can be present in the air as well. The duration of exposure becomes very important as well.

The Hon. GREG DONNELLY: Could you just elucidate the one about the exposure—the last part you just referred to about time being important?

RAVI NAIDU: Duration of exposure is really important. For example, if you ingest food today that might have PFAS, if you do it over a sustained period, you would be ingesting quite a lot. One-off, it's not an issue at all, but total daily intake plays a fairly significant role. I will give you an example again. I was one of the first in Bangladesh to let the community know that rice could be a potential source of arsenic to Bangladeshis. They all rejected that. They said rice arsenic content was so low—below threshold values. I said, "Look at the volume of rice that they ingest." I went from house to house, weighing the rice that they were having morning, for lunch, for dinner, looking at the concentration. I said, "Look, it easily exceeds TDI." So how much you ingest and how long you ingest can play a very significant role as well.

The CHAIR: Professor Naidu, with biosolids, have you had much to do with the biosolids review that's happening within government? Have you provided any advice or research in that area?

RAVI NAIDU: Yes. My team has been working on biosolids, and the research that we do has been sponsored by utilities—water industries. The few things that we're doing there, one is looking at biosolids-amended soils and whether there is PFAS present and transfer of PFAS from soil to vegetables, for example. We are also working on—what the utilities have come up with is that you can convert biosolids into biochar and, during that process, they said that PFAS is eliminated from biosolids. They're doing that at about 600 degrees Celsius, which is different from what we all knew—that you needed about 1,000 degrees Celsius for PFAS mineralisation. Therefore, they have provided us a project where we are looking at biochar derived from biosolids to see whether the biochar still has PFAS. If it has, then what is the form of PFAS and does it become available to plants, because biosolids can be a very rich source of nutrients as well. So they've invested money and we are working on that. Also, we are working on effluent-amended soils, looking at PFAS present in soil—again, for water industries—and whether it's leaching and, if it is leaching, what can we do to prevent leaching?

The CHAIR: It's my understanding that the treatment of biosolids to biochar, to date, most of the PFAS stays in the biochar, and that's the issue, isn't it?

RAVI NAIDU: As a scientist, that is what I would say as well, but the industries—they have done all the work. What I understand from them is that PFAS disappears; it's removed from biochar. That takes me to research conducted at Texas A&M University where they found that if you similarly treat PFAS in the presence of granulated activated carbon it would catalyse the mineralisation of PFAS. Whether that's one reason why PFAS disappears from biochar—from biosoils when you char it—I don't know. But we're doing work on that now.

The CHAIR: Thank you very much, Professor. We're out of time but we'll get some time with you later, which is good. Thank you so much for appearing today and your work in this area. The Committee will be in touch if you agreed to take anything on notice or if we've got any further questions for you.

(The witness withdrew.)

Mr ROB MANNING, Managing Director, Sustainable Oil Recovery and Remediation, affirmed and examined

The CHAIR: Mr Manning, could I get your position title?

ROB MANNING: I have several titles. I'm here today as the general manager of SORR, but I started this journey as a community science lead on the Central Coast Council's Changemaker program.

The CHAIR: Great. Do you have an opening statement for us?

ROB MANNING: Other than to say that, as a concerned citizen, I entered the Central Coast's Changemakers program because of the degradation of Tuggerah Lakes. I live on Tumbi creek. I observed pollution in that creek and set about the Changemakers course to find out what it was and how it could be remediated. During that process I discovered a company, which at the time was operating as Sustainable Oil Recovery. Then I was successful in getting a grant under the Changemakers program, which lead to the Tuggerah estuaries and stormwater trial on the Central Coast Council's Tuggerah Lakes. We deployed the Sustainable Oil Recovery boom in several locations on the lake. It was the results that came back from the tests of that that have led me to now become the general manager of SORR. The sustainable oil company changed its name, changed its focus and changed its trajectory, and we are now operating in India and the UK. We're about to launch in South America, and we'll also be in the Kingdom of Saudi Arabia by the middle of this year. We've had a great range of success with the solutions that we offer, which we believe to be a new remediation method for PFAS. That's what I'm here to talk about today.

The CHAIR: Firstly, just going back to the contamination in Tuggerah Lakes, was there known contamination of PFAS or did you discover that in your clean-up work?

ROB MANNING: The remediation work for the Tuggerah Lakes started as hydrocarbons because the SORR Gyroid Sponge was developed to capture oil in water. When we deployed it at Shaw Street—Long Jetty 15, 16 and 19 are the names of the stormwater outlets we deployed it in—the test results, we worked with the Newcastle Global Centre for Environmental Remediation, ChemCentre labs in WA and microanalysis labs to conduct analysis both on the water and the sponge that we'd deployed. We found that the sponge not only was removing hydrocarbons, in the form of C10 through C40 hydrocarbons, but it also was taking out heavy metals such as phosphorous, strontium, zinc, lithium and other metals. We also were capturing 2.4 grams of PFAS chemicals across the full range of both short- and long-string PFAS chemicals in the sponge, and the sponge was able to hold those chemicals.

We then reported that to council in April of 2023. Then, by April 2024 when we said we're still discovering PFAS in that water, we were asked to take the booms out and they removed our signage from the work that we were doing. So there is no longer any remediation actively happening on Tuggerah Lake. However, on Ourimbah Creek, the Newcastle university had conducted necropsies on platypus and discovered that the platypus in Ourimbah Creek, which flows into Tuggerah Lake, had been contaminated and were deceased with large quantities of PFAS in their systems. So we know that the PFAS in the water there is contaminating the marine life. It is in the soil that is at Tuggerah Lake and it is also continuing to come through the stormwater outlets.

The CHAIR: You had this boom in place firstly where you had discovered that there were PFAS chemicals. Was it a range of different chemicals? You've got that analysis of different—

ROB MANNING: Correct. They're a full analysis, and I think in the submission there are details of the range of chemicals that are there. But subsequently we've worked with a laboratory in the UK—SOCOTEC—who are one of the world leaders in testing water samples in the spill response arena. We've had it confirmed that the gyroid sponge is capable of capturing the full range of the PFAS chemicals. Then the destruction process we use, which is a titanium dioxide decomposition process, has the capability to actually break those chemical bonds that hold the strings of PFAS together because it operates at a temperature of around 800 degrees Celsius without the use of flames. It's a process that is normally used for chemical waste, but it has been developed to tackle our sponge and PFAS.

The CHAIR: How long was your boom in the water at Tuggerah Lake?

ROB MANNING: For over 15 months.

The CHAIR: Then you approached Central Coast Council?

ROB MANNING: We approached Central Coast Council within the first three months of the deployment of the booms. The Tuggerah estuaries and stormwater trial started as a grant program under the Australian Federal Government estuary reconstruction program or some such. When the results of the testing were coming through

for the hydrocarbons, David Mehan, the local member for The Entrance, had identified that a number of Long Jetty outlets were contaminated with diesel. So we were asked to deploy the sponges to pick up the diesel that was coming through the stormwater. But the same results were coming back for the PFAS at that 2.94 grams per kilogram of PFAS.

The CHAIR: Talk us through what happened when the council told you to take the booms away and that was it. You notified them of the results, and then what happened?

ROB MANNING: We suggested that we could help remediate that. The sponge has three things that it can do: It can do diagnostics, it can do remediation and it can do prevention. We put a proposal to them. We were told by the Central Coast Council that they had problems across their waterways and they couldn't pick and choose which waterway they started with or did work on. We asked them to sign a release, saying that we are happy to take the booms out but don't want to have any responsibility for any action further down the track. They wouldn't do that. Then they asked us to take them out, so we did.

The Hon. AILEEN MacDONALD: Thank you for your submission. It's not a one-off solution, is it? It has to be repeated.

ROB MANNING: It has to be repeated. I don't know whether it has come out in your inquiry so far but the PFAS will settle in the sediment on the base of a riverbed, a lake, a creek, in the sediment that builds up in stormwater outlets. So as the water passes through, either the water has contaminants already—you never find PFAS in isolation; it's always mixed waste. Any water sample will be mixed waste. It's very easy when you're taking water samples to simply put your finger in the water and say, "That's what's in that water, and that's it," when really what you should be doing is trying to get a longer analysis of the water. The sponge in its diagnostic form is capable of doing that. The water will continue to pass through.

We know from the research that we've done—I should just say too that whilst I don't have any scientific qualifications, our chief research officer is a gentleman by the name of Professor Dr Richard Banati, who is a distinguished fellow of the ANSTO, the Australian Nuclear Science and Technology Organisation. He's the gentleman who identified the qualities of the gyroid sponge being the fact that it's a gyroid structure which has some physical properties, some chemical properties and then what he has scientifically called some indeterminate or indescribable properties because it does things that we didn't think it could do, and PFAS retention is one of them. From our perspective, the remediation can be done in the water. So as water passes through, the sponge is capable of taking the PFAS out. Over 90 per cent of the PFAS can be removed from the water in a single pass. If we were to set up in serial, the way that granular activated carbon is used, we believe that our solution is not only cheaper but easier to deploy and then easier to maintain and keep going because the end-of-life cycle of our product, the way that we designed it, takes the PFAS out of the environment.

Cate, I don't know if you have recognised my name as the person who helped set up the organ and tissue friends of Parliament of New South Wales. I'm a liver transplant recipient and I am immunocompromised, so I am very particular about what I do with my time and how I do things. I'd actually retired onto the Central Coast, and when I saw PFAS in the water, that raised alarm bells. For the last two and a half years, I've spent a considerable amount of time trying to understand this challenge. The reality is when it comes to the range of chemicals, we can look at taking it out of the water. We can deploy trench-based soil remediation, so that as groundwater rises up through the soil, that will flush the PFAS out. PFAS is not the sort of chemical that just sits there and waits for something to happen.

In December 2024, just a couple of months ago, I went to the Christie Downs metropolitan fire service station, which was a contaminated site. I was expecting, although I'd grown up in Adelaide, to go and see a fire station on the top of a hill, isolated. Right next door, and it was on the high side of a mound—there wasn't a hill in Adelaide; as you know it's probably very flat—there was a Telstra building and then 16 flats on the same residential block. That fire station, and I'd spoken to the senior fire officer who was involved, never used fire-retardant chemicals on that site. The PFAS that's on that site they're being blamed for, but he tells me that it's not from them. There is a lot of industry around there, so the PFAS chemicals, as we've found, are proliferating.

Fire-retardant chemicals are the easy target. If you see a fire, it's over there; that's where the fire is. But who started it? Where did it come from? The reality is PFAS, yes, it is out there, but it can be remediated one waterway at a time without the complex nature of the granular activated carbon, because one of the challenges you have with GAC is that once you've contaminated it, you have to then either incinerate it or bury it. We either burn it or bury it. When you burn it, you create other toxins. When you bury it, you create a problem for later on. But if you use the titanium dioxide decomposition, we can break it down.

The Hon. AILEEN MacDONALD: Is your technology at commercial scale?

ROB MANNING: It is. The frustrating part is on 28 January this year—last week—we signed a $20 million contract with Bharat CSR Network in India to deploy across the rivers of Goa, the waste management centre, the Goa State Pollution Control Board. We've had success overseas. We're going to the Interspill conference in April in the UK, where we launched in June last year. We have knocked on virtually every door here. I've written to journalists from every media outlet—the ABC, Nine; everyone—telling them that we have a solution here in Australia. I am a member of the ANSTO nandin innovation crew. I co-chaired a webinar with Dr Stuart Field and Dr Elisabeth Tondl and we spoke about the capabilities that we have and we just can't get traction in this market because, like when we reported it to the Central Coast Council, they turned away and said, "Thank you but the problem is too big for us."

The Hon. AILEEN MacDONALD: In your opinion would mandatory industry-funded remediation be an effective solution?

ROB MANNING: I think potentially so. I think one of the challenges that you've probably heard is that it's difficult to identify the source. One of the reasons why it's difficult to identify the source is it's difficult to collect the PFAS in significant quantities to determine who the source is. One of the things—and I heard one of the earlier presentations when it was the two gentlemen before Professor Naidu. They said that there's a lack of interest from people like the EPA and others. We actually report it to them whether it's PFAS, hydrocarbons or other chemicals.

The sponge acts like a vault. As the toxins pass through the SORR Gyroid Sponge, they're captured, and they can be captured in sufficient quantities to start doing things like fingerprint analysis or working out where did that come from. We're able to tell the Central Coast Council the type of diesel, the type of chemicals that were in that diesel and so we can do the same with PFAS. You can work out what PFAS is used to put into fuels as a catalyst for the different temperature to set the fuel off, into vaccines for the vaccine. When we had the COVID vaccine, the chemicals used in that to set it off at body temperature—they're not necessarily good for us long term but the reality is we can assist in diagnostics, identification, prevention and remediation.

The Hon. GREG DONNELLY: Congratulations on the work that has been put into the technology. With respect to the point you made about the collection using the boom, that obviously will capture that flowing down through a channel or a pipe, whatever the case may be. Could you elucidate on the matter of the residue that may be on the bottom of the water? How does it capture that? Because looking at your supplementary submission on page 2, the picture of the boom—it captures what's flowing. But what about the residue that may be beyond the boom? It may well be the case that's already—

ROB MANNING: Settled?

The Hon. GREG DONNELLY: Yes, settled.

ROB MANNING: One of the great things about the SORR Gyroid Sponge is its versatility and flexibility in deployment. When I started, the company was focusing on things like bilge socks for boats in marinas. The deployment on the Tuggerah estuaries and stormwater trial proved to us that, by using a process engineering application—so looking at what is the dirty water, what is the clean water, what do you want taken out of that water to make it clean and then what is the scenario that you find yourself in. We have now done tests for trench remediation, curtain deployment, column deployment—

The Hon. GREG DONNELLY: Can you explain what trench remediation means?

ROB MANNING: Trench remediation is where we would actually dig a trench—if you wanted to build a barrier, you could dig a trench, lay some agricultural pipe. All of this can be provided to the Committee or the hearing. We could lay a trench of SORR Gyroid Boom in agricultural pipe, for example, so that the water can pass through it so it doesn't impede and, as the water passes from one side of the boom to the other, the water that passes through the soil would then be—the water that hit the other side of the soil would actually have either no PFAS or reduced PFAS as a result. It's actually deploying the sponge into the ground so that you collect groundwater. We're currently in discussions with the Department of Defence to look at Amberley air force base and building trench remediation around the runway there.

The great thing about the SORR Gyroid Sponge is that it doesn't have to be deployed in exactly the same way in every environment. We heard Prof Naidu started talking about the different soils that exist here in Australia versus other places, but I'd also argue that one of the reasons we have 200 wine districts in Australia is because we have different soil in the Clare Valley and Barossa Valley versus the Hunter Valley. The wines out of the Hunter Valley I still think are superior, but that's irrelevant. We can deploy, using our PAGE process—which is the pollutant-adaptive gradient extraction process, which is where we treat the sponge with heat, chemicals or the

way in which its deployed. Then, by looking at what is the dirty water and what is the clean water, we can engineer a solution for a lot less budget than what are currently the remediation processes that are used globally.

The Hon. GREG DONNELLY: Going back to the matter of the project on Tuggerah Lake, I didn't quite understand that part of your explanation whereby, as you approach the conclusion of the timeline for the project—did you have concern of potential liability as a business?

ROB MANNING: Correct—having identified PFAS.

The Hon. GREG DONNELLY: Right. That that might be a matter that could be a liability, in a legal sense, that you might have to face by having—

ROB MANNING: If you like, if I was a first responder—an ambulance officer—and I put a bandage on you and, just before you got into the ambulance and went off to hospital, you said, "Can you take the bandage off me?" and then you bled out, am I responsible for your death? In this case, we identified PFAS on Tuggerah Lake. It's now been confirmed from other studies around Lake Munmorah and the northern part of Tuggerah Lakes and on Ourimbah Creek that PFAS is prevalent throughout the waterways of the Central Coast. Having brought that to council's attention and been dismissed, we didn't want to have anyone going back through this sort of inquiry saying, "Hang on—this company identified that to you and then they put their booms out."

The Hon. GREG DONNELLY: I understand. Thank you.

The Hon. CAMERON MURPHY: Thanks for your submission. I want to ask a bit more about the trial that occurred at Tuggerah Lakes and see, in terms of feedback from the council and what they said—you said they're not interested in taking up the technology or rolling it out elsewhere. Was there anything detrimental that came out of the trial—for example, is it a hazard to the fish?

ROB MANNING: From my perspective—and you'd know this representing the State of New South Wales as a politician—to talk about the council as a monolith is probably the wrong way to look at it. The people in the waterways were very concerned about what was happening. They were actually the people pushing for us to widen the use of the booms across Tuggerah Lakes. Other areas—engineering, stormwater and those people whose budget it was probably going to come out of—were the ones who were reluctant to progress and do more about it. So there are people within council who want to resolve the problem, but then they'll turn around and say, "We can't do anything because we've got to look at Erina or other waterways within the council before that."

The Hon. CAMERON MURPHY: Sure, but were any other concerns raised by them as a result of the trial or was it just a money issue?

ROB MANNING: No, we said that we'd be happy to—

The Hon. CAMERON MURPHY: No government wants to be responsible for paying it. I'm sure the council will say it should be the State or somebody else. But, outside the money, were there any other issues that came up?

ROB MANNING: No. Certainly when you talk about money too, we said we'd work with the EPA so the polluter would pay, but the original purpose of the trial was to take hydrocarbons out of the water. So as soon as we went beyond our scope, that was identified as the reason. They didn't say, "You've identified PFAS and we don't want to touch it." They said, "The issue regarding hydrocarbons—we've got problems everywhere."

The Hon. CAMERON MURPHY: Have you looked to do a PFAS or PFOA-specific trial with the sponge somewhere?

ROB MANNING: Yes. As I said, we're working with the engineering company that's looking after Amberley air force base to put that process in trial, and we've been working with the PFAS remediation team for the Federal Government since October 2023 to develop that trial. One of the problems that we had—and this is in an email which I can provide to the Committee—was that we were told that our original scope for the proof-of-concept demonstration, at $35,000, was well below their normal budget for these sorts of activities.

The CHAIR: And that was a problem?

The Hon. CAMERON MURPHY: So, it's too cheap a solution?

ROB MANNING: Too cheap a solution, which is probably why it's been picked up in India because over there we can do a lot more with a lot less and they're happy to do that.

The Hon. GREG DONNELLY: That's counterintuitive. What was your response when that was put to you?

ROB MANNING: It's like I've said on the global stage in presentations: We're a First World country with First World problems and we don't like Third World solutions, when a Third World solution is all we need to fix this problem.

The CHAIR: Around the area on the Central Coast, what is being done, that you know of, to clean up PFAS in waterways? Is there anything?

ROB MANNING: As far as I'm aware, nothing. That was born out of the fact that after the Newcastle university's Ourimbah campus, which is right on Ourimbah Creek itself, identified through the necropsies of the platypus—I went on ABC radio at the end of last year to talk about that specific issue with Scott Levi, and we've had zero response from them because they've had zero response from anyone who wants to help them identify it. We actually offered, and I'll do the same with Professor Naidu. We're happy to offer our gyroid sponge to anyone for free to demonstrate its capabilities, because we believe it's an Australian discovery, backed by research, advanced by science, that is going to take off. It has taken off overseas but not here at home.

The Hon. SCOTT BARRETT: It's possibly a very broad question, and I'm asking from a community perspective. What does utopia look like for you with this product? Are we using it to stop PFAS getting in waterways? Can we use it to clean up the situation we saw in Katoomba the other day? And then, if you want to go on a bit of a ramble, what do you need to get to that point?

ROB MANNING: It's a very good question, and I've heard that said to you a few times today. Utopia looks like where we understand just how big the problem is. It's easy to say it's too big for us to address. One of the challenges that we have, and that we heard about before from the two speakers before me, is the ability to actually test where the problem is. It reminds me of the story of the police officer who went over to the drunk guy staggering around under the streetlight, and the officer said, "Are you okay?" He says, "Yeah, I'm looking for my keys. I can't find them." He said, "Did you lose them around here?" He said, "No, I lost them over there, but there's no light and I can't see."

We're happy, it seems to be, as bureaucracies to say, "Well, if we don't know where the problem is or where it's coming from, then we don't have to look everywhere for it, because everyone is saying it's everywhere. If it's everywhere, we can't fix it." The reality is if you can identify a source, even within something like Ourimbah Creek, Tumbi Creek, Brisbane Water or Sydney Harbour—we're looking to work with Sydney university on trials where we put it in at places like Rhodes and other places.

For me, how do we get there? As I said, we're happy to give our sponge to anyone who wants to demonstrate the capabilities of this product. The reality is we can develop solutions, like Professor Naidu said, at residential level so that it can be used for filters on taps. We can use it for trench remediation around long runways for airports. Every airport in the world has the problem, so they're part of the 10 million sites that are contaminated. The reality is we stand on the precipice of something that is well beyond our comprehension as to how vast this problem is and how long it will take to clean up, but we have to start somewhere.

Our solution is many fractions less than the current methodologies that are used. If we look at the Blue Mountains water treatment plant, it's very curious that they announced that there was PFAS in the water, shut the dams down, and three months later opened up a $3½ million plant. I don't know how you could build it that quickly. So they knew it was there for a long time before they announced it, and that's the same in every council. We're currently talking with ShireBiz, which is a group down in the Sutherland shire, to see how we can help them with Sylvania Waters and other waterways. But we're a small team. How do we get there? We're going to do it because, as a company, we've decided that we are going to clean the world's oceans, one waterway at a time. Thankfully, the Indian state government of Goa found that we were the right solution for them. As the money flows in from that, we'll deploy it here on backyard projects.

The Hon. GREG DONNELLY: Are the booms manufactured here in Australia?

ROB MANNING: The booms can be made here in Australia. The gyroid sponge has to go through a particular process, and we've only found two manufacturers in the world that can do what we need them to do. Only one was prepared to use our formula; they're based in Malaysia. We bring the sponge from Malaysia and we create the booms both here in New South Wales and in Perth. But our whole philosophy as a company, if I was to just take a leaf out of our Indian company—I travelled to India for the first time in May of '24—was to pick up on Modi's vision of "made in India, sold to the world".

But ultimately, as a company, we want to make the victims of pollution the beneficiaries of remediation. In India, for example, the Swayampurna women, which is the self-sustainability—it does sound gender biased, but India is a very gender-biased country. They call them the Swayampurna women. They are going to be making the booms from recycled fabric that they recycle themselves, with the sponge that we give them, and they're giving

the booms to the fishermen who will fish for oil and trawl for plastic and then turn that into valuable building materials.

The Hon. CAMERON MURPHY: Just a couple of quick questions—

The CHAIR: No, there is no time for a couple of quick questions, I'm sorry. Mr Donnelly took the last one. It is 10.46 a.m. Thank you so much for appearing, Mr Manning. I think we could have gone on for some time; that was very interesting. The Committee will be in touch with you if you took anything on notice, but I'm not sure you did. I wish you all the luck. Thanks again for the work you're doing.

(The witness withdrew.)

Mr DARREN CLEARY, Managing Director, Hunter Water, affirmed and examined

Ms EMMA BERRY, Executive Manager, Strategy and Engagement, Hunter Water, affirmed and examined

The CHAIR: I welcome our next witnesses. Mr Cleary, I assume you've got an opening statement?

DARREN CLEARY: I do, thank you, Chair. I would like to begin by acknowledging the Awabakal and Worimi people here in Newcastle and pay respects to the traditional custodians of the lands and waters upon which Hunter Water operates. I understand that the Committee will also be meeting with my colleagues at Sydney Water and WaterNSW. While there are many similarities between our businesses, there are also some differences amongst the three State owned corporations and how water is managed across the region.

I'll start by briefly summarising Hunter Water's role and how it relates to PFAS. Hunter Water provides water, wastewater and some stormwater and recycled water services to a population of about 640,000 people across the lower Hunter region. We were established almost 130 years ago for the public health and take seriously our obligations as custodians of drinking water for the communities we serve. We are responsible for drinking water management from catchment to tap, owning and managing two surface water dams, Chichester and Grahamstown, and several aquifer water sources—the Tomago, Tomaree and Anna Bay sand beds—and drawing the water from the Paterson, Allyn and Williams rivers. Construction is currently underway on our region's next water source augmentation, our new desalination plant at Belmont, anticipated to be completed by 2028.

Our drinking water is regulated by the National Health and Medical Research Council's Australian Drinking Water Guidelines via conditions imposed in our operating licence, issued by the Government and regulated by IPART, the Independent Pricing and Regulatory Tribunal. We're required to maintain and fully implement a drinking water quality management system that is consistent with these guidelines and to the satisfaction of NSW Health. Our compliance with our operating licence, including performance against the Australian Drinking Water Guidelines, is audited annually by IPART. As the region's wastewater service provider, we're responsible from toilet to sink through the treatment and release of treated water back to the environment, including managing biosolids. Our wastewater operation's regulated in accordance with our various environment protection licences and New South Wales biosolids guidelines as set by the NSW EPA.

Both Hunter Water and myself personally have an extensive history dealing with PFAS, particularly in relation to the contamination emanating from the historic use of firefighting foams at RAAF Base Williamtown, which sits atop a portion of the Tomago sand bed aquifer. In 2015 the New South Wales Government publicly advised that PFAS chemicals had been detected in water leaving RAAF Base Williamtown and established the Williamtown investigation area. An expert panel was established and I represented Hunter Water as a member. Hunter Water's role was coordinated as part of the New South Wales Government's response.

Our responsibility took several elements. Firstly, for local communities surrounding RAAF Williamtown, former Premier Baird and Parliamentary Secretary Scot MacDonald directed Hunter Water to connect properties within the Williamtown investigation area to Hunter Water's reticulated water network to provide access to safe drinking water. Via this program, 350 properties in Williamtown, Salt Ash and Fullerton Cove were connected to our network. The $4.9 million project was initiated by the NSW Government and later funded by the Commonwealth.

Secondly, Hunter Water developed a comprehensive plan to safely manage the Tomago Sandbeds drinking water source for our whole community via the PFAS operating strategy for the Tomago bore field. This strategy was developed based on the best national and international advice, and was reviewed and endorsed by the PFAS expert panel which, at the time, was chaired by the New South Wales chief scientist. The strategy includes an embargo on two pump stations in proximity to RAAF Base Williamtown—pump stations 7 and 9—and comprehensive water quality monitoring prior to water being supplied to our customers. The current strategy was approved in 2018 and continues to comply with the *Australian Drinking Water Guidelines*.

Thirdly, we have implemented an extensive PFAS testing and reporting program for the bore fields and also across our water network. Under this program, Hunter Water samples for PFAS in our catchments and untreated water at all six of our drinking water treatment plants and at 83 locations across our drinking water network. A summary of the results is published on our website each month for transparency with our community. Additionally, each quarter, Hunter Water and NSW Health review all PFAS results across our drinking water system. This dataset is extensive, with more than 4,000 samples collected within our drinking water distribution system since 2016 which is representative of the treated drinking water we provide to our customers. A further 4,000 samples have been collected from our catchments and raw or untreated water at our water treatment plants.

Over time, our understanding of PFAS chemicals continues to improve, as does the sensitivity of laboratory testing. In our treated water samples, we do infrequently get low-level positive detections of PFAS, and of the 4,000 samples taken, approximately 150 have reported low-level detections. We have documented procedures for responding to PFAS detections, including engagement with NSW Health. If this is of interest to the Committee, I can talk you through examples of this. Through this comprehensive testing and monitoring, and the controls we have in place, our customers and community can be confident that their drinking water remains safe. Our drinking water meets the current Australian drinking water guidelines for PFAS, and our analysis indicates that it will meet the requirements of the proposed Australian drinking water guidelines.

Briefly, and for completeness with respect to our role as a wastewater service provider, our wastewater network collects sewage from homes and businesses across the region. Like our water treatment processes, our existing wastewater treatment processes are not effective at removing PFAS chemicals should they enter the sewer network. As a result, our focus has been on preventing PFAS being disposed of by our customers within their wastewater discharges. This has required proactive and, at times, difficult engagements with our commercial trade waste customers. The most prominent example of this is the former Truegain Australian waste oil refineries facility at Rutherford.

The management of wastewater for PFAS chemicals is an emerging area of regulation, and we work closely with our peer agencies as the regulatory landscape adjusts to the latest science, both at a Commonwealth level via the draft PFAS National Environmental Management Plan 3.0, and at a State level with the NSW EPA. We support submissions from other utilities for regulation to better mitigate PFAS chemicals at their source, which will go some way to prevent them from entering the water or wastewater, helping to prevent the need for further technically challenging and costly treatment actions.

Finally, I understand that the Committee is interested in the resourcing, capacity and coordination of PFAS responses by agencies, and the financial and water security impacts of taking contaminated water sources offline. For Hunter Water, with the exception of the Williamtown water reticulation program that I referenced earlier, our PFAS response is fully funded by our customers through their water bills. These costs are not insignificant. In the most recent financial year, we invested in the order of $235,000 to undertake PFAS sampling and testing alone, with similar amounts incurred each year since 2016. We consider this to be a prudent investment in the safety of our region's water supply.

Further, there is a quantifiable cost borne by our customers through the existing embargo of the two bore stations I mentioned within the Tomago Sandbeds aquifer. Our sand beds are our drought water reserve, providing especially valuable water during dry periods. The embargoed bores can provide a combined yield of around one billion litres per year on average, and up to 10 million litres per day during peak production, representing about 10 per cent of the accessible storage from the Tomago Sandbeds. The cost of permanently losing access to this water to our community is in the order of 50 to 150 million, and would require us to bring forward our region's next source augmentation to maintain our water security. Thank you for inviting us to present to the inquiry.

The CHAIR: Mr Cleary, who is responsible for monitoring the movement of the contaminated groundwater in the Williamtown area? Who is overall responsible for that?

DARREN CLEARY: We have responsibility for monitoring it, with respect to our drinking water source, which covers the majority of the aquifer. Our responsibility obviously relates to using that as a drinking water source. That is the result we provide to NSW Health. We do also share those with other agencies such as NSW EPA as part of that PFAS taskforce. The NSW EPA have responsibility as it relates to environment protection and managing contaminated sites.

The CHAIR: The two pump stations—it was 7 and 9. Is that right? There is an embargo on those two.

DARREN CLEARY: Correct.

The CHAIR: What are the PFAS levels within those two pump stations? I assume we test them regularly, those bores.

DARREN CLEARY: We don't test them regularly at the moment because testing them—getting representative samples requires you to run the bores, so we don't test them very regularly and they are not in production. We have never had a PFAS detected at bore station 7, and that is due to the hydrology of the region. But we have isolated it as a very conservative approach to be sure that we are not drawing contaminated water into that bore. At bore station 9, it's at levels that have been, I think, above the *Australian Drinking Water Guidelines* but relatively low levels. But I would have to take on notice the exact concentrations.

The CHAIR: Is the contamination moving in the groundwater? Is there a plume of PFAS contaminated water that is on the move?

DARREN CLEARY: Yes, our understanding is that the groundwater generally in that area of the Tomago Sandbeds moves from north to south. That groundwater is migrating off the RAAF base. We are not best placed to give advice about that because it's not our focus and it's not what we do. But it is certainly migrating. I think the testing that has been made publicly available shows that it is clearly migrating off the base. It is worth noting that there is a strong connection with the groundwater and the surface water, particularly in that area, so it can be migrating both through the ground and through the surface water.

The CHAIR: Sorry, so who is responsible for that then? When you said it wasn't you, who publishes that and informs the community about it? Is it Defence? Is it the EPA?

DARREN CLEARY: The details of this question should be directed to the EPA because there are complications, given the different jurisdictions of the Commonwealth and New South Wales State. But NSW EPA are the lead agency regarding that PFAS taskforce.

The CHAIR: But you're here from Hunter Water.

DARREN CLEARY: Correct.

The CHAIR: In terms of the groundwater, do you have authority over that or you don't because it's within the Williamtown area, just to be clear?

DARREN CLEARY: We don't have authority over the groundwater. Our role is with respect to harvesting that groundwater for drinking water purposes. We share the monitoring we do and obviously the knowledge we have regarding the behaviour of the aquifer and have had input into providing advice to the PFAS taskforce. But we don't have any responsibility with respect to the broader management of groundwater in that area.

The CHAIR: There were concerns raised by residents earlier regarding what they saw as quite a bit of foam in their residential area on, I think, Dawsons Drain—I think they live near there—and foam that has been accumulating on the golf course Pacific Dunes. Are you aware of that complaint by them and that evidence? What is your response to that?

DARREN CLEARY: We are aware. They have written to us previously with respect to those issues. I can provide a general response, but I am also conscious that some of those claims do relate to private property. I am happy to provide a detailed submission in relation to that. I suggest to the Committee that some of that may, for your consideration, be dealt with in camera, given it does deal with private property. In general, our response to that is, from a drinking water perspective and our understanding of contamination in the Tomago Sandbeds, we have a very good understanding of how groundwater is moving and we do extensive testing.

We are confident that the issue that is being raised is not a concern with respect to our drinking water source. As I said, the knowledge we have of groundwater flows and the extensive testing we do demonstrates that. For example, the bore station that is closest to that potential incident that is being raised, we do test that and we have not tested PFAS in that bore. With respect to the incident itself, based upon the most recent correspondence that we received, we did some further research to understand what we knew about that. We did find some archival news footage of a tanker accident in that area, and we've referred that on to the EPA to investigate or to consider as part of their management of contaminated sites.

The CHAIR: You mentioned the PFAS NEMP 3.0 at the Federal level in terms of biosolids.

DARREN CLEARY: Yes.

The CHAIR: Is this a concern for Hunter Water in terms of the application of your biosolids, for example, on agricultural land once that comes into force?

EMMA BERRY: We've been working on a business case to make sure we are prepared for the introduction of the revised guidelines, which I understand are very much aligned with the NEMP 3.0. We have been engaging closely with the EPA to understand what those implications are. We have in the order of about $500 million in investment coming up over the coming years to be prepared to meet the new guideline values. We're also looking at interim measures that we can put in place in the short- to medium-term to reduce the risk and ensure that we comply with these new guidelines.

The CHAIR: How much of your biosolids, in terms of testing, do you think at this point wouldn't be able to be applied as fertiliser on agricultural land because it exceeds the proposed guidelines?

EMMA BERRY: Based on our analysis, we think about 25 per cent of our current biosolids may not meet the new guidelines.

The CHAIR: I'll come back to that.

The Hon. SCOTT BARRETT: You mentioned the testing on the bore. One of the bores that you've got embargoed hasn't shown results of PFAS in it?

DARREN CLEARY: Correct.

The Hon. SCOTT BARRETT: You still have embargoed that, though, because if you draw water out of that—this is a question—you're worried that groundwater will then seep into that bore to replace the water?

DARREN CLEARY: There is that risk.

The Hon. SCOTT BARRETT: Is that why that's embargoed?

DARREN CLEARY: Yes.

The Hon. SCOTT BARRETT: There were comments from earlier evidence we heard—I think they said Hunter Water was doing tests around that area, that they weren't sure of the results. Do you have specific testing areas that you do and that's all you test? Or are you exploring other areas with your testing?

DARREN CLEARY: No, we are testing our bores. Sorry, very briefly, the Tomago Sandbeds is a large area. It's 100 square kilometres. We have over 500 bores that are fairly major pieces of infrastructure. They're then linked up to a large pump. We have bore lines that might go for hundreds of metres. We're testing those bores as it relates to water supply. That's the testing that we do. It varies, but roughly we're drawing water between 12 and 15 metres below the surface. Our bores are not necessarily representative of what a private resident would be testing, and we're not out there testing private bores. As I said, our role is drinking water supply and we're testing it for that reason. I should also flag, just very briefly, the Tomago Sandbeds are a very critical water supply for us, but we don't run them all the time. That's because the water that's in there is more expensive to treat than surface water because of the geology of the sand beds. When we have our dams at high levels like they are at the moment, we don't run the Tomago Sandbeds, so they're not run all the time either. We test as part of an operational response of ensuring water is safe, and also how we manage our bore field.

The Hon. SCOTT BARRETT: What are the trends and/or changes in the results you're getting through over time?

DARREN CLEARY: The movement of groundwater and the movement of the contaminant plume is relatively slow and relatively well understood—not perfectly. We've got confidence that things will not change quickly with respect to groundwater flow. That's not only from our PFAS monitoring but the other monitoring of chemicals within the sand beds. The main contaminant plume moving off the RAAF base—with the embargoes that we've got in place, the management we have in place and the management protocols we have in place with respect to operating our bores, we are confident that we are not going to draw that into our bores and that we are also not going to accelerate the movement of that plume off that base. They were the two considerations that we had with respect to operating our bore fields.

The Hon. SCOTT BARRETT: On the individual bores, are there trends? Is the level of PFAS increasing or decreasing in each bore?

DARREN CLEARY: Generally, no, there's not an increase in PFAS in those bores. One of the challenges—and I'll reflect a little bit on the comment from the previous presenter. We are trying to find areas of PFAS contamination and manage them. It is also a very widely used chemical, and we can detect it at very low concentrations. We have had examples of detects where it can't be explained. No matter how hard we look and find, we can't explain the detection, and then if we do follow-up sampling, it's not there anymore. But as a trend, we're not seeing increasing PFAS concentrations in our bores.

The Hon. SCOTT BARRETT: With the safe PFAS levels you referred to now, are you confident that water will still be safe in five, 10 or 20 years time?

DARREN CLEARY: We are confident, based on what we currently know, but that's why we continue to test. We're obviously open to ensuring that that remains the case, and we have to do that through testing.

The Hon. AILEEN MacDONALD: In your opening statement, you said you rate the water users. Can you just clarify what you said about charging the constituents or consumers of water in the local area?

DARREN CLEARY: Apologies—not so much the local area. All of the costs of running our business, including our PFAS monitoring, are covered by our customers but it's our entire customer base, not just the Williamtown residents.

The Hon. AILEEN MacDONALD: Not just in that small area?

DARREN CLEARY: No. The other thing I was referring to was the reticulation scheme that was provided to the residents of Williamtown. Prior to 2016, when the announcement was made, most of those properties—because they were large rural residential properties—did not have a water connection to Hunter Water's service; they were using groundwater, predominantly. That cost was met by the Commonwealth—initially funded by the State Government, and then met by the Commonwealth.

The Hon. AILEEN MacDONALD: Based on that, is that enough revenue? Is there any other, say, further government support so that you can manage the PFAS?

DARREN CLEARY: That's a much broader question that goes to IPART and the State Government itself. I think the areas of—as my colleague outlined, biosolids management in particular will be a challenge and, based upon our current understanding, will require substantial investment. The way that we operate as a business, the presumption is that those costs are recovered from our customers—from the community that we service. So that's a broader policy question for government to consider.

The Hon. AILEEN MacDONALD: Is your long-term strategy to remove PFAS or to manage PFAS?

DARREN CLEARY: The long-term strategy for us is to ensure that our drinking water is safe and that our wastewater system is operated in a way that it protects the environment and protects human health. We would take the best understanding of the science and then develop a strategy that does that in the most reliable way, and then at the least cost. We need to make sure it's safe, but of course there are limited resources, so we need to be mindful of how we provide that safety in the most efficient way.

The Hon. AILEEN MacDONALD: On the actions that you've taken to protect the community, do you think that those actions are transferable to other areas that may have to deal with PFAS contamination in the future? Can the lessons you've learnt be passed on? I understand that they're different soils and things like that, but there would be some things that you could say are the ground rules.

DARREN CLEARY: I think that's true. Certainly, as water businesses, we do look at what each other is doing and try to learn from each other. Certainly, from a technical perspective, that's definitely true. I would say the focus we've had on PFAS clearly has been because of the particular situation at RAAF Williamtown, with a very clear, known source of very high contamination. That has informed how we've responded. That is different to what others have been confronted with.

The Hon. GREG DONNELLY: Thank you both for coming along and for the detailed explanation you provided. In the whole-of-government submission—and I won't take you to it, but it's submission 19—there is a section that deals with community engagement as an important issue. You are quite right that in 2015 we had the first real manifestation of the issue. It had all the attention that it got, and deservedly so. That goes through to 2025, so we have a 10-year period to look back on. Could you provide an overview of the community engagement that Hunter Water consciously engaged in over that period to educate, inform and explain to the community at large the issue—things like the website and where information is available? That would be useful evidence for the Committee.

DARREN CLEARY: Indeed. With the Williamtown issue in particular there was, quite rightly, a community that was particularly concerned and affected, with a low degree of trust in institutions because of the experience they had with the announcement of the contaminations. We spent a lot of time with our State Government colleagues—particularly within NSW EPA and NSW Health—going to community open days and events, and responding to questions with respect to the understanding of how the sand beds operate, the hydrology of the sand beds and the testing we were doing. That was evolving and emerging. The key lesson for us was engaging with the local community, being open with them, providing the time to answer the questions and being clear about what we did and didn't know. It's still evolving, and it was evolving at that point in time.

At the beginning of that process, there wasn't a drinking water guideline. There was no environmental guideline with respect to PFAS. Part of the challenge was, even with testing, if we found something, we couldn't tell people what it meant. That in itself is a very big challenge. Once we had the guideline we implemented our sampling program across our entire drinking water network and made the summary of those results available to our customers so we could be transparent. Then when we had queries, we could engage and say, "Here is the information we have." Then we could have some dialogue with respect to testing.

The Hon. GREG DONNELLY: It was a very comprehensive approach to try to at least in part rebuild what might have been a bit of a deficit in public trust about matters to do with water. That was very high in your mind in terms of the work you were laying out.

DARREN CLEARY: That's right. It was the testing along with the explanation of—and this is more with particular stakeholder groups—how the system worked. Why are we confident, for example, that the groundwater from RAAF Williamtown isn't draining into Grahamstown Dam, was one of the common questions we would get. It was a combination of all of that. We have provided information with respect to that sum total of knowledge and getting our experts who have that understanding to engage with community to answer their questions.

The Hon. GREG DONNELLY: And that's a continuing exercise—it's not one that's terminated? The issue is still obviously in the public domain. Is that still continuing?

DARREN CLEARY: It is a continuing exercise, but I think in recent years—until very recent times—it has, within our community, from our experience, had less prominence, compared to the earlier days of 2015 or 2016.

EMMA BERRY: More broadly, we do obviously publicise our PFAS results for our drinking water. We've got a range of information and fact sheets available on our website that we refer our community to as well if they want to learn more.

The Hon. GREG DONNELLY: That is helpful evidence. Thank you.

The Hon. CAMERON MURPHY: I just want to say thank you for the work that you do in terms of the safety of the drinking water. I think that's great. I just want to turn to the issue of wastewater. You're responsible for that also.

DARREN CLEARY: Yes, indeed.

The Hon. CAMERON MURPHY: What steps are in place to remediate wastewater, to test and look at PFAS contamination in that now and into the future?

DARREN CLEARY: We are testing, and our focus at the moment is on our controls of what's being discharged into our wastewater network, particularly looking at commercial and industrial customers that potentially have high concentrations of PFAS, and we've been working with them for a while to stop that discharge.

The Hon. CAMERON MURPHY: What about residential?

DARREN CLEARY: With residential, it's very challenging. We can't control that.

The Hon. CAMERON MURPHY: Carpet, clothing, lipstick, cosmetics and things.

DARREN CLEARY: That's right, and our customers can't control that. My opening statement referred to, absolutely, the approach of trying to minimise the use of PFAS in products is, in our view, critical.

The Hon. CAMERON MURPHY: Sure, but that can't be the only approach. Isn't there going to be a requirement at some stage for you to test that and to remediate the water before you put it out to sea or somewhere else?

DARREN CLEARY: We are testing. We do at times often get no detects, and we do get examples of detections of PFAS. This is where it comes back to, then, certainly working with the New South Wales EPA and getting expert advice about what is a safe concentration, what is a safe limit that we can then work out a management strategy to meet.

The Hon. CAMERON MURPHY: What is that at the moment? What do you consider a safe limit in terms of wastewater?

DARREN CLEARY: We're being guided by the NEMP. There is not clear guidance at this point in time. So we are testing. As I said, much of our wastewater has no detect. At times, it does. So it's an area that is still emerging.

The Hon. CAMERON MURPHY: But there's no standard that you're applying to that at all at the moment.

DARREN CLEARY: No.

The CHAIR: But there's a proposed standard, just to be clear.

EMMA BERRY: Yes, correct. We are assessing our biosolids and wastewater against that standard.

The Hon. CAMERON MURPHY: Against that standard?

EMMA BERRY: Yes. That's right.

DARREN CLEARY: That's the biosolids.

The Hon. CAMERON MURPHY: Not the wastewater?

DARREN CLEARY: There's biosolids and then there's also the wastewater discharge. The concentrations we're finding are very low, and so our understanding is we don't think that presents a significant risk, but the science is still emerging, so that's something we're monitoring closely.

The CHAIR: There are concerns, though, are there not, in terms of biosolids? The Australia-New Zealand—what's it called? Biosolids—what's that organisation?

DARREN CLEARY: Biosolids Partnership.

The CHAIR: They're worried about the NEMP 3.0. They're quite concerned about the potential on the biosolids industry and the reuse of biosolids. Is that correct?

DARREN CLEARY: Yes, that's correct.

The CHAIR: What are they saying about it? Why are they concerned?

EMMA BERRY: The new NEMP 3.0 introduces guidelines around PFAS values, which the current guidelines do not. It's silent on PFAS. So this is a big step change for the industry. Yes, there are concerns. As Darren said, it is an evolving science, and we need to be able to understand what are the actual implications for human health. I suspect there's also concerns—and there are certainly in the broader water industry—about the cost implications of complying with those new guidelines as well in the most cost-effective way.

The CHAIR: What are you options with biosolids, then, if these new guidelines do come into force? It appears as though they will. You said, potentially, 25 per cent of your biosolids—was that unrestricted use or restricted use—on agricultural land couldn't be used?

EMMA BERRY: Our biosolids are used across a range of different end users around agricultural for non-dairy. Around 10 per cent, we think, is used on agricultural for diary. Some of it is also composted for further use around land rehabilitation. Our estimation is that around 25 per cent of our biosolids will not meet the minimum thresholds that are currently being discussed in the new or emerging New South Wales biosolid guidelines.

The CHAIR: What are your options? How much is that, by the way, 25 per cent? How many tonnes are we talking?

EMMA BERRY: We produce annually in the order of 40,000 to 50,000 wet tonnes of biosolids each year.

The CHAIR: What are your treatment or disposal options?

EMMA BERRY: We're looking at long-term options in terms of treatment technologies that will address PFAS as well as the other range of contaminants that the new biosolids guidelines will address. As I mentioned before, we are also looking at interim measures to reduce the risk and comply with the new guidelines. They'll be measures like operational measures: blending, for example, or doing more composting of biosolids that don't meet those standards. We could put in more temporary storage so that we can enable us to store biosolids for longer, to enable us to blend and to compost. Longer term, to treat the PFAS and remove the PFAS, we're looking at new technology. So it will take some time to develop a business case and then deliver significant infrastructure requirements.

DARREN CLEARY: It also depends upon the nature of the guidelines and understanding the risk. The detailed risk assessments that we understand the guidelines will provide guidance on is something that we'll need to understand, because if the risk isn't acceptable, then we won't apply biosolids to land. Then our options are either to store—which, from a practical perspective, you can only do it for so long—and then put it into landfill. There is a very large challenge for us if those guidelines were to demonstrate—if they are, we have to follow the public health advice, and we absolutely would—that biosolids application wasn't acceptable under those circumstances, then they would be our options that we'd have to continue to work through. The development of treatment technology to remove is a large investment that will take time to deliver. It's not about—the cost is the

cost, but that sort of technology is not something that you can deliver quickly. It takes years of procurement and construction to implement that sort of technology.

The CHAIR: Is Hunter Water trialling anything at this point in time?

DARREN CLEARY: We're engaged with a bunch of research around much of this technology, both from an understanding of the mechanisms of transport of PFAS, pinching it out of biosolids—so the research that Professor Naidu mentioned before. We're one of the partners as part of that research, for example, as well as partnering with other organisations within the industry to look at what technologies are available and looking at that closely. From our perspective, from the scale perspective, that sort of research about technology is very expensive, so to do that cost effectively, we partner. We don't really have the financial capacity to do that by ourselves, given our scale.

EMMA BERRY: The other research that the Committee may be interested in is looking at the effectiveness of biosolids biochar, which Dr Naidu did mention. We're also contributing to research in that area to understand the fate of chemicals or contaminants in the biochar and also understand what the end uses are for biochar. At the moment, there isn't an end market for biochar, but that doesn't mean to say that there won't be in the future, so we need to understand those risks as well.

The Hon. SCOTT BARRETT: I have a question about the infrastructure. The pipes and the pumps and that sort of stuff—if all of a sudden there was a source that had no PFAS in it and it was then pumped through that infrastructure, would there still be remnants in that infrastructure going forward?

DARREN CLEARY: It's possible that PFAS could accumulate if we have sediment within our pipes. That does happen in various spots. It's possible that PFAS could accumulate in that. In the wastewater system—in the water system, we're not detecting any significant source of PFAS whatsoever. Most of the detections are nil, so I think the risk of that is negligible. In the wastewater system, it is possible, but it's unlikely to be at very high concentrations, and that's why that source control is really essential.

The CHAIR: Any other questions from members?

The Hon. GREG DONNELLY: No, that was very good evidence. Thank you.

The CHAIR: Thanks so much for appearing. The secretariat will be in touch if you've agreed to take anything on notice. The Committee will now break for morning tea.

(The witnesses withdrew.)

(Short adjournment)

Dr TONY MERRITT, Public Health Physician, Hunter New England Local Health District, affirmed and examined

The CHAIR: Welcome to our next session with Hunter New England Local Health District. Do you have an opening statement for the Committee?

TONY MERRITT: I do. Thanks for the opportunity to make a brief opening statement. I'd like to start by recognising the traditional custodians of the lands and waters throughout Hunter New England Local Health District and to acknowledge Aboriginal and Torres Strait Islander Elders past and present. I'm a public health physician and I've worked with the public health unit in Hunter New England for over two decades. I've contributed to public health unit engagement with PFAS issues since 2015 and, in addition to Williamtown, there has been a range of other sites impacted by PFAS in Hunter New England over this period. In terms of our roles, the public health unit has a key role in supporting and informing local communities about public health risks and how these can be mitigated. We have, for example, participated in many community drop-in sessions in Williamtown, and the local health district provided a dedicated mental health service to that community when this was recognised as a significant need early in the response.

It's important to note that decisions on policy are made at the State or Federal level or through expert scientific panels such as the NHMRC, and the public health unit plays a specific role in then communicating these decisions at a local level. We have also been active in supporting and educating local clinicians. This was particularly critical in the earlier response to PFAS in the Williamtown community. We ran multiple sessions for local general practitioners and continue to provide updated information through the local primary health network. We also support local government authorities throughout Hunter New England who are responsible for the provision of safe drinking water. We do this by providing technical advice if there are PFAS or other chemical or microbiological detections, by facilitating engagement with appropriate government agencies, and through assisting with developing clear messaging to keep the community informed if PFAS or other chemical or microbiological risks exceeding drinking water guidelines are detected. We also work with other government agencies as required when they are involved in PFAS-related work in the local health district. I look forward to your questions, and I hope that I can make a useful contribution to the inquiry.

The CHAIR: Thank you very much, Dr Merritt. You said you've been involved in the PFAS issue and working on PFAS since 2015. Is that correct?

TONY MERRITT: Indeed, yes. That's right.

The CHAIR: So you were involved locally in terms of Williamtown.

TONY MERRITT: Yes. I was at that first multi-agency meeting in August 2015 where it was initially dealing with the discovery of PFAS off the site at Williamtown. Yes, I've been involved with a team. There is a group of public health physicians. My director is one as well. There is a group of us who have been involved with both Williamtown and PFAS throughout Hunter New England since that time.

The CHAIR: What knowledge does NSW Health have in relation to the potential health impacts of PFAS on Williamtown residents?

TONY MERRITT: Sure. This is a specific question about health impacts in Williamtown?

The CHAIR: Yes.

TONY MERRITT: We had really extensive involvement with the Williamtown community through those community liaison meetings—the drop-in centres. We had a lot of firsthand experience with how PFAS was affecting and impacting residents in the community. I guess the most detailed study that we can draw on, in terms of science around the health impacts, was done by the Australian National University, and that reinforced our own impressions. We could talk about that at length, but I guess the headline findings there were around the psychological distress—so that really significant finding. That was borne out by our experience with community members at those early drop-in centres. The ANU study looked at levels of PFAS in blood samples, they looked at people's exposure histories, and they looked at data linkage with health outcomes across a broad range of things. In addition to that psychological distress, they noted an increase in cholesterol levels in Williamtown residents.

I might hasten to add that the ANU study was across three sites. It increased its power, involving more people. It was Williamtown, Oakey and Katherine. The most powerful conclusions drew on the data from across all of those populations. There was the issue identified with cholesterol. They went on to note that those elevations were statistically significantly but modest in size and perhaps unlikely to have a significant clinical impact. There were no strong conclusions drawn about other health issues that were strongly delineated across those three

populations, but they looked widely. I can talk more generally about health concerns, of course, but they're the kind of headline findings from the ANU report.

The CHAIR: What does NSW Health do in terms of baseline studies within the community now? So Hunter New England in terms of Williamtown residents and their health issues? I'll also ask about blood tests. I know the Department of Defence does that, I think, but does NSW Health? Are there any studies looking at what's happening with Williamtown residents at a broad level, health-wise, since 2015?

TONY MERRITT: In terms of that kind of research-oriented cross-section across the community, we've relied on that ANU investigation. It was done in enormous detail. It involved data linkage. It involved a bigger population, as well, drawing on those other bases. They also had capacity to have comparison populations, other communities of similar size but not exposed to PFAS, which allowed them to bring that comparison lens to the experience of Williamtown residents. So we've relied on that work in terms of the best picture available of impact of PFAS on Williamtown residents.

The CHAIR: When was that done?

TONY MERRITT: I'd have to refer back. It's a couple of years ago now.

The CHAIR: I've got that in front of me. NSW Health hasn't undertaken its own, even though the ANU study did acknowledge that some of the limitations of that study were the small size and being unable to measure the Williamtown residents against the general population. Wouldn't it make sense for Hunter New England to look at some of that work?

TONY MERRITT: The power is an important issue, as you point to. They had the capacity to include the two other communities, and that was both to get a realistic look at other communities known to be impacted by PFAS and also to increase the power—their capacity to pick up effects, should they be there. That was part of the advantage of relying on that ANU work, indeed; to address that.

The CHAIR: But this was just in PFAS-affected communities.

TONY MERRITT: That's correct.

The CHAIR: Katherine, Oakey and Williamtown.

TONY MERRITT: That's right, yes.

The CHAIR: NSW Health is not curious as to how Williamtown residents are comparing against residents in other parts of the Hunter?

TONY MERRITT: As I say, we've relied on that detailed study to address that particular question.

The CHAIR: It doesn't do that, though, with respect, Dr Merritt. Does it?

TONY MERRITT: Can you restate your question again because I've misunderstood?

The CHAIR: In terms of comparing the PFAS-affected communities in Williamtown, compared to the rest of the population in the Hunter.

TONY MERRITT: I guess what they did do for the ANU study was compare the Williamtown community with a comparison community. I would have to go back to the study to be reminded where that comparison community was. But that goes to the heart of your question, I think, and that is to pick up whether there were significant differences between Williamtown and an otherwise similar community that didn't have exposure to higher levels of PFAS.

The CHAIR: Are you aware of how that's tracking over time? The PFAS-affected community in Williamtown, is NSW Health aware of how they're tracking since the ANU study?

TONY MERRITT: I'm not aware of any comparable follow-up work with that community.

The CHAIR: You can't remember when this was done?

TONY MERRITT: I've got the report here. I can pull it out if you'd like me to.

The CHAIR: It's not a trick question. I'm trying to find out as well. In 2021, I think the research was done. It may have been presented in early 2022. Does that sound right?

TONY MERRITT: That sounds reasonable to me. No, I'm not aware of follow-up work of this nature—this kind of detailed, research-oriented comparison—since that time.

The CHAIR: The NHMRC's *Australian Drinking Water Guidelines* came out in January or February this year—the draft drinking water guidelines?

TONY MERRITT: Are we talking about 2024?

The CHAIR: They came out the end of last year.

TONY MERRITT: October, I believe, 2024.

The CHAIR: Yes. You're aware of the IARC's findings in relation to PFOS and PFOA?

TONY MERRITT: I am. That's correct. They've made an announcement they've found PFOA to be carcinogenic and PFOS to be possibly carcinogenic. I think that's the findings you're referring to.

The CHAIR: Yes. And none of our guidelines at this point are referring to that. Is that correct? The latest national NHMRC—

TONY MERRITT: We're getting into technical territory in relation to NHMRC, but I'm happy to comment on it generally. The NHMRC is the peak national body of experts who provide us with their guidance in the Australian Drinking Water Guidelines, amongst other things. As you refer to, there's the established current drinking water guidelines and then, towards the end of last year—as I say, in October—they announced proposed revision to those guidelines based on a renewed look at the evidence. Those are living documents and they get updated from time to time in the light of other evidence. I've looked at the documents that NHMRC released accompanying those proposed guidelines. They make specific reference to and acknowledge the IARC findings in relation to PFOA and PFOS. They note that they await the detailed monographs that will provide the background thinking in terms of both of those things. To your earlier question, if I've understood correctly, Chair, NHMRC, in releasing their proposed documents, were aware of IARC's findings and, as I say, await the detailed content that is behind those.

The CHAIR: We will await that. Do you have any thoughts as to why we at the Australian level, in terms of drinking water guidelines, would suggest that, for PFOA, a limit of 200 parts per trillion would be acceptable when, for example, the US EPA has four parts per trillion. I've seen that some of the justification for that is different circumstances. I was wondering whether you, as somebody who works within the Hunter New England LHD, would be conscious of what those circumstantial differences are between us and the US, to warrant a different standard?

TONY MERRITT: With respect, I'm going to need to refer questions about that kind of policy and more detailed technical consideration to my Health and other agency colleagues. That's not our consideration at the local health district. But I do note that there's a different approach to water guidelines in many different agencies around the world. There are valid considerations and decisions to be made about how guidelines are put together and developed. There are generally different approaches in different jurisdictions. I'll leave the comment on the more technical aspects, if that's acceptable, to my colleagues at the State level.

The CHAIR: I'll come back to that.

The Hon. AILEEN MacDONALD: You might have to take this on notice: What are the long-term effects or health risks of exposure to PFAS chemicals?

TONY MERRITT: It's a fabulous and important question, isn't it, in terms of health and what's driving all this. Clearly, the PFAS group of chemicals are of concern. We've heard repeatedly that they're very long-lasting. They bioaccumulate. Those are characteristics which are concerning. Then there are the health concerns layered on top. I'm sure the Committee has had the enHealth summary document fact sheet presented. That's the succinct, two-page summary which captures health concerns, I think really helpfully. I'm happy to enter that into evidence if you'd like, but I suspect you've heard it repeatedly. There are health concerns in terms of things like cholesterol, uric acid, thyroid hormones, kidney hormones and those kinds of issues. Where those changes have been found, they've often been at modest levels. The extent to which they have any biological consequence is uncertain.

Importantly, we've touched on the issue of concerns around cancer. Those findings from IARC are really important, of course. Links with or concerns about two rare types of cancer—so that's testicular cancer and kidney cancer—is particularly with one of those two chemicals, with the PFOA and particularly in high-exposure settings, industrial settings, for example, overseas. In Australia, and certainly in Hunter New England—I'll confine my comments to that—it's more generally the PFOS that we've had excesses of. Your question was long-term consequences, and it really goes to that aggregate consideration about potential health impacts. We continue to learn more about these chemicals, but I'd point you to that enHealth summary as a fabulous kind of succinct status

of—it's the peak body in Australia summarising the evidence as they had it then. That's a living document as well; they'll update it of course as new evidence comes to light.

The Hon. AILEEN MacDONALD: In your current role, do you have the capacity to advise NSW Health to update its public health guidelines in line with international standards based on what you've just said? Just in your role.

TONY MERRITT: That kind of policy regulation development level, that happens amongst my peers at the New South Wales Government level, not at a local health district level where I operate, and you got a sense of the kinds of things we get involved in through my opening statement.

The Hon. SCOTT BARRETT: How do I filter between the list of the problems that PFAS is causing through to the line in the thing where there's no causative relationship between health effects and PFAS exposure? How do I equate those two statements?

TONY MERRITT: I think the language is scientific and it's careful and it's accurate, so there is an important kind of leap in understanding there. The concerns relate to associations with that list of things, for example cholesterol, and so a chemical exposure might be associated in studies with an outcome like cholesterol without it being a clear causal pathway. Maybe there were other things going on in that population group that explained that cholesterol being raised, for example. It's entirely appropriate that a precautionary approach is taken to PFAS and that is what drives this Committee's interest. It's what drives our public health action in terms of helping keeping communities safe.

In terms of the underlying health evidence, the summary from enHealth accurately reflects that. There are associations that we need to consider. In terms of them being causatively established, that evidence is not here. In terms of cancer—high level concerns. You have IARC declaring PFOA as a carcinogen. That's critically important and drives the precautionary principle in terms of moving that down. As the enHealth statement says—I think you have it in front of you; you were just quoting it—"studies of these cancers remain conflicting and associations have only been observed in high-exposure groups, such as workers in international factories where PFOA is produced". It would be really important to have a very careful look when the full monographs are available from IARC how that information applies most appropriately to the Australian scene.

The CHAIR: Dr Merritt, what were you just reading from?

TONY MERRITT: I do apologise. We've just referred to the enHealth fact sheet multiple times.

The Hon. SCOTT BARRETT: I personally don't have it in front of me. As a medical professional, you're comfortable with that—what I read is contradictory language?

TONY MERRITT: I don't think it is contradictory. We can have association. I am comfortable, to go to your question. I start and finish with a precautionary approach, given all those health concerns, absolutely. The associations are there—higher cholesterol, for example, in that Williamtown population. We need to take that seriously. But there may be other factors contributing to the associations that have been seen.

The Hon. SCOTT BARRETT: What would change if this causative relationship was established?

TONY MERRITT: I think the precautionary approach that has been taken takes that absolutely into account. The driving practice behind the application of that principle has been to establish safety of drinking water supplies and ensure levels are at a standard that the national body in Australia, the NHMRC, sees as protective over a lifetime. It would be to ensure people's exposure to water in particular—that it was safe for drinking. That wouldn't change at all in terms of the things we've just been talking about. The current approach takes that into account and is protective. The guidance, for example, that NHMRC produces for the *Australian Drinking Water Guidelines*—if water complies with those guidelines, it's assessed as safe for a person's whole lifetime. That's exposure over an entire lifetime with no health impacts expected if the levels remain below the guidance level. Have I answered your question?

The Hon. SCOTT BARRETT: Yes. Thank you.

The Hon. CAMERON MURPHY: What you've outlined really is just a risk-based approach, isn't it, where it's about reducing exposure, following those national guidelines? Then, as more knowledge comes to light, the guidelines change. But what we've seen over time is the level of exposure that's tolerable is just reducing. Why wouldn't we be taking more steps to, for example, ban materials that contain the PFAS group of chemicals from being sold and used? Do you think we're at the point where something like that should be considered?

TONY MERRITT: It's a little bit beyond where I work in a local health district but I am aware that there are all sorts of measures at an international and State level to do exactly the kinds of things that you talk about

and reduce the flow of PFAS-containing items into use in New South Wales. That's part of the picture. That's not something I deal with day to day but reducing PFAS in our day-to-day environment—I get involved in the safety of water but in terms of all the other pathways you've heard about this morning, treatment of fabrics, food wrappings and so forth—

The Hon. CAMERON MURPHY: Because that's one of the areas from which it ends up in water—from cosmetics, carpet, from all these other products, cooking in non-stick plans and implements that are used and things like that.

TONY MERRITT: My old bushwalking jacket, absolutely.

The Hon. CAMERON MURPHY: How would you compare the approach we've taken to this group of chemicals to other things that pose a risk to human health where, in the same way as we've just talked about, we don't necessarily have the exact science to determine that this particular cancer is caused by that chemical? When the linkages aren't there, what do we do in other situations where there is a potential risk to public health?

TONY MERRITT: Some of those regulatory questions would be best addressed to my State colleagues tomorrow. But, as I say, I point to measures that are underway internationally, nationally and at a State level to reduce PFAS-containing items from being used in New South Wales and Hunter New England. There are analogous approaches from a safety perspective in relation to other toxic items over time.

The Hon. GREG DONNELLY: Thank you very much for coming today. I appreciate all the work you've done in this area, very significant for this region, particularly bearing in mind, I think from your opening statement, that around 2015—that's when you started to be drawn into this, particularly in light of the Williamtown revelation. My question goes to the experience or insights that you've gathered in your pre-eminent role in the local health district dealing with this matter. In terms of communication to the public at large and engagement to endeavour to explain something quite complex and scientifically nuanced, to enable that communication to provide the best insights for people without overwhelming them with technical detail, which otherwise would create a cloud over the whole thing, how have you gone about that?

TONY MERRITT: It's a really broad question and it's obviously really important. I guess, from a one-to-one basis at those early Williamtown drop-in centres, we had a lot of experience dealing with people across a broad intersection. As you say, some people wanted a lot of detailed information. There are some incredible community scientists in the Williamtown area we appreciate greatly. There are some people who just wanted a simple headline message. Clearly there's the importance of talking with people one on one, and there's the importance of making information that's readily intelligible available on the website. Some of that's on NSW Health's and some of that's on other agencies', such as NSW EPA.

I mentioned in my opening statement that we did a lot of work with clinicians locally. The local GPs are a really important point of trusted information for people who might be considering what potential health impacts there might be. That's historically been really important in Williamtown and elsewhere, and we continue the flow of information through to GPs. I might mention just one other example: our work with local water utilities in Hunter New England, working under the management of local councils. They have a responsibility for communicating water safety issues through to their community. So we have a very proactive role supporting councils with developing and disseminating their information materials out to communities in local councils in more rural parts of Hunter New England.

The Hon. GREG DONNELLY: My next question follows on, about one describing it—standing above and looking at what's played out in this region since 2015. If you feel that it's not within your remit to answer this particular question, please indicate it. What government at large can learn from the experience that has played out here, given the quite significant announcement back in 2015 and the ongoing tail. This has got a long tail and no doubt will have further playing out into the future. Other than the communication—which I presume you endorse still needs to be looked at to see how that can be refined and done on an ongoing basis—are there any other matters that we should pay particular attention to?

TONY MERRITT: Coming back to first principles here, in terms of going to a specific, broader approach in New South Wales at a New South Wales Government level, I'll leave that for your discussions with colleagues tomorrow.

The Hon. GREG DONNELLY: Certainly, that's fine. In the context of this region, then, particularly.

TONY MERRITT: I think you've pointed to communication and building trust is critical. It's the kind of detailed investigation and understanding involving critical community members who are interested, and credible

flow of information to build trust with ongoing communication. They're kind of key pillars of any response of this sort. They all certainly seem to be key elements in responding to PFAS in Hunter New England.

The Hon. GREG DONNELLY: And just like communication, going back to where I started, were there challenges experienced in untangling some of what I might describe as—I'll say this cautiously and carefully—exaggerated claims or unfounded claims that may have been made at the time when this all came to pass, or is that factored in as something which is understandable when something like this happens, in terms of managing this?

TONY MERRITT: I think we started with a lot of unknowns back in 2015. It was new for us to be responding to it, so there was a huge amount that we didn't know. The learning curve, I think for all agencies involved, was very steep. It was obviously—

The Hon. GREG DONNELLY: Much has been learnt from this experience.

TONY MERRITT: Yes, and obviously incredibly steep for the Williamtown community there too. As I said, there are some extraordinarily well-informed community members who have travelled internationally and have a really detailed understanding of these elements at an international level.

The Hon. GREG DONNELLY: Who have patiently worked through these matters.

TONY MERRITT: So I'm not sure about exaggerated claims, but there was a lot of unknowns early on that needed to be acknowledged and fed into. We've alluded already to the really high levels of psychological distress, and they came from many things. We saw that firsthand with our contact with Williamtown people—people who'd come to that area for a significant change and their lifestyle was dramatically changed overnight in terms of restrictions on what they could do on the property.

The Hon. GREG DONNELLY: So the communication went around and around to feed back further answers to the questions.

TONY MERRITT: Yes, sure, it is indeed an iterative process, and if people flag concerns with us then very often that's entirely appropriate for us to explore those, and understand what the substance is, and address that as best we can.

The CHAIR: Dr Merritt, I've got an email here that you did write in April last year. I got a lot of documents returned in the Parliament on PFAS and there's a lot from NSW Health. There's a fair few documents from NSW Health in relation to the PFAS fact sheet. In April last year, you wrote an email suggesting that the NSW Health PFAS fact sheet, which was dated at the time April 2017, could benefit from an update. You wanted to draw the attention of two people, Stephen and Kishen, to the fact that does exposure to PFAS cause cancer. You put underneath that, this could be updated to incorporate the IARC decision late in 2023 to list PFOA as Group 1—carcinogenic, and PFOS as Group 2B—possibly carcinogenic. Shortly after that, the NSW PFAS fact sheet was removed and all references are now at the Federal which, to be honest, talks down any connection to cancer with the causality that you were just stating. In April, you did seem concerned that the NSW Health PFAS fact sheet didn't specifically reference the fact that PFOA is carcinogenic, according to the IARC.

TONY MERRITT: Yes, and that reflects what we're alluding to: unknowns, developing information, and lots of these documents being living documents that need to be updated with new information. My recollection is that—you've just mentioned the NSW Health fact sheet, which had been invaluable in our early work.

The Hon. GREG DONNELLY: Could I just confirm, are you familiar precisely with these letters being referred to? If not, it's fair to share that.

TONY MERRITT: That's fine. That rings true. I wouldn't have been able to give you the date but, certainly, that rings true. I recognise that as a very brief email I'd sent to colleagues at a New South Wales level. The original fact sheet, which was enormously helpful, but I think dated 2017 which is implied by my—by the time I was writing this email, many years had passed. There's lots more information, and the key issue that wasn't adequately addressed in the original fact sheet related to the new IARC findings, so very appropriate that either the NSW fact sheet incorporate that or be replaced by a national fact sheet. I'm fully supportive of using an enHealth fact sheet that represents the same advice to all States and Territories in Australia. I understand that was the decision made at the time.

The CHAIR: The enHealth fact sheet—I think I've got a slightly longer one than the one you have, but does it mention that PFOA is listed as carcinogenic by the International Agency for Research on Cancer, that organisation IARC? Does it say that PFOS is potentially carcinogenic? I don't think it does. But you were very keen to see the NSW Health PFAS fact sheet mention that back in April last year.

TONY MERRITT: The gist of my email was that the 2017 fact sheet didn't have adequate mention of the updated information about cancer and those two things. So that's appropriate.

The CHAIR: Yes, and good on you for suggesting that.

TONY MERRITT: I've got that. I'd need to be scanning here. I'm not sure that it does mention IARC, Chair, but—

The CHAIR: All this says is:

> … studies on these cancers remain conflicting and associations have only been observed in high exposure groups such as workers in international factories where PFOA is produced.

Do you think that's enough? Do you think that adequately reflects what the international science is suggesting?

TONY MERRITT: I'm keen to see the detailed work behind the IARC documents. This is a living document. I'm sure it will be updated in time. But that detailed background information from IARC will helpful.

The CHAIR: Population Health, is that your—

TONY MERRITT: I work for Hunter New England Population Health.

The CHAIR: Have you read the studies behind the IARC finding? Let's stick with PFOA at this point.

TONY MERRITT: No, I couldn't discuss the more detailed findings with any detailed knowledge, I'm sorry.

The CHAIR: If you've got the enHealth thing, can you just read again—I just want to check what I've got in front of me. There are two versions floating around. What does it say about causing cancer?

TONY MERRITT: I've got a two-page enHealth fact sheet, not a broader document, that I printed off on 11 December last year. I believe that is still current. I haven't checked in the last two weeks.

The Hon. GREG DONNELLY: Can we get a copy of that?

The CHAIR: Yes, I think that would be great. At the end, because you are reading from it at this point.

TONY MERRITT: I think the paragraph you are referring to, Chair, says:

> Potential associations between PFAS exposure and increased risk of two uncommon cancers, namely testicular and kidney cancer, have also been reported … much of this evidence relates specifically to PFOA, and not PFOS and PFHxS which are more common in Australia. However—

and I mentioned this earlier—

> studies on these cancers remain conflicting and associations have only been observed in high exposure groups such as workers in international factories where PFOA is produced.

Does that align with the document you have?

The CHAIR: Yes.

TONY MERRITT: That's what I have in front of me.

The CHAIR: Do you know how common kidney cancer is?

TONY MERRITT: In the community?

The CHAIR: In the general population.

TONY MERRITT: It's not common, but I don't have an incidence rate in front of me. No, I can't help you there.

The CHAIR: I think it's the sixth most common cancer in men in Australia. Can I ask whether there are any observations of other forms of PFAS chemicals that you have? At this stage, the *Australian Drinking Water Guidelines* have—for example, GenX chemicals. Is there anything that you are looking at research wise that we should know about in terms of GenX chemicals?

TONY MERRITT: The research tends to happen in other areas, not in the Population Health unit. We are service delivery in the way I outlined in my opening statement. I'm not involved, and I don't think anyone in our unit is involved, in any research around GenX. That would be a question for technical and policy people at the State level. I'm not aware of any flow of information about other PFAS chemicals. The ones that come across

our desk relate to the Drinking Water Guidelines and the particular chemicals that are listed there. That is bread and butter for us day in and day out with water utilities and their testing.

The CHAIR: Within the Hunter New England LHD and, say, PFAS studies in particular, who works on that? What type of a workforce do you have that is very up to date on PFAS science? Do you have a unit, for example, within the LHD that is tasked with this?

TONY MERRITT: No, we are part of NSW Heath and so there is a Ministry of Health team. There is, at a State level, an all-government NSW PFAS expert group, supported by technical advisory groups. In terms of high-level latest science and deliberating on questions and policy like these, then we are guided by colleagues at a State level, particularly that PFAS expert panel group, for example.

The CHAIR: With the psychological distress that seems to be noted a lot, in the ANU study, there was psychological stress as a result of people living in PFAS-affected communities versus the other diseases that were also shown to be slightly higher compared to the rest of the population. Was psychological distress way over and above some of the other diseases?

TONY MERRITT: I'm reliant on the summary report, and so the way it's presented—I've got a copy of their extract here, if you'd like me to read from it. But certainly the clearest conclusion was around psychological distress, and then good evidence of increased cholesterol without compelling evidence across all of the other issues that they looked at. Does that go to your question?

The CHAIR: Yes. I'm noticing with this enHealth fact sheet, it makes note of the communities—people living in PFAS-affected communities are more likely to experience psychological distress. This is around what evidence there is of health effects from exposure to PFAS. Then it goes on:

> Whilst PFAS has not definitely been shown to be a cause of disease in humans …

Do you agree with that statement as well? Just disease broadly now we're getting to, not just cancer.

TONY MERRITT: I'm reliant on the scientific expertise of groups like enHealth and NHMRC, and that is indeed the conclusion that they've come to.

The CHAIR: Do you know who the New South Wales representative is on the NHMRC from NSW Health?

TONY MERRITT: I don't, no.

The CHAIR: Does the Hunter New England LHD make any submissions to that process?

TONY MERRITT: No, that happens at a State level.

The Hon. SCOTT BARRETT: You spoke of the support and attention offered to Williamtown, which I'm not begrudging at all. But is the same support being rolled out to other communities where they're finding PFAS in their drinking water, such as Warialda, which I believe is also in your health district?

TONY MERRITT: The support has taken different forms in different communities, depending on the circumstances, which is what you'd expect. In Warialda, we've had a lot of time supporting the local council, who run the local water utility. That's taken the form, again, pretty much on the lines I outlined in my opening statement in terms of supporting the testing, understanding the results, facilitating meetings with other agencies, formulating appropriate investigation and helping support them with clear communication with the community in terms of exactly what was going on.

The Hon. SCOTT BARRETT: Are you getting calls from communities to do more surveillance, more testing—blood tests and the like? We heard yesterday in the Blue Mountains that there certainly was that community sentiment that more testing was desired.

The CHAIR: Or just testing.

The Hon. SCOTT BARRETT: Yes, that testing was desired?

TONY MERRITT: I guess an important distinction with testing water or—

The Hon. SCOTT BARRETT: No, blood tests.

TONY MERRITT: —testing blood, okay. To the best of my knowledge, when I last had an update there was a single question about blood testing in the Warialda community. Yes, it had been brought up, but I'm only aware of that coming up once. We worked with the local GPs to provide the background in terms of discussion around blood testing. It has come up as a question now and then. It was a question that was much more common

in the early days of the Williamtown response. As you know, the Federal Government funded and provided a blood testing program for the Williamtown community at that time, and blood testing was part of the ANU research program. But your question related to more recent times. It comes up, but just now and then; it's not a recurring or frequent issue in terms of calls that come to us.

The Hon. SCOTT BARRETT: Are there avenues for people to go down that path?

TONY MERRITT: It's possible, is the short answer. Blood testing, you'd be aware from previous testimony—from my perspective it's best placed in the context of a research or population-wide sampling. It made sense in the ANU study, which was part of a research protocol looking at associations across a whole population. It's been useful in community sampling to get a sense of trends in PFAS across age groups and communities over time. That's where we get that information from.

It's much less useful in individuals. You will be familiar with the NSW Health advice that blood testing is generally not recommended for individuals, and it's because it doesn't bring the kind of usefulness or utility that you would hope for out of a test—the sort of usefulness you'd expect if you went to your GP to get your cholesterol tested, for example. All of us will have PFAS in our bloods. There are not levels at which your GP could see and say, "Look, that represents a specific risk of some health outcome." We just don't have that information with PFAS, certainly not at the moment. That combination of everyone having PFAS and a lack of useful action flowing from looking at an individual person's PFAS level does mean that a blood test in individuals is less useful. Does that go to your question?

The CHAIR: From a population health perspective though, Dr Merritt, it would be very useful, wouldn't it, to do studies that look at the different levels of PFAS in a certain population's blood and then their associated health? I understand there are a lot of different factors, but surely it would be useful to see, "Look, 56 per cent of people with this much PFAS in their blood have this much higher cholesterol," for example. That's putting it very bluntly but, from a population health perspective, wouldn't it be useful?

TONY MERRITT: It has been useful, and that's what ANU did in Williamtown—as I say, it was a few years ago. But I agree entirely: It needs to be in that context of a really carefully constructed research project that considers the kind of other influences that might impact somebody's cholesterol, for example, as a comparison group, so that you can come to valid conclusions about what you're seeing. It's in that context. That ANU study was a really useful contribution because it addressed all of those elements.

The CHAIR: We are out of time. Thank you so much for appearing today. If you agreed to take anything on notice or if we have any supplementary questions for you, the secretariat will be in touch.

(The witness withdrew.)

Mr DAVID GATHERCOLE, Director, Operations, NSW Environment Protection Authority, sworn and examined

Ms CORRIE FORD, Manager, Operations, NSW Environment Protection Authority, affirmed and examined

The CHAIR: I welcome our final witnesses for today. Is there an opening statement from one of you?

DAVID GATHERCOLE: Yes please, Chair. Before I begin I would like to acknowledge the traditional custodians of the land on which we meet, the Awabakal from Lake Macquarie and here in Newcastle. It is known that their heritage and cultural ties go back 10,000 years on this land. I pay my respects to Elders past and present. The regulation and management of the PFAS family of chemicals is a complex and challenging issue. With this in mind, I would like to start by providing some context on the role the NSW Environment Protection Authority plays in the New South Wales Government's response to PFAS contamination. In September 2015 the EPA put out a media release to notify that legacy firefighting chemicals had been discovered around Williamtown RAAF base and Newcastle Airport. Since then the New South Wales Government has implemented a whole-of-government approach to investigate and provide the community with advice on legacy PFAS contamination.

It involves taking a risk-based approach to identify potential risks using agreed national policies and standards, such as the 2020 *Intergovernmental Agreement on a National Framework for Responding to PFAS Contamination* and the *Australian Drinking Water Guidelines* to name a few. When it comes to the EPA specifically, we lead the largest PFAS investigation program in the country. The program is guided by appendix B of the *PFAS National Environmental Management Plan* 2.0, which lists out the priority sectors for investigation. Through this program we have systemically assessed and triaged more than 1,100 sites. We have identified 51 sites in New South Wales with significant PFAS contamination. This means they remain a high priority and require continued investigation, remediation and/or monitoring.

In New South Wales, the polluter pays. The EPA has no legal powers to compel the Commonwealth Government to undertake remediation actions on Commonwealth land. This includes Department of Defence sites in New South Wales, such as RAAF Base Williamtown, and Commonwealth Government Department of Infrastructure, Transport, Regional Development, Communications and the Arts sites in New South Wales. These are the Federal airports of Sydney, Bankstown and Camden. The EPA has vigorously pursued the Commonwealth Government, as a polluter, to take action to protect the community from PFAS contamination at RAAF Base Williamtown, other defence sites and Federal airports in New South Wales. Without the legal power to compel the Commonwealth Government, this has created issues for the EPA in exercising our regulatory powers.

The EPA advocates on behalf of the community impacted by Commonwealth activities, such as RAAF Base Williamtown, to ensure they are assessed and managed even though we do not have legal powers to do so. The EPA has also assessed New South Wales sites around Commonwealth Government sites to ensure local communities have access to accurate information. In New South Wales, we have fostered a collaborative approach to the management of PFAS across the agencies, including the health and water agencies and the Department of Primary Industries and Regional Development. This has not always been our experience working with Federal agencies. We would appreciate the opportunity to extend the spirit of collaboration across jurisdictions. Greater effort from the Federal agencies to work with us on matters relating to PFAS contamination in New South Wales will ensure the local community receives 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. The TAG is chaired by the EPA and consists of government experts from the EPA, the Office of the Chief Scientist and Engineer, NSW Health, the Department of Primary Industries and Regional Development, Fisheries NSW, NSW Agriculture, Biosecurity NSW, the NSW Food Authority and a scientist from the DCCEEW. The TAG reviews investigations, scientific reports and sampling results to help develop tailored and general precautionary dietary advice on actions impacting communities and actions they can take to reduce their exposure. The TAG also assesses ongoing monitoring reports for specific sites, such as RAAF Base Williamtown, and undertakes detailed risk assessments used to formulate specific tailored precautionary dietary advice for food consumption and precautionary dietary advice for the community.

Additionally, the NSW PFAS Expert Panel provides strategic informed advice to us, the EPA, to assist in developing coordinated responses on PFAS issues. Established under the Protection of the Environment Administration Act 1991, the expert panel is chaired by the NSW Office of the Chief Scientist and Engineer and consists of senior officers representative of the same agencies making up the TAG. When it comes to drinking water quality, that is the responsibility of NSW Health and the water utilities under the Public Health Act 2010.

I understand that NSW Health have asked water utilities to ensure they have assessed risks for drinking water from PFAS. This is their drinking water management system. NSW Health is supporting local water utilities in regional New South Wales that have not tested already with initial screening tests for PFAS. The EPA supports NSW Health for this work.

The work the EPA is involved in within the PFAS space does not stop there. The EPA assists authorities to comply to with the New South Wales Government's ban and restriction on the use of long-chain PFAS firefighting foam unless it is being used for fighting catastrophic fires. Thanks to the passing of the Environmental Legislation Amendment (Hazardous Chemicals) Bill 2024 in March last year, New South Wales is aligned with the Industrial Chemicals Environmental Management Standard [IChEMS]. Under the IChEMS, the PFAS chemicals of PFOS and PFHxS will be prohibited from being imported, manufactured, exported or used in Australia from 1 July 2025. The EPA is also focused on stopping PFAS from being included in everyday products and packaging like composting packaging because of the risk to waste streams. This includes guidance on how to test and report on PFAS and fibre-based food-containing packaging and how to find alternative materials.

The EPA is also involved in the development and implementation of the PFAS National Environmental Management Plan and other matters relating to PFAS, which are considered through the Heads of EPA forum. This is just a summary of actions the New South Wales EPA is undertaking to manage the existing PFAS contaminated sites, including RAAF Base Williamtown, and to prevent further contamination from occurring. The issue of PFAS contamination remains complex, and the science is continuing to evolve. We appreciate that the issue of PFAS contamination greatly impacts communities that live around these sites. The long-term impact is still emerging, and the assessment process is highly technical.

For communities impacted by significant off-site PFAS contamination, we provide tailored precautionary dietary advice. We often undertake local surveys to understand people's use of groundwater and whether they grow their own produce. We often follow up with individual doorknocking so that we can have one-on-conversations when providing this advice so the resident can understand absolutely what that means for them. We're always looking for better ways to engage with impacted communities and how we can provide simple advice to minimise their exposure to PFAS. Thank you, Chair.

The CHAIR: Are you local or from Sydney?

DAVID GATHERCOLE: Newcastle part of our area, our branch. We've been involved with PFAS investigations since about 2016.

The CHAIR: We've heard from witnesses, quite a few witnesses already, particularly community witnesses, the frustration, in terms of dealing with the EPA. They've all said that what's needed is like an independent body, independent authority—an organisation or a body that can take control so they know who is coordinating the response. Technically, in New South Wales, that body is the EPA, isn't it? You're essentially responsible for coordinating the response to PFAS contamination? Is that correct?

DAVID GATHERCOLE: Yes. Since 2016 the EPA has led the New South Wales PFAS Investigation Program on behalf of the New South Wales Government. We provide a single point of truth for the community, and we work with the New South Wales PFAS Expert Panel and the New South Wales Technical Advisory Group on a whole-of-government approach.

The CHAIR: But, for some reason, people in the community think that that coordination is lacking, or they don't seem to think that there is one agency that's responsible. Do you think that's a fair comment?

DAVID GATHERCOLE: The community is at the core of what we do, and we give tailored precautionary dietary advice to the community, and that includes doorknocking—going to residents' homes—and speaking with them, and talking them through that advice to make sure that they understand that advice.

The CHAIR: You're talking about Williamtown at this point when you say "doorknocking" and "precautionary dietary advice". Is that what you're referring to?

DAVID GATHERCOLE: We provide that across the State. Where communities and residents are impacted by PFAS contamination, we will engage and make sure they understand and give them letters that follow up.

The CHAIR: With the contaminated sites, since 2015, the EPA's largely identified contaminated sites as firefighting operations—if you could talk me through these—Defence, other areas where the firefighting foam has been sprayed. Is that, essentially, how you're working out what contaminated sites are?

DAVID GATHERCOLE: Yes. In Australia, PFAS contamination has resulted largely from the use of PFAS firefighting foams, and we have targeted Defence bases, airports, industrial processes that used PFAS firefighting foams and also Fire and Rescue NSW and RFS sites.

The CHAIR: What about aerial spraying of massive bushfires with firefighting foam historically? What's happened with that?

DAVID GATHERCOLE: From my understanding, the aerial spraying were not using PFAS foams.

CORRIE FORD: RFS have done testing in the foams that are used during bushfires. From my understanding, it doesn't contain PFAS. It's a different class of foam.

The CHAIR: So that's historically as well?

CORRIE FORD: I can't answer that. That would be a question for them.

The CHAIR: What about major incidents and also biosolids that are leaching into the water as well? I think what I'm getting at is that the Blue Mountains contamination appears to have come after both Sydney—well, Sydney Water said there were no known contamination hotspots in the catchment, but, of course, that came about as a result of possibly a major accident on the highway. Is the EPA looking at expanding what it deems as potential contamination sites or potential contamination sources?

DAVID GATHERCOLE: Absolutely. That's what we're here to do. We're looking at PFAS-contaminated sites in New South Wales, and we're definitely looking at that site where that crash occurred. We're investigating that as a high priority. We're engaging with the RFS and Fire and Rescue NSW about foam that was deployed in that area back in about 1992.

The CHAIR: We did Katoomba yesterday, so I'll move on from that. We're in the Hunter at the moment. Central Coast, we just heard from witnesses this morning about—well, one of them, the guy from SORR that had the clean-up boom, was talking about contamination in Tuggerah Lake and PFAS through the waterways in the Central Coast, and Central Coast Council wasn't really doing anything, according to him, to clean up and in fact moved him along. He and his PFAS clean-up technology got it out of the water. What's the EPA doing about the contaminated water? Just one example in Central Coast waterways.

DAVID GATHERCOLE: No problem. We targeted power stations as well because they traditionally used firefighting foams. We've conducted major PFAS investigations on all coal-fired power stations as well and the former Lake Munmorah Power Station as well over there. As part of those investigations, the New South Wales Government obtained biota, or fish species and crustacea, from Lake Macquarie and Tuggerah lakes. In 2017 we provided precautionary dietary advice.

CORRIE FORD: Yes, that's right.

The CHAIR: PFAS has just been discovered in Central Coast waters very recently. It says that the council informed the EPA. The EPA is working on possible sources?

DAVID GATHERCOLE: Yes, about a week and a half ago we were notified by the Central Coast Council of a PFAS detect in Ourimbah Creek. Now, what I understand is that that is a raw water supply. It's not a drinking water supply. The national health and medical research guidelines for drinking water don't apply to that raw water supply in Ourimbah.

The CHAIR: Can I just interrupt you, Mr Gathercole? This inquiry is also looking at waterways. We've heard a lot about drinking water, but it would be great here to also talk about the impact of PFAS in water generally on wildlife, the environment—we haven't had much evidence on that. That's also the EPA's responsibility, isn't it—PFAS in the waterways, not just drinking water?

DAVID GATHERCOLE: Yes. With respect, Chair, I was getting to that part. I just want to provide some context on Ourimbah Creek first. There was a detect, and we took it very seriously and engaged with Central Coast Council and had a meeting with NSW Health and council to try to identify some sources. What's important, just on that last point, is that at the Mardi Dam where water is provided, the drinking water, it complies with the national health and medical research guidelines for drinking water. Ourimbah Creek hasn't been used by council since last year—I think, from memory, August—to go into the water supply. That has been isolated and is not proposed to be used. Council has undertaken a sample program, and they've detected PFAS in Ourimbah Creek and some of the waterways around that area. They're below the National Environmental Management Plan 2.0 95 per cent on ecological guidelines in those waterways. But any detect is taken seriously by the EPA, so we're looking at other sources.

We do have a licensed premises, Chair—the former Mangrove Mountain landfill—that's in that vicinity, in that catchment. That hasn't been operating since 2014, but we want to make sure there are no discharges from that. We have been undertaking sampling in that area—around Ourimbah Creek and in that area—many times last year, and annually we've been going out with DCCEEW science to undertake a suite of sampling, and that's due again in February. We've just completed a five-year licence review, and there are a number of samples that have been obtained in the last couple of weeks. We went out last Friday and obtained samples from that site to make sure there's been no impact on the waterways, and we'll continue to do that. We are out again this week, and we're not aware of any discharges from that site in the past few years. But we are still looking at that seriously. We are also working with council and other potential sources because you need to use the National Environmental Management Plan 2.0, appendix B—there is a list of sectors, and that includes sewerage as well. I know that Mangrove Mountain operates on a septic tank, so when there is rainfall those can overflow, and they can be a source of PFAS as well.

The Hon. SCOTT BARRETT: You mentioned the fact that PFAS entering the environment is largely from firefighting foam. Is that 80 per cent or 90 per cent? What sort of breakdown do we think of? My follow-up question is going to be, now that is taken out of the cycle, there is obviously then less PFAS entering the environment.

The CHAIR: PFOS.

The Hon. SCOTT BARRETT: PFOS.

DAVID GATHERCOLE: Yes. Just for context, when we started looking at PFAS in 2016, the PFAS family included about 2,000 chemicals. Today it's about 16,000 chemicals, so it shows how that has emerged over the years. That's just a bit of context. What we have found is that firefighting foam has been the major source of PFAS contamination in Australia, and that was banned in New South Wales in 2021, except for catastrophic circumstances. But we do know products have come into Australia, in everyday life, that we've used for decades—toothpaste, shaving creams, shampoos, soaps, frypans et cetera, scotchgard, carpets. What happens—that goes down the drain when we're having a shower and things, and that goes to a sewage treatment plant or a septic tank. The waste products—we have our muesli bar wrappers and things are put into landfill, and then those landfills receive those solid wastes. So there are other sources of PFAS that can get into society. We have benefited from those products for some decades, and what really needs to happen is for those to be phased out as well.

The Hon. SCOTT BARRETT: You mentioned the 51 sites that are under investigation. What's the end goal for them? Is it to just contain the contaminants on that site, or is it to clean those sites so that they are free of contaminants?

DAVID GATHERCOLE: Yes, good question. We triage all of our investigations. There are 51 on our website, and they are ones where there's offsite impacts on groundwater or surface water or both and have potential to impact on community members—so where we've gone and engaged and doorknocked. There are the investigations we've undertaken where we've doorknocked and given residents advice as well but, largely, where there are offsite impacts, that's where those 51 are, and they require ongoing investigation, remediation or monitoring.

The Hon. SCOTT BARRETT: Is that number stable? Is that number coming down because you're managing more? Is it increasing because you're finding more?

DAVID GATHERCOLE: I think increasing.

The Hon. SCOTT BARRETT: And is there a reason we can't get more off that list as they become managed?

DAVID GATHERCOLE: One of the frustrations of the EPA is Commonwealth sites and that, in New South Wales, the polluter pays and we have no jurisdiction to make the Department of Defence or Federal Airports Corporation do what we need them to do in terms of remedial action. So that cooperative alignment across all jurisdictions to work together to better serve the community, to provide better advice and information to the community and have those investigations undertaken quickly and in accordance with the National Environmental Management Plan would help because we are frustrated by delays in getting that remedial action undertaken, and we can't compel the Commonwealth to do so.

The Hon. SCOTT BARRETT: Just finally, I presume you have a register of those catastrophic incidents where that foam is being used.

DAVID GATHERCOLE: Yes, we do. When we talk catastrophic, we're talking about an 80-megalitre tank of fuel at Port Botany blowing up and potentially killing hundreds and thousands of people; that's a

catastrophic event. Those PFAS foams are very good at putting out those very high-intensity fires. That's an example of a catastrophic event where lives and properties are severely at risk, and a catastrophic circumstance is a word that Fire and Rescue NSW and RFS use.

The Hon. CAMERON MURPHY: First, to start with a point of clarification of what you were just saying—across the PFAS family of chemicals, you say there are around 16,000 of them. This is just a growing problem, isn't it?

DAVID GATHERCOLE: It certainly is.

The Hon. CAMERON MURPHY: Would you characterise it that way?

DAVID GATHERCOLE: Yes, absolutely.

The Hon. CAMERON MURPHY: It has become a bigger problem over time.

DAVID GATHERCOLE: It's becoming a bigger problem. From 2016 it was emerging; it still is emerging, worldwide. We are learning every single day about the family of chemicals and how extensive they are throughout society.

The Hon. CAMERON MURPHY: Is it fair to say it really isn't going to be a problem that will be reduced unless we stop the proliferation of that family of chemicals?

DAVID GATHERCOLE: Absolutely, and stopping products coming into the country and stopping chemicals coming into the country would help.

The Hon. CAMERON MURPHY: The other thing I wanted to ask you about is you've mentioned a few times the doorknocking that you say you've done. It's around these 51 sites. How many doorknocks have you done in Newcastle, for example?

DAVID GATHERCOLE: I think back to Williamtown. That was traumatic for the community but also for us, because we do care about the community and the environment; that's why we turn up to work every day. With Williamtown, we doorknocked 750 people on a Sunday morning. Corrie and I were both there. We got up early. We were with NSW Health officers to do that. We made sure at each door that people understood what that precautionary dietary advice was. That precautionary dietary advice was developed by the NSW PFAS Expert Panel, the NSW Technical Advisory Group. The EPA delivered that advice door to door to the residents of Williamtown to make sure that in each of the zones—because we'd come up with the Williamtown area map and it had three zones. A primary zone where—

The Hon. CAMERON MURPHY: Sorry, when was that doorknock?

DAVID GATHERCOLE: That was November 2017.

The Hon. CAMERON MURPHY: Have you doorknocked since then in the same area?

DAVID GATHERCOLE: So 750 then—I don't think so.

The Hon. CAMERON MURPHY: It was one doorknock—once?

DAVID GATHERCOLE: Yes.

The Hon. CAMERON MURPHY: In terms of the doorknocks, is there a plan to go back to the same area? People move house; they move on. What's the plan to use this effective form of communication consistently so that you're going back and doing it over and over again to new people who have moved in?

DAVID GATHERCOLE: Absolutely. That is the plan, to double back and do that. We work with the polluter, Defence. They give an ongoing management plan report annually to the EPA for review—OMP, we call it. The latest ongoing monitoring report was released in July 2024. The findings do not suggest any potential exposure risk for the community have changed since 2021-23.

The Hon. CAMERON MURPHY: Sure, but you were talking about people growing vegetables in their backyards. If you've just moved in, 2017 was eight years ago. When is the next doorknocked planned?

DAVID GATHERCOLE: We're circling around with our current plan to do that, to doorknock the community and reiterate.

The Hon. CAMERON MURPHY: But there would be a lot of turnover. It might hit the 10-year mark before you get back to doorknocking and there could be a third or half the community that has moved on. A lot of people might be growing vegetables in that time.

CORRIE FORD: Every year, with the release of the data that Defence has collected, they organise community information sessions, which are advertised via a letterbox drop and on the local radio, from what I can recall. There is annual advice provided by Defence and other New South Wales agencies via those community information sessions. There are other avenues for the community to access information if they have moved into the area.

DAVID GATHERCOLE: We will still double around and do the doorknocks, but that's what I was getting at. There are those drop-in sessions Defence organises, and EPA attend along with other government agencies to answer questions from the community. We also have information updated on our website, as does Defence, to make sure the community has access to the latest information, sample results and advice. As that information and advice changes, the EPA will revisit precautionary dietary advice. There is nothing we'd love more than to take that away, but we need that there to protect the community for now.

The Hon. CAMERON MURPHY: When's the next one in Williamtown, for example?

DAVID GATHERCOLE: The next—

The Hon. CAMERON MURPHY: You said you were going to get around and revisit them. When's the next one planned, given the last one was eight years ago?

DAVID GATHERCOLE: It's part of our plan right now to do that.

The Hon. CAMERON MURPHY: You haven't planned it yet?

DAVID GATHERCOLE: No, we have. We've got a two-year plan. We're circling back to all impacted communities.

The Hon. CAMERON MURPHY: Every two years?

DAVID GATHERCOLE: No, to do the doorknock within the next two years.

The Hon. CAMERON MURPHY: Within the next two years.

DAVID GATHERCOLE: That's within our plan. We will be doing those doorknocks to revisit those communities members that may have moved in.

The Hon. CAMERON MURPHY: Do you think that once a decade is an appropriate time frame? Because it will be 10 years by then, won't it?

DAVID GATHERCOLE: There have been those other ways of communicating but, yes, we do need to get back as quick as we can.

The Hon. GREG DONNELLY: Thank you very much for coming along today to provide evidence. Could I ask a question to you about the New South Wales Fire and Rescue contamination issue and, specifically, their contaminated sites, and the engagement between the EPA and New South Wales Fire and Rescue? If it's not within your remit, please explain, if you don't mind, who we could speak to. In terms of the identification of the sites that hitherto have taken place—and we understand the sites that tend to be most impacted are those where training of Fire and Rescue employees was done, and then there are the standalone stations. In terms of ensuring that the work is being done to do the remediation or whatever is required with respect to those Fire and Rescue sites, is that something that the EPA has responsibility for?

DAVID GATHERCOLE: Fire and Rescue NSW has a PFAS triage program, and they refer investigations to the EPA. They undertake investigations for the past use of PFAS firefighting foams for training. Sometimes this occurred at the back of stations et cetera or on the local sports ground. Similarly, with the RFS, they've got their own PFAS triage program, and they refer investigation sites to the EPA for oversight—both of them for oversight.

The Hon. GREG DONNELLY: In terms of finding out about how well, how effectively and how competently the work is being done by New South Wales Fire and Rescue and the RFS, with respect to their PFAS and PFOS problem—if I can use that term arguably—the EPA is the one that retains that body of information about where everything is up to?

DAVID GATHERCOLE: That's correct. The EPA has oversight to that. It works very closely with them and encourages the highest priority investigations to be undertaken first, of course, where communities are impacted. An example was Fire and Rescue NSW in Mullumbimby last year. There was an engagement of 30 residents and doorknocks by the EPA and extensive media on that to let everybody know and understand, at people's doors, what the impacts were on them from the past use of firefighting foams.

The Hon. GREG DONNELLY: I'll just follow that up because, when we heard from New South Wales Fire and Rescue in evidence provided to the Committee, I certainly had a sense that it's an issue that covers a number of sites, and the task of working through and doing the required work, given the current availability of the expertise required to do what needs to be done on any given site, means that this could be a very long-term project. I'm wondering if you would care to comment on that. They didn't put a specific period of time, but I got the impression that this could potentially be a relatively modestly unfolding exercise which could take some time. Would you care to comment on that?

DAVID GATHERCOLE: Absolutely. These PFAS investigations take a number of years; they're not a quick thing. It starts generally with a preliminary site investigation, which is like a desktop review, and then it moves into a detailed site investigation. These take a number of years because a number of samples have to be obtained—groundwater, surface water samples, historic use et cetera—and then reports are prepared by consultants and submitted to the EPA, which we then have oversight to review those and provide comment. We got to the New South Wales technical advisory group, who provide comments on those reports as well, and give feedback to the polluter in this stage—the Fire and Rescue NSW or RFS—with our advice on that.

The Hon. GREG DONNELLY: In terms of a follow-up to ensure the recommendations, if there are recommendations, come back to RFS or Fire and Rescue NSW, does the EPA have an active engagement to follow up to ensure this work is being done?

DAVID GATHERCOLE: Yes, we do. We meet with them monthly and make sure that Fire and Rescue NSW and, separately, RFS are doing as much as they can to help us with our PFAS investigation program and that their triage programs dovetail in for our oversight. We say to them, "What are your highest priorities and next priorities to be looked at that may impact on the community or the environment?"

The Hon. AILEEN MacDONALD: I probably misunderstood, but you said before that with Federal or Defence, you have no oversight?

DAVID GATHERCOLE: No jurisdiction. No power to compel.

The Hon. AILEEN MacDONALD: I assume that you would have a database of affected PFAS sites. Are they included in that registry or database?

DAVID GATHERCOLE: You're talking about the 51 sites that we have on our website where there are offsite impacts, and they're the highest priority sites that we have listed on our website. We have investigated about 1,100 overall. Where there has been PFAS detected or remediated, sometimes if you find PFAS in soils, you can sometimes dig that out and take it to a landfill. You can use water treatment plants and activated carbon to treat groundwater et cetera, as what they've done at Williamtown. They have three giant water treatment plants the size of football fields that they treat groundwater through with activated carbon. There are some remedial actions that can be employed. We also make note on any licensed premises that we have, if PFAS is detected and there is an investigation and what were the findings, whether that was remediated or whether that is contained on site.

The Hon. AILEEN MacDONALD: And so that information is available publicly you said? It's on your website?

DAVID GATHERCOLE: We only have the 51 sites listed that have offsite impacts, which are the highest priorities.

The Hon. AILEEN MacDONALD: What barriers does the EPA face in holding, say, industries and Defence accountable for PFAS contamination?

DAVID GATHERCOLE: Starting with the Commonwealth, as I said earlier, the polluter pays in New South Wales, and that's really important. We can't compel Defence to take remedial action. They have cooperated somewhat, though, with some of their defence bases, but it does take a long time, and it is of frustration to the EPA on how time moves over that period. Whereas with industry, the EPA has jurisdiction in New South Wales to compel industry to do what we want them to do with PFAS investigations. They usually work with us a bit more expediently to get their PFAS investigations and/or any remediation undertaken.

The Hon. AILEEN MacDONALD: If you could do something to remove those barriers, what would it be?

DAVID GATHERCOLE: If the Commonwealth abided by New South Wales laws or we could get powers to compel Defence and the Federal Government to do what we needed them to do in a timely manner to

ensure that communities are protected, because that's what the EPA is all about. The community is at the centre of what we do every day.

The CHAIR: Can I ask what the response was from the EPA when you saw the results of that research into platypus that UNSW released last year? This was the eight or nine dead platypus with huge levels of PFOS in their blood, but particularly the worst affected was found in the Hunter River in Morpeth. That concentration was 1,200 micrograms per kilo. There was another one in Ourimbah Creek on the Central Coast; that was 740. What was the EPA's response to that? Have you tried to find the reasons why, for example, a platypus in the Hunter River at Morpeth has such high levels of PFOS in its blood?

DAVID GATHERCOLE: Absolutely. We were certainly alarmed with those findings. A platypus is a native animal, and we're here to protect the community and the environment. With Morpeth, there's the Hunter Water sewage treatment plant in that vicinity. We've been working with Hunter Water about that and about the licence that they hold with the EPA, and looking into those discharges from that water treatment plant and how they manage PFAS, for instance. In terms of Ourimbah Creek, we've ramped up our sampling of Ourimbah Creek. We've been out there many times last year—the EPA—to undertake sampling, hand in hand with the Central Coast Council. We take them out every time, or we invite them to come out with us, to work with us on possible sources that may impact on those fatalities.

The CHAIR: Can I just check, with the Hunter Water sewage treatment plant and the Hunter River, have you checked upstream from the Hunter Water sewage treatment plant so much so to ascertain that it's that sewage treatment plant that's discharging high levels of PFAS wastewater into the river?

DAVID GATHERCOLE: We've looked at that catchment area generally with Hunter Water, I understand.

The CHAIR: Because there's PFAS in mining activities as well, isn't there?

DAVID GATHERCOLE: There can be, Chair, yes. Depending—sometimes it's as a result of fires or firefighting training.

The CHAIR: Suppressing dust as well—do they do it with that?

DAVID GATHERCOLE: Potentially, yes.

The CHAIR: After that research was released into the deaths of platypuses, has the EPA tested, for example, that area, or do you already know that the Hunter sewage treatment plant is discharging high levels of PFAS into the river?

DAVID GATHERCOLE: I will defer to my colleague. Have we been looking with Hunter Water?

CORRIE FORD: Hunter Water do testing at all of their STPs fairly regularly, so the EPA does have access to that information. But I don't have that in front of me. I can't give you any definitive answer at this point.

DAVID GATHERCOLE: We have made some investigations with Hunter Water. I'm not sure if we've tested upstream from that water treatment plant, Chair.

The CHAIR: Just in the couple of minutes remaining, could you explain to the Committee what actions you have asked Hunter Water to take to discharge less contaminated water into the river? Given the impact is clearly not just on platypuses—they're an indicator species in this situation; it's got to be impacting kind of everything—what actions so far has Hunter Water been asked to take? Or are you still investigating?

DAVID GATHERCOLE: I think we're still investigating, but what I understand is the best gains can be made upstream of the sewage treatment plants. Where you have trade waste agreements with Hunter Water, people who are putting into that sewer, there are limits imposed by Hunter Water for that licence to go into their sewer. That's where you'll get the gain to reduce PFAS.

The CHAIR: But Hunter Water is also releasing its water at—

DAVID GATHERCOLE: Yes. It's more difficult at the back end to treat the PFAS. It's easier to treat it at the front end, if you can put the right limits on PFAS, what's being inputted into the sewer.

CORRIE FORD: Hunter Water are going through a process of looking through all of their operations and trying to assess where PFAS treatment may be required in their network.

The CHAIR: Finally, there's no regulations at this point in terms of load limits, is there? I'm thinking in terms of recommendations for this Committee. At this point, in terms of EPLs, there's no load limits at all in terms

of PFAS chemicals that are discharged into waterways from industry or from water treatment plants. That's because it's in some ways such an emerging issue. Is that correct?

DAVID GATHERCOLE: Correct.

The Hon. SCOTT BARRETT: How close are we to finding the origin of the PFAS in the Warialda drinking water?

The CHAIR: That's Gwydir council.

DAVID GATHERCOLE: I would have to take that on notice. I don't have any information on that, sorry.

The CHAIR: That's the end of our time. Thank you very much for appearing and for the work that you're doing in this very complicated space; we appreciate it. The secretariat will be in touch with you if you've agreed to take anything on notice or if we've got any supplementary questions for you both.

(The witnesses withdrew.)

The Committee adjourned at 13:15.