

PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

Inquiry into PFAS remediation in and around Defence bases

Final report

Joint Standing Committee on Foreign Affairs, Defence and Trade

March 2022
CANBERRA

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Chair's Foreword

Over the 46th Parliament, the PFAS Sub-Committee of the Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT) undertook to monitor progress under the Department of Defence's National PFAS Investigation and Management Program. This followed the JSCFADT's inquiry last Parliament on Defence's management of PFAS contamination in and around Defence bases, which reported in 2018.

This report is the final in a series of three reports issued by the Committee since December 2019:

- The first report for the inquiry was tabled in December 2019 provided an overview of evidence from the Department of Defence and the ANU PFAS Health Study.
- The second report was tabled in August 2020 and evaluated the Government's response to the JSCFADT's 2018 recommendations. The Committee issued a further 9 recommendations in its second report.
- This third, and final, report discusses evidence and updates received since August 2020 from Government Departments and PFAS researchers.

Through receiving updates from government agencies, the aim of inquiry was to provide an opportunity for the public, and PFAS-affected communities, to hear what is being done by Government to manage and remediate PFAS. Through this public scrutiny, it also provided an opportunity for Committee members to raise issues affecting constituents and to improve government accountability.

The Committee heard during this inquiry that residents in affected communities continue to exert great effort in seeking and understanding the latest information available on PFAS investigation and remediation efforts in their local communities. This report hopes to provide some assistance in clarifying the individual roles and responsibilities, as per evidence received from each federal government agency.

In addition to the Department of Defence, there are a range of government agencies involved in the Government's response to PFAS contamination. Airservices Australia and DITRDC provided perspectives on PFAS remediation approaches away from Defence bases. The Department of Agriculture, Water and the Environment described work including the management of the PFAS.gov.au website, the PFAS National Environmental Management Plan, and progress on chemical regulation. The Department of Health and Food Standards Australia New Zealand also provided an update to the Committee.

The interface between federal, state, and territory government agencies continues to be critical, and the Committee heard reflections on the collaboration between different jurisdictions.

The report also describes evidence received on the evolving research to understand the impacts of PFAS on humans, communities and the environment. The Committee also heard from those developing and operating technologies to remediate PFAS contamination. These researchers and companies described the positive progress made in these areas.

Ultimately, the Committee heard that issues affecting residents in PFAS-affected communities are far from being resolved. The Committee thanks those who have written to the inquiry, and particularly thanks the community members who have been tirelessly speaking up on this issue for over six years.

Senator Dr Sam McMahon
Chair
PFAS Sub-Committee

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Members of the JSCFADT

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Senator the Hon David Fawcett

LP, SA

Deputy Chair

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Paterson, NSW

Members

Senator the Hon Eric Abetz

LP, TAS

Hon Kevin Andrews MP

Menzies, VIC

Senator Tim Ayres

ALP, NSW

Mr Vince Connelly MP

Stirling, WA

Hon Damian Drum MP

Nicholls, VIC

Senator Mehreen Faruqi

AG, NSW

Senator the Hon Concetta Fierravanti-Wells

LP, NSW

Hon Joel Fitzgibbon MP

Hunter, NSW

Mr Patrick Gorman MP

Perth, WA

Mr Garth Hamilton MP (*from 11 March 2022*)

Groom, QLD

Mr Chris Hayes MP

Fowler, NSW

Mr Julian Hill MP	Bruce, VIC
Hon Steve Irons MP	Swan, WA
Mr Peter Khalil MP	Wills, VIC
Senator Malarndirri McCarthy	ALP, NT
Hon Michael McCormack MP (<i>from 11 March 2022</i>)	Riverina, NSW
Senator Sam McMahon	CLP, NT
Senator Jim Molan AO DSC	LP, NSW
Mr Ted O'Brien MP	Fairfax, QLD
Senator Deborah O'Neill	ALP, NSW
Mr Tony Pasin MP	Barker, SA
Mr Gavin Pearce MP	Braddon, TAS
Senator Janet Rice	AG, VIC
Mr Dave Sharma MP	Wentworth, NSW
Senator Tony Sheldon	ALP, NSW
Hon Warren Snowdon MP	Lingiari, NT
Mr Phillip Thompson OAM MP	Herbert, QLD
Ms Maria Vamvakinou MP	Calwell, VIC
Mr Ross Vasta MP	Bonner, QLD

Former JSCFADT Members

Senator Kimberley Kitching (<i>to 10 Mar 2022</i>)	ALP, VIC
Mr Andrew Wallace MP (<i>to 24 Nov 2021</i>)	Fisher, QLD
Mr Andrew Hastie MP (<i>to 22 Dec 2020</i>)	Canning, WA
Mr Nick Champion MP (Deputy Chair) (<i>to 1 Dec 2020</i>)	Spence, SA

The Hon Dr John McVeigh MP (<i>to 18 Sep 2020</i>)	Groom, QLD
The Hon Keith Pitt MP (<i>to 6 Feb 2020</i>)	Hinkler, QLD
Senator the Hon Arthur Sinodinos (<i>to 11 Nov 2019</i>)	LP, NSW

Members of the PFAS Sub-Committee

Chair

Senator Dr Sam McMahon (*from 7 Oct 2020*)

CLP, NT

Deputy Chair

Ms Meryl Swanson MP (*ex officio*)

Paterson, NSW

Members

Senator the Hon David Fawcett (*ex officio*)

LP, SA

Senator Mehreen Faruqi

AG, NSW

Senator Malarndirri McCarthy

ALP, NT

Ms Maria Vamvakinou MP

Calwell, VIC

Former Members

Senator Kimberley Kitching (*to 10 Mar 2022*)

ALP, VIC

Hon Dr John McVeigh MP (Chair) (*to 18 Sep 2020*)

Groom, QLD

Senator the Hon Arthur Sinodinos (*to 11 Nov 2019*)

LP, NSW

Secretariat

Ms Julia Morris, Committee Secretary (to Jan 2020; from Nov 2020)

Mrs Lynley Ducker, Committee Secretary (from Jan 2020 to Nov 2020)

Mr Andrew Dawson, Inquiry Secretary (from Aug 2021)

Mr Chris Gahan, Inquiry Secretary (from Oct 2021)

Mr Raqeeb Bhuyan, Senior Research Officer (from Feb 2021)

Ms Loes Slattery, Senior Research Officer (to Jan 2021)

Mr Francis Corcoran, Research Officer (from Dec 2020)

Mrs Dorota Cooley, Office Manager

Ms Alex Grimes, Administrative Support Officer (to Sep 2021)

Ms Renee Dennis, Administrative Support Officer (from Sep 2019 to Jun 2020)

Terms of Reference

On Wednesday 18 September 2019 the Joint Standing Committee on Foreign Affairs, Defence and Trade initiated under its annual report powers an inquiry into the remediation of PFAS related impacts in and around defence bases.

The focus of the review will be work progressed under the ‘National PFAS Investigation and Management Program’, as reported in Chapter 9 of the Department of Defence 2017–18 Annual Report.

The Department’s annual report stated that Defence had conducted environmental investigations of 23 PFAS affected sites, with site work being progressed under PFAS Management Area Plans (MAPs), including by:

- provision of alternative water supplies to residents who live near investigation sites and are reliant on bore water for drinking;
- implementation of management and remediation options for contaminated water and soil, including through clearance of drains, the installation of water treatment plants; and
- review of emerging remediation technologies for future application.

The Department of Defence 2018-19 Annual Report subsequently advised of this work on 28 sites. The PFAS Sub-committee’s inquiry will monitor the progress of Defence activity under the National Program and review evolving policy on PFAS-related health and environmental impacts over the course of the 46th Parliament.

Abbreviations

AFFF	Aqueous film-forming foam
ANU	Australian National University
CASA	Civil Aviation Safety Authority
COVID-19	Coronavirus disease of 2019 (SARS-CoV2)
CRC CARE	Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
CRG	Community Reference Group
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAWE	Department of Agriculture, Water and the Environment
DITRDC	Department of Infrastructure, Transport, Regional Development and Communications
DPI	Department of Primary Industries (NSW)
ECT2	Emerging Compounds Treatment Technologies
EPA	Environment Protection Authority
FSANZ	Food Standards Australia New Zealand
HMAS	Her Majesty's Australian Ship
ICAO	International Civil Aviation Organisation
ICHEMS	Industrial Chemicals Environmental Management Standards
JSCFADT	Joint Standing Committee on Foreign Affairs, Defence and Trade
MFB	Metropolitan Fire Brigade
NDA	Non-Disclosure Agreement

NEMP	National Environmental Management Plan
NHMRC	National Health and Medical Research Council
NSW	New South Wales
NT	Northern Territory
OEH	Office of Environment and Heritage (NSW)
PFAS	Per-and poly-fluoroalkyl substances
PFHxS	Perfluorohexane sulfonate
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
PHN	Primary Health Networks
PMAP	PFAS Management Area Plan
QAEHS	Queensland Alliance of Environmental Health Sciences
RAAF	Royal Australian Air Force
TDI	Tolerable Daily Intake

List of Recommendations

Recommendation 1

- 1.24 The Committee recommends the Australian Government expedite the implementation of any recommendations made by this Committee in its reports to date which have been agreed or agreed in principle and which remain outstanding.

Recommendation 2

- 2.49 The Committee recommends the Australian Government continue to review and adapt its engagement, communication and support to meet the evolving needs of communities affected by PFAS contamination.

Recommendation 3

- 2.50 The Committee recommends that as part of implementing Recommendation 2, the Australian Government engage the NSW Government to assess the case for re-establishing the community reference group process.

Recommendation 4

- 4.45 The Committee recommends that the Australian Government produce and publish quarterly updates on the work of Department of Defence, Department of Health and Department of Agriculture, Water and the Environment on PFAS management issues, on the pfas.gov.au website.
- 4.46 These updates should detail work completed and new information made available within their respective portfolios in that quarter.

Recommendation 5

- 4.47 The Committee recommends that the Australian Government work with state and territory governments to produce regular updates on PFAS management issues for publication on the pfas.gov.au website.

Recommendation 6

- 7.19 The Committee recommends that the Australian Government establish a coordination mechanism with state and territory environment protection authorities (EPAs) to enable information sharing and, where appropriate, access to undertake PFAS-related investigations related to Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) airfields.

Recommendation 7

- 9.93 The Committee recommends that the Australian Government consider the research, with a view to examining suitable options for a mechanism for people with high levels of PFAS, who are otherwise unable to donate blood or plasma, to make therapeutic donations as an intervention to reduce their levels of PFAS.

Recommendation 8

- 9.94 The Committee recommends that the Australian Government provide funding for further longitudinal studies on potential adverse health effects for firefighters and members of PFAS-affected communities.

1. Introduction

- 1.1 On Wednesday 18 September 2019 the Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT) initiated an inquiry into the Department of Defence 2017-18 Annual Report, focusing on matters relating to the Department of Defence's National PFAS Investigation and Management Program, and referred it to its PFAS Sub-Committee.
- 1.2 This inquiry follows the JSCFADT inquiry in 2018, during the last Parliament, into the management of per-and poly-fluoroalkyl substances (PFAS) contamination in and around Defence bases.
- 1.3 As part of this inquiry, the Committee sought to monitor government action on per-and poly-fluoroalkyl substance (PFAS) harms and their remediation over the course of the 46th Parliament.
- 1.4 The aim of inquiry was to provide an opportunity for the public, and PFAS affected communities, to hear what is being done by government. It also aimed to provide an opportunity for the Committee members to raise issues affecting constituents and to improve government accountability.

Previous interim reports

- 1.5 This report is the final in a series of three reports issued by the Committee as part of this inquiry in the 46th Parliament.
- 1.6 The first report for the inquiry, the *first progress report*, was presented to Parliament on 20 December 2019.¹ It covered evidence taken at public hearings on 25 November 2019 from experts at the Australian National University (ANU) PFAS Health Study and from the Department of Defence

¹ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [*Inquiry into PFAS remediation in and around Defence bases: First report*](#), December 2019.

on 2 December 2019. The first report of the Committee's inquiry assessed the progress of Defence's remediation work against the background of reforms and research into the broader impacts of PFAS substances on humans and the environment.

- 1.7 The Committee's *second progress report* was presented to Parliament on 31 August 2020.² The second report, evaluates the Government's response to the JSCFADT's recommendations against evidence taken in this inquiry to date. It also covered evidence received up to June 2020.
- 1.8 A government response to the Committee's *second progress report* was presented out-of-sitting to the Senate on 20 January 2022.³

Conduct of the inquiry

- 1.9 The Committee called for submissions on 21 October 2019. The Committee received 27 submissions and 1 exhibit, which are listed in Appendix A.
- 1.10 The Committee held 14 public hearings throughout its inquiry, which are listed in Appendix B.
- 1.11 Hearings held between November 2019 and June 2020 are discussed in the Committee's first and second progress reports. As such, this report focuses on evidence received in hearings held since August 2020, as listed in Table 1.1.

² Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [*Inquiry into PFAS remediation in and around Defence bases: Second progress report*](#), August 2020.

³ Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade's inquiry into PFAS remediation in and around Defence bases*](#), January 2022.

Table 1.1 Hearings since August 2020

Hearing date	Witnesses
24 Aug 2020	United Firefighters Union of Australia
31 Aug 2020	Researchers from Macquarie University
9 Nov 2020	CRC CARE
30 Nov 2020	Commonwealth Scientific and Industrial Research Organisation (CSIRO)
7 Dec 2020	Ventia Utility Services, Emerging Compounds Treatment Technologies (ECT2), and Synergy Resource Management
3 Sep 2021	Department of Defence, DITRDC, Airservices Australia, researchers from Macquarie University, and researchers from the University of Queensland
22 Oct 2021	Department of Agriculture, Water and the Environment (PFAS Taskforce), Department of Health, and Food Standards Australia New Zealand
26 Nov 2021	Community members, Department of Defence, Northern Territory Environment Protection Authority
15 Dec 2021	Researchers from the Australian National University

Report structure

- 1.12 As a committee of the Parliament of Australia, the Federal Parliament, the Committee has focused on the action undertaken by federal government entities. The phrase the Australian Government will also be used to refer to the federal level of government in Australia throughout this report.
- 1.13 For community members seeking information the range of government agencies involved in PFAS remediation at the federal level can be a point of confusion. As such, this report is structured by the entities that provided appeared at public hearings. This is to provide a clearer picture of the role and work of that each entity has undertaken in relation to PFAS

investigation and remediation since the Committee's last report in August 2020.⁴

- 1.14 For ease of reference, this report will refer to the collection of per-and poly-fluoroalkyl substances, including PFOS, PFOA, PFHxS as PFAS.
- 1.15 Chapter 2 discusses the experiences of individuals affected by PFAS contamination. The Committee invited certain members of the community, who had provided evidence in the 45th Parliament, to provide their reflections on the progress of PFAS management and remediation since 2018.
- 1.16 Chapter 3 discusses evidence from the Department of Defence.
- 1.17 Chapter 4 discusses evidence from the Department of Agriculture, Water and the Environment, which manages the PFAS Taskforce.
- 1.18 Chapter 5 discusses evidence from Airservices Australia and the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC), which have responsibilities relating to PFAS investigations at certain commercial airports in Australia.
- 1.19 Chapter 6 discusses evidence from the Department of Health, and Food Standards Australia New Zealand.
- 1.20 Chapter 7 discusses the collaboration between the federal government, and state and territory governments.
- 1.21 Chapter 8 discusses evidence from companies contracted by the Department of Defence that are delivering technologies to remediate PFAS on certain Defence bases.
- 1.22 Chapter 9 discusses evidence from researchers undertaking studies into PFAS.

Concluding comment

- 1.23 The Committee is disappointed about the delay in the receipt of the Australian Government response to its second progress report. This report was tabled in August 2020, with a response expected to be tabled in the Senate within 3 months of this date. The Australian Government response was received in January 2022. Further, the Committee is concerned that the

⁴ JSCFADT, [*Inquiry into PFAS remediation in and around Defence bases: Second progress report*](#), August 2020.

Australian Government has not committed to timely action on all Committee recommendations which were agreed or agreed in principle.

Recommendation 1

- 1.24 The Committee recommends the Australian Government expedite the implementation of any recommendations made by this Committee in its reports to date which have been agreed or agreed in principle and which remain outstanding.**

2. Individuals affected by PFAS contamination

- 2.1 While the Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT)'s focus in the 46th Parliament was on monitoring the actions undertaken by Government on the management of PFAS contamination, the Committee sought to hear from members of community.
- 2.2 On 26 November 2021, the Committee heard from three members of the community that had provided evidence to the JSCFADT's 2018 PFAS inquiry, seeking the reflections of these community members on the PFAS remediation and management response over the past few years.
- 2.3 The Committee also heard from the United Firefighters Union of Australia on 24 August 2020.
- 2.4 The Committee undertook the opportunity to raise the concerns expressed at its 26 November 2021 public hearing directly with the Department of Defence. This evidence is discussed in Chapter 3.
- 2.5 The Committee heard that there are concerns about the PFAS safety standards. This issue was further discussed with the Department of Health and Food Standards Australia New Zealand in Chapter 5.
- 2.6 The Committee heard that individuals continue call for the ban of PFAS in Australia. The PFAS Taskforce provided evidence on progress on chemical regulation of PFAS in Australia, which is discussed in Chapter 4.
- 2.7 The Committee spoke to:
 - Mr Lindsay Clout, a resident of Fullerton Cove whose small farm holding is within the Williamstown PFAS contamination zone, who detailed his involvement 'in a six-year campaign to have this PFAS

chemical contamination cleaned up.’ Mr Clout has been ‘a community representative at the Williamstown Community Reference Group’ (CRG) and ‘a member of the Williamstown class action steering committee’.¹ Mr Clout previously provided evidence to the JSCFADT in 2018 for its *Inquiry into the management of PFAS contamination in and around Defence bases*;

- Ms Dianne Priddle, a cattle producer from Oakey, Queensland, who previously provided evidence to the JSCFADT’s 2018 inquiry;
- Mrs Janice Robinson, a Williamstown resident who also provided evidence to the JSCFADT’s 2018 inquiry; and
- Mr Michael Tisbury, the junior vice-president of the United Firefighters Union, the acting assistant chief fire officer for Fire Rescue Victoria, with 31 years of service as a professional firefighter.

Reflections on the progress in remediation efforts

- 2.8 Inquiry participants expressed that there had been no progress in remediation of PFAS contamination on their properties.
- 2.9 Mr Lindsay Clout stated that there is an ‘exhaustion in the community because it’s gone on for so long’² and that ‘not one gram of contaminated soil nor one litre of contaminated water has been removed from my property.’³ Mr Clout further stated that ‘people whom I’ve spoken with in the community ... are the same—zero.’⁴
- 2.10 Ms Dianne Priddle stated that ‘you can clean a site up to a point but you can’t clean what’s had a decade’s head start’⁵:
- [PFAS contamination] cannot be fixed by taking soil from one contamination site to another spot 100 kilometres up the road and putting it there. You cannot pull enough soil out of the environment to make this right.⁶
- 2.11 Mr Clout stated that ‘for the last two years, we have been moving backwards’ on PFAS management and remediation:

¹ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

² Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 8.

³ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

⁴ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

⁵ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 3.

⁶ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 3.

We've lost our PFAS blood-testing program, we've lost our community reference group forum, taking away direct access to the Defence PFAS task force and state government agencies, we've lost our mental health clinic from Fern Bay, and our properties remain not fit for purpose, with restrictions preventing us from consuming any produce grown on our land.⁷

- 2.12 Mr Clout acknowledged that the Department of Defence are 'having a red-hot crack at cleaning up this mess', but felt that other government agencies were 'sitting on the sidelines'.⁸ Mr Clout further stated:

Where are the remaining participants in the game that we are relying on to clean up our backyards—New South Wales government environment agencies, EPA, OEH, DPI; the federal government environment minister; the PFAS Taskforce? Where are they?

They're sitting on the sidelines ... trying to look like they're doing something but actually doing very little for us. It is six years on. How much longer do we have to wait?⁹

Remediation efforts by Fire Rescue Victoria

- 2.13 Mr Michael Tisbury detailed efforts made by Fire Rescue Victoria to discontinue the use of PFAS products, and decontaminate its working environment.

- 2.14 Mr Tisbury stated that firefighters could not wait any longer, and commenced mitigation strategies on their own accord:

... for 20 years governments of all persuasions have kicked this PFAS can down the road. We couldn't wait any longer for governments to act, so we've implemented a number of mitigation strategies. The reason we've done this is that, quite frankly, we've buried too many of our workmates.¹⁰

- 2.15 Mr Tisbury stated results of PFAS blood testing of firefighters in 2016 'showed that we had extraordinarily high PFAS levels in our blood'.¹¹

⁷ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

⁸ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

⁹ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

¹⁰ Mr Michael Tisbury, Junior Vice-President, United Firefighters Union; Acting Assistant Chief Fire Officer, Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 1.

¹¹ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 1.

Mr Tisbury was emphatic that ‘as firefighters, we know that we have these PFAS levels in our blood’ and it was imperative ‘to get it out of our bodies.’¹²

- 2.16 Mr Tisbury explained that in 2018 ‘blood and plasma donation’ was proposed as an idea ‘for getting PFAS out of our bodies’, and Macquarie University was commissioned to undertake a clinical trial.¹³ This clinical trial is discussed further in Chapter 9.
- 2.17 Mr Tisbury detailed Fire Rescue Victoria’s attempts to reduce PFAS contamination in its working environment. This involved removing PFAS from ‘heavily contaminated’ Fire Rescue Victoria fire trucks, which resulted in:
- every single one of them [being] below 1,000 parts per trillion in total sum of PFAS, and
 - a third of them are below 70 parts per trillion.¹⁴

As part of this PFAS removal process, Mr Tisbury stated the Fire Rescue Victoria had ‘found significant PFAS levels in the soil and in the fruit and [vegetable] patches that we had at some of our fire stations’.¹⁵ Mr Tisbury detailed that Fire Rescue Victoria was ‘working with the local council and the EPA to address those and remediate the soil around the property neighbouring the fire station.’¹⁶

Relocation and financial difficulties arising from PFAS contaminated land

- 2.18 Some inquiry participants expressed the need to provide relocation options for community members who wished to relocate. The Committee acknowledges that not all residents in PFAS-affected communities would wish to relocate from their homes and communities.

¹² Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 2.

¹³ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 2.

¹⁴ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 1.

¹⁵ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 2.

¹⁶ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 2.

- 2.19 The desire to relocate stemmed from inquiry participants expressing the sentiment that PFAS contamination would not be resolved. Ms Priddle felt that ‘for a producer like’ her family ‘there is only one answer: move us out of PFAS’.¹⁷ Mrs Janice Robinson also stated that ‘since you can’t clean [the PFAS contamination] up ... we need to get off our contaminated land’.¹⁸
- 2.20 Ms Priddle and Mrs Robinson both emphasised any relocation needed to be ‘like for like’, with Ms Priddle stating ‘we just want what we once thought we had bought into in 2005, a clean environment—like for like; no more, no less’.¹⁹
- 2.21 Mr Clout and Mrs Robinson spoke about the financial difficulties experienced in the community. Mr Clout stated that ‘we are now seen as economic lepers, and no financial institution is even prepared to touch us.’²⁰ Mrs Robinson described the challenge of selling and moving due to ‘the current market value’ of her property ‘being reduced because of the contamination’:

We need to get off our contaminated land so that we can go back to having our chickens, growing our vegetables and being able to use the groundwater. ... I have looked around and there just doesn’t seem to be anywhere I can go at the moment. They say to me ‘current market value’. Unfortunately, with the current market value being reduced because of the contamination I will never find anywhere to live.²¹

Reflections on community engagement by government agencies

- 2.22 Mr Clout, Ms Priddle and Mrs Robinson described that limited communication from the Department of Defence and other government agencies had led to a lack of trust in their communities.
- 2.23 Ms Priddle stated that ‘communication from 2019 to now has been non-existent’, stating that the only communication ‘that has occurred since

¹⁷ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 1.

¹⁸ Mrs Janice Robinson, *Committee Hansard*, Canberra, 26 November 2021, p. 11.

¹⁹ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 1.

²⁰ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

²¹ Mrs Janice Robinson, *Committee Hansard*, Canberra, 26 November 2021, p. 11.

December 2019 is a few months ago', when she 'received a letter about [her] water', which resulted in an inspection.²²

- 2.24 Ms Priddle further stated that she had not heard about results of PFAS testing and had to make inferences herself, detailing that her property was only tested for PFAS levels 'in the very beginning.'²³ Ms Priddle stated in November 2021 that she was aware that 'last year—[possibly] in a rain event; [possibly] the year before—water was taken off [her] place by the task force', however, she did not receive the results of these readings.²⁴

Ms Priddle stated as her 'neighbours [property] are now contaminated' she 'can only assume the overland flow comes from the base to [her] property and into the creek', which is 'downstream from the base.'²⁵

- 2.25 Mr Clout stated that Defence had switched to holding drop-in sessions instead of group forums, stating that 'Defence skipped away from a group forum some years ago because they had great difficulty dealing with the anger in the community, and that hasn't changed.'²⁶

- 2.26 Ms Priddle suspected that governments were afraid to deliver bad news, stating that:

I believe that if it were all good information we would hear it from the bells from the towers. But it's not good information, so we don't hear it. Keeping us in the dark doesn't make this better; it makes it damn worse.²⁷

- 2.27 Mr Clout stated that he has 'written to Defence', but 'the process of writing to Defence and waiting for a reply can take anywhere from three to six weeks.'²⁸

- 2.28 As a result, Mr Clout stated this has created an 'ambivalence in people's reaction when they're given new information.'²⁹

²² Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 2.

²³ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 2.

²⁴ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 2.

²⁵ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 2.

²⁶ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 9.

²⁷ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 8.

²⁸ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 7.

²⁹ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 8.

- 2.29 Mrs Robinson stated her community won't 'trust what we're being told, because [the Department of Defence] seem to downplay everything and not answer our questions and there's no transparency.'³⁰ Mrs Robinson expressed a sentiment that Defence was working against the community, stating:

[Defence] were happy to take you to court for something that you know that they've done. They've admitted that it comes from the base and knew that there was a class action, and they fought it.³¹

- 2.30 Mr Clout stated that 'with the lack of trust, there is ambivalence in people's reaction when they're given new information'³², and further stated:

We have a communication session with Defence that's been advertised and is coming up in a couple of weeks time, and a lot of the people I've been talking to about it are saying: 'Well, why should I attend? I'm not going to learn anything new, and if I do I don't trust what they say.'³³

- 2.31 Mr Clout emphasised that this deterioration in communication from governments, this has resulted in the community being unable to provide guidance, as communities 'were able to tell them the things that were wrong.'³⁴ Mr Clout suggested that:

Decisions get made about how this process moved forward from people who are remote from here and people who are not communicating with us. It sets itself up for bad decision-making, and that's what's occurring.³⁵

- 2.32 Mr Clout and Mrs Robinson stated they were in favour of the Williamstown Community Reference Group (CRG) being re-established. Mr Clout recommended that 'the community reference group process' in NSW should be re-established.³⁶ The Williamstown CRG was established by the NSW Government³⁷, and provided a platform for the Department of Defence and

³⁰ Mrs Janice Robinson, *Committee Hansard*, Canberra, 26 November 2021, p. 11.

³¹ Mrs Janice Robinson, *Committee Hansard*, Canberra, 26 November 2021, p. 11.

³² Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 9.

³³ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 9.

³⁴ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 6.

³⁵ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 6.

³⁶ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 6.

³⁷ New South Wales Department of Premier and Cabinet, *Williamstown Community Reference Group*, 8 June 2018, <https://www.epa.nsw.gov.au/working-together/community->

state government agencies to share information with community members. However, Mrs Robinson stated that any new community reference group should not have confidentiality restrictions, as community members attending the CRG were previously 'were told [information] in confidence and ... couldn't repeat what was said at meetings with Defence.'³⁸

Reflections on PFAS safety standards

- 2.33 Inquiry participants expressed concern about the tolerable daily intake levels of PFAS considered to be protective of human health by Food Standards Australia New Zealand (FSANZ).³⁹
- 2.34 Mr Clout stated that contamination surrounding consumable produce in his community has meant that they 'are unable to eat vegetables, fruit, eggs, beef and poultry produced on our land'.⁴⁰
- 2.35 Ms Priddle and Mrs Robinson identified that there were international discrepancies in what were considered safe consumption levels of PFAS. Ms Priddle identified that there was a 'huge difference' in the daily total of PFAS set by FSANZ in Australia and the European Food Safety Authority in Europe.⁴¹ Mrs Robinson similarly raised concerns that 'the Danish drinking standard maximum is two nanograms per litre. In Australia, 630 nanograms per litre is supposed to be safe.'⁴²
- 2.36 Ms Priddle questioned whether these federal regulations were 'keeping consumers safe in Australia', and whether they would keep the trade of producers safe.⁴³

engagement/community-news/raaf-williamtown-contamination/-/media/ecf2853768d84af9bb006f546a0953b9.ashx, viewed 25 January 2022.

³⁸ Mrs Janice Robinson, *Committee Hansard*, Canberra, 26 November 2021, p. 11.

³⁹ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5; Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 2; Mrs Janice Robinson, *Committee Hansard*, Canberra, 26 November 2021, p. 11-12.

⁴⁰ Mr Lindsay Clout, *Committee Hansard*, Canberra, 26 November 2021, p. 5.

⁴¹ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 1.

⁴² Mrs Janice Robinson, *Committee Hansard*, Canberra, 26 November 2021, p. 12.

⁴³ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 1.

Calls to discontinue the use of PFAS

- 2.37 In calling for ‘a ban of PFAS’, Mr Tisbury highlighted that PFAS foams need not be used ‘when there are safe, viable alternatives’.⁴⁴ Ms Priddle also called on the federal government ‘to ban, nationally, this product now’.⁴⁵
- 2.38 Mr Tisbury explained that:
- Fire Rescue Victoria has ‘been using fluorine-free foam since 2010’,
 - ‘every international airport currently uses fluorine-free foam in Australia’, and
 - ‘the majority of the professional fire services in Australia now use only fluorine-free foam’.⁴⁶
- 2.39 Mr Tisbury addressed the ‘misinformation about the efficacy of the fluorine-free foam’ and conveyed that ‘every single B-class fire that has been extinguished by us down here [in Victoria] has been extinguished using fluorine-free foam, so it works’.⁴⁷
- 2.40 The Australian Defence Force’s use of PFAS foams was queried by Mr Tisbury, who stated ‘they keep hanging their hat on this milspec—military specification. The ironic thing is the current batches of [aqueous film-forming foam] don’t meet milspec anyway’.⁴⁸

Concluding comment

- 2.41 The ongoing response to investigate and remediate PFAS contamination is an issue that continues to affect the livelihoods of communities. The Committee acknowledges that the impacts of PFAS contamination on individual community members is wide and varied, and that there are a range of views in the community as to how remediation should proceed.

⁴⁴ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 3.

⁴⁵ Ms Dianne Priddle, *Committee Hansard*, Canberra, 26 November 2021, p. 2.

⁴⁶ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 3.

⁴⁷ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 3.

⁴⁸ Mr Tisbury, United Firefighters Union; Fire Rescue Victoria, *Committee Hansard*, Canberra, 24 August 2020, p. 3.

- 2.42 The Committee acknowledges that PFAS contamination has occupied the minds of residents and former residents of affected communities for over 6 years. The Committee heard evidence on the toll that this has taken on residents.
- 2.43 The Committee also understands that residents are exhausted by the range of inquiries, consultation and engagement activities from all levels of government that they have been asked to participate in. The Committee thanks those who were able to make the time to write and speak to the Committee throughout its inquiry in the 46th Parliament.
- 2.44 While the primary purpose of the inquiry was to make available to the public information from the Federal Government on its response to PFAS contamination emanating from Defence bases, the Committee considered it important for this report to place on record the experiences of community members.
- 2.45 The experiences of these community members provide the primary metric of success for the Australian Government's PFAS management program. While the following chapters of this report detail a range of government programs, the effectiveness of these programs can be clearly measured by what assistance has been provided those affected by PFAS contamination, and what progress has been achieved in the clearing of PFAS contamination in these communities.
- 2.46 The Committee heard from inquiry participants that progress on the remediation of PFAS levels on their properties was considered to be minimal. The Committee was concerned to hear that there is a perception that progress may have 'gone backwards', with the reduction or disestablishment of certain support services.
- 2.47 The Committee heard that a lack of trust has developed due to communities not feeling adequately informed by government agencies over the last three years. The Committee considers it essential that the Australian Government ensure that it is open, direct, and timely when information and updates are provided to the community.
- 2.48 The Committee in its *second progress report* recommended that the Government prioritise assisting property owners and businesses in affected areas through compensation for financial losses associated with contamination emanating from Defence bases, including the possibility of

buy-backs.⁴⁹ The Australian Government in its response to the Committee's *second progress report* in January 2022 noted the recommendation.⁵⁰

Recommendation 2

- 2.49** The Committee recommends the Australian Government continue to review and adapt its engagement, communication and support to meet the evolving needs of communities affected by PFAS contamination.

Recommendation 3

- 2.50** The Committee recommends that as part of implementing Recommendation 2, the Australian Government engage the NSW Government to assess the case for re-establishing the community reference group process.

⁴⁹ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [*Inquiry into PFAS remediation in and around Defence bases: Second progress report*](#), August 2020, p. 68.

⁵⁰ Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade's inquiry into PFAS remediation in and around Defence bases*](#), January 2022, p. 13.

3. Department of Defence

- 3.1 The Committee heard from the Department of Defence three times during the course of its inquiry in the 46th Parliament. Evidence from the Department of Defence's first appearance is discussed in the Committee's *first and second progress reports* published in December 2019¹ and August 2020² respectively.
- 3.2 Following these progress reports, the Department of Defence appeared on 3 September 2021 to provide an update to the Committee on PFAS remediation and management matters, and on 26 November 2021 to allow the Committee to follow up on matters raised by community members.
- 3.3 Some of the key issues discussed with the Department of Defence at these hearings included:
- the shift from the investigation to remediation planning phase of the management of PFAS contamination,
 - monitoring the migration of PFAS from Defence bases,
 - testing emerging technologies for remediation, and
 - community engagement by the Department of Defence.

Role of the Department of Defence

- 3.4 The Department of Defence established its National PFAS Investigation and Management Program to 'manage the risks associated with per- and poly-

¹ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [*Inquiry into PFAS remediation in and around Defence bases: First report*](#), December 2019.

² Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [*Inquiry into PFAS remediation in and around Defence bases: Second progress report*](#), August 2020.

fluoroalkyl substances (PFAS) contamination in and from a number of its properties'.³

- 3.5 Defence has sought to 'determine the nature and extent of PFAS contamination, and to work to manage and remediate contamination across the estate and in surrounding communities.'⁴
- 3.6 Information on the status of its investigation and remediation work is published by the Department of Defence on its PFAS website:
<https://defence.gov.au/Environment/PFAS/>

Shifting from investigation to remediation planning

- 3.7 In November 2021, the Department of Defence characterised its last year as 'a period of moving from the investigation [of PFAS contamination] to remediation and action planning.'⁵ During the investigation period, Defence described that it was 'trying to understand the nature and scope of the contamination, where those plumes went ... and the underlying science.'⁶ These investigations have led to the production of a PFAS Management Area Plan (PMAP), which are published on the Department of Defence PFAS website.⁷
- 3.8 The Department of Defence stated that as at September 2021, 'PFAS environmental investigations at 26 out of the 28 sites' have been completed, an increase from 16 investigations completed in December 2019.⁸ Defence stated that investigations at the remaining two sites (RAAF Williams, Laverton, VIC; and the Singleton military area, NSW) are expected to be concluded prior to the end of 2021.⁹
- 3.9 The Department of Defence admitted 'there has been a lull' in communication on PFAS actions and 'absolutely acknowledge[d] the need for more engagement with communities'.¹⁰ Defence stated that 'over the last

³ Department of Defence, *Department of Defence Annual Report 2020-21*, September 2021, p. 160.

⁴ Department of Defence, *Annual Report 2020-21*, p. 163.

⁵ Ms Celia Perkins, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 15.

⁶ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

⁷ Department of Defence, *Submission 1: 3*, p. 6.

⁸ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 3 September 2021, p. 1.

⁹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 3 September 2021, p. 1.

¹⁰ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 15.

year' it has begun 'planning remediation actions that are specific to each site'¹¹, and further explained that its current planning work has required a focus on in-house scientific work:

[Remediation and action planning] has necessitated ... more in-house work with the scientific evidence and the ongoing planning for remediation to bring that to a place where [Defence has] better information to share with communities around what the next steps are.¹²

- 3.10 Defence stated the finalisation of Remediation Action Plans will bring Defence 'to a phase where [it] will have more information to share with communities'.¹³ The Department of Defence detailed that the development of Remediation Action Plans for each site will require further consultation with the community and consideration by Defence:

Where remediation is recommended, Remediation Action Plans are developed, which typically assess options to achieve remediation goals; select and justify a preferred approach; and identify how successful implementation will be demonstrated. The development of a Remediation Action Plan requires a range of additional data (over and above that collected during the investigations phase) to inform options and the design of associated works. Following data collection and analysis, timing of any remedial works is also influenced by a range of factors, including procurement of necessary consultants and experts, complexity of addressing contamination at the site, Defence capability requirements, seasonal timing and gaining concurrence of technical advisers (who are separately accredited as auditors by state and territory Environment Protection Authorities) to verify that the remedial works are appropriate to the circumstances of each site.¹⁴

- 3.11 Defence detailed that following remediation planning, it would then undertake the remediation actions and monitor any change in contamination levels.¹⁵ Using RAAF Base Williamstown as an example, Ms Celia Perkins, Deputy Secretary, Estate and Infrastructure, Department of Defence, illustrated how the remediation process would be iterative¹⁶:

¹¹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

¹² Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 15.

¹³ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

¹⁴ Department of Defence, *Submission 1*: 3, p. 6.

¹⁵ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

¹⁶ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

What we hope to do, now that we've planned remediation, is move to an implementation and monitoring phase. We think it'll take a while to see the contamination levels shift, but what we want to do then is continue the interventions and the remediations to help that. We'll learn more as we continue to study what's happening and, if that means we need to do different interventions to remediate a site, we will continue the science to do that.¹⁷

Migration of PFAS from Defence bases

- 3.12 The Department of Defence stated its 'focus in responding to PFAS contamination is minimising or reducing the migration of contamination from the boundary of Defence sites as far as reasonably practicable.'¹⁸
- 3.13 The Department of Defence advised that it was 'too soon to tell' whether PFAS migration in any areas had stopped.¹⁹
- 3.14 Defence outlined that the 'ongoing monitoring of contamination after investigations are complete is a core element of [its] PFAS management area plans' and that it is 'undertaking groundwater and surface water monitoring.'²⁰ Defence stated that it 'shares the results of all sampling with relevant state and territory authorities as results become available' and publishes 'an annual interpretive report', which provides 'analysis and interpretation of that data ... as part of keeping affected communities informed.'²¹
- 3.15 'PFAS mass flux assessments' were explained by Defence to 'measure the amount of PFAS that leaves an area, in this case a Defence property in both surface water (runoff after rainfall) and groundwater.'²² Defence stated it 'primarily undertakes mass flux measurements ... to inform and prioritise remedial action' and 'to measure improvements in the long term'.²³
- 3.16 Defence stated that it had observed various causes of PFAS migration:

¹⁷ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

¹⁸ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 3 September 2021, pp. 1-2.

¹⁹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 3 September 2021, p. 2.

²⁰ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 3 September 2021, pp. 1-2.

²¹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 3 September 2021, pp. 1-2.

²² Department of Defence, *Submission 1*: 3, p. 12.

²³ Department of Defence, *Submission 1*: 3, p. 13.

In most instances PFAS flux from Defence properties is dominated by surface water transport (runoff and stormwater), with groundwater transport often a secondary mechanism. In instances where PFAS is mostly transported in surface water, remedial efforts will prioritise surface soils in source areas to reduce PFAS transport via runoff. There are exceptions where the geology (e.g. sand dunes) permit larger fluxes of PFAS in groundwater. In areas where groundwater transport is significant, remediation of groundwater may also be required.²⁴

- 3.17 For a PFAS mass flux assessment of a region, Defence stated that once results of individual samples are received, it requires time to analyse ‘the trends across all of those individual samples over larger areas to get a better understanding of what the water movements have been over that period.’²⁵ Mr Daniel Fankhauser, First Assistant Secretary, Infrastructure, Department of Defence, explained that this leads to more meaningful analysis for a region:

We have individual samples that we could talk to the individual property owners about, but when we have that broader analysis of what has been occurring across the sample sites, that will give us a better understanding of what is going on in that specific region.²⁶

- 3.18 Defence stated that it had not sought to sample each private landholder’s property in a community, and that its sampling points are ‘designed by using scientific methods based around where the investigations have indicated to us that plumes exist.’²⁷ Ms Perkins, Department of Defence, acknowledged ‘one of the important elements of the PFAS investigation and remediation work is community confidence’ and considered the proposal of expanded testing would be ‘well worth having a good look at’.²⁸ Ms Perkins further stated:

I would just mention that there is some information around testing and how to get in contact around testing on the website. There are two parts to it. We’ll look at it in terms of the scientific method, and then we’ll look at it in terms of

²⁴ Department of Defence, *Submission 1*: 3, p. 13.

²⁵ Mr Daniel Fankhauser, First Assistant Secretary, Infrastructure, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 20.

²⁶ Mr Daniel Fankhauser, First Assistant Secretary, Infrastructure, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 21.

²⁷ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 21.

²⁸ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 21.

particular residents' interests and concerns and how we might best respond to those.²⁹

Box 3.1 Monitoring and remediation at Williamtown

Monitoring and remediation work at RAAF Base Williamtown provides an example of how the Department of Defence is using mass flux studies to inform and evaluate remediation actions.

There has been no change in PFAS contamination levels at Williamtown. Defence stated it has 'communicated with the [Williamtown] community to indicate that, within scientific parameters, the contamination hasn't materially changed.'³⁰ Defence stated it was 'not surprised ... that the PFAS contamination has stayed at a fairly stable rate'³¹, and explained:

*Water is still flowing from the contamination site out through plumes. There are groundwater plumes at Williamtown where firefighting foam was used for a very long time over a very large area, so we have large fonts of contamination. PFAS doesn't degrade in groundwater, and we know that. That's been a result of the years of study.*³²

Ms Perkins, Deputy Secretary, Estate and Infrastructure, Department of Defence, characterised Williamtown as 'the most complex site'³³ as part of Defence's PFAS management program, and explained:

*It is [a flood plain]. The water table is high. The groundwater mixes with surface water at many points. During periods of rainfall, this happens more frequently. The second issue is that the soil at Williamtown is very sandy, so water moves very freely through the soil. This is quite different to other sites, where you have clay soil or different levels of water.*³⁴

The mass flux assessments have informed the remediation actions taken at Williamtown, with Defence initially attempting to remediate the

²⁹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 21.

³⁰ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, pp. 16-17.

³¹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, pp. 16-17.

³² Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, pp. 16-17.

³³ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, pp. 16-17.

³⁴ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, pp. 16-17.

contamination source. Defence explained its focus ‘has been on remediating [the] sources of contamination on the base’³⁵, to try and break ‘the chain of PFAS flowing outside the base.’³⁶ Defence acknowledged ‘there is some scepticism’ about this strategy, but stated ‘there’s some good science in it—to pump and treat on the base.’³⁷ Mass flux assessments are also planned to be continued by Defence, to evaluate whether remediation action is successful in reducing PFAS contamination.³⁸

The Department of Defence stated that ‘as part of ... ongoing monitoring at Williamtown’ it has ‘found that those remediation works of the source areas have resulted in significantly reduced PFAS concentrations.’³⁹ However, Defence stated ‘it will take time for those results to flow into the groundwater samples that [it is] continuing to monitor as well.’⁴⁰ Ms Perkins, Department of Defence acknowledged that it ‘will be a slow process’⁴¹, and elaborated:

*We will continue to remain focused on remediation on the base where the contamination originated, because what we know about the flow of PFAS through groundwater and soil is that, until we clean up that source, it will continue to flow through those plumes into those affected areas. I know that’s incredibly frustrating for residents, and it will be a slow process.*⁴²

³⁵ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

³⁶ Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

³⁷ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

³⁸ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

³⁹ Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

⁴⁰ Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

⁴¹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 16.

⁴² Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 16.

Testing emerging technologies for remediation

- 3.19 The Department of Defence advised that it has trialled ‘a lot of new emerging technologies, with differing levels of success.’⁴³ Ms Alison Clifton, Assistant Secretary, Environment and Engineering Branch, Department of Defence, stated that Defence is now at the stage of re-assessing which technologies it should implement:

We’re now at a point where we’ve done enough different types of things that we think it’s worthwhile having a look at our remediation strategy and assessing whether it is still the most effective way to go forward. We may need to modify some of our water treatment activities as we understand new and emerging technologies.⁴⁴

- 3.20 The Department of Defence stated it will ‘continue to also develop further strategies to address [contaminated] groundwater’⁴⁵, but stated that Defence is ‘very much still learning as these initiatives continue to roll out.’⁴⁶
- 3.21 Technologies delivered by companies contracted by Defence are further discussed in Chapter 8.

Engagement with the community

- 3.22 The Department of Defence adjusted its consultation program due to the COVID-19 pandemic. Defence stated that ‘over the last year, while Defence has been somewhat restricted by COVID’, it has been publishing information on its ‘PFAS investigation and remediation program website.’⁴⁷ Defence stated that alternate strategies have included:

- producing pre-recorded videos on its website, ‘in relation to the findings of [Defence’s] studies at Blamey Barracks, Kapooka, and the Wagga area’, and

⁴³ Ms Alison Clifton, Assistant Secretary, Environment and Engineering Branch, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 19.

⁴⁴ Ms Clifton, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 19.

⁴⁵ Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

⁴⁶ Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 17.

⁴⁷ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 13.

- 'briefing through a range of stakeholders, including local representatives, so that [Defence] can convey the messages and the latest advice that [Defence] have out to their communities.'⁴⁸

- 3.23 Defence advised in November 2021, that 'with the easing of COVID restrictions' it was recommencing its 'in-person and online engagement sessions.'⁴⁹ In-person events planned in December 2021 included events in Western Australia and New South Wales. Defence stated that it was 'in the process of planning the 2022 community outreach and events at those sites where we continue to conclude investigations and remediation programs and we will keep ... those communities informed of those events.'⁵⁰
- 3.24 The Department of Defence detailed that it had engaged with community consultation groups established by state and territory governments. In the NT, Defence stated that it was 'funding a PFAS support officer for the Katherine community ... through the Northern Territory's Department of Chief Minister and Cabinet.'⁵¹ Defence further stated that it worked with the Katherine PFAS Community Consultation Group, and detailed:
- [Defence have] also engaged local liaison for the Katherine community to support the rainwater tank program. This is all done in conjunction with the Katherine PFAS Community Consultation Group, which is the mechanism that has been established in conjunction with the Northern Territory government to enable two-way communication with the community and also ensure that we can release the most timely information that we hold in relation to the ongoing monitoring.'⁵²
- 3.25 For community engagement initiatives in NSW, the Department of Defence advised that the Williamstown Community Reference Group⁵³ that Defence previously worked in conjunction with 'was an initiative of the New South Wales government and was disbanded by the New South Wales

⁴⁸ Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 3 September 2021, p. 4.

⁴⁹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 13

⁵⁰ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 13

⁵¹ Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 15.

⁵² Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 15.

⁵³ NSW Department of Premier and Cabinet, *Williamstown Community Reference Group*, 8 June 2018, <https://www.epa.nsw.gov.au/working-together/community-engagement/community-news/raaf-williamtown-contamination/-/media/ecf2853768d84af9bb006f546a0953b9.ashx>, viewed 25 January 2022.

government.⁵⁴ Despite this, Defence stated 'it remains committed to engaging closely with [affected NSW] communities.'⁵⁵

- 3.26 Defence stated that its current work 'in the remediation and the development of management plans continues to be very detailed scientific studies.'⁵⁶ The Department of Defence acknowledged comments from the community about the challenge of interpreting detailed technical reports published by the Department of Defence. Ms Perkins, Department of Defence, acknowledged that while the 'technical data is quite difficult' to interpret, the entire technical report is 'posted in full'.⁵⁷ Ms Perkins advised that this is to meet the Department of Defence's principle of 'maximum total transparency'⁵⁸, and elaborated that Defence seeks to supplement this with additional information:

So the large report ... is certainly posted in full. We don't want to post extracts; we want to post all that information. But when we post those to the Defence PFAS remediation and management website, we also apply fact sheets, and we have a variety of mechanisms and contact points on there for concerned residents to reach back out to us.

The nature of the consultations that will be run in the year ahead is to talk through in detail what those remediation activities have been, what the results of the ongoing monitoring are showing us at this point, and what the next steps are.⁵⁹

- 3.27 The Australian Government in its response to the Committee's *second progress report*, presented out-of-sitting to the Senate on 20 January 2022, stated that 'the Government will continue to assess options for improving communications on PFAS, including in the context of [its] evolving understanding of the science'⁶⁰, and further stated:

⁵⁴ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, pp. 15-16.

⁵⁵ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, pp. 15-16.

⁵⁶ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 16.

⁵⁷ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 16.

⁵⁸ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 16.

⁵⁹ Ms Perkins, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 16.

⁶⁰ Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade's inquiry into PFAS remediation in and around Defence bases*](#), January 2022, p. 8.

The Government recognises that communicating about PFAS contamination is difficult, including due to current gaps in scientific knowledge. Agencies working on PFAS investigation and management aim to communicate clearly, informatively, empathically, and regularly with affected communities, whose wellbeing remains the Government's continued focus.⁶¹

- 3.28 PFAS consultations held by Defence have varied in the style of presentations. The Department of Defence explained that its current 'drop-in-session[s]' are intended 'so that residents can get that one-on-one engagement with those people who have the answers that they're looking for'; where Defence takes 'a number of [its] subject matter experts' to 'be there for a number of hours on the ground.'⁶²

Concluding comment

- 3.29 It is evident that the clearing of PFAS contamination from affected communities is work that will be an active concern for years to come. The Committee notes that the Department of Defence has acted to apply the precautionary principle in its activities, and is continuing to research and learn to improve on remediation strategies.
- 3.30 The Committee appreciated the open and direct evidence provided by the Department of Defence. The Committee acknowledges the Department of Defence's evidence that it is 'too soon to tell' if PFAS migration from bases has stopped, and that remediation and seeing change will be a 'slow process'.
- 3.31 Chapter 2 discussed evidence that the level of communication from the Department of Defence has not met community expectations. The Committee notes the Department of Defence acknowledged that there has been a 'lull' in information that it has provided to communities. The Committee was also advised that this was due to the Department of Defence focusing on in-house research as part of planning remediation actions.
- 3.32 The Committee heard that the Department of Defence expects that the next phase of remediation planning will be accompanied with a greater level of consultation and information made available to the community. The

⁶¹ Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade's inquiry into PFAS remediation in and around Defence bases*](#), January 2022, p. 8.

⁶² Mr Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 19.

Committee understands that remediation planning may take some time, due to the level of detail required to produce the Remediation Action Plan.

- 3.33 The Committee acknowledges the challenges of the COVID-19 pandemic for delivering face-to-face information sessions. The Committee was pleased to hear that the Department of Defence has resumed and prioritised face-to-face community information sessions. The Committee emphasises the importance of departmental officials being available on-the-ground to answer the questions of local communities, and that these should continue.
- 3.34 The Committee heard that the effectiveness of remediation technologies besting tested by Defence is promising, as discussed in Chapter 8. The Committee also notes, as discussed in Chapter 4 and 5, that the Department of Defence has come to be viewed as the lead agency in the Federal Government dealing with PFAS contamination.

4. DAWE (PFAS Taskforce)

- 4.1 The PFAS Taskforce, which sits in the federal Department of Agriculture, Water and the Environment (DAWE), has coordination responsibilities between federal government departments, and across federal, state and territory governments on PFAS matters.
- 4.2 The Committee heard from the DAWE about the PFAS Taskforce in February 2020, evidence which is discussed in the Committee's *second progress report* published in August 2020.¹
- 4.3 The Committee received a further update from the DAWE on 22 October 2021, evidence which is discussed in this chapter. Some of the key issues discussed with the DAWE about the PFAS Taskforce at the October 2021 public hearing included:
- changes in the structure of the PFAS Taskforce over time,
 - the PFAS National Environmental Management Plan (NEMP),
 - progress on ratification of the listings of PFAS under the Stockholm convention,
 - the PFAS Taskforce's collaboration with state and territory governments,
 - the collaboration between federal government agencies on PFAS matters, and
 - the management of the pfas.gov.au website.

¹ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [*Inquiry into PFAS remediation in and around Defence bases: Second progress report*](#), August 2020.

Role of the PFAS Taskforce

4.4 The DAWE stated that the PFAS Taskforce:

- oversees implementation of the Intergovernmental Agreement on a National Framework for Responding to PFAS Contamination,
- runs the Commonwealth's PFAS Interdepartmental Committee, and
- maintains the pfas.gov.au website.²

4.5 The DAWE is the lead agency responsible for 'developing the PFAS National Environment Management Plan' (NEMP) and has a 'role of providing external advice to support assessments under the Environment Protection and Biodiversity Conservation Act [1999] and the [Environment Protection (Sea Dumping) Act 1981].'³ Through these two responsibility areas, the DAWE 'also provides guidance and advice to Commonwealth site owners and other responsible agencies on responding to PFAS contamination'.⁴

4.6 The Australian Government response to the JSCFADT's 2018 report noted that 'much of the work of the PFAS Taskforce [is] behind-the-scenes'.⁵

Current structure of the PFAS Taskforce

4.7 The PFAS Taskforce was established in December 2016 under the Department of Prime Minister and Cabinet, and moved to the Department of Environment and Energy in April 2018.⁶ On 1 Feb 2020, the Taskforce was re-located to the Department of Agriculture, Water and Environment,

² Ms Kate Lynch, First Assistant Secretary, Environment Protection Division, Department of Agriculture, Water and the Environment (DAWE), *Committee Hansard*, Canberra, 22 October 2021, p. 1.

³ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 1.

⁴ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 1.

⁵ Australian Government, *Whole of Australian Government Response to the report of the JSCFADT: Inquiry into the management of PFAS contamination in and around Defence bases*, Department of Agriculture, Water and Environment (DAWE), 20 February 2020, p. 4.

⁶ Australian Government, *Whole of Australian Government Response to the report of the JSCFADT*, p. 3.

following changes to the structure of certain Government Departments.⁷ This change was discussed in the Committee's *second progress report*.⁸

- 4.8 The DAWE described that 'the role of the taskforce has not changed significantly' over time with functions still involving 'whole-of-government coordination and information sharing'.⁹ The DAWE also advised that the COVID-19 pandemic did not result in the PFAS Taskforce needing to reduce its functions.¹⁰
- 4.9 The DAWE stated that it had three employees allocated to 'the PFAS Taskforce itself'.¹¹ Ms Nicola Powell, Acting Assistant Secretary, DAWE further stated that the Department has a 'significant body of chemical and other technical expertise' and 'it is particularly helpful to have the PFAS Taskforce located in the Environment Protection Division and in the Chemicals Management Branch' as the Taskforce can 'draw on that range of expertise across the branch and across the division'.¹²
- 4.10 Ms Powell, advised that the previous iteration of the PFAS Taskforce at Prime Minister and Cabinet 'was [a] significantly larger task force, as is generally the case with the Department of the Prime Minister and Cabinet. It ranged between 10 to 18 staff at any given time'.¹³
- 4.11 As discussed in the Committee's *second progress report*¹⁴, the DAWE advised that the ongoing nature of PFAS remediation had led to both the consolidation of expertise in the environment portfolio and its decentralisation across government agencies:

... If you go back to when the task force was established in [Prime Minister & Cabinet], not just Defence but the environment portfolio and the health

⁷ Australian Government, *Administrative Arrangements Order made on 5 December 2019 with effect from 1 February 2020*, 5 December 2019, p. 2.

⁸ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [Inquiry into PFAS remediation in and around Defence bases: Second progress report](#), August 2020, pp. 9-11.

⁹ Ms Nicola Powell, Acting Assistant Secretary, Chemicals Management Branch, Environment Protection Division, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 3.

¹⁰ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 3.

¹¹ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 5.

¹² Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 5.

¹³ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 5.

¹⁴ Joint Standing Committee on Foreign Affairs, Defence and Trade, *Inquiry into PFAS remediation in and around Defence bases: Second progress report*, August 2020, p. 10.

portfolio all seconded one or two staff into a group, whereas now those functions have almost been normalised within each portfolio.¹⁵

PFAS National Environmental Management Plan (NEMP)

- 4.12 As detailed in the previous two progress reports, the Committee heard about the Australian Government's process for revising the PFAS National Environment Management Plan (NEMP). Version 2 of the PFAS NEMP published in May 2020.¹⁶ The DAWE advised that version 2 of 'the PFAS NEMP includes some new guidance on reuse of soil, on PFAS in wastewater, and on storage, stockpiling and containment, as well as refinements to values for ecological [assessments]'.¹⁷
- 4.13 The DAWE identified that the NEMP has led to greater consistency in PFAS responses, providing 'consistent national diagnostic values for investigation across the country' as an example.¹⁸ The DAWE stated that the NEMP 'supports and contributes to [state and territory] regulatory and policy frameworks'.¹⁹ The DAWE further stated that the NEMP is 'implemented in each jurisdiction according to its own regulations' so that it does not 'override jurisdiction regulations'.²⁰
- 4.14 The DAWE stated that it had heard 'from feedback from consultants, site owners and the public who have reached out to us' that the NEMP is 'used very actively'.²¹ The DAWE also referred to downloads and page views of the document as an indicator that the document 'seems to be very actively

¹⁵ Mr James Tregurtha, First Assistant Secretary, DAWE, *Committee Hansard*, Canberra, 10 February 2020, p. 3.

¹⁶ Australian Government PFAS Taskforce, *PFAS National Environmental Management Plan – version 2.0 published*, 5 May 2020, <https://www.pfas.gov.au/news/pfas-national-environmental-management-plan-version-20-published>, viewed 25 January 2022.

¹⁷ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 2.

¹⁸ Dr Sara Broomhall, Director, Contaminants, Standards and Advice Section, Chemicals Management Branch, Environment Protection Division, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 7.

¹⁹ Dr Broomhall, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 7.

²⁰ Dr Broomhall, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 7.

²¹ Dr Broomhall, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 7.

used and welcomed as bringing nationally consistent guidance and standards.’²²

- 4.15 The NEMP is viewed as a ‘continually evolving document’ by the DAWE, ‘reflecting the latest state of knowledge.’²³ The DAWE advised that ‘the PFAS NEMP version 3 is under development and is expected to be published for public consultation [in] mid [2022].’²⁴

Progress on international ratification

- 4.16 Coordination across the federal, state and territory governments was described as a precondition for Australia to ratify the listing of PFOS and PFOA chemicals under the Stockholm Convention on Persistent Organic Pollutants. In addition to evidence provided at public hearings, the Australian Government response to the Committee’s *second progress report* detailed work to be undertaken on national chemical reforms encompassing PFAS.²⁵
- 4.17 The Committee was advised that ‘under Australia’s federated system of government, responsibility for regulation of industrial chemicals is shared across the Commonwealth, states and territories. There are multiple regulatory systems and a co-ordinated, collaborative approach is required to manage any given chemical.’²⁶
- 4.18 The Food Standards Australia New Zealand stated that ‘Australia has elected to be an ‘opt-in’ country to the Convention ... Before ratifying a new listing, the Government considers the merits of ratification and ensures that measures are in place to allow Australia to meet any associated obligations.’²⁷
- 4.19 Industrial Chemicals Environmental Management Standards (IChEMS) legislation was passed by the Federal Parliament in March 2021.²⁸ The

²² Dr Broomhall, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 7.

²³ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 2.

²⁴ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 1.

²⁵ Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade’s inquiry into PFAS remediation in and around Defence bases*](#), January 2022, pp. 13-15.

²⁶ Food Standards Australia New Zealand, *Submission 14*, p. 1.

²⁷ Food Standards Australia New Zealand, *Submission 14*, p. 1.

²⁸ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 8.

DAWE advised that the Federal Government is 'going to be in a much better position to be able to ratify those listings and any further listings of those kinds of PFAS under the Stockholm convention' once the IChEMS legislation is implemented.²⁹

4.20 The DAWE described IChEMS as 'a major step to improve the management of industrial chemicals in Australia', including for PFAS:

Industrial chemicals such as PFAS will be scheduled in the IChEMS register according to their level of environmental risk, along with measures to manage those risks, which might include tighter restrictions or prohibitions, where warranted. This will provide a single source of information for chemical users, importers and manufacturers on how to manage risk to the environment.³⁰

4.21 The DAWE advised that that the next step is for the federal government, and each state and territory government to also implement the IChEMS legislation:

- 1 IChEMS legislation was passed by the Federal Parliament in March 2021. This establishes the 'basis for Industrial Chemicals Environment Management Standard';
- 2 implementation legislation needs to be passed by each state and territory government;
- 3 the Federal Government can then schedule PFAS and other chemicals on the IChEMS register;
- 4 this will enable a 'nationally consistent way of managing the risks of the various types of PFAS of concern';
- 5 once national consistency is obtained, Australia will be able to 'meet the obligations of the Stockholm convention'; and
- 6 the Federal Government will then be in a position to proceed with ratification of the listings.³¹

²⁹ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 7.

³⁰ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 2.

³¹ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 8.

Collaboration with states and territories

- 4.22 PFAS management matters overlap between federal government (Commonwealth), and state and territory governments. Established in mid-2017, the State and Territory PFAS Forum meets quarterly.³² In addition to the PFAS Taskforce, and the Department of the Prime Minister and Cabinet', the State and Territory PFAS Forum has 'representatives from all of the environment protection authorities across all of the states and territories, [and] representatives from the first minister's department of every state and territory.'³³
- 4.23 The DAWE stated that the PFAS Taskforce through the quarterly state and territory forum is 'kept abreast of these new kinds of sites—contamination development'.³⁴ The DAWE stated the 'the main issues that are discussed [at the forum] are about:
- whether there is an intersection between the Commonwealth and a state regulatory authority,
 - making sure that [forum members] understand who is responsible for what at a particular site,
 - [a heavy focus] on the PFAS National Environmental Management Plan and its implementation,
 - the progress underway on further developments on the PFAS National Environmental Management Plan, [and]
 - investigations underway.³⁵
- 4.24 Ms Powell, Acting Assistant Secretary, DAWE stated that the purpose of the forum is 'mainly information sharing'³⁶, elaborating:
- It's about bringing those people together to share each other's experiences and learning and to understand the extent of the issues across each state and territory, including whether there are any significant issues emerging where there is a shared responsibility between the Commonwealth and the states and territories, in particular. It is largely informal discussion. If there are any

³² Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 5.

³³ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 5.

³⁴ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 5.

³⁵ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 6.

³⁶ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 6.

significant issues arising, we manage that in a separate side discussion between the relevant agencies.³⁷

- 4.25 The PFAS Taskforce stated it is 'interacting with states and territories on a really regular basis' and accordingly does not 'rely on that forum to hear about ... contamination, [or] new sites coming up for investigation.'³⁸

Collaboration across the Commonwealth (Federal) Government

- 4.26 The PFAS Taskforce 'runs the Commonwealth's PFAS Interdepartmental Committee'.³⁹ The DAWE stated that updates on 'all of the site investigations and management processes' across the Australian Government are 'received regularly to the interdepartmental committee.'⁴⁰
- 4.27 The DAWE clarified that the PFAS Taskforce does not 'direct other Commonwealth agencies on how they go about their remediation activities.'⁴¹ Instead, the DAWE stated that the PFAS Taskforce 'simply oversee the implementation of the intergovernmental agreement on PFAS to ensure that those protocols and processes and principles are being followed.'⁴²
- 4.28 The PFAS Taskforce stated that it also monitors 'developments in remediation research and to help agencies understand the current state of play' and aims 'to be a central repository of information about any developments in that area'.⁴³ Ms Powell described that the Department of Defence had become the lead expert agency on remediation research in the Federal Government, stating:

³⁷ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 6.

³⁸ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 6.

³⁹ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 1.

⁴⁰ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 6.

⁴¹ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 3.

⁴² Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 3.

⁴³ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 3.

Defence are leading the charge in that respect for the Commonwealth and are very up to speed with all of the latest remediation technologies and are trialling various technologies around the country.⁴⁴

Management of the pfas.gov.au website

4.29 In its *second progress report*, the Committee recommended that information for the community on the pfas.gov.au website be expanded. The DAWE acknowledged in October 2021 that ‘it is true’ that there has been no key information placed on the pfas.gov.au website for 500 days.⁴⁵

4.30 The Australian Government response to the Committee’s *second progress report* in January 2022 stated:

The pfas.gov.au website provides a general PFAS information portal for Australians and an avenue for enquiries about PFAS related issues. Relevant Commonwealth, state and territory government agencies’ websites link to pfas.gov.au as a central source of information on PFAS.⁴⁶

4.31 The DAWE stated that ‘the pfas.gov.au website is intended to provide core updates’, and can act as ‘the central information starting point for people’, or as ‘a directory ... to refer people to other sources of government information.’⁴⁷ The DAWE advised that the PFAS Taskforce ‘tend[s] not to duplicate information but instead to refer people to the primary source of that information, so that it’s always accurate and current.’⁴⁸

4.32 The DAWE advised that it ‘agree[d] with the committee’s recommendation that [it] should provide important community support contacts in a central location on the PFAS website and include links to relevant reports such as this parliamentary inquiry and others.’⁴⁹ The DAWE stated it is ‘planning to include those updates as part of a current overall content edit.’⁵⁰

⁴⁴ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 3.

⁴⁵ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 4.

⁴⁶ Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade’s inquiry into PFAS remediation in and around Defence bases*](#), January 2022, p. 8.

⁴⁷ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 4.

⁴⁸ Ms Lynch, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 4.

⁴⁹ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 4.

⁵⁰ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 4.

- 4.33 The DAWE stated that ‘it takes time to gather ... information’ from other agencies, and further stated:

[The DAWE is] very reliant on other agencies from both the Commonwealth and the states and territories to provide us with that updated information and locations of websites where the best information can be found.⁵¹

- 4.34 The Australian Government in its response to the Committee’s *second progress report*, received on 20 January 2022, stated that dedicated telephone lines are made available by the Department of Defence and Department of Health:

Dedicated PFAS information lines already exist to support enquiries on a range of PFAS related topics. The Department of Defence has dedicated telephone lines and email contacts for enquiries about each of its 28 PFAS site investigation and management areas. The Department of Health has a telephone information line and email contact for enquiries about PFAS exposure and potential health impacts.

The PFAS Taskforce will ensure that direct contact information to the range of available PFAS information and support services is captured in a central location on pfas.gov.au, for ease of reference. An overview of what these services offer will also be provided.⁵²

Concluding comment

- 4.35 The Joint Standing Committee on Foreign Affairs, Defence and Trade in its 2018 report called for appointment of a PFAS Coordinator-General with a key role of ‘working across portfolios, and with state, territory and local governments, to overcome barriers to cooperation, coordinate actions and to clearly communicate outcomes and advice to the public’ and to provide ‘a national point of contact and accountability for the Government’s response to the PFAS issue’.⁵³
- 4.36 In its response to the Committee’s 2018 report, the Australian Government noted this recommendation, stating that the ‘Australian Government

⁵¹ Ms Powell, DAWE, *Committee Hansard*, Canberra, 22 October 2021, p. 4.

⁵² Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade’s inquiry into PFAS remediation in and around Defence bases*](#), January 2022, p. 3.

⁵³ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), *Inquiry into the management of PFAS contamination in and around Defence bases*, December 2018, pp. 126-127.

believes that the substance of the Committee's recommendation is being, or can be delivered through existing structures and agreement' and highlighted the PFAS Taskforce in this role, and as the manager of the upgraded PFAS website.⁵⁴

- 4.37 The Committee acknowledges the work of the PFAS Taskforce over the last two years in achieving consistency in areas of the PFAS response across Australian governments, in particular through the continuing revisions of the NEMP, and the establishment of the Industrial Chemicals Environmental Management Standards to progress towards international ratification of listing of PFAS under the Stockholm convention.
- 4.38 The Committee heard that the overlap between Commonwealth and state and territory governments on PFAS matters continues to be managed through regular information sharing through the quarterly PFAS State and Territory Forum supported by the PFAS Taskforce.
- 4.39 In August 2020, the Committee noted that if the PFAS Taskforce is to be the face of the Government's national PFAS effort, then the Committee considered it must have a dedicated interface on the PFAS website, with direct contact details, enhanced site interactivity and profiled consumer support information.
- 4.40 The Committee was concerned to observe in October 2021 that there have been no 'core news updates' for over 500 days on the pfas.gov.au website. The Committee acknowledges evidence from the DAWE that an 'overall content edit' to address this is in progress, and that the DAWE relies on information being received from other Federal government agencies.
- 4.41 The Committee considers that delays in the PFAS Taskforce receiving information from other agencies raises questions about the effectiveness of the Australian Government's Interdepartmental Committee for sharing information across Federal government agencies.
- 4.42 The Committee considers that quarterly updates that summarise the work of the Australian Government on PFAS remediation issues would be useful in ensuring that the pfas.gov.au website remains the central source of information on PFAS. Quarterly updates should assist in providing community members confidence that active progress is being undertaken on

⁵⁴ Australian Government, [*Whole of Australian Government response to the report of the Joint Standing Committee on Foreign Affairs, Defence and Trade Inquiry into the management of per- and polyfluoroalkyl substances \(PFAS\) contamination in and around Defence bases*](#), February 2020, pp. 3-4.

PFAS issues, and avoid the impression that the Australian Government has been inactive on PFAS management issues.

- 4.43 The Committee was concerned to learn that PFAS Taskforce has been reduced to three full-time staff. The Committee acknowledges evidence that the PFAS Taskforce draws on resources from the broader Department of Agriculture, Water and the Environment.
- 4.44 The Committee questions whether this is a sufficient level of resourcing for the PFAS Taskforce to undertake its role as the first contact and information point for residents in communities experiencing PFAS contamination, on top of its existing workload of managing revisions to NEMP, progressing IChEMS and managing interdepartmental and intergovernmental forums.

Recommendation 4

- 4.45 **The Committee recommends that the Australian Government produce and publish quarterly updates on the work of Department of Defence, Department of Health and Department of Agriculture, Water and the Environment on PFAS management issues, on the pfas.gov.au website.**
- 4.46 **These updates should detail work completed and new information made available within their respective portfolios in that quarter.**

Recommendation 5

- 4.47 **The Committee recommends that the Australian Government work with state and territory governments to produce regular updates on PFAS management issues for publication on the pfas.gov.au website.**

5. Airservices Australia and DITRDC

- 5.1 The Committee heard perspectives on PFAS contamination responses by the Australian Government, outside of Defence bases, from the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) and Airservices Australia on 3 September 2021.
- 5.2 Some of the key issues discussed with the DITRDC and Airservices Australia at this hearing included:
- the adoption of new foam product by Airservices Australia,
 - site investigations and remediation efforts undertaken by Airservices Australia,
 - investigations at federally-leased airports,
 - the challenges specific to commercial airports,
 - collaboration with the Department of Defence, and
 - the blood serum study of current and former Airservices Australia staff.

Role of the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC)

- 5.3 The DITRDC stated that it ‘is responsible for the administration of the airport environmental regulatory regime at 19 federally leased airports around Australia.’¹ The DITRDC advised that:

Under the terms of head lease agreements between the Commonwealth and airports, the airport-lessee companies are responsible for the environmental management of airport land. The department has a role as regulator in ensuring that all federally leased airports are managing those requirements.²

Role of Airservices Australia

- 5.4 Airservices Australia is ‘Australia's air navigation service provider’ and is ‘responsible for Australia's airspace management and aviation rescue and firefighting services.’³ Airservices Australia operates the Federal Government’s Aviation Rescue Fire Fighting Service at 27 airports, which has resulted in some cases of PFAS contamination arising from the use of PFAS containing fire fighting foams.⁴

Adoption of a PFAS-free foam product by Airservices Australia

- 5.5 Airservices Australia stated ‘when concerns about these foams first emerge in the early 2000s, [it] acted quickly’ and has ‘been using a PFAS-free foam at civilian airports since 2010.’⁵ Airservices Australia currently uses the Solberg foam product, which is considered by Airservices to be ‘as effective as the

¹ Ms Diane Brown, Acting Deputy Secretary, Department of Infrastructure, Transport, Regional Development and Communications (DITRDC), *Committee Hansard*, Canberra, 3 September 2021, p. 10.

² Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

³ Dr Claire Marrison, Chief Safety and Risk Officer, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

⁴ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

⁵ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

prior foams. It meets our operational requirements, and it's also approved by [the Civil Aviation Safety Authority (CASA)].⁶

5.6 Airservices advised that the Solberg product it uses is PFAS free:

Airservices has signed [a non-disclosure agreement] with Solberg and is aware of the chemical makeup of the RF6 foam that we carry on our vehicles.

Airservices can confirm that RF6 does not contain PFAS and we have performed our own analysis to confirm it is PFAS free.⁷

5.7 Due to 'when this foam was developed and confirmed for use, as an organisation' Airservices Australia stated it is 'very hopeful that the negative impacts of foams that were developed in the 1970s will have been ameliorated in the current foams that we are now using'.⁸ Airservices Australia elaborated that:

Outside of assessments undertaken by Airservices and Solberg, we are not aware of any independent studies into the potential environmental or health impacts of the Solberg RF6 foam. It is important to note that Solberg RF6 foam is a fire fighting foam product accredited by the Civil Aviation Safety Authority (CASA) for use in an aviation setting. All manufacturers of accredited firefighting foams must meet the requirements of the International Civil Aviation Organisation (ICAO) which include environmental assessments of the impacts of their foams on flora and fauna.⁹

5.8 Airservices Australia stated that in 2019 at joint-user facilities with the Department of Defence it had also 'transferred to the Solberg products, which Defence decided they were happy to do'.¹⁰

Investigations undertaken by Airservices Australia

5.9 Airservices Australia has ongoing investigations at certain sites where its Aviation Rescue and Firefighting Services operated. Airservices Australia stated that it 'commence[d] an extensive investigation program to inform what ongoing management actions were required and how best to direct

⁶ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

⁷ Airservices Australia, *Submission 27*, p. 1.

⁸ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 13.

⁹ Airservices Australia, *Submission 27*, p. 1.

¹⁰ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 11.

remedial efforts’ and has ‘ongoing investigations at 19 airports.’¹¹ Airservices Australia elaborated:

... desktop reviews identified that we have not used PFAS containing foams at five of the 27 airports which we service. Of the remaining 22 locations, Darwin and Townsville airports are joint-user facilities where the Department of Defence is leading investigations. At one airport the PFAS identified predates our presence.¹²

- 5.10 Airservices Australia stated its current focus is to undertake ‘detailed site investigations’ that obtain ‘comprehensive information on the type, extent and level of contamination and if remedial action is required.’¹³ Airservices Australia stated due to the complexity of [the] sites these may take between 12 and 18 months to complete.¹⁴

Remediation efforts

- 5.11 Site management plans that were developed by Airservices Australia were stated to ‘include ongoing monitoring of ground and surface water, removing stockpiles of contaminated materials and capturing and removing contaminated water runoff in some locations.’¹⁵
- 5.12 Airservices Australia stated it continues ‘to explore practical remediation solutions’ through its research and development program.¹⁶ This has included ‘trailing several technologies at Hobart Airport to treat wastewater prior to release into the environment’, and looking at ‘soil-binding agents and applications to concrete which prevent leaching of contamination into the ground and surface water.’¹⁷ Airservices Australia stated ‘these are promising technologies, but challenges still remain in deploying solutions at scale without disrupting [its] service provision.’¹⁸

¹¹ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

¹² Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

¹³ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

¹⁴ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

¹⁵ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

¹⁶ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

¹⁷ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

¹⁸ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

Investigations at federally-leased civilian airports

5.13 There are 19 federally-leased civilian airports regulated by the DITRDC. The DITRDC stated there is PFAS contamination ‘at federally leased airports from the use of PFAS based firefighting foams in aviation rescue and firefighting services and fuel suppression systems in aircraft hangars, fuel facilities and other tenant facilities on airports.’¹⁹

5.14 The DITRDC stated that ‘the full extent of pollution across all airport sites is not currently known.’²⁰ The DITRDC detailed that ‘airports are at different stages in undertaking PFAS investigations and establishing management plans’²¹:

For example, the larger airports, such as Perth, Melbourne and Brisbane, have significantly advanced investigative programs, whereas other airports may not yet have commenced this process. As Airservices Australia indicated, it is also undertaking investigations at 19 locations where it has historically used PFAS-containing firefighting foam.²²

5.15 The DITRDC advised that the regulatory framework established by the Airports Act and the Airports (Environment Protection) Regulations captures PFAS issues as it ‘applies to the management of all on-airport environmental issues, including air, soil, water, noise and chemical pollution.’²³ The DITRDC stated that ‘airport environment officers, or AEOs, are employed by the department to oversee the on-ground environmental management of federally leased airports’, including PFAS matters.²⁴

Challenges specific to commercial airports

5.16 Airservices Australia and DITRDC identified that complexities of commercial airports, which DITRDC described as ‘complex industrial sites with multiple tenants’.²⁵ Airservices Australia also highlighted that

¹⁹ Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

²⁰ Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

²¹ Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

²² Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

²³ Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

²⁴ Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

²⁵ Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

remediation at a 'busy civilian airport, has the potential to disrupt service provision and affect operations.'²⁶

- 5.17 The DITRDC stated that the 'presence of former landfill sites and the migration of PFAS from surrounding urban or industrial areas may also contribute to on-airport contamination.'²⁷

Collaboration with the Department of Defence

- 5.18 At Darwin and Townsville Airport, Airservices Australia stated that it operates 'under contract to Defence'.²⁸ Airservices Australia stated that while the Department of Defence is the primary investigator at the joint-user facilities, Airservices Australia will 'be undertaking a targeted site investigation at Darwin Airport to get much more detail on the PFAS that may be under the training path that we use there.'²⁹
- 5.19 Airservices Australia stated it 'most recently met with the Department of Defence in August 2021. It's very much about learning lessons from each other and also sharing guidance material' with the agencies having 'a very open relationship that's mutually beneficial.'³⁰ The DITRDC stated that it also recognised that 'Defence is the leader in this space and so are very much liaising with them as we start to frame our own investigative program and learn lessons from them.'³¹

Blood serum study of current and former Airservices Australia staff

- 5.20 Airservices Australia commissioned the University of Queensland to evaluate *per- and polyfluoroalkyl substances in the blood serum of Airservices*

²⁶ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 9.

²⁷ Ms Brown, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 10.

²⁸ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 11.

²⁹ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 11.

³⁰ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 11.

³¹ Ms Clare Chapple, Assistant Secretary, Regional Policy and Programs, Domestic Aviation and Reform, DITRDC, *Committee Hansard*, Canberra, 3 September 2021, p. 11.

Australia's current and former staff in 2014 and 2018.³² This research is discussed further in Chapter 9.

- 5.21 Airservices Australia stated 'at an organisational level' the study has given it 'confidence that the controls that ... put in place are effective.'³³ Airservices also stated it was 'very pleased to be contributing to the health science, given that this was a world-first study.'³⁴
- 5.22 For employees, Airservices Australia stated the study 'has given' its 'employees significant assurance.'³⁵ Dr Claire Marrison, Chief Risk and Safety Officer, Airservices Australia, indicated that Airservices Australia intends to commission 'further studies to assure ourselves that all actions that we can take have been taken and that we give our staff the mental wellbeing confirmation that the PFAS is depleting in their bloodstream.'³⁶
- 5.23 Airservices Australia highlighted the increase in participation, from 137 employees in the first study, to over 800 current and former employees in 2018.³⁷ Dr Marrison, Airservices Australia, stated this increase suggested 'that people are both confident in the researchers and interested in the reduction in PFAS that has come from us taking the opportunity to eliminate PFAS-containing foam from our operations.'³⁸

³² Nilsson S, Aylward L, Kay M, Smurthwaite K, Toms LM, King L, Marrington S, Rotander A, Kirk M, Mueller J, Bräunig J. *Evaluation of per- and poly- fluoroalkyl substances (PFASs) in Airservices Australia's Aviation Rescue Fire Fighting Service (ARFFS) Staff – 2018/2019*. The University of Queensland, 2020, p. 4, https://qaehs.centre.uq.edu.au/files/5462/C02758-005%20Formatted_ASA%20Exposure%20Report_Final%281%29.pdf, viewed 3 February 2022.

³³ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 13.

³⁴ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 13.

³⁵ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 13.

³⁶ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 13.

³⁷ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 13.

³⁸ Dr Marrison, Airservices Australia, *Committee Hansard*, Canberra, 3 September 2021, p. 13.

Concluding comment

- 5.24 In its *Second Progress Report*, the Committee identified that the approaches of Airservices Australia and DITRDC may provide insight into PFAS contamination approaches off Defence bases.³⁹ The Committee acknowledges evidence that Airservices Australia and the Department of Defence have shared information and learnings.
- 5.25 The Committee heard that Airservices Australia is undertaking investigations at sites where the Aviation Rescue Fire Fighting Service has operated. The Committee also heard that the DITRDC has an environmental regulatory role over airports based on Federal Government (Commonwealth) land.
- 5.26 The Committee notes that the operation of commercial airports involve some complexities that do not exist for Department of Defence sites. The Committee learned that PFAS remediation at busy commercial airports has the potential to disrupt service provision and affect operations.
- 5.27 The Committee acknowledges evidence that Airservices Australia started transitioning to a PFAS-free foam in 2010. The Committee also acknowledges evidence that Airservices has also obtained the agreement of the Department of Defence on the use of this foam at Townsville and Darwin airports.
- 5.28 The Committee heard that Airservices Australia arranged blood testing for employees, through the University of Queensland, at an early stage. The Committee notes that this has provided assurance to Airservices Australia that PFAS blood levels in its staff have decreased as, and provided peace of mind to its employees in understanding their baseline PFAS levels.

³⁹ JSCFADT, [*Inquiry into PFAS remediation in and around Defence bases: Second progress report*](#), August 2020, p. 40.

6. Department of Health and FSANZ

- 6.1 The Committee's *second progress report* discusses evidence from the Department of Health's appearance on 24 February 2020, and Food Standards Australia New Zealand (FSANZ) appearance on 15 June 2020.¹
- 6.2 On 22 October 2021, the Committee received an update from the Department of Health and FSANZ. Some of the key issues discussed with the Department of Health and FSANZ at this hearing included:
- support for medical research,
 - community engagement that the Department of Health has undertaken,
 - mental health support services for PFAS-affected communities,
 - health based guidance values for PFAS,
 - the findings of the Australian Total Diet Study, and
 - trigger points for contaminated site investigation.

Role of Department of Health

- 6.3 The Department of Health oversees 'enquiries about health-based guidance values for PFAS; community support including mental health and counselling services; ... and water quality guidelines for drinking and recreational water.'² In addition, the Department of Health is involved in the commissioning of blood testing and health research.³

¹Joint Standing Committee on Foreign Affairs, Defence and Trade, *Inquiry into PFAS remediation in and around Defence bases: Second progress report*, August 2020.

² Australian Government PFAS Taskforce, *Media centre*, <https://www.pfas.gov.au/media>, viewed 2 February 2022.

³ Australian Government PFAS Taskforce, *Media centre*, <https://www.pfas.gov.au/media>, viewed 2 February 2022.

Role of Food Standards Australia New Zealand (FSANZ)

- 6.4 Food Standards Australia New Zealand is part of the Federal Government's health portfolio.
- 6.5 The FSANZ stated its primary objective 'is to protect public health and safety by ensuring a safe food supply', which it does 'by setting, but not enforcing, food standards for Australia and New Zealand in the Australia New Zealand Food Standards Code.'⁴ These 'standards apply to domestically produced and imported foods.'⁵ The FSANZ also 'develop[s] guidelines, undertake[s] targeted surveillance of the food supply and coordinate[s] food recall and national incident response activities.'⁶

Support for medical research by the Australian Government

- 6.6 The Department of Health stated that 'the inclusion of PFAS testing as part of ABS's Intergenerational Health and Mental Health Study' will provide a 'robust national benchmark for PFAS exposure'.⁷
- 6.7 The Department of Health also stated that it will 'continue monitoring research into potential health impacts of PFAS, including the nine studies funded by the National Health and Medical Research Council's targeted call for research.'⁸ The Department of Health further stated that 'new evidence is considered to ensure that our responses remain appropriate and support positive health outcomes'.⁹

⁴ Mrs Christel Leemhuis, Acting General Manager Science and Risk Assessment Branch, Food Standards Australia New Zealand (FSANZ) *Committee Hansard*, Canberra, 22 October 2021, p. 10.

⁵ Mrs Christel Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

⁶ Mrs Christel Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

⁷ Ms Lara Purdy, Assistant Secretary, Environmental Health and Health Protection Policy Branch, Office of Health Protection and Response, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 9.

⁸ Ms Purdy, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 1.

⁹ Ms Purdy, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 9.

Community engagement by the Department of Health

- 6.8 The Department of Health stated that it would ‘continue to work with other agencies to support community engagement activities as required.’¹⁰ The Department of Health detailed that since February 2020 it had:

... supported community engagement activities held by the Department of Defence, including attending information sessions in Jervis Bay as well as those held by the Department of Infrastructure, Transport, Regional Development and Communications on Norfolk Island to provide information to community members on any health-related concerns.¹¹

- 6.9 The ANU PFAS Health Study was funded by the Australian Government.¹² The Department of Health stated that it will also ‘facilitate the delivery and communication of the final reports of the ANU study to the affected communities, broader stakeholder groups and the public.’¹³ The results of the ANU PFAS Health Study is further discussed in Chapter 9.

Dedicated mental health support services

- 6.10 The Department of Health advised that ‘the PFAS-specific mental health services ceased in 2019-20.’¹⁴ As such the Department of Health was not able to provide advice on any change or increase in residents seeking mental health services in PFAS-affected communities, stating that it is ‘very difficult to disentangle the use of mental health services in these regions.’¹⁵
- 6.11 The Department of Health referred to the ANU PFAS Health Study as having explored specific mental health impacts in PFAS-affected communities. The ANU PFAS Health Study is discussed further in Chapter 9.
- 6.12 Mr Roddam, First Assistant Secretary, Mental Health Division, Department of Health stated that it was important to make ‘sure that people are aware of

¹⁰ Ms Purdy, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 9.

¹¹ Ms Purdy, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 1.

¹² Department of Health, *Submission 5*, p. 2.

¹³ Ms Purdy, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 1.

¹⁴ Mr Mark Roddam, First Assistant Secretary, Mental Health Division, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 12.

¹⁵ Mr Roddam, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 12.

our service, in terms of mental health support, and the service environment around them.’¹⁶ Mr Roddam also highlighted support services ‘that are already in the community, or through digital services.’¹⁷

- 6.13 The Australian Government response to the Committee’s *second progress report* in January 2022 stated:

Whilst these specific PFAS mental health services will cease, people impacted by PFAS are able to access the full range of Government-funded mental health services, including Medicare-subsidised psychology services, other PHN commissioned mental health services, and low-cost and free digital mental health services.¹⁸

Health based guidance values for PFAS

- 6.14 FSANZ recommended Australian ‘health based guidance values for PFAS’, which were published in 2017.¹⁹ FSANZ stated that ‘these are known as tolerable daily intakes and represent the highest safe level of the chemical that people can consume through food every day of their life.’²⁰
- 6.15 The Department of Health stated the ‘the guidance that is provided by FSANZ is then used by states and territories to provide specific guidance, in a local context, for all communities.’²¹
- 6.16 FSANZ acknowledged that ‘a notable characteristic of health based guidance values for PFAS is differences in values established by authorities worldwide, despite largely considering the same data.’²² FSANZ observed that ‘this is not unusual in chemical risk assessments and reflects differences in scientific policy and regulatory environments’²³, and elaborated that:

¹⁶ Mr Roddam, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 12.

¹⁷ Mr Roddam, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 12.

¹⁸ Australian Government, [*Australian Government response to the Second Progress Report of the Joint Standing Committee on Foreign Affairs, Defence and Trade’s inquiry into PFAS remediation in and around Defence bases*](#), January 2022, p. 12.

¹⁹ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

²⁰ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

²¹ Ms Purdy, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 11.

²² Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

²³ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

For PFAS chemicals, the international differences are attributable mainly to differences in the use of animal or human data, modelling techniques and the application of uncertainty factors. FSANZ continue to monitor the evolving literature in this area and are confident that our 2017 tolerable daily intakes remain protective of human health.²⁴

Trigger points for contaminated site investigation

- 6.17 The FSANZ advised that the results of the 27th Australian Total Diet Study referred to the general Australian food supply, and was not specific to PFAS-affected areas.²⁵ For PFAS-affected areas, the Department of Health understood that ‘as part of the detailed site investigations undertaken by Defence, they typically do include different types of food, including generally cattle ... and probably other types of meat as well.’²⁶
- 6.18 The FSANZ stated that it undertook work ‘recommending PFAS trigger points for contaminated site investigation.’²⁷ The FSANZ elaborated that:
- Trigger points represent the maximum concentration of these chemicals that could present in different foods so that even high-level consumers of these foods would not exceed the safe levels of dietary exposure. The trigger points have been used by authorities when analysing PFAS in foods to identify whether further investigation of a food may be required.²⁸
- 6.19 The FSANZ stated in October 2021 that ‘based on all of our analysis of the data, the trigger points remain valid.’²⁹ The FSANZ advised that it had ‘not been approached by jurisdictions to have further discussions around the changing of those trigger values’, and as such those trigger points remain the values that should be used and implemented by jurisdictions.³⁰
- 6.20 The FSANZ advised that it had not undertaken any studies on meat specifically from affected areas.³¹ The FSANZ detailed that it ‘worked with

²⁴ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

²⁵ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

²⁶ Ms Maryka Gaudio, Director, Environmental Health and Climate Change Policy Section, Department of Health, *Committee Hansard*, Canberra, 22 October 2021, p. 13.

²⁷ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

²⁸ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

²⁹ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 11.

³⁰ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, pp. 11-12.

³¹ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 13.

the Northern Territory Department of Health in relation to PFAS monitoring of concentrations in food and dietary exposures' in 2018, where sampling was not undertaken by FSANZ but information provided to it on 'fish and seafood from Darwin waters, fruit and vegetables, and also some animal products.'³² The FSANZ detailed that 'since that time we haven't had any more input into work in that area.'³³

Low levels of PFAS in the general Australian food supply

- 6.21 As part of the 27th Australian Total Diet Study, the 'ongoing monitoring survey of the general Australian food supply', FSANZ investigated a broad range of Australian foods and beverages for levels of PFAS.³⁴ The FSANZ used these results 'estimate dietary exposure for the general Australian population.'³⁵ The FSANZ detailed that 'PFOS, PFOA, PFHxS' were the three primary PFAS congeners of interest:

Over 4,000 food samples, representing 112 different foods, were collected from retail outlets from all Australian states and territories. Food samples were prepared to a table-ready state—including cooking when required—composited and analysed for 30 different PFAS congeners, including three congeners of primary interest for food safety. These were PFOS, PFOA and PFHxS.³⁶

- 6.22 The FSANZ advised that 'the 27th Australian Total Diet Study found PFAS levels in the general Australian food supply were very low.'³⁷ The FSANZ stated 'PFOS was the only congener detected out of the 30 analysed, and it was detected in five of the 112 food types and less than two per cent of all samples'³⁸, these five foods including 'mammalian offal, tuna, prawns, fish fillets and eggs.'³⁹ The FSANZ stated that 'the overall exposure to PFOS for

³² FSANZ, *Submission 14: 1*, p. 2; Mrs Tracy Hambridge, Principal Specialist, Dietary Exposure Assessment, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 12.

³³ Mrs Hambridge, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 12.

³⁴ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

³⁵ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

³⁶ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

³⁷ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

³⁸ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

³⁹ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 12.

the general Australian population is lower than the TDI, the tolerable daily intake, indicating no public health and safety concerns'⁴⁰:

PFAS levels in Australian foods were consistently lower than those found in several overseas studies. PFAS levels were also well below Australian guidance values, including the FSANZ trigger points for site investigations and the National Health and Medical Research Council's drinking water guidelines. ... In the absence of public health and safety concerns in relation to the general food supply, there is no current need to consider establishing food regulatory measures such as maximum levels for PFAS in the Australia New Zealand Food Standards Code.⁴¹

Concluding comment

- 6.23 The Department of Health and Food Standards Australia New Zealand (FSANZ) has played an important role in the response to PFAS, in monitoring research on the health impacts of PFAS, issuing guidance on the tolerable daily intakes for PFAS, and recommending the trigger points for contaminated site investigation.
- 6.24 The Committee understands that the FSANZ sets standards, and notes advice from FSANZ that chemical regulation and food safety is a state and territory government responsibility to enforce and implement. The Committee notes that specific food safety advice in PFAS-affected locations has been issued by state and territory Environment Protection Authorities (EPAs).
- 6.25 The Committee in its second progress report in August 2020 had observed the continued need for mental health services. The Committee heard further evidence on the mental health impacts in PFAS-affected communities from the ANU PFAS Health Study, discussed in Chapter 9.
- 6.26 The Committee notes advice that the PFAS-specific mental health services in Williamtown, Katherine and Oakey have ceased. The Committee understands that the Department of Health is engaged in mental health promotion in PFAS-affected areas.
- 6.27 The Committee acknowledges evidence that the Australian Total Diet Study found that there were low levels of PFAS in the general Australian food supply.

⁴⁰ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

⁴¹ Mrs Leemhuis, FSANZ, *Committee Hansard*, Canberra, 22 October 2021, p. 10.

- 6.28 The Committee acknowledges evidence from FSANZ that it has reviewed the evolving literature, and assessed that the tolerable daily intakes levels for PFAS remain valid and 'protective of human health'.
- 6.29 As discussed in Chapter 2, the Committee heard community members continue to be concerned with the adoption of lower tolerable daily intakes in Australia, compared to other countries. The Committee acknowledges advice from FSANZ that international variations in chemical risk assessments is not considered unusual.
- 6.30 The Committee notes that these international variations have caused community members to view the information provided by the FSANZ and Department of Health with distrust. The Committee considers that the Department of Health has an important role in providing assurance that its information is reasoned and valid, particularly as it applies to human health protection in PFAS-exposed communities.
- 6.31 The Committee considers that the Department of Health and FSANZ should prioritise its attendance at community engagement events, to update residents on the Department's understanding of evolving literature. The Committee notes that the Department of Health has supported community engagement events arranged by other government departments, including the Department of Defence.

7. Collaboration with state and territory governments

- 7.1 As a committee of the Federal Parliament, the Committee has largely focused on scrutiny of the work at the federal level of government. However, significant parts of the response to PFAS contamination is under the purview of state and territory governments. This has required the Federal Government to cooperate and collaborate with state and territory governments.
- 7.2 In Chapter 3, the Committee heard evidence that the Department of Defence works with state and territory Environment Protection Authorities (EPAs) on site investigations and remediation plans. The Department of Defence also detailed that it shares information with these state and territory EPAs, and had worked with community consultation groups established by the Northern Territory (NT) and New South Wales (NSW) governments.
- 7.3 In Chapter 4, the PFAS Taskforce detailed the quarterly state and territory forum that meets to discuss PFAS matters and share information. The PFAS Taskforce also detailed its large focus on negotiating nationally consistent approaches and legislative outcomes for across Australian states and territories.
- 7.4 In Chapter 6, the Department of Health detailed the national guidance that it and FSANZ publishes, which are then implemented by state and territory governments.
- 7.5 The Northern Territory (NT) Environment Protection Authority (EPA) briefed the Committee at its 26 November 2021 public hearing, providing the Committee with insight into the perspectives of a territory government on PFAS investigation and remediation.

Site investigations and assessments by the NT EPA

7.6 The Northern Territory EPA has responsibility for PFAS investigations and assessments for sites in the Northern Territory. The Northern Territory EPA stated it has ‘been collaborating and interacting with Defence’ at Tindal, Darwin, Robertson Barracks sites since about mid-2016’, which has required ‘a lot of work, ... interaction, [and] collaboration with Defence’.¹

7.7 The NT EPA also stated it has ‘a range of other sites which are non-Defence sites that [it is] dealing with.’² The NT EPA elaborated that a NT PFAS task force has been established to address PFAS contamination on NT land sites:

In the last 12 months we've received some additional funding for a number of jobs and we've established a PFAS task force, which is essentially designed to address PFAS contamination on NT land sites. That includes [NT Government] operations such as fire stations, land fills and wastewater treatment plants, but it also includes private operators such as tank farms, ports and other installations where PFAS has been identified.³

7.8 The NT EPA detailed that it uses a ‘a risk-based approach to prioritise the sites’, which involves identifying priority sites ‘where PFAS [aqueous film forming foams] may have been used’⁴:

... the obvious ones are fire stations; wastewater treatment plants, where that's the end zone, or the final treatment process, where everything gets collected; and landfills that generate leachate, for example, which is that contaminated or polluted watery substance at the bottom of a landfill, which does come up with PFAS concentrations.⁵

¹ Mr Peter Vasel, Director, Environmental Operations, Environmental Regulation Branch, Environment Division, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

² Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

³ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

⁴ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 20.

⁵ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 20.

Jurisdictional issues faced by the NT EPA

- 7.9 Jurisdictional issues were described by NT EPA as affecting its ability to undertake action. The NT EPA stated that Alice Springs Airport ‘is on Commonwealth land and Airservices Australia do run a fire station on the airport.’⁶ The NT EPA stated it was ‘aware of some contamination on the boundary of the land, primarily soil samples’, but it was experiencing ‘difficulties ... gaining access’⁷:

We are aware of contamination on that site and somewhat offsite but we are constrained somewhat with the jurisdictional issue in relation to Commonwealth land and Territory land. That's been a struggle for us. There have been some difficulties there with gaining access. ... If we were to do the job properly we'd be requesting a full, detailed site investigation of the source to track it to see where it's coming from and where it's going.⁸

- 7.10 The NT EPA stated that it is ‘not the only jurisdiction having difficulties with Airservices Australia in relation to properly regulating potential contamination coming off Commonwealth sites.’⁹ The NT EPA explained that it ‘can't issue instruments on an operator on Commonwealth land — because it will be ultra vires’, and stated that it was ‘trying to negotiate with the parties involved, particularly Airservices Australia.’¹⁰

Concluding comment

- 7.11 The Committee thanks the NT EPA for providing a briefing to the Committee on PFAS investigation and remediation matters in the Northern Territory. Across its inquiry, the Committee has heard about the positive outcomes that have been achieved from federal, state and territory cooperation on PFAS matters, with key achievements including the

⁶ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

⁷ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

⁸ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

⁹ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

¹⁰ Mr Vasel, Department of Environment, Parks and Water Security, Northern Territory, *Committee Hansard*, Canberra, 26 November 2021, p. 14.

intergovernmental agreement on PFAS and the development of the PFAS NEMP.

- 7.12 The division of PFAS responsibilities across federal, state and territory governments can be a source of confusion for communities who are seeking answers about the progress on PFAS contamination.
- 7.13 The Committee heard from both the Department of Defence, as described in Chapter 3, and the NT EPA about the collaboration that has been required across jurisdictions to progress investigations on Defence sites.
- 7.14 The Committee also heard from the Department of Health, as described in Chapter 6, that food and water safety matters in PFAS-affected areas are matters for state and territory governments.
- 7.15 The Committee considers that the cooperation across federal, state and territory governments is paramount to ensuring safe environments for local residents.
- 7.16 As such, the Committee was concerned to learn from the NT EPA that it has been unable to receive a full, detailed site investigation at Alice Springs Airport. The Committee was further concerned to hear that that other state and territory EPAs may feel restricted in their ability to request or undertake investigations when potential PFAS contamination has affected or come off Commonwealth land.
- 7.17 In Chapter 5, DITRDC outlined that it has a regulatory role over airports on Commonwealth land. Airservices Australia also detailed that it is undertaking investigations at a number of airports where it operates.
- 7.18 The Committee notes that PFAS may migrate in and out of an airport and its surrounding sites. These surrounding sites may be under the jurisdiction of state and territory governments. As such, the Committee considers that the evidence provided the NT EPA indicates that the DITRDC and Airservices Australia need to establish a coordination mechanism that accommodates the needs of state and territory EPAs.

Recommendation 6

- 7.19 **The Committee recommends that the Australian Government establish a coordination mechanism with state and territory environment protection authorities (EPAs) to enable information sharing and, where appropriate, access to undertake PFAS-related investigations related to Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) airfields.**

8. Contractors delivering remediation technologies

- 8.1 The Department of Defence has experimented with new technology options to remediate PFAS contamination at Defence bases. Defence detailed that it ‘excavated 14,300 tonnes of PFAS contaminated soil’ at RAAF Base Williamtown, and is ‘also operating three groundwater treatment plants, which, to date, have treated over 3.3 billion litres of water.’¹ Defence also detailed soil-washing trials at RAAF Base Edinburgh.²
- 8.2 On 7 December 2020, the Committee heard from companies contracted by Defence: Ventia Utility Services; Emerging Compounds Treatment Technologies, and Synergy Resource Management, about facilities that provided on Defence bases to attempt to remediate PFAS contamination.
- 8.3 The primary methods of remediation discussed were the treatment of contaminated water, including active ‘pump and treat’ solutions and ‘passive’ treatment systems, as well as the ‘washing’ of PFAS-contaminated soil. Water treatment solutions used at Defence bases include wastewater, surface water and groundwater systems.

¹ Mr Daniel Fankhauser, First Assistant Secretary, Infrastructure, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 18.

² Mr Daniel Fankhauser, Department of Defence, *Committee Hansard*, Canberra, 26 November 2021, p. 19.

Work of Ventia Utility Services

- 8.4 Founded in 2015, Ventia Utility Services (Ventia) is a large infrastructure services provider in Australia and New Zealand.³ The company has developed a technology for the removal of PFAS from soil and, in collaboration with the Department of Defence, has ‘been focused on the remediation of PFAS contamination and the challenge that that brings’.⁴
- 8.5 Ventia advised that there is ‘generally not one silver bullet that will fix the problem [of PFAS], and the risks that PFAS presents to human health and the environment need to be sustainably balanced with a proportionate remediation response’.⁵
- 8.6 Over the past six years, Ventia detailed that it had invested substantially in the development of solutions to remediate and remove PFAS from the environment. This includes ‘the development and application of thermal technology to destroy PFAS compounds’, as well as ‘SourceZone, Ventia’s unique PFAS removal process’.⁶
- 8.7 Ventia described SourceZone as a permanent and complete solution to PFAS soil contamination. This type of technology is colloquially known as ‘soil washing’.

SourceZone treatment at RAAF Base Edinburgh

- 8.8 Since 2018, Ventia has worked with the Department of Defence to trial their SourceZone technology at scale. This trial took place at RAAF Base Edinburgh in South Australia. While acknowledging that ‘all remediation solutions have their place, depending on the challenges and objectives of each individual project’, Ventia’s focus has been on ‘technologies that treat the high-concentration source areas.’⁷ This is based on the fact that ‘up to 90 or 99 per cent of the PFAS mass can remain in soil source areas decades after being deposited’ and that the ‘small amounts of PFAS that continue to leach

³ Ventia Utility Services, *About us*, <https://www.ventia.com/page/about-us>, viewed 17 December 2021.

⁴ Mr Ian Brookman, General Manager, Strategy and Development, Environmental Services, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 1.

⁵ Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 1.

⁶ Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 1.

⁷ Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 2.

from these source areas can cause significant issues in groundwater and surface water'.⁸

- 8.9 Ventia described that technologies focused on the remediation of high-concentration source areas are more cost-effective than alternatives and that 'by removing the ongoing source of PFAS, you are addressing the source, pathway and receptor model. As a result, the source of the PFAS problem can now be dealt with and not left for future generations to fix.'⁹
- 8.10 According to Ventia, SourceZone is 'markedly different from traditional soil washing, and permanently removes up to 99 per cent of PFAS contamination from soil'.¹⁰ The process involves:
- excavation and stockpiling of soil from the contaminated soil source area;
 - sampling and testing of the stockpiled soil to assess PFAS levels;
 - feeding of contaminated soil into SourceZone using an excavator or loader;
 - soil is transported via a conveyor to the first wet process within SourceZone;
 - soil is sprayed with a wash solution to start the process of removing PFAS;
 - soil is then exposed to many individual processes, depending on the size and density of the soil particles, to enhance desorption of PFAS;
 - washed soil is then dried and stored in bunkers for further sampling and testing;
 - following confirmation of results, the soil is collected by an excavator or loader and reused as backfill within the excavation; [and]
 - finally, the wash solution is cleaned to be reused again to wash further soil.¹¹
- 8.11 With regard to communities affected by PFAS contamination, Ventia noted the industry is 'very focused on bringing solutions to bear to those challenges faced by those communities' and that Australia is 'probably leading the world in many regards with our approaches' to PFAS management.¹²

⁸ Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 2.

⁹ Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 2.

¹⁰ Ventia Utility Services Pty Ltd, *Submission 24*, p. 7.

¹¹ Ventia Utility Services Pty Ltd, *Submission 24*, p. 8.

¹² Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 11.

Work of Emerging Compounds Treatment Technologies

- 8.12 Emerging Compounds Treatment Technologies (ECT2) advised that it was founded in the United States of America, and that it began researching and developing methods to remove PFAS from water in 2015. In 2017, the company established their first treatment system at RAAF Base Williamtown.¹³
- 8.13 As of December 2020, ECT2 has 'treated over four billion litres of contaminated water in Australia alone, removing an estimated 35 kilograms of PFAS from the environment.'¹⁴ The treatment of this affected water has 'generated a total of 46 tonnes of waste that has had to be disposed of to landfill or thermal destruction, which equates to 0.0025 per cent of waste per litre of water treated.'¹⁵

Water treatment at Defence bases

- 8.14 As at 30 July 2020, ECT2 operated the following water treatment systems for the Department of Defence:
- Williamtown Fire Training Area PFAS source area remediation;
 - Williamtown Southern Area PFAS plume control;
 - Williamtown Moors Drain stormwater treatment for PFAS removal;
 - Williamtown Regeneration Plant that services regenerable ion exchange resin vessels from the three Williamtown sites;
 - Oakey Former Fire Station PFAS mass removal;
 - Tindal Fire Training Area PFAS source area remediation;
 - Tindal Fire Station Area PFAS mass removal; [and]
 - Tindal Regeneration Plant services regenerable ion exchange resin vessels from the two Tindal sites.¹⁶

- 8.15 Following a detailed environmental investigation at RAAF Base Williamtown, the Department of Defence identified the former fire training

¹³ Mr Carl Sueli, General Manager, Australia, Emerging Compounds Treatment Technologies (ECT2), *Committee Hansard*, Canberra, 7 December 2020, p. 2.

¹⁴ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 3.

¹⁵ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 3.

¹⁶ Emerging Compounds Treatment Technologies (ECT2), *Submission 21*, p. 6.

area as a key source area for PFAS contamination.¹⁷ ECT2 were engaged to build a water treatment plant, which began operation in July 2018.

- 8.16 To treat PFAS-contaminated water, ECT2 uses an ion exchange treatment solution, which is a 'regenerable medium' that can be reused.¹⁸ Ion exchange resins were selected following laboratory tests which 'identified that certain ion exchange resins had the highest PFAS removal capacities'.¹⁹ The system at RAAF Base Williamtown utilises three water treatment plants, with a total capacity of 30 litres per second.²⁰
- 8.17 Throughout its inquiries into PFAS contamination and remediation, the Committee has received evidence from members of the local community on the impact of PFAS-contaminated water flowing from RAAF Base Williamtown. It was therefore important to hear from ECT2 that their contract with the Department of Defence was 'focused on an off-base plume' of PFAS contaminated water and that, despite some challenges with landholder agreements, there is a treatment plant at RAAF Base Williamtown 'that is treating water from the boundary of the property'.²¹
- 8.18 Since 2017, ECT2 has also been operating a water treatment plan at the former fire station at the Army Aviation Centre in Oakey. This plant is 'treating contaminated groundwater and reinjecting the treated water back into the aquifer to remove PFAS from the environment'.²² ECT2 advised Oakey water treatment plant also uses a regenerable resin system, and has 'has treated over 122 million litres of PFAS contaminated water, while only generating 800kg of waste'.²³
- 8.19 ECT2 detailed that its treatment process enables the company to 'effectively superload that PFAS concentrate down to very small volumes' resulting in minimised amounts of waste. The waste produced by the treatment process

¹⁷ Department of Defence, *PFAS Investigation and Management Program, RAAF Base Williamtown*, <https://defence.gov.au/Environment/PFAS/Williamtown/managementactivities.asp>, viewed 12 January 2022.

¹⁸ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 6.

¹⁹ ECT2, *Submission 21*, p. 3.

²⁰ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 6.

²¹ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 6.

²² Department of Defence, *PFAS Investigation and Management Program, RAAF Base Williamtown*, <https://defence.gov.au/environment/pfas/oakey/managementactivities.asp>, viewed 12 January 2022.

²³ ECT2, *Submission 21*, p. 9.

is assessed, and any hazardous waste is sent to a facility in Melbourne for thermal destruction²⁴, which requires temperatures of between 900 and 1,100 degrees centigrade.²⁵

- 8.20 ECT2 also outlined efficiency improvements it had made to its technology at RAAF Base Williamtown. The waste produced by this system has reduced from one per cent per litre of water treated, to 0.1 per cent.²⁶
- 8.21 While discussing improvements to PFAS remediation at sites using ‘pump and treat’ technologies, ECT2 stated that ‘beyond the development of new treatment technologies, the best opportunities to improve remediation ... are to proactively assess and manage the site hydrogeology to ensure the most is made of every well installed and litre pumped.’²⁷ This may include adding more wells where PFAS concentrations are highest, evaluating ways to enhance groundwater extraction, and testing the addition of infiltration galleries, recharge fields or recharge trenches to increase PFAS removal rates.²⁸

Work of Synergy Resource Management

- 8.22 Synergy Resource Management (Synergy) is an Australian company specialising in civil construction, demolition and environmental contamination remediation. This includes a ‘a very large focus on research and development in remediation and treatment technologies’.²⁹ As at December 2020, Synergy has treated ‘over three billion litres of PFAS contaminated water.’³⁰
- 8.23 In 2015, following an approach from the Department of Defence, Synergy established a large-scale water treatment plant at RAAF Base Williamtown. The Committee heard Synergy has also established water treatment systems

²⁴ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 8.

²⁵ Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 8.

²⁶ Mr Reardon, Chief Executive Officer, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 11.

²⁷ ECT2, *Submission 21*, p. 9.

²⁸ ECT2, *Submission 21*, p. 9.

²⁹ Mr Andrew Reardon, Chief Executive Officer, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 3.

³⁰ Ms Chloe Smith, Water Treatment Performance Specialist, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

at other Defence sites, including Jervis Bay, HMAS *Cerberus*, and RAAF Base Tindal, where Synergy ‘treated highly contaminated [Aqueous Film Forming Foam] wash water that was produced from testing the fire suppression system.’³¹

PFAS treatment at RAAF Base Williamtown

8.24 The first water treatment plant built by Synergy at RAAF Base Williamtown operated for three years and ‘was a combination of anion exchange ... and activated carbon’.³² This ‘blend of two technologies’ was ‘an Australian-first high-flow-rate system to treat PFAS and the other co-contaminants on site’ and treated approximately 1.8 billion litres of PFAS-contaminated water.³³ Over its operating life, the Synergy plant at RAAF Base Williamtown removed over 14 kilograms of PFAS from the environment.³⁴

8.25 Synergy highlighted the lessons learnt operating the treatment plant at RAAF Base Williamtown:

When treating construction and environmental water that have high levels of solids, organics and tannins an emphasis is placed on the importance of pre-treatment. This includes powdered activated carbon injection and settlement prior to the specialised media filtration downstream to optimise the filtration use, ensuring longevity and lessening the need to change the media out.³⁵

Lake Cochran water treatment technologies

8.26 Synergy was also engaged by the Department of Defence to establish a second water treatment plant at RAAF Base Williamtown. This plant, which is focused on the Lake Cochran outflow, aimed ‘to mitigate the risk of water flowing offsite by both creating freeboard in the lake and reducing the level of PFAS within the lake.’³⁶

8.27 This plant serviced Lake Cochran from 2016 until August 2020, and treated 1.17 billion litres of water.³⁷ In August 2020, it was replaced by a new

³¹ Ms Smith, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

³² Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 3.

³³ Ms Smith, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

³⁴ Ms Smith, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

³⁵ Ms Smith, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

³⁶ Ms Leah Kaslar, Project Manager, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

³⁷ Ms Kaslar, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

‘passive barrier system’ which is intended to ‘passively remove PFAS from the water that moves through that system to reduce both the concentration of PFAS within the lake and the concentration of PFAS moving offsite.’³⁸

- 8.28 Synergy explained the newer passive barrier system is installed ‘in both the incoming drains in Lake Cochran and the outgoing drain’ and includes ‘three passive filtration walls, as well as a weir box system, which is a polishing stage for PFAS removal, and also a geoweb filtration system which is suited to low-lying drains.’³⁹
- 8.29 As one reason for the trial of the new passive system at RAAF Base Williamtown, Synergy stated that the Department of Defence has ‘always wanted to explore through Australian and overseas suppliers improvements to technologies, new technologies, and also lower cost’.⁴⁰ Synergy explained passive treatment of contaminated water ‘is a much lower cost, lower waste and easier to implement and maintain system than active pump and treat water treatment plants.’⁴¹
- 8.30 Synergy advised that the original Lake Cochran water treatment plant cost up to \$500,000 per month to operate. In comparison, the new passive barrier treatment system, while slower, costs ‘around \$20,000 to \$30,000 a month’.⁴²
- 8.31 While discussing their engagement by the Department of Defence to address PFAS contamination at Lake Cochran, Synergy noted that their system was required to ‘treat the water that was leaving that lake’ and did not extend to work to address ‘anything in terms of stopping the groundwater from entering the lake or any sort of modifications to the lake itself.’⁴³ Mr Reardon, Chief Executive Officer at Synergy, noted contractors are:

... usually given a scope of work developed by Defence and their consultants. We don't make the decisions on whether to treat onsite or offsite. We're not part of that decision-making process. We're contractors who come in and are told, 'This is the scope. This is what we want you to do,' and then we use our

³⁸ Ms Kaslar, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

³⁹ Ms Kaslar, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 4.

⁴⁰ Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 5.

⁴¹ Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 5.

⁴² Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, pp. 4-5.

⁴³ Ms Kaslar, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 7.

smarts to design and develop technologies around that specific area or zone of influence.⁴⁴

Reflections on the PFAS National Environmental Management Plan (NEMP)

8.32 As discussed in the previous two progress reports and in Chapter 4, the Committee has received evidence about the Australian Government's process for revising the PFAS National Environmental Management Plan (NEMP). Version 2 of the PFAS NEMP was published in May 2020.⁴⁵

8.33 When queried on the PFAS NEMP and the interface between federal, state and territory governments, Ventia stated 'having national guidance is helpful and it's definitely heading in the right direction.'⁴⁶ Mr Grimson, PFAS Manager, Ventia was also positive about the process for the next iteration of the NEMP, noting:

The engagement moving to a NEMP 3.0 has been really good. They're communicating well and bringing up issues at the back of the NEMP 2.0. They raise a number of issues that'll be fixed in 3.0, and I think they're all relevant and worthy to be in there.⁴⁷

8.34 However, Ventia described the challenges faced in the management of PFAS contamination, due to coordination issues across federal, state and territory governments. Ventia advised 'there is landfill guidance in the NEMP at a national level, but [Ventia is] not seeing that adopted in the various states, at least from a practical level.'⁴⁸

8.35 Mr Andrew Reardon, the Chief Executive Officer of Synergy Resource Management offered a similar view regarding the management of PFAS waste, stating:

⁴⁴ Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 7.

⁴⁵ Australian Government PFAS Taskforce, *PFAS National Environmental Management Plan – version 2.0 published*, 5 May 2020, <https://www.pfas.gov.au/news/pfas-national-environmental-management-plan-version-20-published>, viewed 25 January 2022.

⁴⁶ Mr Charles Grimson, PFAS Manager, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 9.

⁴⁷ Mr Grimson, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 9.

⁴⁸ Mr Grimson, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 10.

My personal experience is that it's still very disjointed across all the states and territories in this country. We've worked in every one of them except for Western Australia. There are different perceptions of what you should treat water and soil to on site and there's not consensus across states and territories. We hope that the new NEMP will help with that regard to actually help contractors execute the works.⁴⁹

- 8.36 All three companies agreed on the need for nationally consistent PFAS regulation and standards. Synergy advised that, in terms of acceptable PFAS levels:

In Australia, even with what we've seen with NEMP 2.0, it could depend on one person or a couple of people at a regulatory level who might decide to go higher or lower.⁵⁰

- 8.37 ECT2 cautioned about the potential for projects to 'get bogged down with the regulation'.⁵¹ Mr Carl Sueli, ECT2's General Manager in Australia, argued that very low limits could potentially reduce other remediation opportunities.⁵²

- 8.38 Synergy also highlighted one of the benefits that nationally consistent PFAS standards would bring to the marketplace:

As an industry, we're still evolving, and we just need some support with the regulators to make regulatory data more consistent. It will enable our clients, including Defence, to have a clearer path as to what the remediation objectives should be so that they can go to market and get a good consistent apples-for-apples comparison.⁵³

Reflections on health-based guidance values for PFAS

- 8.39 The Committee also heard from ECT2 on international comparisons with Australia's health-based guidance values for PFAS. The Australian guidelines, recommended by Food Standards Australia New Zealand, are discussed in Chapter 6.

⁴⁹ Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 9.

⁵⁰ Mr Grimson, Ventia Utility Services, *Committee Hansard*, Canberra, 7 December 2020, p. 10.

⁵¹ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 11.

⁵² Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 11.

⁵³ Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 11.

8.40 ECT2 noted that tolerable daily limit guidelines are ‘based on a toxicology focus’ and that ‘each country and even regions within countries have different toxicologists, and they all have different interpretations of the science because it’s far from an exact science’.⁵⁴

8.41 Discussing variations in global intake standards, ECT2 stated:

For example, in the United States we’re seeing some states where these regulations and/or guidelines that are being set are below those seen in Australia, and in other states they’re similar or they’re higher. In Europe the regulations and guidelines vary greatly, as does the interpretation of the toxicology.⁵⁵

8.42 Somewhat in contrast to the identified need for a nationally consistent approach for standards, ECT2 explained that in addition to toxicology standards, environmental and other factors also contribute to how PFAS contamination is managed across the world:

A lot of it depends on the environment local to the country or the region. Is it landlocked or is it predominantly near a marine environment? What are the local culture and habits? What types of food do people eat? Where do they source these foods? How do they use water for recreational activities? So a lot of factors come into the decision-making process, not the least of which is the toxicological interpretation. And political pressure also comes into play—in a big way in some cases.⁵⁶

Need for more research into PFAS remediation

8.43 The Committee heard about the importance of continued research into PFAS remediation technologies. These includes not only the soil- and water-contamination solutions outlined in this chapter, but also further research into other in-situ systems, as well as technologies to safely destroy PFAS.

8.44 In its submission, Ventia acknowledged there ‘are still significant gaps in knowledge in keys areas such as human health toxicology, PFAS behaviour in the environment and remediation of PFAS in soil and water’⁵⁷ and stated:

⁵⁴ Mr Steven Woodard, Senior Vice President of Research and Development, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 9.

⁵⁵ Mr Woodard, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 9.

⁵⁶ Mr Woodard, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 10.

⁵⁷ Ventia Utility Services Pty Ltd, *Submission 24*, p. 13.

Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, p. 13.

This presents many challenges to an industry that is trying to manage and remediate the PFAS problem now before key fundamental knowledge has been developed. To undertake a successful PFAS remediation project therefore a significant focus on research is required.⁵⁸

8.45 Ventia supported two of the projects selected for the Australian Research Council's PFAS Remediation Research Program:

- University of Queensland project, led by Professor Jochen Mueller, on the remediation of PFAS contaminated soil using soil washing and immobilization.
- University of Newcastle, in partnership with Suez and Ventia joint venture, led by Professor's Eric Kennedy and Michael Stockenhuber, on the thermal decomposition of PFAS.⁵⁹

Further information on these research projects is at Chapter 9.

8.46 ECT2 advised it also conducts research into PFAS and other contaminants. The company describes its focus as:

[ECT2] focus solely on water and we limit our focus to remediation of emerging and complex-to-treat contaminants ... The specialised focus means that we are continuously scanning the horizon to identify emerging contaminants of concern and with a view to removing those contaminants from water to protect human health and the environment.⁶⁰

8.47 In its submission to this inquiry, ECT2 stated that PFAS remediation efforts will improve with the development of 'in-situ soil and water treatment, destruction, and immobilisation technologies' and that 'in-situ destruction technologies will provide the greatest return on-investment and greatest liability reduction.'⁶¹

8.48 Synergy also described itself as having a 'large focus on research and development in remediation and treatment technologies'⁶² and has 'environmental scientists, chemists and engineers that work in collaboration

⁵⁸ Ventia Utility Services Pty Ltd, *Submission 24*, p. 8.

Mr Brookman, Ventia Utility Services, *Committee Hansard*, Canberra, p. 13.

⁵⁹ Australian Research Council, [Funding Announcements, Special Research Initiatives 2018 round 1](https://rms.arc.gov.au/RMS/Report/Download/Report/a3f6be6e-33f7-4fb5-98a6-7526aaa184cf/198), <https://rms.arc.gov.au/RMS/Report/Download/Report/a3f6be6e-33f7-4fb5-98a6-7526aaa184cf/198>, viewed 12 January 2021.

⁶⁰ Mr Sueli, ECT2, *Committee Hansard*, Canberra, 7 December 2020, p. 2.

⁶¹ ECT2, *Submission 21*, p. 10.

⁶² Mr Reardon, Synergy Resource Management, *Committee Hansard*, Canberra, 7 December 2020, p. 3.

with the Queensland University of Technology to test and design new remediation techniques and strategies.’⁶³

Concluding comment

- 8.49 Much of the Government’s response to PFAS has been predicated on the precautionary principle: that the lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.
- 8.50 While there are many unknowns about the environmental and human health impacts of PFAS contamination, there are also many unknowns about the ability to fully remove and restore the environment to its original condition.
- 8.51 The Committee notes the innovative approaches that have been trialled at Defence bases. These approaches span from remediation of the soil, wastewater, surface water and groundwater.
- 8.52 The Committee also acknowledges evidence that the development of these remediation technologies benefited from expertise that contracted service providers drew from around the world, and also contributed to the scientific knowledge base on the treatment of PFAS contaminants.
- 8.53 The Committee notes the industry has committed to ongoing research into PFAS remediation, immobilisation and destruction, and that much of this research is being done in partnership with Australian universities.
- 8.54 The Committee considers that these technologies provide optimism that remediation is possible, and encourages further development and experimentation of the science and technology to progress remediation efforts.
- 8.55 The Committee notes the challenges faced by remediation technology operators due to ‘disjointed’ standards. The Committee also heard the positive feedback on the consultation process for NEMP 3.0, and that these concerns may be addressed through the next revision.
- 8.56 The Committee acknowledges evidence that further development and progress in in-situ remediation solutions would benefit from nationally

⁶³ Synergy Resource Management, *Submission 16*, p. 4.

consistent standards, allowing easier comparison of data obtained from various sites.

- 8.57 However, the Committee acknowledges evidence that standards should allow for local factors to be accommodated when assessing the appropriateness of a remediation method.

9. Research on PFAS

- 9.1 The Committee has followed with interest the evolving research on PFAS, including research into its environmental and health impacts, as well as research into PFAS remediation techniques.
- 9.2 The Committee's *first progress report* discussed evidence from the Australian National University (ANU) PFAS Health Study. The Committee's *second progress report* discussed this study, a study by the Queensland Alliance of Environmental Health Sciences Centre at the University of Queensland, and provided an overview of targeted grants issued by the National Health and Medical Research Council (NHMRC).
- 9.3 Between August 2020 and December 2021, the Committee heard from researchers associated with the following institutions:
- Commonwealth Scientific and Industrial Research Organisation (CSIRO),
 - Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE),
 - ANU PFAS Health Study,
 - Macquarie University, and
 - University of Queensland.

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

- 9.4 The CSIRO has been commissioned by the Department of Defence as part of a special research initiative. The Committee heard in Chapter 3 how this special research initiative has informed the Department of Defence's approach to remediation.

- 9.5 CSIRO advised it has a 'broad portfolio of research and technical expertise relevant to PFAS issues'.¹ However, the CSIRO also acknowledged that 'PFAS remains a global issue' and that data about the behaviour of PFAS chemicals in the environment and their treatment 'remains lacking'.² The CSIRO advised that 'resolving all PFAS issues is probably a decadal or multidecadal issue'.³

Focus of PFAS research

- 9.6 The CSIRO stated the focus of their research is on 'the environmental fate and behaviour of PFAS chemicals, as well as their remediation and treatment' including pathways for exposure.⁴ The CSIRO's work does not include the potential impact to human health.⁵
- 9.7 Dr Paul Bertsch, Science Director, Land and Water, CSIRO, informed the Committee that the organisation is currently working to 'ensure better measurement, prediction, risk definition and risk mitigation'.⁶ This includes engaging with 'a range of international agencies' to ensure Australia remains at the forefront of PFAS research and understanding.⁷
- 9.8 The CSIRO stated it has advanced research and development 'on PFAS distribution in the environment and mobility to soils and groundwater as well as surface water'.⁸ The Committee heard that CSIRO research also includes PFAS 'remediation technologies and site management scenarios'.⁹
- 9.9 The CSIRO advised that its research has resulted in important findings for Australian-specific challenges in terms of understanding how PFAS compounds move through the environment.¹⁰

¹ Dr Paul Bertsch, Science Director, Land and Water, Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Committee Hansard*, Canberra, 30 November 2020, p. 1.

² Dr Bertsch, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 1.

³ Dr Gregory Davis, Chief Research Scientist, Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Committee Hansard*, Canberra, 30 November 2020, p. 2.

⁴ Dr Bertsch, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 1.

⁵ Dr Bertsch, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 1.

⁶ Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 2.

⁷ Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 2.

⁸ Dr Bertsch, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 1.

⁹ Dr Bertsch, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 1.

¹⁰ Dr Bertsch, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 2.

Work with the Department of Defence

9.10 The CSIRO described their work with the Department of Defence as focused on the ‘the design and relevance of various remediation strategies for Defence bases nationally.’¹¹

9.11 This work includes site sampling, measuring the mobility of the PFAS chemicals through various materials, and then ‘embedding that knowledge into this modelling platform to assess management scenarios for defence bases.’¹²

9.12 The CSIRO explained its work with the Department of Defence includes testing the effectiveness of ‘reducing the leaching of PFAS through soils into the groundwater’ with a view to examining the ‘effect that might have on the extent of subsequent groundwater plumes or ongoing groundwater impacts.’¹³

9.13 Other research with Defence involved reviewing the relative effectiveness of pumping and treating water at the boundaries of PFAS-contaminated sites, compared to pumping and treating the water ‘in the body of sites’.¹⁴

9.14 Based on its research, the CSIRO emphasised the need for multiple technologies and approaches to combat PFAS contamination:

... you need multiple options for treatment for different circumstances. In some environments, the PFAS chemicals will be more readily mobile. In other environments, they'll be more retained in the soil and the groundwater environments, and so you may address them with different approaches. The immobilisation strategy is a very relevant and very useful tool. Complete removal is obviously very attractive, but much more difficult—for example, over long dilute groundwater plumes. You need a number of technologies and approaches, depending on site conditions...¹⁵

¹¹ Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 2.

¹² Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 2.

¹³ Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 2.

¹⁴ Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 2.

¹⁵ Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 3.

PFAS National Environmental Management Plan (NEMP)

- 9.15 The second version of the Australian Government's PFAS National Environmental Management Plan (NEMP) was published in May 2020.¹⁶ The PFAS NEMP is discussed in Chapters 4 and 8 of this report.
- 9.16 The CSIRO advised it has provided 'advice and review to the PFAS assessment criteria for the Department of Agriculture, Water and the Environment' and input to 'the National Chemicals Working Group of the Heads of [Environment Protection Authorities] in Australia and New Zealand as they seek to update the PFAS National Environmental Management Plan.'¹⁷
- 9.17 The CSIRO stated it is trying 'to create a national program around PFAS that links in to state regulators' and that its role as the national science agency is to link and partner with the 'heads of the [Environment Protection Authorities] across the various state agencies and federally.'¹⁸

Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE)

- 9.18 The Cooperative Research Centre (CRC) for Contamination Assessment and Remediation of the Environment (CARE) is an initiative funded through the Australian Government's Cooperative Research Centres Program.
- 9.19 Established in 2005, CRC CARE works collaboratively with 29 partner organisation and conducted research which:
- ... focuses entirely on contaminants, be they conventional contaminants or emerging contaminants, to assess risk and, where contaminants pose risk, to develop solutions for environmental contamination problems.¹⁹

¹⁶ Australian Government PFAS Taskforce, *PFAS National Environmental Management Plan – version 2.0 published*, 5 May 2020, <https://www.pfas.gov.au/news/pfas-national-environmental-management-plan-version-20-published>, viewed 25 January 2022.

¹⁷ Dr Bertsch, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, pp. 1-2.

¹⁸ Dr Davis, CSIRO, *Committee Hansard*, Canberra, 30 November 2020, p. 3.

¹⁹ Professor Ravi Naidu, Managing Director and Chief Executive Officer, Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE), *Committee Hansard*, Canberra, 9 November 2020, p. 1.

- 9.20 A PFAS immobilisation technology, matCARE, developed by CRC CARE is discussed in the Committee's *second progress report*.²⁰

Work with the Department of Defence

- 9.21 Professor Ravi Naidu, the Managing Director and Chief Executive Officer, stated that CRC CARE's relationship with the Department of Defence began in 2005. CRC CARE was engaged to 'develop methods for assessing the presence of [PFAS] in the environment and to develop technology for the cleaning up of the environment, both in wastewater and soil.'²¹
- 9.22 Professor Naidu described the Department of Defence as being:
- The very first organisation globally that recognised PFAS, particularly the active ingredients PFOS and PFOA, as being of potential concern, particularly that it could pose risks to the environment and human health.²²
- 9.23 CRC CARE outlined its development of tools to monitor the presence of the active ingredients PFOS and PFOA, as well as soil and wastewater remediation technologies. CRC CARE's PFAS immobilisation technology, matCARE, is discussed in the Committee's *second progress report*.²³
- 9.24 CRC CARE has been engaged by the Department of Defence to remediate PFAS-contaminated wastewater at RAAF Base Edinburgh, RAAF Base Pearce, RAAF Base Townsville and RAAF Base Darwin. Trials of its immobilisation solutions have also been carried out at RAAF Base Richmond (contaminated groundwater) and RAAF Base Darwin (contaminated soil).²⁴
- 9.25 CRC CARE stated that its studies conducted from 2010-2017 demonstrated the long-term stability of its soil immobilisation technology and that PFAS was not released following the remediation work.²⁵

²⁰ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [Inquiry into PFAS remediation in and around Defence bases: Second progress report](#), August 2020, p. 37.

²¹ Professor Naidu, CRC CARE, *Committee Hansard*, Canberra, 9 November 2020, p. 2.

²² Professor Naidu, CRC CARE, *Committee Hansard*, Canberra, 9 November 2020, p. 2.

²³ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [Inquiry into PFAS remediation in and around Defence bases: Second progress report](#), August 2020, p. 37.

²⁴ CRC CARE, *Submission 19*, pp. 3-6.

²⁵ CRC CARE, *Submission 19: 1*, pp. 3.

- 9.26 The Centre also outlined the role it has played in training ‘more than 4,000 environmental practitioners, including those environmental managers who work for Defence or who work in private companies here in Australia.’²⁶
- 9.27 In addition to its work with the Department of Defence, CRC CARE was engaged by Airservices Australia to remediate PFAS-contaminated wastewater at Adelaide Airport and Darwin Airport.²⁷ The role of Airservices Australia is discussed in Chapter 5.

ANU PFAS Health Study

- 9.28 The Committee heard from the ANU PFAS Health Study at an early stage of its study on 25 November 2019. This evidence, including discussion of the ANU PFAS Health Study’s systematic literature review, examining the state of PFAS research in 2018, and the focus group study, gathering ‘social and health-related experiences and perceptions from current residents and workers exposed to PFAS in Katherine, Oakey and Williamtown’ was discussed in the Committee’s *first progress report*.²⁸
- 9.29 In December 2016, the Australian Government commissioned the National Centre for Epidemiology and Population Health at the Australian National University (ANU) to conduct an epidemiological study examining the potential health effects resulting from PFAS exposure in the investigation areas of Williamtown, NSW and Oakey, Queensland. Katherine in the Northern Territory was added to the study in May 2018.²⁹
- 9.30 The PFAS Health Study had five main components, which were conducted over two phases:
- Phase I - Systematic Literature Review
 - Phase I - Study Protocols for Phase II
 - Phase II – Focus Groups Study
 - Phase II – Cross-sectional Survey and Blood Serum Study

²⁶ Professor Naidu, CRC CARE, *Committee Hansard*, Canberra, 9 November 2020, p. 2.

²⁷ Professor Naidu, CRC CARE, *Committee Hansard*, Canberra, 9 November 2020, p. 3; CRC CARE, *Submission 19*, p. 4.

²⁸ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), [*Inquiry into PFAS remediation in and around Defence bases: First report*](#), December 2019.

²⁹ Australian National University (ANU), *PFAS Health Study Component One: Oakey, Williamtown and Katherine Focus Groups Study Report*, February 2019, p. 8, https://rsph.anu.edu.au/files/FINAL%20PFAS%20Health%20Study%20Focus%20Groups%20Report%20February%202019_3_0.pdf, viewed 8 December 2021.

▪ Phase II – Data Linkage Study³⁰

- 9.31 The ANU PFAS Health Study reported its final results in December 2021. The Committee previously heard from the PFAS Health Study at an early stage of its study on 25 November 2019. This evidence, including discussion of the ANU PFAS Health Study’s systematic literature review, examining the state of PFAS research in 2018, and the focus group study, gathering ‘social and health-related experiences and perceptions from current residents and workers exposed to PFAS in Katherine, Oakey and Williamtown’ was discussed in the Committee’s *first progress report*.³¹
- 9.32 Following the publication of its final results, the Committee heard again from the ANU PFAS Health Study on 15 December 2021. The findings discussed at this hearing included the results of Cross-sectional Survey, Blood Serum Study and the Data Linkage Study.
- 9.33 The Committee understands that letters with the results of biomarker testing were sent to participants in Katherine, Oakey and Williamtown. The Committee also understands that the PFAS Health Study team and the Department of Health held a webinar with participants on the results of the study on 9 December 2021.

Blood Serum Study

- 9.34 The Blood Serum Study tested blood specimens of people living or working in an area contaminated with PFAS and compared them to people not living in those areas. The study began in November 2016.³²
- 9.35 The study examined the blood PFAS levels, biochemical markers of health and exposure to PFAS in 2,587 people living or working in Katherine, Oakey and Williamtown. These were compared with 702 people living in Alice Springs in the Northern Territory, Dalby in Queensland, and Kiama and Shellharbour New South Wales.³³

³⁰ ANU, Research School of Population and Health, *PFAS Health Study*, <https://rsph.anu.edu.au/research/projects/pfas-health-study>, viewed 12 January 2021.

³¹ Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT), *Inquiry into PFAS remediation in and around Defence bases: First report*, December 2019.

³² ANU, Research School of Population and Health, *PFAS Health Study*, <https://rsph.anu.edu.au/research/projects/pfas-health-study>, viewed 12 January 2021.

³³ ANU PFAS Health Study, *PFAS Health Study: overall summary*, December 2021, p. 4. [https://rsph.anu.edu.au/files/PFAS%20Health%20Study%20Overall%20Summary Final Dec2021.pdf](https://rsph.anu.edu.au/files/PFAS%20Health%20Study%20Overall%20Summary%20Final%20Dec2021.pdf), viewed 4 February 2022.

- 9.36 The PFAS Health Study conducted a survey of participants to understand the blood test results, along with health effects and other concerns.³⁴ Professor Martyn Kirk, Principal Investigator of the PFAS Health Study, advised the Committee the purpose of this survey was ‘to identify whether people had poorer self-reported health and also their level of psychological distress’.³⁵
- 9.37 The study detected PFOS, PFHxS and PFOA in the blood serum samples of more than 80 per cent of participants from exposed and comparison communities. Average blood serum concentrations of PFOS and PFHxS (the main types of PFAS in firefighting foam) were higher in residents and workers of PFAS Management Areas than in residents of comparison communities. The study did not observe a similar result for PFOA.³⁶
- 9.38 The study also found that certain groups within exposed communities were more likely to have elevated PFAS levels:
- PFAS concentrations were higher in older participants and in males. In Oakey and Williamstown, serum PFOS and PFHxS concentrations were also higher in participants who lived in a section of the PFAS Management Area located closer to the military base...³⁷
- 9.39 The study identified several risk factors for a resident of an exposed community having an elevated PFOS or PFHxS concentration. These include:
- consuming bore water or certain locally grown foods at least weekly
 - length of residence in an exposed community
 - occupational exposure to firefighting foams.³⁸

³⁴ ANU, Research School of Population and Health, *Cross Sectional Survey and Blood Serum Study Summary*, <https://rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-cross-sectional-survey-blood-serum-study-summary.pdf>, p.1., viewed 12 January 2021.

³⁵ Professor Martyn Kirk, NHMRC Fellow, Australian National University (ANU), *Committee Hansard*, Canberra, 15 December 2021, p. 1.

³⁶ ANU PFAS Health Study, *PFAS Health Study: overall summary*, December 2021, p. 3.

³⁷ Smurthwaite, K. et al, *PFAS Health Study Component two: Blood serum study of PFAS exposure, related risk factors and biochemical markers of health*, ANU, Canberra, December 2021, p. ix, <https://rsph.anu.edu.au/files/PFAS%20Health%20Study%20Blood%20Serum%20Study%20report%20Dec2021.pdf>, viewed 4 February 2022.

³⁸ Smurthwaite, K. et al, *PFAS Health Study Component two: Blood serum study of PFAS exposure, related risk factors and biochemical markers of health*, ANU, Canberra, December 2021, pp. ix-x.

- 9.40 In terms of links between elevated PFAS levels and adverse health outcomes, the study identified elevated cholesterol concentrations as the ‘most commonly observed ‘abnormality’ among participants from the exposed communities’³⁹:

A higher concentration of PFAS in blood serum was associated with elevated blood cholesterol levels in participants from Williamstown and uric acid levels (a marker of kidney function) in participants from Williamstown and Katherine.⁴⁰

- 9.41 While emphasising the limitations of the study, given the self-selecting nature of the participants in PFAS-affected communities, and the ‘point-in-time’ nature of the samples collected, the study did not observe any other significant links to adverse health outcomes.⁴¹

Cross-sectional Survey

- 9.42 The Cross-sectional Survey investigated the exposure history, physical health, and mental health of 917 people living or working in Katherine, Oakey and Williamstown, and 801 people living in the three comparison communities of Alice Springs, Dalby, and Kiama and Shellharbour. The survey compared ‘the prevalence of self-reported physical and mental health outcomes between exposed and comparison communities’. It also examined associations between self-reported health outcomes and blood serum levels of PFAS.⁴²
- 9.43 The survey asked people in the exposed and comparison communities about:
- their demographic details,
 - where they had lived and worked,
 - whether they had ever been diagnosed with any of 32 health conditions, and

³⁹ Smurthwaite, K. et al, *PFAS Health Study Component two: Blood serum study of PFAS exposure, related risk factors and biochemical markers of health*, ANU, Canberra, December 2021, p. x.

⁴⁰ ANU PFAS Health Study, *PFAS Health Study: overall summary*, December 2021, p. 6.

⁴¹ Smurthwaite, K. et al, *PFAS Health Study Component two: Blood serum study of PFAS exposure, related risk factors and biochemical markers of health*, ANU, Canberra, December 2021, p. x.

⁴² ANU, Research School of Population and Health, *PFAS Health Study*, <https://rsph.anu.edu.au/research/projects/pfas-health-study>, viewed 12 January 2021.

- the state of their mental health.⁴³

9.44 The survey also asked people in exposed communities about their health concerns and use of healthcare related to the PFAS contamination.⁴⁴

9.45 The main findings of the survey were:

- People who lived or worked in PFAS Management Areas were more likely to self-report various health outcomes than participants from comparison communities. Participation in the survey was voluntary, however, so survey findings may not accurately reflect the experience of the whole community.
- Participants from PFAS Management Areas reported higher levels of psychological distress than participants in comparison communities.
- PFAS concentrations in blood serum were largely not associated with a higher prevalence of self-reported health outcomes, nor were associations consistently observed across the three exposed communities.⁴⁵

9.46 With regard to comparisons between the exposed communities and comparison communities, the results of the survey showed that:

- People in Katherine were more likely to report cancer (especially breast cancer) and liver disease (especially fatty liver disease) than people in Alice Springs.
- People in Williamtown were more likely to report rheumatoid arthritis, hypercholesterolaemia (high cholesterol), type II diabetes, and problems with fertility compared to people in Kiama and Shellharbour.
- In Oakey and Dalby, the numbers of people surveyed were too small to make reliable comparisons.⁴⁶

9.47 The study also found that people living in PFAS-affected communities reported much higher levels of mental distress. Again, certain cohorts within

⁴³ Lazarevic, N. et al, *PFAS Health Study Component three: Cross-sectional survey of self-reported physical and mental health outcomes and associations with blood serum PFAS*, ANU, Canberra, December 2021, p. vi, https://rsph.anu.edu.au/files/PFAS%20Health%20Study%20Cross-sectional%20Survey%20Report_Dec2021.pdf, viewed 4 February 2022.

⁴⁴ Lazarevic, N. et al, *PFAS Health Study Component three: Cross-sectional survey of self-reported physical and mental health outcomes and associations with blood serum PFAS*, ANU, Canberra, December 2021, p. vi.

⁴⁵ ANU, Research School of Population and Health, *PFAS Health Study*, <https://rsph.anu.edu.au/research/projects/pfas-health-study>, viewed 12 January 2021.

⁴⁶ Lazarevic, N. et al, *PFAS Health Study Component three: Cross-sectional survey of self-reported physical and mental health outcomes and associations with blood serum PFAS* ANU, Canberra, December 2021, p. vi.

exposed communities were more likely to experience mental distress as a result of PFAS exposure:

People who worked with firefighting foams containing PFAS and people who used bore water on their properties reported higher levels of worry and concern than people who did not.⁴⁷

- 9.48 The findings on the mental health of residents living in PFAS-affected communities echoes the concerns raised with the Committee throughout its inquiries:

One in three people reported being 'very' or 'extremely' concerned about their health and one in five people had serious concerns about their mental health. People surveyed in these communities also reported concerns about their finances, the stigma of living in exposed communities, and uncertainty about the future.⁴⁸

- 9.49 Professor Kirk noted that mental distress has been consistently observed in communities exposed to environmental contamination events:

When you look at communities that have had environmental contamination and have been put in a situation they are not in control of, you see overt psychological distress. It's definitely something we've seen before, and it's experienced by communities that have these environmental contamination events.⁴⁹

- 9.50 The PFAS Health Study researchers again stressed that participants in the Cross-sectional Survey were not randomly sampled, and that the results may therefore represent the experiences of people who were more concerned with PFAS exposure, and not the experiences of all residents of affected communities.

- 9.51 Noting this caveat, overall the study found 'that people with higher PFAS levels were not more likely to report most diseases'.⁵⁰ This finding appears

⁴⁷ Lazarevic, N. et al, *PFAS Health Study Component three: Cross-sectional survey of self-reported physical and mental health outcomes and associations with blood serum PFAS* ANU, Canberra, December 2021, p. vi.

⁴⁸ Lazarevic, N. et al, *PFAS Health Study Component three: Cross-sectional survey of self-reported physical and mental health outcomes and associations with blood serum PFAS*, ANU, Canberra, December 2021, p. vii.

⁴⁹ Professor Kirk, ANU, *Committee Hansard*, Canberra, 15 December 2021, p. 8.

⁵⁰ Lazarevic, N. et al, *PFAS Health Study Component three: Cross-sectional survey of self-reported physical and mental health outcomes and associations with blood serum PFAS*, ANU, Canberra, December 2021, p. vi.

broadly consistent with the results of the Blood Serum Study and the Data Linkage Study.

Data Linkage Study

- 9.52 The Data Linkage Study used historical health records collected since 1984 to examine whether rates of adverse health outcomes were higher among people who had lived Katherine, Oakey and Williamstown, than among people who had lived in the comparison areas.⁵¹
- 9.53 Professor Kirk, Principal Investigator of the PFAS Health Study, advised that the Data Linkage Study comprised three separate studies.⁵² These studies examined a total of 48 health outcomes:
- The first study investigated maternal and infant (perinatal) health outcomes (15 outcomes),
 - The second study examined childhood development (6 outcomes), and
 - The third study investigated cancer (23 outcomes) and death from specific causes (4 outcomes).⁵³

The childhood development study used repeated surveys to examine whether children in affected areas had higher rates of poor health outcomes.⁵⁴

- 9.54 Dr Nina Lazarevic, a Research Fellow at the National Centre of Epidemiology and Population Health at the ANU, described the Data Linkage Study, which used a large dataset of '35 or so years of historical records', as a 'more reliable analysis' of adverse health outcomes such as cancer than the Cross-sectional Survey.⁵⁵
- 9.55 Over the three separate studies, for most of the health outcomes that were examined, the researchers did not conclude that rates of adverse health

⁵¹ Associate Professor Rosemary Korda, Senior Research Fellow, ANU, *Committee Hansard*, Canberra, 15 December 2021, p. 3.

⁵² Professor Kirk, ANU, *Committee Hansard*, Canberra, 15 December 2021, p. 1.

⁵³ Law, HD. et al, *PFAS Health Study Component four: Data linkage study of health outcomes associated with living in PFAS exposure areas*, ANU, Canberra, December 2021, p. iv, https://rsph.anu.edu.au/files/PFAS%20Health%20Study%20Data%20Linkage%20Study%20Report_7Dec2021.pdf, viewed 4 February 2022.

⁵⁴ Professor Kirk, ANU, *Committee Hansard*, Canberra, 15 December 2021, p. 1.

⁵⁵ Dr Nina Lazarevic, Research Fellow, National Centre of Epidemiology and Population Health at the ANU, *Committee Hansard*, Canberra, 15 December 2021, p. 2.

outcomes were higher in the PFAS-affected towns than the comparison areas.⁵⁶

- 9.56 Several health outcomes did, however, show at higher rates in a particular PFAS-affected community, but this was not observed in the other two affected towns. In Katherine, the evidence showed higher rates of prostate cancer. In Oakey, the researchers observed higher rates of stillbirth, laryngeal cancer, as well as developmental vulnerabilities in physical health and wellbeing, and communication skills and general knowledge. In Williamtown, there were higher rates of postpartum haemorrhage, pregnancy-induced hypertension, kidney cancer and lung cancer.⁵⁷
- 9.57 In presenting these findings, the research team emphasised the study's design limitations. These included an inability to fully account for risk factors such as smoking or family medical history, or for the impact of a person's socioeconomic background.⁵⁸
- 9.58 Despite these limitations, the researchers ultimately concluded that they could not find a conclusive, causative link between PFAS and the examined adverse health outcomes. The study also found that, while there was evidence of higher rates of some adverse health outcomes in PFAS-affected communities, 'the evidence suggesting that this was due to living in these areas was limited'.⁵⁹

Macquarie University

- 9.59 Macquarie University was commissioned by the United Firefighters Union and Fire Rescue Victoria to study a possible medical intervention for reducing PFAS levels, as mentioned in Chapter 4. The Committee heard from Macquarie University on 31 August 2020, and on 3 September 2021.
- 9.60 The study is a health intervention that:

⁵⁶ Law H.D. et al, *PFAS Health Study Component four: Data linkage study of health outcomes associated with living in PFAS exposure areas*, ANU, Canberra, December 2021, p. iv.

⁵⁷ Law H.D. et al, *PFAS Health Study Component four: Data linkage study of health outcomes associated with living in PFAS exposure areas*, ANU, Canberra, December 2021, p. iv.

⁵⁸ Law H.D. et al, *PFAS Health Study Component four: Data linkage study of health outcomes associated with living in PFAS exposure areas*, ANU, Canberra, December 2021, p. iv; Associate Professor Rosemary Korda, Senior Research Fellow, ANU, *Committee Hansard*, Canberra, 15 December 2021, pp. 3-4.

⁵⁹ Law H.D. et al, *PFAS Health Study Component four: Data linkage study of health outcomes associated with living in PFAS exposure areas*, ANU, Canberra, December 2021, p. iv.

- hypothesises that the reduction of serum PFAS levels via blood and plasma donation may be a mechanism to lower the body burden of these persistent compounds, which may reduce potential future health impacts, and
- aims to determine if regular blood donation (either whole blood or plasma donation) will be effective in reducing circulating serum PFAS levels.⁶⁰

9.61 In the study, 285 firefighters were randomized into three separate groups. One group received no intervention, one group was asked to donate plasma every six weeks, and one group was asked to donate blood every 12 weeks.⁶¹

9.62 The Committee heard that the focus of the study was:

... on two particular PFAS chemicals: PFOS and PFHxS, although we did look at a large panel of 28 PFAS chemicals in total. But we chose those as the primary endpoint because previous research had shown that they are the chemicals which tend to have the higher levels. We also looked at other PFAS chemicals and at other health markers: blood count, biochemistry, biofunction and lipids.⁶²

Results of the study

9.63 Dr Gasiorowski of Macquarie University stated that the study showed regular blood and plasma donation is ‘effective at reducing blood PFAS levels’. PFOS levels in participants who did not donate blood or plasma over the course of the trial showed ‘minimal change in PFOS levels’ and ‘actually saw a slight increase in [PFHxS] levels over time’.⁶³

9.64 This was compared to the blood donation group, which experienced a reduction in PFOS levels of approximately 10 per cent, and stable PFHxS levels. The plasma donation group saw ‘a much greater drop in the PFOS levels of about 30 per cent’ and a similar 30 per cent reduction of PFHxS levels.⁶⁴

⁶⁰ Macquarie University, *PFAS clinical study*, <https://www.mq.edu.au/about/about-the-university/our-faculties/medicine-and-health-sciences/departments-and-centres/departments-of-clinical-medicine/pfas-clinical-study>, viewed 12 January 2022.

⁶¹ Dr Robin Gasiorowski, Senior Lecturer, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 15.

⁶² Dr Gasiorowski, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 15.

⁶³ Dr Gasiorowski, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 15.

⁶⁴ Dr Gasiorowski, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 15.

- 9.65 While cautioning that the ultimate impact of these findings to people's health remains unknown, the Macquarie University researchers emphasised that this study shows that 'we can actually do something for people with elevated blood PFAS concentrations.'⁶⁵
- 9.66 Importantly, the Committee heard that the study demonstrated 'the biggest changes were in those with the highest [PFAS] levels', noting that 'these are the people for whom there might be the greatest urgency to intervene.'⁶⁶
- 9.67 Mr Tisbury of Fire Rescue Victoria advised that many firefighters were ineligible to participate in the study. This was due to a range of factors, including blood donation within three months of the commencement of the study, whether firefighters were taking certain medications, or if they had contracted certain diseases. As a result, many of the 'most highly exposed firefighters' and 'older firefighters' were not able to participate.⁶⁷
- 9.68 The Committee heard that following the presentation of the results of the study, there are firefighters 'who want to go and have their blood or plasma removed right now' but that there are not necessarily interventions options, such as blood donation, available to them. As a response to this, Dr Gasiorowski called for a mechanism for people with high PFAS levels to receive the identified interventions.⁶⁸
- 9.69 Professor Mueller of the University of Queensland agreed with the need to offer these interventions of people with high PFAS levels, stating:

I think the frustration in the communities and for these people is because they lose control, and loss of control is really bad for you. In a strange way, if you allow people to give blood and have a way to reduce their own level it means they can actually do something to gain the control back. That is mentally important. It's not just about what it does to the PFAS level; it also helps people to deal with the problem they are in. So I'm really supportive of the idea. I've brought it up for many years that bloodletting should be at least considered as an option for helping people dealing with it. We think it's low risk to donate blood, so why not allow people to do that? It doesn't sound expensive, considering how big the PFAS problem is.⁶⁹

⁶⁵ Dr Gasiorowski, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 16.

⁶⁶ Dr Gasiorowski, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 20.

⁶⁷ Mr Michael Tisbury, Assistant Chief Fire Officer, Fire Rescue Victoria, *Committee Hansard*, Canberra, 3 September 2021, p. 15.

⁶⁸ Dr Gasiorowski, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 20.

⁶⁹ Professor Jochen Mueller, private capacity, *Committee Hansard*, Canberra, 3 September 2021, p. 22.

- 9.70 In terms of future research, Dr Gasiorowski noted the importance of examining the health outcomes for those who regularly donate blood or plasma, and advised that ‘funding to do more longitudinal studies on this group or other groups to see how these interventions perhaps help with their overall health would be extremely useful.’⁷⁰
- 9.71 Professor Mark Taylor echoed these comments, stating that he also sees value in a longitudinal study or further research on the firefighter cohort, in part to better understand if there are any longitudinal adverse health effects of PFAS. Professor Taylor added a further reason for such a study:
- Most states and territories have adopted the presumptive legislation for firefighters, and the diseases associated with PFAS are not included, largely, on that list. So there is some benefit in better understanding what those risks may be so that those illnesses or diseases associated with PFAS could then be added to the presumptive legislation disease list.⁷¹

University of Queensland

- 9.72 The Queensland Alliance of Environmental Health Sciences (QAEHS) Centre at the University of Queensland has undertaken a series of PFAS blood serum studies. The first two studies were commissioned by Airservices Australia, as mentioned in Chapter 5. The third study is the result of a grant by the NHMRC.
- 9.73 The Committee heard from the University of Queensland on 3 September 2021.

Airservices Australia study

- 9.74 The University of Queensland also undertook a study in 2018 to evaluate per- and polyfluoroalkyl substances in the blood serum of Airservices Australia’s current and former staff. This was the second PFAS Exposure Study of Aviation Rescue and Fire Fighting Services staff, following the first study in 2014.
- 9.75 The study of 799 Airservices Australia current and ex-staff aimed:
- to measure the participants’ PFAS blood concentration levels and understand how these levels were linked to ‘work history’;

⁷⁰ Dr Gasiorowski, Macquarie University, *Committee Hansard*, Canberra, 3 September 2021, p. 20.

⁷¹ Professor Mark Taylor, private capacity, *Committee Hansard*, Canberra, 3 September 2021, pp. 22-23.

- to determine how PFAS blood levels change over time and compare these levels and changes to those in the general population;
- to determine whether the PFAS blood levels were associated with any changes in other biochemical measures of health such as cholesterol, liver and kidney tests; [and]
- to provide advice to Airservices Australia on how best to assess and minimise exposure to PFASs.⁷²

9.76 Professor Mueller of the University of Queensland told the Committee that the study made every effort to recruit firefighters who had taken part in the 2014 study.⁷³

9.77 Similar to the results of the earlier study, the second Airservices Australia study showed that ‘only firefighters who really worked before 2005 had elevated levels [of PFAS compounds]’ and that firefighters who began work after 2005 had ‘very normal’ levels of ‘PFOS, perfluorohexane sulfonate and PFOA.’⁷⁴

9.78 The Committee heard the study also showed decreased levels of PFAS in the blood of firefighters who had previously returned high results, suggesting:

... that the intervention or essentially the move from 3M Light Water to other [aqueous film-forming foams] has really discontinued exposure above general population levels.⁷⁵

Exposure control study

9.79 The aim of the QAEHS study is to ‘investigate the changes over time in PFAS concentrations in the blood serum of individuals who are known to have elevated exposures to PFAS.’⁷⁶

9.80 The study commenced in 2020 and individuals from exposed communities in Williamstown, Oakey and Katherine were invited to participate, as were members of exposed occupational groups, such as firefighters.

⁷² University of Queensland, Queensland Alliance of Environmental Health Sciences (QAEHS) Centre, *PFAS Airservices Australia’s current and former staff – results*, <https://qaehs.centre.uq.edu.au/pfas-exposure-control>, viewed 12 January 2022.

⁷³ Professor Jochen Mueller, private capacity, *Committee Hansard*, Canberra, 3 September 2021, p. 16.

⁷⁴ Professor Mueller, private capacity, *Committee Hansard*, Canberra, 3 September 2021, p. 15.

⁷⁵ Professor Mueller, private capacity, *Committee Hansard*, Canberra, 3 September 2021, p. 16.

⁷⁶ University of Queensland, Queensland Alliance of Environmental Health Sciences (QAEHS) Centre, *Assessing effectiveness of PFAS exposure control in exposed communities and firefighters*, <https://qaehs.centre.uq.edu.au/pfas-exposure-control>, viewed 12 January 2022.

- 9.81 Professor Mueller informed the Committee that while PFAS levels in the general population are decreasing, no studies at the time had shown if exposure in PFAS-affected communities was also decreasing.⁷⁷
- 9.82 The Committee heard the study has recruited 450 people, including 300 from affected communities, who had returned elevated levels of PFAS in the ANU PFAS Health Study or other previous studies.⁷⁸
- 9.83 On 21 December 2021, participants were sent the PFAS results for their first blood sample.⁷⁹ No results have been published to date.

Concluding comment

- 9.84 The Committee is pleased to see the range of research being undertaken in relation to PFAS, both in terms of its environmental impact and its effect on human health.
- 9.85 While much about PFAS remains unknown, the Committee has heard evidence of the real progress that has been made, especially in the last decade, to clarify our understanding about many aspects of PFAS.
- 9.86 The Committee acknowledges the important research that has been done in Australia, by the CSIRO, by bodies such as CRC CARE, by Australian universities, and by industry partners. This research has been undertaken in a spirit of cooperation, with a view to furthering our collective understanding and capability.
- 9.87 The Committee notes that the studies conducted by universities were undertaken with a commitment to community engagement. This approach has provided a level of comfort and assurance to communities.
- 9.88 The Committee also acknowledges evidence it heard from researchers and industry partners about the positive approach of the Department of Defence to trialling PFAS remediation technologies and solutions.
- 9.89 The Committee welcomes the results of the ANU PFAS Health Study. While the study observed evidence of higher levels of mental distress among residents of PFAS-affected communities, it did not otherwise show evidence

⁷⁷ Professor Mueller, private capacity, *Committee Hansard*, Canberra, 3 September 2021, p. 16.

⁷⁸ Professor Mueller, private capacity, *Committee Hansard*, Canberra, 3 September 2021, p. 17.

⁷⁹ University of Queensland, Queensland Alliance of Environmental Health Sciences (QAEHS) Centre, *Assessing effectiveness of PFAS exposure control in exposed communities and firefighters*, <https://qaehs.centre.uq.edu.au/pfas-exposure-control>, viewed 12 January 2022.

of significant adverse health outcomes for those people with elevated PFAS levels.

- 9.90 The Committee has had a longstanding concern for the mental health of those affected by PFAS, and acknowledges that, despite the findings of the ANU PFAS Health Study, people will continue to experience mental distress as a result of PFAS contamination. The Committee also understands that people may continue to be concerned about any future effects of PFAS on their health.
- 9.91 The Committee also welcomes results of the Macquarie University study showing that regular blood and plasma donation is effective at reducing blood PFAS levels, and echoes the calls of researchers at Macquarie University and the University of Queensland for a mechanism for people with high PFAS levels to be able to donate or let blood.
- 9.92 The Committee considers it is important that longitudinal studies of firefighters and members of PFAS-affected communities continue to monitor for adverse health effects.

Recommendation 7

- 9.93 The Committee recommends that the Australian Government consider the research, with a view to examining suitable options for a mechanism for people with high levels of PFAS, who are otherwise unable to donate blood or plasma, to make therapeutic donations as an intervention to reduce their levels of PFAS.**

Recommendation 8

- 9.94 The Committee recommends that the Australian Government provide funding for further longitudinal studies on potential adverse health effects for firefighters and members of PFAS-affected communities.**

Senator the Hon David Fawcett

Chair

Joint Standing Committee on Foreign Affairs, Defence and Trade

15 March 2022

Senator Dr Sam McMahon

Chair

PFAS Sub-Committee

15 March 2022

Additional comments from the Australian Greens

- 1.1 The Australian Greens note and give our support to the original drafting of Recommendations 1, 2, 3 and 6, and paragraph 1.23 which were contained in the PFAS Subcommittee's draft report presented to the JSCFADT Committee on 15 March 2022. The amended recommendations in the final report weaken the original position the PFAS Subcommittee agreed on.
- 1.2 The original recommendations, reproduced below, better reflect the PFAS Subcommittee's position on the need to implement *all* of its Recommendations, not just the ones agreed or agreed in principle by the government. These recommendations provide stronger support for communities impacted by PFAS contamination and call for improving engagement with affected communities.

Recommendation 1

1.24 The Committee recommends the Australian Government expedite the implementation of all recommendations made by this Committee in its reports to date.

Recommendation 2

2.49 The Committee recommends the Australian Government improve its engagement, communication and support for the communities affected by PFAS contamination.

Recommendation 3

2.50 The Committee recommends the Australian Government work with the NSW Government to re-establish the community reference group process.

Recommendation 6

7.19 The Committee recommends that the Australian Government accommodate state and territory environment protection authorities wishing to undertake investigations relating to PFAS contamination on or coming off Commonwealth-owned or regulated land.

Paragraph 1.23

1.23 The Committee is disappointed about the delay in the receipt of the Australian Government response to its second progress report. This report was tabled in August 2020, with a response expected to be tabled in the Senate within 3 months of this date. The Australian Government response was received in January 2022. Further, the Committee is concerned that the Australian Government has not committed to meaningful and timely action on the recommendations made by the Committee.

Senator Mehreen Faruqi
Australian Greens Senator for New South Wales

A. Submissions and Exhibits

- 1 Department of Defence
 - 1.1 Supplementary to submission 1
 - 1.2 Supplementary to submission 1
 - 1.3 Supplementary to submission 1
- 2 Department of Agriculture, Water and the Environment
 - 2.1 Supplementary to submission 2
- 3 Hawkesbury Environment Network (HEN)
 - Attachment 1
 - Attachment 2
 - Attachment 3
 - Attachment 4
- 4 Fullerton Cove Residents Action Group
- 5 Department of Health
- 6 National Health and Medical Research Council (NHMRC)
- 7 Queensland Department of Environment and Science
- 8 Coalition against PFAS
- 9 Associate Professor Deborah Glass
- 10 Professor Cheng Fang
- 11 Metropolitan Fire Brigade (MFB) and Macquarie University PFAS Clinical Trial
 - 11.1 Supplementary to submission 11

- 12 PFAS communities, risk communication and mental health – ANU & University of Newcastle
- 13 Professor Behdad Moghtaderi - University of Newcastle
- 14 Food Standards Australia New Zealand (FSANZ)
 - 14.1 Supplementary to submission 14
- 15 Plasma Bubble Column Project – University of Sydney
- 16 Synergy Resource Management Pty Limited
 - 16.1 Supplementary to submission 16
 - 16.2 Supplementary to submission 16
- 17 United Firefighters Union Australia (UFUA)
 - 17.1 Supplementary to submission 17
 - Attachment 1
 - Attachment 2
 - Attachment 3
 - Attachment 4
- 18 Dr K Morphet, Assoc Profs K Fielding and A Roiko
- 19 Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
 - 19.1 Supplementary to submission 19
 - Attachment 1
 - Attachment 2
 - Attachment 3
 - Attachment 4
 - Attachment 5
- 20 John Donahoo
 - Attachment 1
 - Attachment 2
 - Attachment 3
 - Attachment 4
 - Attachment 5
- 21 ECT2
- 22 Dr Gerard Kaiko
- 23 Fire Rescue Victoria

- Attachment 1
 - Attachment 2
 - Attachment 3
 - Attachment 4
 - Attachment 5
- 24 Ventia Utility Services Pty Ltd
- 25 Willson Consulting
- 25.1 Supplementary to submission 25
 - Attachment 1
 - Attachment 2
 - Attachment 3
 - Attachment 4
 - Attachment 5
- 26 Queensland Alliance for Environmental Health Sciences, University of Queensland
- 27 Airservices Australia

Exhibits

- 1 ECT2, RAAF Williamtown NSW – Summary of plume condition at former fire training area (PFHxS=PFOA), received 7 December 2020

B. Public Hearings

Monday, 25 November 2019 - Canberra

National Centre for Epidemiology and Population Health, Australian National University (ANU)

- Dr Miranda Harris, Public Health Medicine Registrar, Australian National University
- Professor Martyn Kirk, Principal Investigator, PFAS Health Study, National Epidemiological and Population Health Centre, Australian National University

Monday, 2 December 2019 - Canberra

Department of Defence

- Mr Christopher Birrer, First Assistant Secretary, Infrastructure, Department of Defence
- Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence
- Mr Luke McLeod, Assistant Secretary, PFAS Investigation & Management, Department of Defence

Monday, 10 February 2020 - Canberra

Department of Agriculture, Water and The Environment

- Mr James Tregurtha, First Assistant Secretary
- Mr Anthony McGregor, Assistant Secretary, Chemicals Management Branch
- Dr Sara Broomhall, Director, Chemicals Policy and Advice Section

- Ms Nicola Pawell, Director, PFAS Taskforce, Chemicals Management Branch

Monday, 24 February 2020 - Canberra

Department of Health

- Dr Gary Lum, Principal Medical Advisor, Officer of Health Protection

Monday, 15 June 2020 - Canberra

Food Standards Australia and New Zealand

- Dr Scott Crerar, General Manager Science and Risk Assessment
- Ms Tracy Hambridge, Principal Specialist Dietary Exposure Assessment
- Dr Matthew O'Mullane, Section Manager Standards and Surveillance

Monday, 24 August 2020 - Canberra

United Firefighters Union of Australia

- Mr Michael Tisbury, Delegate

Monday, 31 August 2020 - Canberra

Macquarie University PFAS Clinical Study

- Dr Robin Gasiorowski, Senior Lecturer in Haematology
- Professor Mark Taylor, Academic Chief Investigator, PFAS Clinical Trial Project

Monday, 9 November 2020 - Canberra

Cooperative Research Centre for Contamination Assessment and Remediation of the Environment— CRC CARE

- Professor Ravi Naidu, Managing Director and Chief Executive Officer

Monday, 30 November 2020 - Canberra

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

- Dr Gregory Davis, Chief Research Scientist
- Dr Paul Bertsch, Science Director, Land and Water

Monday, 7 December 2020 - Canberra*Synergy Resource Management Pty Ltd*

- Mr Andrew Reardon, Chief Executive Officer
- Ms Leah Kaslar, Project Manager
- Ms Chloe Smith, Water Treatment Performance Specialist

Emerging Compounds Treatment Technologies - ECT2

- Mr Andrew (Andy) Bishop, Senior Vice President of Product Development
- Mr Steven Woodard, Senior Vice President of Research and Development
- Mr Carl Sueli, General Manager, Australia

Ventia Utility Services Pty Ltd

- Mr Ian Brookman, General Manager Strategy and Development—Environmental Services
- Mr Charles Grimson, PFAS Manager

Friday, 3 September 2021 - Canberra*Department of Defence*

- Ms Celia Perkins, Deputy Secretary Estate and Infrastructure Group
- Mr Daniel Fankhauser, First Assistant Secretary Infrastructure Division
- Ms Alison Clifton, Assistant Secretary Environment and Engineering Branch

Department of Infrastructure, Transport, Regional Development and Communications

- Ms Diane Brown, A/g Deputy Secretary
- Ms Clare Chapple, Assistant Secretary, Regional Policy and Programs, Domestic Aviation and Reform
- Ms Victoria Wright, Director

Airservices Australia

- Dr Claire Marrison, Chief Safety and Risk Officer
- Mr Peter Curran, Chief Customer Experience and Strategy Officer

Researchers associated with Macquarie University PFAS study

- Dr Robin Gasiorowski, Senior Lecturer, Macquarie University
- Professor Mark Patrick Taylor, Private capacity

- Mr Michael Tisbury, Assistant Chief Fire Officer, Fire Rescue Victoria

Researchers associated with University of Queensland PFAS study

- Professor Jochen Mueller, Private capacity
- Dr Jennifer Braeunig, Private capacity
- Ms Shelby Marrington, Private capacity

Friday, 22 October 2021 - Canberra

Department of Agriculture, Water and the Environment (PFAS Taskforce)

- Ms Kate Lynch, First Assistant Secretary, Environment Protection Division
- Ms Nicola Powell, Acting Assistant Secretary, Chemicals Management Branch, Environment Protection Division
- Ms Jessica Phillips, Acting Director, Chemicals Policy & International Section, Chemicals Management Branch, Environment Protection Division
- Ms Sara Broomhall, Director, Contaminants, Standards & Advice Section, Chemicals Management Branch, Environment Protection Division

Department of Health

- Dr Gary Lum, Principal Medical Adviser, Office of Health Protection and Response
- Ms Lara Purdy, Assistant Secretary, Environmental Health and Health Protection Policy Branch
- Ms Maryka Gaudio, Director, Environmental Health and Climate Change Policy Section
- Mr Mark Roddam, First Assistant Secretary, Mental Health Division

Food Standards Australia New Zealand

- Mrs Christel Leemhuis, Acting General Manager Science and Risk Assessment Branch
- Dr Matt O'Mullane, Director, Standards and Surveillance
- Ms Tracy Hambridge, Principal Specialist Dietary Exposure Assessment

Friday, 26 November 2021 - Canberra*Community member*

- Ms Dianne Priddle, Private capacity

Community member

- Mr Lindsay Clout, Private capacity

Community member

- Mrs Janice Robinson, Private capacity

Department of Defence

- Mr Daniel Fankhauser, First Assistant Secretary Infrastructure
- Ms Celia Perkins, Deputy Secretary Estate and Infrastructure Division
- Ms Alison Clifton, Assistant Secretary Environment and Engineering Branch

Department of Environment, Parks and Water Security, Northern Territory

- Ms Amy Dennison, Executive Director, Environmental Regulation Branch, Environment Division
- Mr Peter Vassel, Director, Environmental Operations, Environmental Regulation Branch, Environment Division

Wednesday, 15 December 2021 - Canberra*The Australian National University (ANU) PFAS Health Study*

- Professor Martyn Kirk, NHMRC Fellow
- Associate Professor Rosemary Korda, Senior Research Fellow
- Dr Nina Lazarevic, Research Fellow
- Ms Hsei Di Law, Data Analyst
- Ms Kayla Smurthwaite, Postdoctoral Research Fellow