The Parliament of the Commonwealth of Australia

Inquiry into PFAS remediation in and around Defence bases

First report

PFAS Sub-committee

House of Representatives Joint Standing Committee on Foreign Affairs, Defence and Trade

December 2019 Canberra

ISBN 978-1-76092-062-3 (Printed version)

ISBN 978-1-76092-063-0 (HTML version)

Contents

Foreword

This is the first report of the Joint Standing Committee of Foreign Affairs, Defence and Trade's inquiry into the Department of Defence's National PFAS Investigation and Management Program. The PFAS Sub-committee will undertake this review to provide ongoing scrutiny of Defence's site investigation and remediation processes over the course of the 46th Parliament.

PFAS remediation is a complex exercise involving many partners. It is also conducted within a sphere of change—research and regulatory reform continue as the nature and potential impacts of PFAS are becoming better understood. In response to this, treatment methods are also being advanced—from sophisticated soil and water cleaning technologies to developments in pyrolytics, which uses heat to break down complex chemical substances like PFAS into safer simpler substances.

This report presents evidence from the Australian National University's PFAS Health Study at the National Centre for Epidemiology and Population Health and from Executive managers of the Department of Defence's National Program. It was recorded in the final sitting weeks of 2019 and provides key information for review as the inquiry unfolds.

The ANU's PFAS Health Study provides an important background and introduction to consideration of Defence's work. The Department of Health commissioned the ANU to build a basis for longitudinal analysis of PFAS related health impacts in Williamtown, Oakey and Katherine.

The Sub-committee wanted greater clarity on this important research into the health implications of PFAS exposure as Defence's massive program of work at 28 sites around Australia proceeds.

The Committee learned that the ANU's study, which is in Phase II of evidence taking and analysis, is unique in a number of ways. The Cross-sectional Survey and Blood Serum Study now in progress uses blood samples from the Government's voluntary survey in these communities. It also broadens the spectrum of analysis to cover people who have lived temporarily in those

communities, and compares these results with people who live in three unaffected locations.

The Survey component, moreover, is not just about blood analysis; it considers the whole spectrum of health effects on people living with PFAS contamination. This includes mental health. This evidence highlighted the importance of keeping a steady eye on the broader psycho-social impacts of living with PFAS contamination, and of recognising that these effects can be different for communities, and groups in communities, at different stages of the remediation process.

In this regard, the frank and detailed evidence given by Department of Defence representatives on its remediation work, and its ongoing engagement with affected communities in that process was welcome. Defence reported a rigorous program of innovation in the trialling and monitoring of methods to reduce PFAS levels in soil and water and to disrupt its penetration into new areas.

The Committee was advised that the remediation methods used are now increasingly effective. Super-concentrated PFAS contaminants can, for example, be extracted by cleaning and efficiently stored. However, there were questions about safety and also about the regulation of pyrolytic innovation, for example.

The Department also referred to 137 community engagements and to available online information, which showed its commitment to keeping people informed about its work. However, the Committee also noted that the management of information, in addition to its volume and detail, is very important—the things communities need to know, including frank advice on land status after investigation or remediation, health research and environmental reforms, should be easy to access from the Defence web-site.

Given the importance and scale of the remediation work the Sub-committee also considered coverage in the Department's annual report should include actual investment, contract arrangements and progress reports for the National Program. More detail was called for in written Questions on Notice within a tight time frame but these were not received in time for inclusion in this report. The Sub-committee anticipates this information will be forthcoming in the near future.

The Committee's inquiry will look for a high level of commitment from Government in this regard and will be monitoring for reforms which will improve the safety and coordination of remediation work in the coming year.

Hon Dr John McVeigh MP
Chair
PFAS Sub-committee

Members of the Committee

Members of the Joint Standing Committee on Foreign Affairs, Defence and Trade

Chair Senator the Hon David Fawcett

Deputy Chair Mr Nick Champion MP

Members

Hon Kevin Andrews MP

Mr Vince Connelly MP

Hon Damian Drum MP

Mr Patrick Gorman MP

Mr Andrew Hastie MP

Mr Chris Hayes MP

Mr Julian Hill MP

Mr Peter Khalil MP

Hon Dr John McVeigh MP

Mr Ted O'Brien MP

Mr Tony Pasin MP

Hon Keith Pitt MP

Mr Dave Sharma MP

Hon Warren Snowdon MP

Senator the Hon Eric Abetz

Senator Tim Ayres

Senator Mehreen Faruqi

Senator the Hon Concetta Fierravanti-Wells

Senator Kimberley Kitching

Senator Malarndirri McCarthy

Senator Sam McMahon

Senator Deborah O'Neill

Senator Tony Sheldon

Ms Meryl Swanson MP

Mr Phillip Thompson OAM MP

Ms Maria Vamvakinou MP

Mr Ross Vasta MP

Mr Andrew Wallace MP

Former members of the Joint Standing Committee on Foreign Affairs, Defence and Trade

Senator the Hon Arthur Sinodinos AO *(22.7.19 – 11.11.19)*

Membership of the Sub-committee

Members of the PFAS Sub-committee

Chair	Hon Dr John McVeigh MP
Deputy Chair	Ms Meryl Swanson MP
Members	Mr Nick Champion MP *(ex officio)*
	Senator Mehreen Faruqi
	Senator the Hon David Fawcett *(ex officio)*
	Senator Kimberley Kitching
	Senator Malarndirri McCarthy
	Senator Sam McMahon
	Ms Maria Vamvakinou MP

Former members of the PFAS Sub-committee

Senator the Hon Arthur Sinodinos AO *(22.7.19 – 11.11.19)*

Committee Secretariat

Secretary	Mr James Rees *(till 11.10.19)*
	Ms Sonya Fladun *(from 13.10.19)*
	Ms Julia Morris *(from 28.10.19)*
Senior Research Officer	Ms Loes Slattery
Administrative Officers	Mrs Dorota Cooley
	Ms Renee Dennis

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 PFAS Sub-committee will undertake the inquiry which 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.

List of abbreviations

ACT	Australian Capital Territory
ARC	Australian Research Council
AFFF	Aqueous Film Forming Foams
ANU	Australian National University
COAG	Council of Australian Governments
CRC CARE	Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
ECT2	Emerging Compounds Treatment Technologies
EFSA	European Food Safety Authority
EPA	Environmental Protection Agency
FSANZ	Food Standards Australia New Zealand
NEMP	National Environmental Management Plan
NSW	New South Wales
NT	Northern Territory
PFAS	Per-and poly-fluoroalkyl substances
PFHxS	Perfluorohexane sulfonate
PFOA	Perfluoro-octanoic acid

PFOS	Perfluorooctane sulfonate
PMAP	PFAS Management Area Plan
Qld	Queensland
RAAF	Royal Australian Air Force
TWI	Tolerable weekly intakes
VBTP	Voluntary Blood Testing Program

1

Introduction

1.1 On 18 September 2019 the Joint Standing Committee on Foreign Affairs, Defence and Trade (JSCFADT) initiated an inquiry into the 'National PFAS Investigation and Management Program', as reported in Department of Defence Annual Report 2017–18, and referred the matter to the PFAS Sub-committee.[1]

1.2 The Sub-committee's review follows the JSCFADT inquiry last Parliament into the management of per- and poly-fluoroalkyl substances (PFAS) contamination in and around Defence bases. The inquiry report, presented in December 2018, made nine recommendations to Government to better coordinate the national PFAS response, to improve monitoring of health impacts, and to compensate and better inform affected communities.[2]

1.3 With the Government response to that report is still in preparation,[3] the PFAS Sub-committee determined to closely monitor and regularly report on Defence's progress in PFAS remediation activities, and to continue that review over the duration of the 46th Parliament.

---

1 *Department of Defence Annual Report 2017–18,* p. 129.

2 The PFAS Sub-committee made nine recommendations in consideration of evidence taken covering coordination of appropriate responses to PFAS contamination, re-evaluation of health advice, ongoing blood monitoring and review, the Department of Defence's site remediation efforts, its engagement with communities, compensation considerations and approaches to national coordination and regulation. See Joint Standing Committee on Foreign Affairs, Defence and Trade Committee (JSCFADT), Inquiry into the management of per- and poly-fluoroalkyl substances (PFAS) contamination in and around Defence bases, December 2019.

3 *President's Report to the Senate on the Status of Government Responses to Parliamentary Committee Reports*, as at 30 June 2019, p. 8.

PFAS in humans and the environment

1.4 PFAS are a group of manufactured chemicals which have been used extensively in a range of consumer products and industrial processes since the 1950s. There are over 4 000 types of PFAS substances which have been used extensively where extremely low surface energy or surface tension and/or durable water and oil-repellence is needed, from non-stick cooking ware and glossy packaging to pesticides and stain repellents.[4]

1.5 Over the last decade, concerns have been raised about use of the long chain PFAS chemicals Perfluorooctane sulfonate (PFOS), Perfluoro-octanoic acid, (PFOA) and Perfluorohexane sulfonate (PFHxS) in particular. These chemicals accumulate in the bodies of humans and wildlife, are bio-accumulative in food chains, and are very mobile and persistent in the environment.[5]

1.6 Exposure to these chemicals in domestic products has meant that most Australians have a low level of PFAS in their blood. Concerns arise when concentrations in the environment, and hence exposure to these chemicals, are high.[6] While the toxicity of PFAS in humans is poorly understood, research into the impacts of high level exposure indicates that:

> People in communities with high levels of PFOS and/or PFOA in their drinking water have been found to have serum PFOA and PFOS concentrations above those reported for the general population. PFAS may be passed to infants through breastmilk, and prenatal exposure to PFAS can occur through the placenta.
>
> PFOA and PFOS bind to serum proteins, especially albumin, with high affinity. PFAS are absorbed into the blood stream via digestive and gas-exchange pathways. Generally, PFAS tend to accumulate in tissues with a large blood supply, including the liver, kidneys and lungs.[7]

1.7 Aqueous Film Forming Foams, or AFFFs containing PFOS and PFOA as active ingredients, were once used extensively at Defence bases due to their effectiveness in fighting liquid fuel fires. PFHxS is also commonly

4 OECD, What are PFASS and what are they used for?', Portal on Per and Poly Fluorinated Chemicals www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/aboutpfass/ viewed 12 December 2019.

5 OECD, 'A risk for the environment, health and safety', Portal on Per and Poly Fluorinated Chemicals, viewed 5 December 2019.

6 Department of Defence, 'What are PFAS?' www.defence.gov.au/Environment/PFAS/PFAS.asp viewed 5 December 2019.

7 Research sited in M Kirk, K Todd, B Armstrong et al, *The PFAS Health Study Cross-sectional Survey and Blood Serum Study Research Protocol,* Australian National University (ANU) Report Prepared for the Department of Health, 20 March 2019, pp. 10–11, quote at p. 10.

found in the legacy firefighting foam as an impurity in the manufacturing process.[8]

1.8 While Defence has phased out the use of PFAS, these chemicals are concentrated in and around Defence locations and other places where firefighting foams were used for training to control fuel or chemical fires.[9] Defence is now conducting extensive remediation work to remove PFAS contaminated soil and water from affected Defence locations and to contain its spread in the surrounding environment.

Conduct of the inquiry

1.9 The Defence Annual Report 2017–18 advised that, under the National PFAS Investigation and Management Program, environmental investigations for PFAS contamination were conducted at 23 Defence sites during the reporting period. The 2018–19 Annual Report updated this to 28 sites.[10]

1.10 In undertaking this review the Sub-committee aims to ensure that the public, and particularly people in affected communities, are fully informed about the progress of Defence remediation work under the National Program—what is being done, when, and how effective it is.

1.11 The Committee's program of review will involve direct questioning of key agencies and experts in a schedule of public hearings during the period of review. The objective will be to gain technical updates and other operational information about the remediation program in the context of evolving regulatory reform and ongoing research into the health and environmental impacts of PFAS contamination. Reports will be made regularly to Parliament on matters under consideration, with community comment invited as the investigation proceeds.

1.12 The first public hearings for the inquiry were held in Canberra with representatives from the Australian National University's National Centre for Epidemiology and Population Health on 25 November 2019 and with the Department of Defence on 2 December 2019.

1.13 Transcripts of evidence are available on the inquiry website at www.aph.gov.au/Parliamentary_Business/Committees/Joint/Foreign_Affairs_Defence_and_Trade/PFASRemediation

8 Department of Defence, 'What are PFAS?', viewed 5 December 2019.

9 Department of Defence, 'What are PFAS?', viewed 5 December 2019.

10 *Department of Defence Annual Report 2018–19*, p. 138.

This report

1.14 The first report of the Committee's inquiry assesses 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. It provides a brief overview of the main issues, with some background and contextual information, before considering verbatim evidence taken at the recent public hearings.

1.15 Information from this report will be further examined over the course of the inquiry, when responsible agencies and expert witnesses will be called, with invitations also made for written responses from key community stakeholders.

1.16 This report records evidence provided by Professor Martyn Kirk, Principal Investigator of the PFAS Health Study, Dr Miranda Harris, Public Health Registrar, ANU, and from Executive Managers of the Department of Defence's National PFAS Investigation and Management Program.

1.17 Written Questions on Notice were also issued to the Department of Defence, with answers requested within a very tight time frame for inclusion in this report. The responses were not furnished in time for inclusion.

1.18 The report is structured as follows:

- Chapter 1— Purpose, conduct and report of the inquiry
- Chapter 2—The health impacts of PFAS—an overview and progress report of summary findings and issues identified to date by experts at the ANU's PFAS Health Study
- Chapter 3—PFAS remediation — status report—an overview and update from the Department of Defence on its PFAS investigation and management work, and related issues and developments.

Appendices

- Appendix A—Public hearings
- Appendix B—PFAS Health Study—Focus Group Study Poster and Cross-sectional Survey research questions

2

Health impacts of PFAS contamination

2.1 The PFAS Sub-committee of the 45th Parliament investigated the adequacy of the Government's health advice on the potential health impacts of PFAS contamination on staff and residents in and around defence bases. An underpinning concern among medical experts, advocates and community groups at that time was that the Government's health advice underplayed the potential risks of high PFAS ingestion and exposure, as indicated in some overseas studies.[1]

2.2 The Department of Health, while supporting a review of existing health advice, suggested that 'very long term studies with large numbers' would be needed to confirm clinical results.[2] It commissioned the National Centre for Epidemiology and Population Health at the Australian National University (ANU) to conduct meta-analysis of existing research and assess the potential health effects of PFAS exposure in the local context in an epidemiological study.[3] The data will provide evidence for longitudinal analysis of the possible health impacts of PFAS. [4]

2.3 This chapter provides an update on work being done under the study, with some contextual discussion of the initiation of the project, its goals and progress to date.

---

1 Evidence to Inquiry into management of PFAS contamination in and around Defence bases (hereafter, Inquiry into PFAS contamination around Defence bases), PFAS Professor Brendan Murphy, Chief Medical Officer, Department of Health, *Committee Hansard,* Canberra, 14 September 2018, pp. 38, 39.

2 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, pp. 38, 39.

3 Australian Government, *Submission* 64, JSCFADT, Inquiry into PFAS contamination around Defence bases, p. 15.

4 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, p. 39.

About the PFAS Health Study

2.4 The PFAS Health Study is an epidemiological study which will investigate whether disease rates are higher in three communities exposed to PFAS through environmental contamination compared with communities with a background exposure to PFAS.[5]

2.5 The study involves evaluation of blood sampling from people who have lived or worked in the areas surrounding RAAF Base Williamtown, the Army Aviation Centre Oakey and the RAAF Base Tindal.[6] It utilises blood gathered by the Government in a free testing program for people with possible exposure to PFAS at/or near the Investigation Areas.[7]

2.6 The Study has five main components which are being progressed in two phases. Each component of the study aims to inform the following components:

- *Phase I*—a ***Systematic literature review*** of 221 separate scientific publications on the health effects of PFAS prior to February 2017. The review report was released in May 2018. It supported the association between two PFAS chemicals and elevated blood cholesterol with limited evidence on a range of other factors. Study protocols were also developed for evaluation phase II.

- *Phase II*—a ***Health impact evaluation*** examines whether rates of diseases, including cancers, potentially associated with PFAS exposure are higher among people who have lived in the investigation areas, compared to the general population. This phase utilises the blood samples taken from the Government's Voluntary Blood Testing program for PFAS supplemented by additional sampling, a survey and data analysis.[8]

---

5 Australian National University (ANU), FAQs PFAS Health Study webpage, PFAS Health Study Fact Sheet rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-fact-sheet.pdf viewed 6 December 2019.

6 See Department of Health, Per- and Poly-Fluoroalkyl Substances (PFAS)—An Epidemiological Study www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas-epi-study.htm viewed 5 December 2019.

7 On permission by the donor. Department of Health, Voluntary Blood Testing Program www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas-blood-testing.htm viewed 5 December 2019.

8 Information at ANU, Research School of Population Health, ANU College of Health and Medicine, PFAS Health Study rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-2 viewed 6 December 2019.

2.7 There are four components in Phase II of the study:

- *Component 1*—the ***Focus group study*** heard concerns from individuals living around Williamtown, Oakey and Katherine in relation to exposure to PFAS and their health.[9]
- *Components 2 and 3* – a ***Cross-sectional survey*** and ***Blood serum study*** are to be undertaken in combination.
  - ⇒ The cross-sectional survey will investigate the exposure and risk factors for high serum PFAS levels (including factors such as age, sex, location and duration of residence in the area, water source used) and any common symptoms, signs and diagnosed illnesses in investigation areas associated with high serum PFAS levels.[10]
  - ⇒ The Blood Serum study will define the serum concentrations of PFAS in people living in PFAS Investigation and Management Areas and compare the levels to those of people in uncontaminated areas.[11]
- *Component 4* – the ***Data linkage study*** will examine whether sex-specific age-adjusted rates of diseases potentially associated with PFAS are higher among people who have lived in the PFAS Investigation and Management Areas, compared to those living outside in the general Australian population.[12]

Phase 1—project initiation and literature view

2.8 As noted previously, the ANU PFAS Health Study was commissioned by the Department of Health to provide evidence for longitudinal analysis of the possible health impacts of PFAS.

2.9 Professor Brendan Murphy, the Chief Medical Officer of Department of Health, told the PFAS Sub-committee of the JSCFADT last parliament:

> To get conclusive evidence of health impacts, if there are any, will take a very long time—and because of the bioaccumulation, I think, very long-term studies with large numbers. If there were very obvious health impacts they would have been detected by

9 The PFAS Focus Group Study Report was released in March 2019, see a link to the report at rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-3 viewed 6 December 2019.

10 ANU PFAS Health Study, viewed 6 December 2019.

11 Research protocols for the study are at: rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-cross-sectional-survey-blood-serum-study-protocol.pdf viewed 5 December 2019.

12 ANU PFAS Health Study, viewed 6 December 2019.

> now. So any health impacts that may be clearly proven will take large studies over a long period of time.
>
> Because the data is weak and inconsistent, we need more data and we need longer follow-up. That's why the ANU study is going to be very important.[13]

2.10 Asked about the ANU's brief for the project during the present inquiry, Professor Martyn Kirk, Principal Investigator for the Health Study, advised that the development of the project methodology was an iterative process:

> In part we were approached by the federal Department of Health because we'd had experience in similar environmental issues {ACT asbestos—Mr Fluffy investigation]. In the first phase… we put together a detailed protocol of how we would approach this problem and that's been published on our website. The way that this is working is very similar to what we have proposed. We've obviously made changes along the way in response to things that we realised weren't going to work or we needed to do differently. We're currently in the process of developing detailed analysis plans for some of the data because it is actually far more complicated than even we realised, as it always is.[14]

2.11 Community input was also encouraged, with the project model further refined with the aid of a community consultation panel. Professor Kirk added:

> We tried to publish all of our methods on the website, and we've been out to community to convey that to them—although it's hard for community members to necessarily engage with study methods, which can be quite dense, but we appreciate their input. We also have a community consultation panel with between two to three people from each community, and they've been incredibly helpful to us just testing what we're doing and telling us whether it makes sense to them.[15]

13 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, pp. 38, 39.

14 Professor Martyn Kirk, Principal Investigator, PFAS Health Study, National Centre for Epidemiology and Population Health, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 6.

15 Professor Kirk, PFAS Health Study, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

Questions about the study protocols

2.12 The Sub-committee asked about the PFAS Health Study's Literature review of 221 overseas studies which had informed the study protocols. Members asked questions about the validation of the data, its screening for bias and, more fundamentally, whether assertions that there are 'no proven links' between high PFAS exposure and health impacts could still be considered sound.[16]

2.13 In regard to the validity of the last claim, Professor Kirk stated:

> I don't think people use that kind of language as much anymore. They might've initially. I see people going the other way as well, which is really saying that there is irrefutable evidence, and I don't believe that either. We tend to think in terms of: there's sufficient evidence for elevated PFAS and elevated cholesterol. That means that there are more studies that show that there's an association than there are that don't. They're of reasonable quality in terms of bias, and then there's a handful more with limited evidence. [17]

2.14 However, it was also the case that research on PFAS was now being produced in a volume that Professor Kirk described as 'astounding'. He noted that since the Health Study's Systematic review, 70 to 100 studies of good quality were being published on PFAS related impacts each year. There were 1 800 investigations of sites being undertaken in the United States and PFAS was now a 'big issue' in European Union and other countries.[18]

2.15 In this context, community concerns about bias in evidence used in the Systematic literature review are relevant. A member reported fears that evidence reviewed in the first phase was not impartial, and especially where studies were sponsored by the chemical industry.[19]

2.16 Professor Kirk affirmed that in public health, it is matter of 'utmost importance…that investigators don't have conflicts of interests or, if they do, they're at least declared'. He went on to explain that in the literature review each study was rated by risk of bias at low, medium or high, based

16 Deputy Chair Ms Meryl Swanson MP, Chair Dr John McVeigh MP, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 3, 7.

17 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

18 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

19 Ms Swanson MP, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

on scoring against a variety of different components. One of these was funding source.[20]

2.17 Professor Kirk confirmed that studies that were conducted on behalf of, or funded by, industry were 'marked as having at least a moderate risk of bias'. However, he also noted that many other studies that were not industry funded were also risk rated for bias:

> In our conclusions we noted where the majority of studies were moderate to high risk of bias. But there's not only bias from a source of funding; there's also bias in the way they conducted the study, and whether the conclusions were robust. Sometimes you've got to do studies even though the risk of bias is reasonably high. Even we suffer from that as well. We'll do studies from time to time where it's not as neat as we would like or as methodologically rigorous, and so we have inherent bias in our studies. A good example is, if we're only surveying one type of person, then we get a certain type of response, compared to if we survey the whole community and do it randomly.[21]

2.18 He concluded that research work in Australia was on track and comparable with that done overseas, and that we are all 'grappling' with the problem of PFAS. [22]

Phase II—progress and review

2.19 The PFAS Health Study site posts monthly progress reports on its website. 2019 milestones for Phase II of the study are documented as follows:

- In March 2019 the *PFAS Focus Groups Study Report* was released.[23]
- In May 2019 Research Protocols and Project plans for Components 2 and 3, the Cross-section survey and Blood serum study, and Component 4, the Data linkage study, were completed and submitted to the Department of Health, and a survey company contracted.

---

20 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

21 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 3–4.

22 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

23 For report results see PFAS Health Study Report Tab at: rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-3 viewed 6 December 2019.

- In July 2019 the Social Research Centre worked with the study team to create final versions of the Cross-sectional survey questionnaire, Data Linkage Study Protocols and Project Plan were approved by Health, and four Ethics applications lodged.
- In October 2019 invitations to participate in the online survey were sent to Voluntary Blood Testing Program participants[24] and to community members who had contacted the Study team. Data analysis plans were drafted for Components 2, 3 and 4 of Phase II.
- An online invitation to those who have lived or worked in the subject communities to take part in the cross-sectional analysis phase was also posted on the ANU PFAS Health Study site. Participants outside of study areas were invited to request access to the survey.[25]

2.20 The ANU has advised that the results of the study components are to be released sequentially. Blood serum study results are to be available in mid 2020, and the data-linkage study results expected by the end of that year.[26]

Component 1—the PFAS focus groups study

2.21 The first component of Phase II of the PFAS Health Study was a series of focus group discussions undertaken between January and August 2018 in Oakey, Williamtown, and Katherine. Further consultations were undertaken in Williamtown, Oakey and Katherine in November and December 2018, and then May 2019, respectively.[27]

2.22 The PFAS Health Study site advises:

> The main aim of this study was to understand participants' views and experiences of PFAS contamination in their local area, with a focus on participants' health concerns. Focus group discussions facilitate discussion of public knowledge, underlying attitudes, perceptions and opinions and are well suited to exploring a range of views on community topics.[28]

---

24 Those blood survey participants who had agreed to take part in the study and had not requested a paper copy.

25 ANU PFAS Health Study, Instructions for participating in the survey at Survey Help rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-5 viewed 12 December 2019.

26 Professor Kirk, PFAS Health Study, ANU, Inquiry into PFAS contamination around Defence bases, 14 September 2018, pp. 14, 16.

27 PFAS Health Study, Study updates rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-4 viewed 6 December 2019.

28 PFAS Health Study Focus Groups Study rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-3 viewed 6 December 2019.

2.23 At the hearing, Professor Kirk commented on the importance of starting in the community with the focus group work to maximise communication, and listening to, diverse groups:

> We did four discussions in Oakey, four discussions in Williamtown and four discussions in Katherine. They amounted to about 111 people, overall. In each of those communities we had one specific focus group for Defence Force personnel and their families, if they wanted to come along to that. We also conducted a further three focus groups in Aboriginal communities in Kalano, Rockhole and Binjari. They were larger, and they had different feedback.[29]

2.24 At the community meetings, the main topics of discussion were physical and mental health concerns, environmental issues and PFAS blood testing, financial concerns, community trust and cohesion, local conditions and exposure pathways, and the way forward.[30] A summary in the Focus Group report stated:

> Participants voiced concerns related to their health and PFAS exposure. Children were considered more vulnerable due to their young age and exposure from growing up in affected areas. Participants were particularly concerned about the onset of cancers and the deterioration of existing health conditions. Another major concern for many participants was the stress and anxiety related to the duration of the PFAS contamination and uncertainty with respect to the long-term impact on health, specifically for their children. In addition to the above concerns, Aboriginal participants were also worried about the health of their children, contamination of river foods and bush tucker, and the overall impacts on country. [31]

2.25 It was notable that the ways in which information was conveyed to different groups was important. A poster produced by the PFAS Study group for Aboriginal communities in Katherine, for example, is in *Appendix B*.

---

29 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 4

30 PFAS Health Study Focus Groups Study, viewed 9 December 2019.

31 C Banwell, T Housen, K Smurthwaite, S Trevenar, L Walker, K Todd, M Rosas [2Ngaigu-Mulu Aboriginal Corporation, Katherine, NT, Australia], M Kirk, *The PFAS Health Study , Component One: Oakey, Williamtown and Katherine Focus Groups Study*, National Centre for Epidemiology and Population Health, Research School of Population Health, ANU, Report Prepared for the Department of Health, February 2019, p. 6.

2.26 In answer to questioning by a Sub-committee member, Professor Kirk confirmed that the overwhelming commonality in the experience of different cohorts in the study was the 'quite immense…depth of feeling and the sense of anxiety' that was afflicting them.[32]

2.27 Dr Miranda Harris, Public Health Medicine Registrar, ANU, explained how the focus group findings had informed the methodology in the next phase of review, the cross-sectional survey:

> The findings from the focus group demonstrated that mental health is an important outcome to be looking at. We have included mental health scales or measures of wellbeing and mental health in our survey that will measure distress and anxiety in particular. We'll also be looking at other health concerns that the community has about exposure to PFAS, as well as concerns that participants have about others' health and concerns about other issues, including finances, stigma and uncertainty about the future.[33]

Components 2 and 3—Cross-sectional survey and blood serum study

2.28 Components 2 and 3 advance the ANU's analysis of the toxicity of PFAS in humans and its possible impacts on their health.

2.29 The research protocol for this study phase states:

> The primary goal of this component of the study will be to measure blood serum concentrations of PFAS in people who have ever lived or worked in the PFAS Investigation and Management Areas of Williamtown, Oakey and Katherine, and compare them to those in an otherwise similar non-exposed, comparison population. In addition, the study will identify the population characteristics and exposure-related factors and characterise the health concerns and health outcomes of people who have ever lived or worked in PFAS Investigation and Management Areas, compare them to an appropriate comparison population and relate them to individually measured blood PFAS concentrations. [34]

32 Senator Mehreen Faruqi to Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 2.

33 Dr Miranda Harris, Public Health Medicine Registrar, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 4.

34 Goals in M Kirk, K Todd, B Armstrong et al, *The PFAS Health Study Cross-sectional Survey and Blood Serum Study Research Protocol*, ANU, Report Prepared for the Department of Health, 20 March 2019, p. 15.

2.30 The study rationale provides the medical context for this assessment:

> There have been a range of proposed mechanisms for possible adverse health effects of PFAS, many of which relate to endocrine disruption potentially affecting male and female reproduction and thyroid function. Human health research into PFAS has focused on: reduced foetal growth and development, decreased fertility and reproductive hormone levels, increased cholesterol levels, immunological effects and cancer.[35]

2.31 The study summary further detailed the research methodology:

> …three comparison towns will be selected and people will be randomly selected to complete the survey and provide a blood sample for PFAS. Invitations to participate in the survey and blood testing will be sent out through the Medicare database in mid-2019 in the comparison towns. All blood samples in the Study will be tested for PFAS, cholesterol and uric acid. The study is aiming to include 3000 people overall; 500 from each of the three affected towns and 1500 from the comparison communities.[36]

2.32 As noted, invitations have now been sent out to participants and notification of the survey and blood study launched online. At hearings, Dr Harris highlighted the broader aims of the Cross-sectional survey:

> In the survey that we have sent out to the affected communities we do ask about 32 self-reported health conditions—10 of which are cancer. We also ask questions using a number of validated scales around mental health to measure levels of distress and anxiety. We're also looking at other concerns that the community might have around stigma, uncertainty and health-seeking behaviours. [37]

2.33 Dr Harris said the survey would also seek to assess the mental health and wellbeing of participants by inviting information about 'health-seeking behaviours' such as visits to the GP or counsellor and whether awareness of PFAS in the area had affected levels of smoking or alcohol consumption.[38] Research questions underpinning the Survey are also at *Appendix B*.

---

35 M Kirk, K Todd, B Armstrong et al, *The PFAS Health Study Cross-sectional Survey and Blood Serum Study Research Protocol*, ANU, Report Prepared for the Department of Health, 20 March 2019, pp. 10-11, quote at p. 10.

36 ANU, The PFAS Health Study: Cross Sectional Survey and Blood Serum Study —[Study Summary] rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-cross-sectional-survey-blood-serum-study-summary.pdf viewed 9 December 2019.

37 Dr Miranda Harris, Public Health Medicine Registrar, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

38 Dr Harris, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 4.

Component 4—Data linkage study

2.34 The data linkage study is the final component and culmination of the PFAS Health Study, and was described by Professor Kirk as 'probably the most important [study phase]', noting too that 'it's also very difficult'. [39]

2.35 Planned for release at the end of 2020, the study will bring together information about individuals across multiple datasets to determine whether 'adverse health outcomes potentially linked with PFAS exposure are more common among people who have lived in areas contaminated with PFAS compared to those who have never lived in those areas'.[40]

2.36 Professor Kirk was asked whether the study might identify PFAS-related immune deficiency as a catalyst to a range of health disorders or diseases, a concern expressed by people in affected communities.[41] He noted that health studies normally seek to identify clusters of similar disease to identify similar causes, however:

> I think the data linkage study will allow us to look at cancer in people who have lived in those areas versus in people who have never lived in those areas. And that is going to be quite different to, maybe, what has been done before, because they've been using broad areas—so it might be postcode level—whereas we are actually going to be looking down at areas that are within an investigation and management design. I think that gives us the best possibility. But there's still a lot to be learnt, and we recognise the concern of the community. We've heard it ourselves.[42]

2.37 Professor Kirk suggested that the PFAS data-linkage study would also be distinguished from other studies in its tracking of a transient population. It would do this by drawing on historical Medicare data and other 'routinely collected' data gathered by hospitals or for Government services.[43]. He advised:

> The Australian Institute of Health and Welfare is linking the data for us, and that involves a number of different datasets but the main national ones are the cancer one [the Australian Cancer Database] and the Australian Early Development Census. And there's another separate one which is looking at perinatal outcomes. Every state and territory has a database where they

39 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 2.

40 ANU, 'Phase II – Data Linkage Study', PFAS Health Study, viewed 9 December 2019.

41 Ms Swanson MP to Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 2–3.

42 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

43 With results only available to researchers.

> record the outcomes and circumstances of births in their jurisdiction, and we're linking that to addresses, so we can look at people who've lived in those areas versus those that didn't.[44]

2.38 The Sub-committee noted that this work may also dovetail with other Federal government funded calls for research into PFAS and health issued earlier this year, and with targeted research done by State governments such as work carried out by the NSW Government on particular cancers around Williamtown.[45]

Effectiveness as a longitudinal assessment

2.39 As noted above, the PFAS Health Study has been commissioned by the Australian Government to produce data that will provide evidence for longitudinal analysis of the possible health impacts of PFAS.[46]

2.40 The Sub-committee wanted to establish whether the information being collated locally in the study would provide an adequate body of evidence for this purpose. A first focus in this regard was the size of the blood sample used in the study. This was based on that taken initially under the Government's Voluntary Blood Testing Program (VBTP), and the current arrangements to expand that sample, whereby the donor would pay to be tested.[47]

2.41 Dr Harris advised that there were around two and half thousand blood samples being used in the current study (under agreement by donors), which was the anticipated number. She also noted that free blood testing had been extended to June this year to increase the sample. Professor Kirk further suggested that the data-linkage component would expand on this evidence base, as it is drawing on Medicare evidence back to 1984.[48]

2.42 A member also raised the possibility of having a second tranche of free blood testing to further verify results and, longer term, to assess the effectiveness of remediation measures.[49]

2.43 Professor Kirk noted that blood testing is expensive, up to $500 per test. Dr Harris pointed out that due to the persistence of PFAS chemicals in the

44 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

45 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 5, 6.

46 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, p. 39.

47 Senator Faruqi, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

48 Dr Harris and Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

49 Ms Swanson MP, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

blood—from two to nine years to halve the levels depending on the chemical, due consideration would be needed on the time frame. Noting these factors—including cost, specificity of the chemicals and half-life variability, they considered that extended blood testing would be a policy decision for Government.[50]

2.44 Professor Kirk could see however some potential utility in extended testing for those people with elevated PFAS blood concentrations, noting:

> … There have been studies overseas where they've done this. A good example is in Sweden. They've used multiple time points. As I said, we haven't really looked at it, but, if we were to, we would go and have a look at the time frames others have used.[51]

2.45 Finally, in answer to questions, Professor Kirk also considered the value of a longitudinal assessment of the mental health issues revealed in the study so far.[52] With longer term impacts not currently being considered, he highlighted the value of the current survey work as 'a snapshot of what mental health is like in each of these three communities at this point in time'. This demonstrates the variation and shows that the feelings and experiences of people in communities change over time.[53]

2.46 The Sub-committee also noted the overall value of the study in its focus in the final phase, as mentioned in the previous section, on the tracking and comparing results of a transient population across the range of total health outcomes. This work, Professors Kirk recalled, reflected the methodology he and Dr Harris had developed for the Mr Fluffy asbestos problem in the Australian Capital Territory:

> We did a study looking at mesothelioma in the ACT, and you don't find any association with living in a Mr Fluffy home, but, when you actually look at people who've moved out of the ACT back to wherever they came from—it's a highly transient population—they might get diagnosed with mesothelioma in Adelaide, and we need to be able to link that back to the time that they spent in Canberra. So that's exactly what we're going to do with the data linkage study. It does take a while, but it's worth taking the effort to try and do it well.[54]

---

50 Dr Harris, and Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

51 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

52 Senator Faruqi, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

53 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

54 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 6.

Clarity on the health question

2.47 In its review, the Sub–committee also canvassed with the PFAS Health Study experts their views on questions which have preoccupied affected communities since the impacts of PFAS contamination were made public.

2.48 As indicated by Professor Kirk, research into the potential health impacts of PFAS has burgeoned after the conclusion of the PFAS Health Study's Systematic literature review, which looked at publications prior to early 2017.

2.49 Since the release of the JSCFADT's 2018 inquiry report, which had recommended a review and refinement of health advice on PFAS, international standards for PFAS intake safety levels, exposure levels and bans on production have been underway.[55]

2.50 In December 2018, for example, the European Food Safety Authority (EFSA) announced major reductions in tolerable weekly intakes (TWI) for PFOS for PFOA.[56] A second draft opinion on the further possible risks to human health from PFAS (other than PFOS and PFOA) would be released following public consultation and frameworks developed for assessing combined exposure to multiple chemicals in the food chain by December 2019.[57]

2.51 Soon after Food Standards Australia New Zealand (FSANZ) judged the results to be 'provisional' pending further review, and stating:

> FSANZ supports current at-site risk management measures by other Commonwealth, state and territory jurisdictions to manage and reduce potential dietary exposure from these chemicals, rather than setting maximum levels (MLs) in the Food Standards Code.[58]

2.52 The Sub-committee wanted to clarify for affected communities this advice, noting some confusion around the relationship between PFAS exposure,

---

55 See Chemicalwatch, *Global Risk and Regulation news,* 'Efsa panel lowers tolerable intakes for PFOS and PFOA', 20 December 2019 chemicalwatch.com/72934/efsa-panel-lowers-tolerable-intakes-for-pfos-and-pfoachemicalwatch.com/72934/efsa-panel-lowers-tolerable-intakes-for-pfos-and-pfoa viewed 12 December 2019.

56 For PFOS to 13 nano grams per kilo (ng/kg) body weight (bw), and for PFOAto 6 ng/kg bw. The previous standard was 150ng/day for PFOS and 1500 ng/day for PFOA. See 'Contaminants update: first of two opinions on PFAS in food', 13 December 2018 www.efsa.europa.eu/en/press/news/181213and *Scientific Opinion* at EFSA Journal, efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2018.5194, viewed 5 December 2019.

57 Formerly September 2019, viewed 5 December 2019.

58 Food Standards ANZ, Perfluorinated compounds, December 2018. www.foodstandards.gov.au/consumer/chemicals/Pages/Perfluorinated-compounds.aspx viewed 12 December 2019.

prohibitions on produce and water intake, and reassurances on the limited proven health impacts of PFAS.[59]

2.53 Professor Kirk explained the current rationale from a health perspective:

> The recommendation is to limit exposure to PFAS, and it really is around two things: uncertainty around their health effects, and, secondly, their persistence in the body. They are unusual, in that they have a long half-life. They're very inert in the environment. And so that's where the concerns arise. From what I've seen in the literature, where people end up with the greatest amount of PFAS in their bodies, it's usually where there's been drinking-water contamination, as opposed to foodstuffs and soils and things like that. That said, the advice is to limit excessive exposure, and, if you're consuming something every day, it makes sense that you should limit that. But there's a background of PFAS in people's homes just through the consumer use of these products.[60]

2.54 In regard to views that the health impact was clear and supported by overseas research, Professor Kirk cautioned (based on experience during the Systematic literature review) that 'the [PFAS] health literature it is incredibly confusing, even for the initiated'.[61]

2.55 At the end of its literature review, the PFAS Health Study had concluded that the majority of studies didn't provide sufficient evidence of a PFAS related health effect, however, there were several studies that did:

> There was sufficient evidence of a positive association of PFOA and PFOS for cholesterol—elevated cholesterol if there was elevated PFOA or PFOS. And then there was a range of different health outcomes where there was more limited evidence—there might have been fewer studies but they still found an association. They included increased uric acid; decreased glomerular filtration rate, which is a marker of kidney disease; chronic kidney disease; kidney cancer; and testicular cancer. And there were two which related to an association with lowered vaccine response to diphtheria and also rubella. That said, where there is limited evidence, there is certainly a need for more studies to understand whether they actually are true health effects.[62]

2.56 Professor Kirk indicated that, against this background, he would not pre-empt the findings of his current review. The PFAS Health Study

59 Senator Faruqi, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

60 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 5–6.

61 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 1.

62 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 1.

would seek evidence on the health effects using a 'couple of different study designs' with controls determined by 'government and communities' together, in the context of other risk assessments and ongoing international reviews.[63]

Conclusion

2.57 In discussion with the PFAS Health Study experts the Sub-committee wished among other things to gauge whether Australia's focus on remediation in the context of current understandings of health impacts is appropriate, and fair, to PFAS affected communities.

2.58 The current review established that, in Professor Kirk's opinion, Australia's position is commensurate with the international experience—'we are grappling', like other countries, with the problem of PFAS.[64]

2.59 The focus of the Sub-committee's inquiry is on Defence's remediation of PFAS related impacts in the environment. It appears that affected community members could remain confused and worried about apparent contradictions in the health advice they receive, the stringent controls on land use and the cautionary advice on many other aspects which affect their quality of life. Meanwhile, as discussed in the next chapter, there are positive results being achieved in remediation while frameworks for environmental regulation of PFAS are being reformed in response to new information.

2.60 The PFAS Health Study Focus Group studies have documented the mental health impacts in different PFAS affected communities. [65] The report also noted discrete differences of need within community groups, by area and demographics. Residents in Katherine, for example, had strong attachment with their river, with Aboriginal people very worried about PFAS impacts on water quality, on bush tucker, hunting and fishing.[66] The ways in which information was conveyed to different groups were thus important, as indicated in the poster reproduced in *Appendix B*.

2.61 In addition to the observations here, the Sub-committee investigated with the study experts whether measures such as a second tranche of blood

63 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 6.

64 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

65 C Banwell, T Housen, K Smurthwaite, S Trevenar, L Walker, K Todd, M Rosas [2Ngaigu-Mulu Aboriginal Corporation, Katherine, NT, Australia], M Kirk, *The PFAS Health Study, Component One: Oakey, Williamtown and Katherine Focus Groups Study*, ANU, Report Prepared for the Department of Health, February 2019, p. 6.

66 *The PFAS Health Study, Component One*, February 2019 p. 19.

testing, proposed in the previous JSCFADT PFAS contamination review, may lend a greater sense of security to individuals tested under the Government's Voluntary blood testing program or by paid testing.

2.62 The Sub-committee noted, however, Professor Kirk and Dr Harris's advice that this may not prove useful for longitudinal analysis unless the research methodology is carefully designed. An example in Sweden was mentioned.

2.63 Matters raised in this chapter will be examined further with responsible Government departments, authorities and experts in the coming year. In particular, the Committee will seek further clarification on the relationship between health advice, food safety and environmental impacts to address apparent concern and confusion in the community.

3

PFAS remediation—status report

3.1 The Department of Defence has described its PFAS Investigation and Management Program as 'possibly the largest program of environmental investigations ever conducted in Australia'.[1]

3.2 Under the Program, the Department of Defence is undertaking environmental investigations in and around 28 Defence sites.[2] The Department has advised the Sub-committee that it does not anticipate that any more sites will need to be investigated.[3]

3.3 This chapter provides a preliminary review of work in progress based on evidence taken from Defence officers during the public hearing in Canberra on 2 December 2019. As noted, answers to Questions on Notice taken at the hearing are yet to be provided.

3.4 Further consideration of the Department's progress in its remediation work, its effectiveness in managing environmental hazards, and its responsiveness to community concerns will be evaluated over the course of the Committee's inquiry.

Site investigation and remediation

3.5 The Department of Defence's environmental investigation of PFAS contaminated Defence sites is conducted in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM) and involves three main steps:

---

1 JSCFADT Inquiry into the management of PFAS contamination in and around Defence bases, Australian Government, *Submission 64*, p. 3.

2 *Department of Defence Annual Report 2018–19*, p. 138.

3 Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 3.

- a Preliminary Site Investigation (PSI);
- a Detailed Site Investigation (DSI); and
- a Human Health and Ecological Risk Assessment (if deemed necessary).[4]

3.6 Once the investigation is completed a PFAS Management Area Plan (PMAP) is tailored to address the specific conditions on the site. [5]

3.7 Current PMAP activities include:

- 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 scientific and technical approaches for future application.[6]

3.8 Defence's PFAS website provides detail on work conducted at each specific site under investigation, including:

- installation of a Soil Treatment plant at RAAF Base Edinburgh;
- operating water treatment plans at Williamtown, Oakey and Katherine;
- provision of bottled at Williamtown, Oakey and Katherine and Bullsbrook, with tanks installed at 87 properties in Katherine;
- funding of town water connections for eligible properties in Williamtown and Oakey; and
- excavation of sediment from open drains at Oakey and RAAF Base Williamtown, replacement of new drain linings and disposure of contaminated material in accordance with EPA guidelines.[7]

4 *Department of Defence Annual Report 2018–19*, p. 138, and see PFAS Investigation Process www.defence.gov.au/Environment/PFAS/InvestigationProcess.asp viewed 5 December 2019.

5 Department of Defence, (all future program references from Defence site) PFAS Investigation Process www.defence.gov.au/Environment/PFAS/InvestigationProcess.asp viewed 5 December 2019.

6 Summary from *Department of Defence Annual Report 2017–18*, p. 192; 2018–19 Annual Report, p. 138.

7 PFAS Investigation and Management Program, Management Activities www.defence.gov.au/Environment/PFAS/ManagementActivities.asp viewed 5 December 2019.

The partners

3.9 The Department of Defence contracts industry partners to provide environmental management services. Contractors on more recent soil and water treatment works include:

- At RAAF Edinburgh
  - ⇒ Enviropacific Services Pty Ltd installed a base water treatment plant to remove PFAS from groundwater beneath the current Fire Training Area conducted by; in operation since mid-August 2019.
  - ⇒ Ventia Utility Services is operating and maintaining a PFAS Soil Treatment Plant to wash 2 500 tonnes of soil, to be reused on site. The plant, delivered from the United Kingdom (UK) commenced work in July 2019, with a trial to be completed by late 2019.[8]
- At Oakey Army Aviation Centre
  - ⇒ Emerging Compounds Treatment Technologies (ECT2) developed a water treatment plant for the former fire station. In operation since September 2017, the plant treats contaminated groundwater and reinjects treated water back into the aquifer.[9]
  - ⇒ OPEC Systems installed and commissioned a commercial scale water treatment plant for the fire training area in first and second quarter of 2019. The plant processes 250 000 litres of PFAS contaminated water per day to drinking water standards.[10]
  - ⇒ Results monitored monthly to September 19 are available on the PFAS management site.
- At Williamtown
  - ⇒ An ECT2 developed water treatment plant is also taking groundwater from a field of 15 extraction bores around the former fire training area at RAAF Base Williamtown. The plant has been operational on site since July 2018.[11]

---

8 ADF Edinburgh Management Activities www.defence.gov.au/Environment/PFAS/Edinburgh/managementactivities.asp viewed 5 December 2019.

9 Oakey Management Activities, Water Assistance, Former Fire Station defence.gov.au/environment/pfas/oakey/managementactivities.asp viewed 5 December 2019.

10 Oakey Management Activities, Water Assistance, Fire Training area and see OPEC Systems, 'PFAS Solutions' www.opecsystems.com/shop/category/pfas-solutions viewed 5 December 2019.

11 ECT2 at www.defence.gov.au/Environment/PFAS/ManagementActivities.asp viewed 5 December 2019.

⇒ Synergy Resource Management developed the Lake Cochran water treatment plant as an interim measure. In Operation since 2017, a long term solution is still being developed.[12]

3.10 Defence also collaborates in studies and trials to improve understanding of PFAS and its management and remediation.[13] Recent research includes:

- The Special Research Initiative: PFAS Remediation Research (Linkage) Program—Australian Research Council (ARC) funding of $4.8 million to manage and remove PFAS from the environment. Applications for round two closed in February 2019.[14]
- Richmond Trial Remediation System—with the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE)— installation of a trial remediation system for PFAS in groundwater, commenced in early October 2019 for completion (two months) and monitoring post installation (six months). Focuses on the fire training area but testing for possible wider application.[15]

The challenge of PFAS

3.11 In 2016, Defence established a national program to investigate the nature and extent of PFAS contamination and assess the associated human health and ecological risks. The program's initial focus was to commence detailed environmental investigations on Defence sites where aqueous, film-forming firefighting foams were used or stored, and to support impacted communities to try and break exposure pathways.[16]

3.12 In evidence to the Sub-committee, the Defence Deputy Secretary, Estate and Infrastructure, Mr Steven Grzeskowiak advised that the Department's understanding of these chemicals and how they interact with the environment has grown significantly since that time:

---

12 Synergy PFAS Treatment synergyresource.com/services/pfas-treatment viewed 5 December 2019.

13 Studies and Trials, PFAS Investigation and Management Program www.defence.gov.au/Environment/PFAS/studiesandtrials.asp viewed 12 December 2019.

14 Applications closed in February 2019, see Australian Government GrantConnect: Linkage Program—Forecast Opportunity View —PFAS www.grants.gov.au/?event=public.FO.show&FOUUID=7F361450-BE46-18B4-7A113D38FA2EA993 viewed 12 December 2019.

15 Department of Defence, Studies and Trials, viewed 12 December 2019.

16 Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 3.

> We know that PFAS chemicals are highly soluble and can migrate significant distances in water. Our investigations have demonstrated that our former and current firefighting training areas and storage areas, where these chemicals were kept, are highly concentrated sources of PFAS. We know that, depending on the nature of the soil at each site, the PFAS are able to migrate through soil and enter groundwater systems. Where the soil is coarse, a sandy type soil, it will more readily enter groundwater systems than at those locations where the soil is fine, or clay based. We know that a significant portion of the mass of PFAS chemicals is still resident in soils at high-concentration areas like source sites. We also know that, when it rains, surface water comes into contact with these source areas and can carry PFAS chemicals away from the areas through drainage networks and off Defence bases.[17]

3.13 On this basis, Defence had focused its remediation efforts on reducing the concentration of PFAS at source areas. As Mr Grzeskowiak explained, current knowledge suggests that this is the most effective action and will mitigate the volume of PFAS which might otherwise migrate off a defence base.[18]

Progress under the National Program

3.14 The Department of Defence is currently conducting investigation and remediation works at sites at 28 Defence sites around Australia. Mr Grzeskowiak provided the following progress report on site assessment and management under the National Program as at December 2019:

> At 17 of those sites the investigations have been completed, with the remaining 11 sites anticipated to be completed by the end of this financial year—around the middle of next calendar year. At those sites where we have completed investigations, we've produced a PFAS management area plan, which has been developed and shared with jurisdictional environmental regulators and made available to communities. These plans propose remediation initiatives focused on mitigating the

17 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 3.

18 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 3.

> migration of PFAS chemicals. The plans include ongoing monitoring programs to inform our understanding of any change in the environment due to the movement of PFAS in the environment, and also to help us assess the impact of remediation activities that we are undertaking.[19]

3.15 The Sub-committee asked about the process for identifying investigation sites and their prioritisation for remediation work. Defence outlined the historical approach explaining that this had evolved in response as knowledge increased:

> When we first were alerted to this issue, which happened at Oakey first and then at Williamtown, we commenced a desktop review of our sites. Obviously, we were looking for places where defence had used firefighting type activities over time. We did an activity to triage where we would look first. So we started our program of investigations. We didn't have the capacity back in 2016 to launch all investigations at the same time and I suspect Australian industry would not have had the capacity to respond to that as well. We launched investigations in a tranched sense. Roughly, every three or four months we would launch the next few investigations.[20]

3.16 First Assistant Secretary, Infrastructure, Mr Christopher Birrer explained that Defence now prioritises works in terms of two questions:

> One is credible and proven migration pathways, where the PFAS can migrate off the base into the community. The second is: are those communities where, as a result of the human health risk assessments, we can see that there are complete potential human health exposure pathways. [21]

3.17 Mr Birrer emphasised that Defence's immediate priority is to disrupt potential exposure pathways, such as by providing alternative water, and then, under remediation, 'to break or wind back those potential migration pathways' from the base into the community.[22]

3.18 A member asked about the process and total number of sites that were evaluated for potential investigation. Mr Grzeskowiak referred to a three tier review— 'Tier 1 was we really need to do an investigation. Tier 3 was

---

19 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, pp. 1–2.

20 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 3.

21 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 4.

22 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 4.

no need to look here'. Overall it was estimated that 60 sites were considered for investigation.[23]

3.19 Questions were also asked about the potential identification and treatment of new sites. Mr Grzeskowiak explained that sites were initially included where the old 3M light water firefighting foam had been used, however: 'Over time, our knowledge has matured and we have been gradually adding in sites as we've learnt more information about places. At 28, I think, we are now at the maximum number of sites'.[24]

3.20 Defence, however, acknowledged a potential that new sites may be identified and undertook to review that number should new information become available. [25]

Effectiveness and monitoring

3.21 According to the Department of Defence's web advice, the aim of the PFAS Management Area Plan (PMAP) is 'to provide options to manage the risks of PFAS exposure on and near the Base and outline a plan for ongoing monitoring'.[26]

3.22 An important concern for PFAS affected communities is whether remediation works can eliminate PFAS from affected sites. Defence representatives were candid about the limitations, stating:

> Proven remediation technologies to destroy PFAS chemicals are limited at this stage. The primary remediation technologies available are focused on separating PFAS chemicals from contaminated materials—that is, soil and water—and concentrating the chemicals in a waste stream which can be contained and stored for destruction at a later date as technology for destruction matures. There are limited waste disposal options available for high concentrations of PFAS waste streams, and we will only use sources for disposal of PFAS where they are licensed and accredited to do so.[27]

---

23 Senator Faruqi asked for further clarification in a Question on Notice, Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 8.

24 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 3.

25 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, pp. 1–2.

26 *PFAS Investigation and Management Program, Management Activities,* www.defence.gov.au/Environment/PFAS/ManagementActivities.asp viewed 5 December 2019.

27 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 8.

3.23 Water and soil treatments are used at Defence sites to remove or disrupt the flow of PFAS contamination through affected environments. Commenting on the effectiveness of these methods Mr Grzeskowiak advised:

> Water treatment technologies for PFAS have matured more quickly than equivalent technologies for treating soil. We've implemented a number of water treatment facilities at some of our high-profile sites to begin removing PFAS, principally from groundwater but also from surface water. Treatment technologies for soil are emerging but are not yet proven at the scale equivalent to Defence's needs. Defence is prioritising the treatment of soil source areas in our current management area plans. This will include a combination of strategies, including excavation of soil or capping of areas where it's likely that PFAS may migrate into groundwater systems or interact with surface water. [28]

3.24 The Committee noted that the results of monthly water testing at Oakey are posted on the Defence web tab dedicated to the remediation work carried out there.[29] Results over 2018 and 2019 indicate declines and fluctuations in PFAS concentrations in untreated water, and overall improvements after treatment, a relative indicator of the effectiveness of the remediation measures deployed.[30]

3.25 Mr Grzeskowiak made ongoing commitments to a flexible program of continuous improvement and monitoring in remediation works:

> We will continue to implement our remediation plans and will remain flexible to take advantage of emerging treatment technologies as they are proven and as they become commercially available. We will continue to monitor PFAS within the environment on and surrounding our bases to understand any changes in concentration or spread and to assess the effectiveness of our remediation actions, and then to inform any changes required of our management area plans.[31]

---

28 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 2.

29 Oakey Management Activities defence.gov.au/environment/pfas/oakey/managementactivities.asp viewed 11 December 2019.

30 The results also record periods when treated water concentration was above the Health Based Guidance Values, with fluctuations for untreated water for different concentrations of PFOS and PFHxS, and PFOA. See 2019 and 2018 Water Sampling Results, Oakey Management Activities, viewed 11 December 2019.

31 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 2.

Testing new approaches

3.26 The Department of Defence provides opportunities for industry to demonstrate treatment technologies, including by funding the Australian Research Council's PFAS special research initiative and other bodies giving grants for research into PFAS remediation and related issues.[32]

3.27 The Sub- committee investigated soil-washing trials being conducted at Edinburgh, which were reported to be effective at separating PFAS from soil. Mr Grzeskowiak explained that the RAAF Edinburgh site was selected for this trial because of the soil type, which was clay based. In effect, this would make for a more rigorous trial of the technology, since evidence had suggested that it is harder to extract PFAS from clay soils.[33]

3.28 As noted in this chapter, the technology being trialled at RAAF Edinburgh has been imported from the UK to wash 2 500 tonnes of soil, with treated soil intended to be reused on site. Mr Grzeskowiak discussed some of the logistical issues involved in an operation of this scale. Noting that the size of the plant precludes its transportation to another site, he advised that Defence is considering at present whether to invest in plant at a few different locations or to transport contaminated soil to treatment centres.[34]

3.29 Another issue discussed was the storage and/or destruction of highly concentrated PFAS which has been extracted from contaminated water either by use of GAC–granulated active carbon or, more currently, resin.[35]

3.30 Mr Birrer updated members on the currency and effectiveness of these measures:

> So there is still GAC that is involved in the water treatment process. As well, we still operate a plant at Williamtown on Lake Cochran which is a GAC based removal of PFAS. In terms of the resin, as you know… it's an ionic exchange resin on the charge of PFAS particles in the water. What that achieves is very high levels of removal of PFAS, and there are the three PFAS … that have health based guidance values attached to them. They're the key ones in terms of having a regulatory framework. It has a very high level of removal, and so you're getting down to the limits of

32 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 2.

33 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, pp. 2, 4.

34 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 4.

35 Ms Swanson, MP, *Proof Committee Hansard*, Canberra, 2 December 2019, pp. 4–5.

> detection in terms of the water that then comes out of the water treatment plant.[36]

3.31 The Sub-committee was told of advancements in PFAS processing, in terms of plant size and efficiency. Super-concentrated PFAS contaminants, in very small amounts, are now being stockpiled in metallic cylinders, while work on the destruction of these small amounts using pyrolitics is also being advanced.[37]

3.32 Pyrolitics involves the use of heat to break down complex chemical substances into simpler substances.[38] Mr Birrer reported on partnership work in this area and its regulation:

> We're continuing to work with companies around that. One thing that we've always worked on is ensuring that the contractors are fully licensed and use licensed facilities and methodologies from the state regulators… it really comes down to it being something that's agreed to by the state jurisdictions in terms of being a credible pathway in that, whenever materials are removed from the bases, we do require our contracts to ensure that they're going to licensed facilities and are being both transported and treated in accordance with state regulatory regimes.[39]

3.33 Mr Grzeskowiak advised that Defence is 'very cautious' about such removal noting that Defence would prefer to stockpile the super concentrated PFAS as 'it doesn't take up a lot of room. Imagine oxygen cylinders and those sorts of things. You run the plant in Katherine for a year and you end up with just one big cylinder full…'[40]

3.34 The Sub-committee was concerned about the robustness of storage arrangements and requested advice on this in a question on notice.[41]

3.35 Mr Grzeskowiak advised that Defence is continuing to engage with industry and internationally to better understand available technologies and their possible applicability in Australia.[42]

---

36 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 4.

37 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 4.

38 Encarta Dictionary UK.

39 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 5.

40 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 4.

41 Ms Swanson MP, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 5, Question on Notice.

42 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 2.

Coordination and leadership

3.36 PFAS is a national problem and the Department of Defence works with governments at all levels to support affected communities in the course of its PFAS remediation activities.

3.37 The Sub-committee enquired about Defence's leadership in the national coordination of PFAS management. Mr Grzeskowiak advised:

> Since commencement of the national program, Defence has been proactive in engaging and collaborating across all tiers of government, nationally and also internationally. At the national level, we've worked with the PFAS Taskforce since it was established and we've worked with intergovernmental agencies throughout this process. We've contributed to the development of the intergovernmental agreement on PFAS, to facilitate a consistent approach to PFAS contamination across responsible jurisdictions. We've also contributed to the development of the PFAS National Environmental Management Plan, which was initially released in 2018 and is due for revision later this year or, probably, early next year.[43]

3.38 The Intergovernmental Agreement on a National Framework for Responding to PFAS was introduced in February 2018 to ensure a harmonised approach was taken among Federal and State jurisdictions to reduce PFAS contamination. The PFAS National Environmental Management Plan (NEMP) was appended to the Agreement at that time.[44]

3.39 In March 2019, a revised draft of the NEMP, the NEMP 2.0, was released for comment. The new draft NEMP aims to strengthen and clarify obligations for State and Territory governments, providing updated guidance on four urgent priorities: standardised environmental guideline values; soil reuse; waste water management, and on-site containment.[45]

3.40 Invited commentary closed in June 2019, but no further advice has been launched about the NEMP consultations on government websites.[46] Mr

---

43 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 2.

44 Council of Australian Governments, Intergovernmental Agreement on a National Framework for Responding to PFAS, 2018 www.coag.gov.au/about-coag/agreements/intergovernmental-agreement-national-framework-responding-pfas-contamination viewed 11 December 2019.

45 PFAS National Environmental Management Plan, Version 2.0 Consultation Draft developed by the National Chemicals Working Group (NCWG) of the HEPA (NEMP2.0) p. 3 www.epa.vic.gov.au/your-environment/land-and-groundwater/pfas-in-victoria/~/

46 The EPA Victoria website notes NCWG work on a report titled *Human health soil screening criteria for PFOS, PFHxS and PFOA*, published in May 2019, viewed 12 December 2019.

Birrer referred to the challenges and importance of these reforms to ensure national consistency in environmental standards:

> It's fair to say that different jurisdictions engage in different ways; that would be my personal observation. So the Victorian EPA has been quite at the forefront of producing some of the draft documents. But it is very much still an emerging contaminant, with the guidelines still emerging. In fact, there's still work being done now on what's been referred to as NEMP 2.0, or National Environmental Management Plan 2.0, to set further guidelines.[47]

3.41 Mr McLeod, Assistant Secretary, PFAS Investigation and Management confirmed that the heads of the Environmental Protection Agency (EPA) and the PFAS Taskforce were all involved in the finalisation of NEMP 2.0, which was now unlikely before the new year.[48]

State level and regional partnerships

3.42 Defence also referred to the importance of its ongoing work with state and regional governments and regional authorities in coordination and delivery of its remediation activities:

> We have productive working relations with various jurisdictional authorities and share all of our investigation findings with them, and we also brief them to the communities involved. That includes sampling results in reports to facilitate those authorities to formulate and release any community based advisories that they consider necessary.[49]

3.43 One area of collaboration is in the provision of alternative water supplies to affected communities with regional councils a partner in this work. Oakey was the first site identified for management of PFAS and is one of the sites where Defence is providing alternative sources of drinking water to eligible residents, in this instance as part of 'a long-term and precautionary measure' for the supply of safe drinking water.[50] The

47 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, pp. 5-6.

48 Mr Luke McLeod, Assistant Secretary, PFAS Investigation and Management, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 6.

49 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 2.

50 As part of its National PFAS management program work, Defence provides alternative sources of drinking water as an interim measure to residents located in areas under investigation or management where residential bore, rainwater tank or other existing sources of drinking water are found to have levels of PFAS above the Health Based Guidance Value. PFAS Environmental Investigation, defence.gov.au/environment/pfas/oakey/support.asp viewed 11 December 2019.

Department has funded Toowoomba Regional Council to provide access to the reticulated water supply system to residents who live within the Oakey Management Area.[51]

3.44 The Sub-committee was also told of whole-of-government initiatives involving partners at all levels. Mr Birrer referred, for instance, to Defence's collaboration with the PFAS Task Force, state jurisdictions and the water industry to coordinate approaches on levels of PFAS from sewage treatment plants, with Defence operating these on its bases.[52]

Keeping communities informed

3.45 As indicate above, partners at many levels of government are involved in keeping affected community members informed about remediation work and its results as work progresses. However, during the inquiry, members of the Sub-committee reported community concerns about consistency in advice about PFAS and uncertainty about what remediation efforts might achieve for families and the environment.

3.46 In evidence to the Sub-committee, the Department of Defence gave firm assurances that it was doing its best to provide accurate information and promote confidence in affected communities that progress is being made:

> We're committed to responding to the PFAS contamination in a responsible, scientifically credible, evidence based and meaningful way. Our initial response to PFAS contamination was to ensure the community exposure pathways were broken through the provision of alternative water and risk advice. We're committed to being open and transparent with each impacted community about our investigation process, the findings of those investigations and the proposed remediation actions. We engage with communities throughout the process and we've run, literally, about a 137 separate community engagements, with more to come.[53]

3.47 Mr Birrer, First Assistant Secretary, Infrastructure, in answer to a question about progress at Richmond described the type of information provided and the level of engagement that Defence undertakes:

> In terms of Richmond, we'd already presented the final investigation and also the PFAS management area plan. We have

51 Oakey management Activities defence.gov.au/environment/pfas/oakey/managementactivities.asp viewed 5 December 2019.

52 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 6.

53 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 2.

> been undertaking ongoing monitoring, including dealing with particularly one member of the community there who had concerns about her eggs. You will recall that we spoke to her that evening as well at that event. Since that event members of the Hawkesbury Environment Network have contacted me and provided additional questions, which we've provided answers to. They came back to me as late as last Thursday actually. They emailed me again saying that they just wanted to stay in contact. We're very much committed to continuing to engage with that community and to be open and transparent with them as we have information available. [54]

3.48 Asked about reported dissatisfaction from the community, Mr Birrer reiterated the Department of Defence's commitment to ongoing engagement. He also noted that, while some community members are satisfied, others are concerned about their own businesses, their ways of living and livelihood. Defence, in response took a 'flexible' and 'open' approach at community fora, where further contact is encouraged: 'We continue to maintain our national information lines, phone number and email, and are happy to engage with members of the community there', he said.[55]

3.49 Defence representatives also referred to online resources on government agency websites with the Government's website PFAS.gov.au being the key resource site with 'all the PFAS information available from government'. Mr Birrer noted that the PFAS National Environmental Management Plan is published there and there are links to it from that website. State and territory jurisdictions also have websites that publish PFAS information.[56]

3.50 The Sub-committee assessed Federal government online resources and found that information on the Defence site was both up to date and detailed whereas information on the PFAS government site, while comprehensive, did not have recent updates on the status of the NEMP2.0 (the original NEMP plan 2016 was reproduced on the site). This was also the case for the Health and former Department of Environment and Energy sites.[57]

---

54 Senator Faruqui to Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 9.

55 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 9.

56 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 3.

57 Sites viewed 6 December 2019.

3.51 Further, updates were not provided on any site (including Defence and Health) about the progress of the PFAS Health Study, nor its current call for input into its critical Cross-sectional survey and blood serum study.

3.52 The Sub-committee also noted that the Defence annual reports do not provide any other indicator of the progress of remediation techniques, nor do they provide links to the information other than online.

3.53 The Committee asked the Department of Defence to provide detail about the types of information it provided to communities in a Question on Notice, including its compliance with COAGs' *PFAS Information Sharing, Communication and Engagement Guidelines,* which are part of the National Framework for Responding to PFAS Contamination.[58]

Issues under review

3.54 As noted in the first chapter of this report, the Sub-committee's review proceeds between the delivery of the JSCFADT's 2018 inquiry report on the management of PFAS contamination in and around Defence bases, and the Government's response to that report which is still being prepared.

3.55 With Government's position on the report as yet unstated, the Sub-committee's review has focused on matters pertinent to remediation progress—the processes, effective management and monitoring of PFAS contamination, innovation in remediation work, on the harmonisation and coordination of remediation works; and finally on communication to communities.

3.56 In the course of this review, a number of persistent concerns raised by residents last Parliament were investigated further by Sub-committee members. This section of the report highlights a few of these.

Continued use in firefighting—is PFAS banned?

3.57 Recommendation 7 of the 2018 JSCFDT report called on the Australian Government to implement legislation to ban long chain PFAS based firefighting foams and regulate non-essential shorter chain non-PFAS based foams, and use PFAS free alternatives wherever possible.

---

58 In Questions on Notice. Note: The aim of the Guidelines is to ensure that agencies and governments provide information to communities that is clear and consistent, see Information sharing, Communication and Engagement Guidelines, National Framework for Responding to PFAS Contamination www.coag.gov.au/sites/default/files/agreements/iga-national-framework-pfas-appendix-c.pdf viewed 6 December 2019.

3.58 The Sub-committee wanted clarification on Defence's progress towards this goal in its operations—has Defence suspended use of PFAS substances on its bases and in firefighting exercises in particular?

3.59 Mr Grzeskowiak's assurances on this matter were qualified—Defence has not moved away from fluorinated products completely, but is progressing towards that. He noted that Defence stopped using the 3M Light Water product in around 2004, because it was the legacy product that introduced PFOS and PFOA into the environment. He went on to explain:

> As ever, it's complicated…. We started using a different product which is called Ansulite, and we still use that product today. While that product doesn't have PFOS and PFOA put into it when it's made, it still would have other chemicals from the PFAS family unit. So it's not a fluorine free foam.… We are now running a quite advanced piece of work looking for the next foam product we can go to. The world has moved on. There are probably foams out there now that are completely fluorine free that will be able to meet the task of doing what we need to do with these products. So we do say we've stopped using the product that had that PFOS and PFOA, but Ansulite does have fluorinated products in it. [59]

3.60 In conclusion, Mr Grzeskowiak indicated that the challenges of becoming fluorine free are ongoing:

> As we said, there are approximately 4 000 different types [of PFAS related substances] and we're seeking to move away from using Ansulite—hopefully next year, but we need to just confirm that we have found a suitable product.[60]

PFAS remediation—what can be expected?

3.61 In this review, Sub-committee members acknowledged the progress Defence has made in implementing mass scale and scoped remediation work. As suggested in the last Parliament, Defence is at the forefront of this work among governments and agencies in Australia.[61]

3.62 Messages from the community at this stage do not appear to be commensurate with this however; confidence remains low. Even with emerging technologies being deployed or investigated and data coming in with good results, many people in affected communities are unsure about

59 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, pp. 6–7.

60 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

61 Associate Professor Robert Niven, University of NSW, *Committee Hansard,* 14 September 2018, p. 40.

what the treatments being conducted and the technologies being used will actually do for them.

3.63 Asked about the overall effectiveness of remediation efforts, the Sub-committee was told that remediation work involves many methods, over the long haul. [62] Mr Grzeskowiak stated:

> We are remediating and we've have started that process, and we've said consistently that it will be a long process. We are attacking source areas as the most high-value mechanism of remediation. We're looking at point-of-use treatment as well, so if there are places—Pearce, for example—where we're still providing bottled water or cask water to some properties, a long-term solution might be point-of-use filters so people could still use groundwater but there is a point-of-use treatment. We're looking at those things. [63]

3.64 The Sub-committee asked for clarification—can Defence's remediation works be expected, eventually, to completely clear sites of the PFAS problem?[64] Defence indicated that present measures could not support that hope:

> …I've been saying for a little while we'll never remove all of the PFAS from the environment, because it's just out and about and spread out. But what we're seeking to do is reduce as much as we can and to continually refine our efforts to target hot spots, if you like, so that we get the best value in terms of the amount of product that we can remove from the ground, all the time with a focus on, if we discover exposure pathways for people, how do you remove that exposure pathway? So that's where connecting to town water and providing water tanks comes from.[65]

PFAS investigations—scoping and review

3.65 A number of questions focused on the process of investigation as a trigger point for remediation activities, and the accurate scoping of investigation areas as PFAS flows penetrated the soil and water tables of surrounding areas.

---

62 Dr McVeigh MP, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

63 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

64 Dr McVeigh MP, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

65 Mr Grzeskowiak, Department of Defence, Proof Committee Hansard, Canberra, 2 December 2019, p. 7.

3.66 Reference was made to the PFAS plume which moved from Oakey Army Aviation Centre south-west. There were concerns that unaffected areas on the opposite eastern side of Oakey were included on published maps of the investigation area, which potentially affected the value of the unaffected land.[66]

3.67 Defence representatives advised that the designated investigation area was an accurate reflection of the risk at the time. Mr Birrer explained that the published map of 2016, which had been referred to then by the media, showed how the PFAS plume would have increased without remediation. However, because of the remediation and management action, the impact shown on the map did not eventuate. Mr Birrer said that this was later reflected in the published management plan:

> As a result of the investigation, when that was completed in December 2017, we then published the management areas, which are different from that investigation area. As a result of the investigation we know that, as well as the groundwater plume, there are very important surface water flows through those drains. We've addressed both in terms of cleaning out the drains and removing PFAS material. We're addressing source areas on the base and we're also treating groundwater, very much in the expectation that over time—and it is a long-term plan—it will shrink the plume in terms of the areas being contaminated. [67]

The status of investigated land

3.68 A related issue to the discussion above was the status of land which had been investigated by Defence and found to be uncontaminated by PFAS. There were concerns that the value of land once included in an investigation area could be reduced based on perceptions, despite it not being subject to PFAS remediation and management.[68]

3.69 This raised questions for the Department about its communication of clearance status, and perhaps also about contamination issues averted by successful remediation outlined previously.

3.70 Mr Grzeskowiak explained that the clearance status would be indicated in in the comparative analysis presented in the management area plan—the area not affected by PFAS would not be included in the MAP. [69]

---

66 Dr McVeigh MP, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

67 Mr Birrer, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

68 Dr McVeigh MP, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

69 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

3.71 The Sub-committee asked about the disparity between the official status of the clearance and its necessary communication to affected communities. Mr Grzeskowiak acknowledged that this needed clarification :

> Your question highlights a point for me about how we communicate to the community at large that—[once] that's been ticked off; it's fine, and we think it's going to be fine for the long term, so our focus is elsewhere. It may be asking a bit much to expect people to read the management area plan, go back and re-reference the investigation area and do their own comparison. Maybe we need to get better at that. [70]

Conclusion

3.72 As noted in this chapter, the Department of Defence currently conducts the largest and most extensive program of PFAS remediation work in Australia. It has been acknowledged as being at the forefront of this, and is participating in the reform of national regulatory frameworks which will confirm, direct and advance this work.

3.73 The review of the PFAS National Environmental Management Plan, the NEMP 0.2, will harmonise and strengthen national requirements for the storage, containment and management of PFAS contaminated waters and soils. New regulations on recreational water use, which highlight the impacts of PFAS on ecosystems and birdlife,[71] will also impose new stringencies on PFAS affected communities, perhaps further diminishing their quality of life and heightening their concerns.

3.74 As recorded in this report, the Sub-committee investigated with Defence representatives a wide range of issues and concerns raised by affected communities, as well as a range of technical matters related to project management. Responses to the Sub-committee were frank on both the strengths and limitations of remediation methods and outcomes. The Department also committed to answer detailed written Questions on Notice on its operations. While these were not provided in time for inclusion, they will be referenced in later reports.

3.75 In regard to other published information, the Sub-committee commends the Department for its very comprehensive PFAS Investigation and

---

70 Mr Grzeskowiak, Department of Defence, *Proof Committee Hansard*, Canberra, 2 December 2019, p. 7.

71 National Health and Medical Research Council, *Guidance on Per and Polyfluoroalkyl (PFAS) in Recreational Water*, 2019 www.nhmrc.gov.au/guidelines-publications/ viewed 12 December 2019.

Management website which provides current and detailed advice about works and consultations at all sites, including information on the monitoring of PFAS levels in treated water and soils over time.

3.76 By contrast, the Sub-committee found that information on PFAS remediation in Defence annual reports was minimal; a half a page for both the 2017-18 and 2018–19 volumes, with no reportage on investment or results evident, nor links included or advice about online information.

3.77 The Sub-committee recognises that management of PFAS contamination and its remediation in the environment is a complex process involving multiple governments, private sector partners, researchers and other experts. There are many strengths in that engagement.

3.78 However, as discussed in this report, levels of anxiety in affected communities remain high. The ANU PFAS study Focus Group report noted:

> Many participants were concerned about continuation of uncertainty and feeling unable to sell their property, being "stuck" in their community and lacking options to "move on".
>
> Participants in the group discussions asked for greater transparency and consistency in the information they received. They discussed options that they thought would reduce their anxiety and provide information or pathways that could lead them out of their current situation soon.[72]

3.79 Proposals to provide key advice on land status, clearance, and understandable information on remediation are vital in this context. Equally so is managing the expectations of community members—knowing what can reasonably be provided or changed, and within what time frame, is just as important as the volume or frequency of updates and advice. Consideration must also be given to the lived impacts of evolving national regulatory and coordination frameworks for management of PFAS, which will protect but also potentially impose new stringencies on affected communities.

3.80 A successful program to build community resilience will inevitably involve the continuation of the high level of commitment currently demonstrated by Defence in its efforts to assist and inform affected community members. It will also entail a higher level of frankness and a visible commitment from the Executive government, by providing new

72 C Banwell, T Housen, K Smurthwaite, S Trevenar, L Walker, K Todd, M Rosas [Ngaigu-Mulu Aboriginal Corporation, Katherine, NT, Australia], M Kirk, *The PFAS Health Study, Component One: Oakey, Williamtown and Katherine Focus Groups Study*, ANU, Report Prepared for the Department of Health, February 2019, p. 6.

opportunities for consultation and leadership, as well as practical and tailored supports to give options to affected residents.

3.81 The Government's response to these challenges will be monitored by the Sub-committee over the cycle of this inquiry.

Senator the Hon David Fawcett
Chair
Joint Standing Committee on Foreign Affairs, Defence and Trade

19 December 2019

A

Appendix A – Public hearings

Public hearing 25 November 2019 - Canberra

Australian National University

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

Public hearing 2 December 2019 - Canberra

Department of Defence

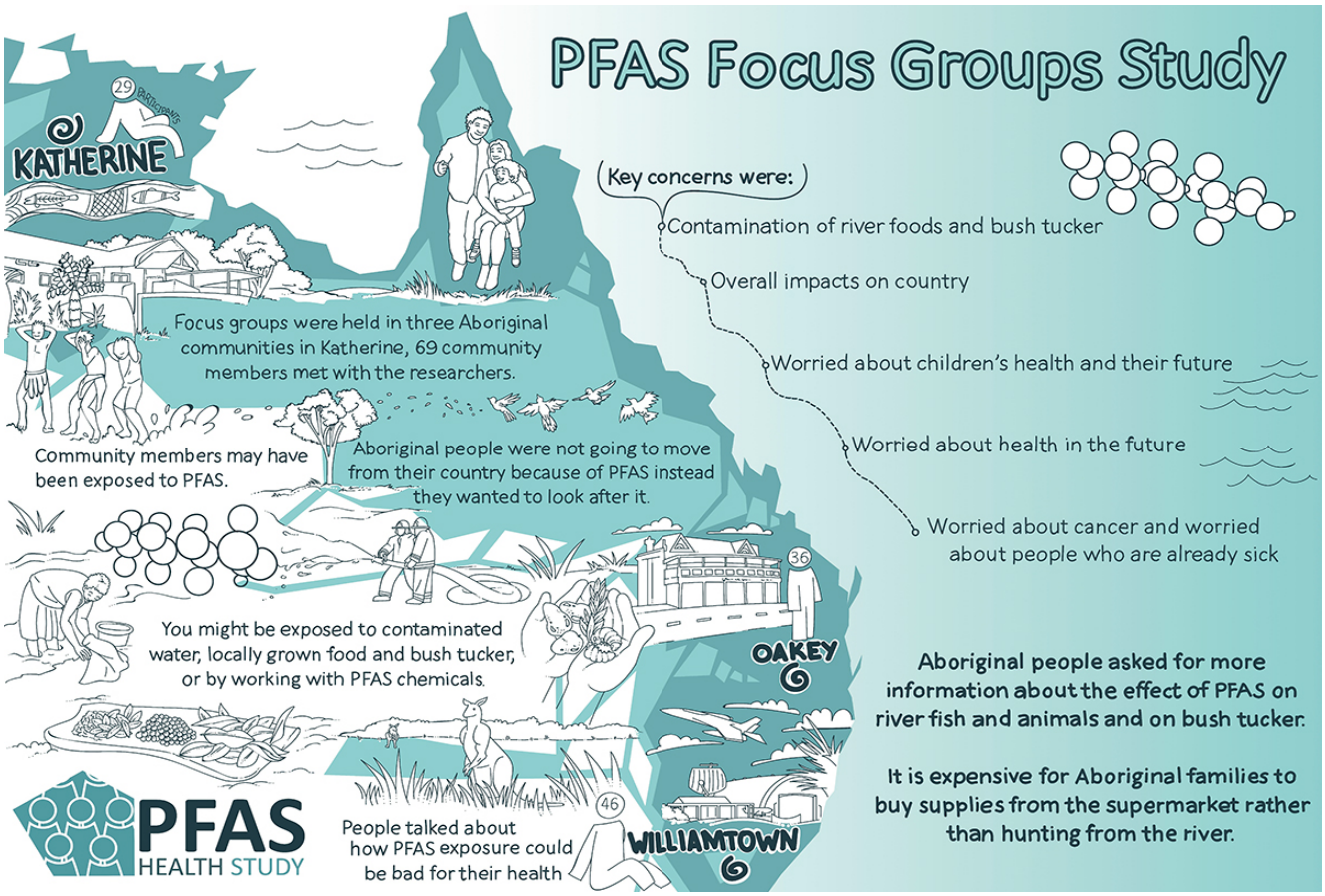
- Mr Christopher Birrer, First Assistant Secretary, Infrastructure
- Mr Steven Grzeskowiak, Deputy Secretary, Estate and Infrastructure
- Mr Luke McLeod, Assistant Secretary, PFAS Investigation and Management

B

Appendix B – PFAS Health Study

PFAS FOCUS GROUP STUDY

Poster for Aboriginal communities in Katherine



RESEARCH QUESTIONS FOR PFAS SURVEY

1. What are the main potential sources of exposure to PFAS through occupation, food, waters, or other factors in Williamtown (NSW), Oakey (Qld) and Katherine (NT)?

2. What are the main concerns regarding health problems associated with living or working in the PFAS Investigation and Management Areas in Williamtown, Oakey and Katherine?

3. What are the main self-reported health outcomes associated with living in or working in the PFAS Investigation and Management Areas in Williamtown, Oakey and Katherine?

4. What are the current levels of psychological distress and how do these relate to PFAS blood results and location of residence or work?

5. What are the main risk factors for higher than background level serum PFAS concentration regarding sociodemographic and other factors?

6. Does the geographic distribution of blood PFAS levels correlate with known zones of contamination of groundwater and soil?

7. What are the mean serum concentrations of PFAS in Williamtown, Oakey and Katherine residents and how do these levels compare to those of people residing in non-contaminated areas?

8. How do serum concentrations vary by location and demographic factors, such as age, sex and length of residence, in the townships of Williamtown, Oakey and Katherine.

Source M Kirk, K Todd, B Armstrong et al, *The PFAS Health Study Cross-sectional Survey and Blood Serum Study Research Protocol*, ANU, Report Prepared for the Department of Health, 20 March 2019, p. 15. rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-cross-sectional-survey-blood-serum-study-protocol.pdf

Survey Help— ANU PFAS Health Study, Instructions for participating in the survey at rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-5