

Committee Secretary
Joint Standing Committee on Foreign Affairs, Defence and Trade
PO Box 6021
Parliament House
Canberra ACT 2600

I would be pleased if you would consider the following comments on the contamination of the Katherine Township, its immediate surroundings and waterways as a consequence of the use of fire fighting foam containing PFAS at the Tindal RAAF Base. The comments address each of the Terms of Reference in a format stating each term of reference followed by comments relevant to that ToR.

I have included a short addendum to my comments which outlines my personal association with Katherine.

Errol Lawson PhD. BE(Coms) Melb.

Comments on Terms of Reference for Inquiry into Contamination of Katherine Township and Surroundings Consequent on the Use of Fire Fighting Foam Containing PFAS at RAAF Base Tindal

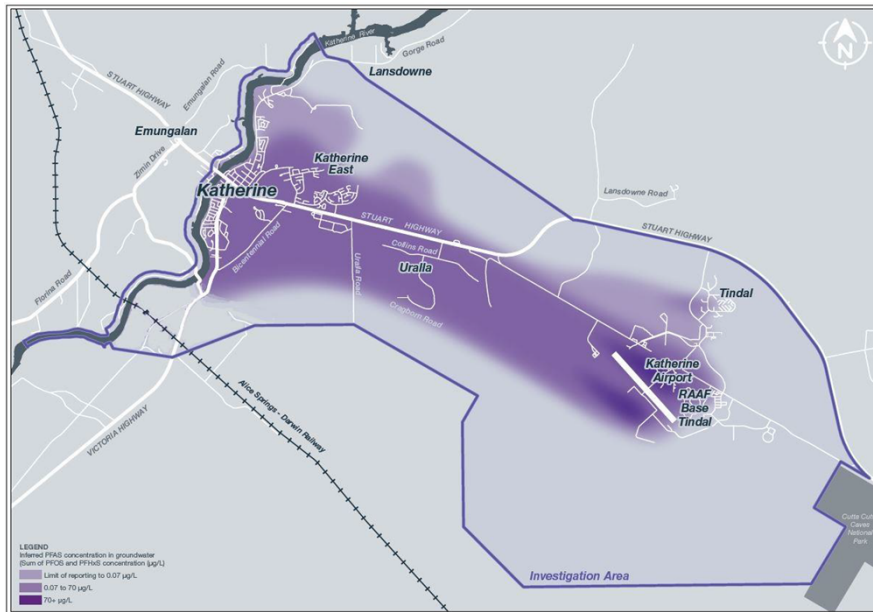
a) the extent of contamination in and around Defence bases, including water, soil, other natural assets and built structures;

The contamination in and around Tindal RAAF Base has been studied by the consultancy company, Coffey, under contract to the Department of Defence. Coffey issued its Detailed Site Investigation report in February 2018.

The broad picture is:

- *Tindal Base has two highly contaminated sites, the fire and the training station and three lesser sites from which PFAS has, for many years, leached into the Tindal aquifer or is carried off the base with surface water into local drains and waterways. The Tindal aquifer flows from the south of the base at about 1km/year passes under the Tindal RAAF Base and thence west-northwest to the Katherine River.*
- *Between Tindal Base and the river the aquifer is now contaminated with PFAS at a level which exceeds the present limit as a source of water for human consumption. The aquifer is not available to supplement the Katherine River for supply of town water. Properties outside the distribution network of town water are dependent on the Tindal aquifer for all uses and have no supply. Restrictions on use of town water have been imposed since August 2017 and Defence immediately commenced supplying bottled water and initiated the provision of tanks supported by a “domestic purposes” filling contract to 64 “bores only” properties. Apart for water for domestic purposes, whatever development projects those owner/occupiers had based on utilisation of bore water are now in limbo.*
- *The Katherine/Daly river system from below the Highway Bridge is also contaminated. This presents a serious problem to the people who rely on those rivers as a food source and encourages recreational fishermen to go elsewhere. Some bores on the north side of the Katherine River are measuring PFAS contamination demonstrating the complexity of the seasonal exchange processes between aquifers and the Katherine River.*
- *The community understands that the aquifer was declared as unsafe for human consumption because PFAS has been determined to be a health hazard. Consequently, the town water supply, normally made up of a mixture of river and bore water, became dependent on the Katherine River pumping and filtering system which is limited to approximately 10MI/day. The peak demand over the dry season is 15MI/day. Restrictions on town water use have kept demand below capacity, helped by a 1MI/day filter supplied by Defence which strips the PFAS from the bore water.*

The image following is from the RAAF Base Tindal-Detailed Site Investigation (DSI) Report date 12 February 2018 (Figure 10.1 page 131). The purple plume indicates PFAS contamination detected by the Coffey DSI. PFAS based fire fighting foam was used at RAAF Tindal between 1988 and 2004.



b) the response of, and coordination between, agencies of the Commonwealth Government, including, but not limited to, the Department of Prime Minister and Cabinet, the Department of Health, the Department of the Environment and Energy, the Department of Defence and the Australian Defence Force;

Department of Prime Minister and Cabinet and the Department of the Environment and Energy

My initial attempt to trace the chains of response and coordination was mildly encouraging. On the organisation chart of the Prime Minister & Cabinet (PM&C) I found a block labelled, PFAS Task Force. I expected that the departments of Defence, Health and Environment and Energy would respond to portfolio responsibilities arising out of the PFAS situation and the PM&C Task Force would be the coordinator. But sooner than I had hoped it became evident that the PFAS Task Force played no role in the activities of the Department of Health, the Department of the Environment and Energy, the Department of Defence and the Australian Defence Force. With the limited information available I could find no linkage between the Task Force and the Defence initiated activities on RAAF Tindal or those of the Health Departments of the Commonwealth and Northern Territory.

I have been told (June 2018) that the PFAS Task Force is to be relocated in the Department of Environment and Energy and that the Commonwealth and all the State and Territory Ministers for the Environment are about to sign a MoU on PFAS. That may be a positive sign that PFAS contamination is recognised as presenting a nation-wide environmental problem in both Defence and civilian facilities. Normal bureaucratic processes are too slow to deal with the array of interacting consequences across departmental boundaries, the uncertainty attached to health and ecological consequences and the size of the areas affected. Processes and structures similar to response to a national disaster would seem to me to be more appropriate.

Whatever the outcome of the relocation of the PFAS Task Force and the intergovernmental MoU, some outstanding questions are:

- *Why has it taken so long for the Environmental Department to be placed front and centre as the coordinating authority for the national response to PFAS?*
- *Where, if anywhere, is the government cell with the forward looking task of providing early warning to the government of impending PFAS type problems*

The signs were there, not least of which was the listing by the Stockholm Convention Amendment of 2009 of PFOS as a toxic, non-biodegrading, accumulating Persistent Organic Pollutant (POP) The Committee might inquire what the Australian Department of Environment and Energy has been doing for almost 10 years, when, by October 2017, 171 countries including China the main global supplier, have ratified the Stockholm Convention 2009 listing of PFOS in Annex B and Australia has not.

I note that the Heads of EPAs Australia and New Zealand (HEPA) and the Australian Government Department of the Environment and Energy (DoEE) released a document “PFAS National Environmental Management Plan” dated January 2018 ten years after the horse has bolted. And it seems most of the work was done by the Victorian Environmental Protection Authority.

Department of Defence and the Australian Defence Force;

The Department of Defence is doing the heavy lifting in response to the PFAS contamination at Katherine. This is clearly in accord with the Defence Minister’s statement of principle to the delegation in December 2017 led by the mayor of Katherine that:

“The Polluter pays, Defence is the Polluter, Defence pays”

I have no objection to the project being managed by Defence. But given that PFAS contamination is present in several places, both Defence and Civil, it is not obvious how the lessons learned by Defence are to be transferred to DoEE if it is to assume responsibility for management of the national response to PFAS contamination.

As of the Community Walk-in Session and Community Shopfront of 18 and 19 June, Defence reported the following:

- *Town water is free of PFAS and has been for months.*
- *Arrangements for stockpiling and reconditioning the resin beads of the 1MI/day PFAS stripping system are in hand.*
- *Two 5MI/day systems are approved for installation at the P&WC site bringing town water capacity to 20MI/day on the basis of 50/50 mixing with the river water. The first system may be running by the Dry of 2019.*
- *Two 1MI/day systems are to be installed on base as close as practical to the Fire station and the Training area to intercept the PFAS contaminated water leaching into the aquifer*
- *Use of the 2MI/day of the output of these systems is yet to be determined. Initially it will be reinjected into the aquifer.*
- *Treatment of the most heavily contaminated soil is still being considered. Two areas of approx 1 hectare to a depth ranging between 2 and 8 metres are*

affected. Complete removal and water proof storage is not practical as the water table rises during the Wet and falls during the Dry and total removal could result in mobilising the PFAS. Technologies for soil treatment are being actively examined.

- *The Human Health Risk Assessment (HHRA) report has been presented. A minor point, indicative how the choice of words can mislead is that the Human Health Risk Assessment is more accurately a Human Exposure Risk Assessment. It reports on exposure; health risk is the province of Health Department. It is too late now to change the title especially as the report now has its identifying acronym.*
- *Monitoring into the future of the PFAS content in the aquifer and the river system is planned to improve knowledge of mechanisms the ground water/surface water interchange over the cycle of the seasons.*
- *The Senior ADF Officer RAAF Tindal Local ADF manages coordination and communication with the Katherine community very effectively.*

An outstanding issue is the fate of the 64 properties dependent on bore water. In the short term they have Defence provided rainwater tanks filled at Defence expense to a quantity estimated to be the annual usage for domestic purposes. Their plans for development of the properties are based on available and safe bore water. Most are on hold and some have joined the Class Action. I understand that by joining the Class Action owners are excluded from negotiations with Defence for compensation. I also understand that Defence is not considering acquisition, but that may not be the Commonwealth's position. Clarification is sorely needed as these people are under severe financial and emotional stress.

There is a report that one property owner had been told by a Bank there was no chance of his getting a loan for improvement of his tourist facilities as his property is worthless. This "worthless" comment is in contrast to statements by Banks to Defence Canberra that values generally are in line with the rest of the NT and loans are subject to the usual conditions. When the Defence representative at the June 2018 meeting of the Katherine PFAS Community Consultative Group learnt of this he undertook to make inquiries as to his knowledge the rainwater tank on that property was positioned in anticipation of the development proceeding.

I see potential for organisational difficulties ahead. While I don't suggest they stop what they are doing, Defence is not an environmental remediation organisation. But at Tindal it is gaining valuable experience which will be of later benefit to whichever agency assumes responsibility for a national remediation and management program.

The Committee might inquire:

- *About plans to extend the management of remediation measures beyond Defence establishments, and*
- *When attention turns, as it must, to civil establishments, is the experience gained within Defence to be made available to the agencies responsible for remediation of civil facilities or will it be lost?*

Health

My knowledge of the Commonwealth Health Department's response to PFAS is summarised in the following:

- 1. Reduction of the upper limit of PFAS in water safe for human consumption from 5ug/litre to 0.07ug/l.*
- 2. The budget provisions for counselling support*
- 3. The funding of blood tests*
- 4. The Experts report on health risks*
- 5. Referral of the Experts Recommendations for a research program to the National Health and Medical Research Council (NMHRC)*
- 6. Confusion in relating Daily Intake to Total Annual Intake allowing for binge eating of contaminated food or fruit.*

My knowledge of the Federal Department of Health is clearly incomplete. At the community level, the response on Health issues is via by the NTG Department of Health. Coordination with the Federal Department of Health is internal to the Health domain.

c) communication and coordination with state and territory governments, local councils, affected local communities and businesses, and other interested stakeholders;

*As written the item reads "communication and coordination **with**", which begs the question "with whom?" I cannot comment on this item unless I rephrase it as "communication and coordination **between**" all those agencies and groups. I make the count of different parties requiring communication and coordination as:*

- | | |
|---|----|
| • Federal government: Three departments plus PM&C and the ADF | 5 |
| • NT government: two departments plus Chief Minister | 3 |
| • Local council Katherine Town Council | 1 |
| • Affected communities Aboriginal, town water, bores only, both | 6 |
| • Business Tourism, horticultural, agricultural, pastoral | 4 |
| • Others Guess the number of sub-sets in Katherine, ANU | 8 |
| • TOTAL | 27 |

For such a number of stakeholders, a well resourced central coordination cell is essential. None such exists. PFAS management is a large scale, long duration, distributed¹ socio/technical project with more than the usual component of unknown—unknowns. It urgently needs a Project Management & Coordination Cell. At the first meeting of the Katherine PFAS Community Consultation Group we asked for a "mud map" showing all the agencies involved, their interdependencies, their responsibilities and their reporting lines. We are still waiting.

¹ Distributed in two senses: geographic—country wide, and socially—stakeholders span the spectrum of government agencies, business, industry and private individuals

d) the adequacy of health advice and testing of current and former defence and civilian personnel and members of the public exposed in and around Defence bases identified as potentially affected by contamination;

Probably the most useful health advice is contained in the Food Standards Australia & New Zealand report on Perfluorinated Chemicals in Food. The relevant extract follows:

FSANZ looked at comprehensive international assessments on the health effects of PFAS and recommended tolerable daily intakes (TDIs) of 20 ng/kg bw/day for PFOS and 160 ng/kg bw/day for PFOA.² There was not enough information to establish a TDI for PFHxS.

But this is not health advice per se, but exposure limiting advice and not easily translated to tolerable daily intake (TDI) on a person by person basis, particularly if the person is having to decide whether to “eat the fish” or not. The long hand version of the TDI for PFOS is:

20 nano grams² per kilogram of body weight per day averaged over a 365 day year.

However, it seems to be the best available. But to be useful and observed it needs to be translated into an easily understood format. For the people of Katherine and surrounds three groups of people can be defined. They are:

Group 1: Towns people supplied with reticulated water by Power and Water Corporation

Group 2: People in area outside the reach of reticulated water and dependent on Tindal aquifer bores.

Group 3: People using the Katherine and Daly Rivers as a food source and recreation.

For Group 1 the health advice is “since August 2017, the town water supply has a PFAS content well below the level of .07ug/litre.” The inference, either explicit or implied, is that the water is safe to drink. Acceptance of that message to the community is obscured by its method of delivery which has been more akin to a departmental presentation rather than one honed for delivery to audiences some of whom may not have attended every presentation, and all of whom are waiting for an unequivocal message, namely, if we drink the water is it going to damage my health.

Unfortunately, the health professionals have to add the qualifier that the level of .07ug/litre is conservative, and is based on existing information. At which point scepticism sets in and the health advice is compared unfavourably with material on the Internet, including the Stockholm Convention Amendment of 2009 which recommends zero exposure for PFAS.

For Group 2 the health advice is “don’t drink your bore water, and don’t consume home grown vegetables, meat or eggs.” The first part of the advice is supported by the

² A nano gram is one billionth of a gram; a gram is one thousandth of a kilogram

supply, initially, by bottled water and in a relatively short time, considering the supply problems, of water tanks filled with town water. As far as drinking water goes, Group 2 joins Group 1 with all its attendant doubts. The second part of the advice is a severe blow to people with ambitions to be self sufficient in fresh, clean food, either for home consumption or for sale.

For Group 3, the health advice was initially delivered in formats which either had too many words or was over simplified. The NTG Department of Health is urgently developing notices for posting along the waterways which will present fish species and crustaceans common to the Katherine-Daly system pictorially and provide maximum daily serves information.

On the issue of health advice the NTG Health Department is actively responding to concerns from the Katherine community and has recently released a report on an investigation of suggestions of a cancer cluster in and around Katherine. The analysis of cancer incidence data from the Northern Territory Cancer Registry up to 31 December 2015 and national data from the Australian Cancer Data Base up to 31 December 2014 is summarised as:

“Whilst figures presented in the report differ slightly from those in two earlier reports, the analysis continues to show no evidence of higher cancer incidence in Katherine Regional Health District”³

The second part of the question in the Terms of Reference is “adequacy of health testing.” The adequacy of health testing, which I assume means blood testing, cannot be questioned. The tests are free and voluntary. However the “adequacy of the response to the results of the blood tests” is altogether another issue for discussion. The timing could not have been worse. Just as the results of blood tests were circulating on the several networks of Katherine with stories of individuals especially children with measurements well above “normal”⁴, the Federal Department of Health, released the Expert Panel for PFAS Report without seeming to recognise an incongruity between the results of the blood tests and the findings in the report, including:

there is no current evidence that supports a large impact on a person’s health as a result of high levels of PFAS exposure.

And

An independent expert health panel established by the Australian Government has concluded there is mostly limited, or in some cases no evidence, that human exposure to PFAS is linked with human disease. Importantly, the panel concluded there is “no current evidence that suggests an increase in overall cancer risk”.

These findings rest on the fine distinction between causation and correlation.

³ Cancer Incidence in Katherine Health District: 1991-2015. *Innovation and Research Branch, Health Policy & Strategy Division, DOH. 15/6/2018*

⁴ The information accompanying the blood test results defines “normal” as “if your level is below the levels in the table it is presumed you have not been exposed to PFAS any more than an average person in Australia.”

The practical person's response to the Experts' report is summed up as, "If there is no disease implications, why are we being put to all this fuss and bother?" and/or "That is no help to me in understanding what the health risk is to me and my family when our blood levels are several times the normal."

I assume the Committee is aware that the Community Walk-in Session on 18 June was more than a little unruly as several community members attempted to impress on the visiting speakers the need to resolve the two divergent views.

This, and the coincident visit by ANU, to introduce the Epidemiological Study—a visit that no one knew about and could set aside time for—reinforces my view that there is no coordination of the various activities in response to the PFAS problems. I spoke with one of the ANU researchers at the Community Shopfront. As with all the people with a part to play in managing PFAS, in one on one discussions they are impressive and have a good understanding of what they expect to do. But no one knew they were coming.

e) the adequacy of Commonwealth and state and territory government environmental and human health standards and legislation, and any other relevant legislation;

Not my area of knowledge.

f) remediation works at the bases; and

Remediation works at the base have not commenced as of June 2018. Defence has the PFAS Investigation and Management report from their contractor, Coffey and has advised that remediation planning is ongoing. The first decision is to purchase two 1MI/day PFAS stripping systems and install one as close as practical to each of the hotspots, the Fire Station and the Training. The intention is to intercept the PFAS plume at its highest concentration and cut off further entry into the aquifer. Hydrologic advice is that this is an effective measure in reducing the PFAS contamination in the aquifer. Purchase has been approved and I understand installation of the first unit is expected by October 2018

How long before the aquifer water is suitable for (a) broad area irrigation of food and watering of livestock for human consumption; (b) recreation purposes; (c) human consumption, is not as yet known. Ongoing monitoring is planned. However it would help the mental health and planning of residents if Defence, or the agency which assumes responsibility for long term activities, would set explicit objectives in these or similar terms.

The second decision on remediation addresses removal, quarantine and eventual treatment of contaminated soil. This is not a trivial problem as the volume of soil which is contaminated to some extent is huge. Quarantining, that is wrapping the soil in a waterproof membrane has the associated risk of membrane failure and all that is achieved is relocation of the problem. Another risk arises from the characteristic of the water table which rises and falls throughout the Wet-Dry cycle. It is possible that the release of PFAS which otherwise would leach slowly through the soil could be accelerated by the effect of this rise and fall on areas which have been disturbed by mass removal.

A third area is the surface water leaving the base in drains and creeks. During the Wet the flow is very high and the PFAS content as a percentage is low; during the dry the runoff rate is low to nil and the PFAS percentage may be high, even though the absolute amount may be low. Coffey propose further work in this area of surface runoff of PFAS to on-Base drains, depressions, open pits and Tindal Creek.

g) what consideration has been given to understanding and addressing any financial impact to affected businesses and individuals.

*I suggest the Committee add **mental health** impact to the Committee's consideration.*

I have no knowledge of the financial impact on businesses and individuals. However an impartial observer would only have to attend the Community Walk-in Session on 18 June to recognise signs of a very high level of stress in the community. This stress has:

- *A number of contributing factors, including loss of lifestyle, loss of property value, unsaleable properties, unresolved health concerns, particularly related to children.*
- *Commenced about the time of water restrictions and supply of bottled water and reached its present high level with the results of blood tests which coincided with the Federal Health Department's Expert Report. This report found no causal link found between PFAS and a range of diseases.*
- *Has been continuous for close to 12 months*
- *Has been externally imposed*
- *Is associated with problems which are beyond the capability of individuals or the community collectively to resolve*

Severe stress experienced over a period of months which the sufferers are unable to alleviate or avoid cannot be good for mental health.

The Committee may wish to inquire into the effects on mental health in the community as a consequence of PFAS contamination of the ground and surface water in and around Katherine.

Errol Lawson


Addendum: Personal history in Katherine

I moved to Katherine in retirement with my wife in June 2007. At the time we were both aged 70 years, having lived in the Adelaide Hills for close to 40 years, on a property entirely dependent on rain water. We purchased a 2.2 hectare property, one of several on Morris Road 4km out of town off the road to Katherine Gorge. The property is not equipped with a bore. Shortly after our arrival we installed a rainwater tank for drinking water with the result that after the first Wet in 2007/2008 we drank rain water rather than town water. The result of my recent blood test was an average of 2.4 for PFOS, very low and very much lower than “normal” of 37, and not detected for PDOA
My wife passed away in December 2016 from cancer.

E C Lawson
24 June 2018