



GOVERNMENT STATEMENT ON PER- AND POLY-FLUOROALKYL SUBSTANCES

Environmental contamination by per- and poly-fluoroalkyl substances, also known as PFAS, is an emerging challenge worldwide. The Minister for Environment, Hon Stephen Dawson MLC, is leading the Western Australian (WA) State Government response to this issue, ensuring that government agencies are working collectively, and in partnership with Commonwealth agencies and other states and territories, to respond to this challenge.

The WA Government is committed to ensuring that communities have access to timely information on PFAS contamination issues that may affect them – this includes listing confirmed contaminated sites on the Contaminated Sites Database, and providing additional information through relevant agency websites.

WA environmental laws, in particular the *Contaminated Sites Act 2003*, are specifically designed and applied to ensure contaminated sites (including PFAS contaminated sites) are identified, investigated and, where necessary, cleaned up. In this regard, the WA Government's precautionary focus is safeguarding public health and the environment from potential harm.

To date, key sites where PFAS contamination has been found include Commonwealth-owned airports and defence bases. While some state laws do not apply to Commonwealth land or entities, the WA Government also liaises with relevant Commonwealth agencies, including the Department of Defence and the Department of Infrastructure and Regional Development, regarding PFAS contamination originating from Commonwealth activities.

WA published the first comprehensive Australian guidance on assessing and managing PFAS contamination in February 2016. During 2017, WA government agencies have contributed to national guidance documents, in partnership with the Commonwealth and other states and territories, to ensure best practice approaches are applied.

Scientific knowledge worldwide regarding PFAS' environmental occurrence, effects of exposure, test methods and remediation technologies is rapidly evolving. The WA Government will continue to use new information to inform decision-making. Where significant new information materially changes the WA Government's position, an updated Position Statement will be published. Other new information will be provided through regular updates to relevant agency websites.

BACKGROUND

WHAT ARE PFAS?

Per- and poly-fluoroalkyl substances, also known as PFAS, are fluorine-containing chemicals which have been used since the 1950's for the manufacture of products that resist heat, oil and water.

There are over 3000 types of PFAS, with the most well-known being perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS).

Some PFAS, including PFOS, PFOA and related compounds such as PFHxS, have been globally identified as chemicals of concern due to their environmental persistence and bioaccumulation potential.

WHERE CAN PFAS BE FOUND?

PFAS were used in a range of common household products, including in the manufacture of non-stick cookware, surface treatments for fabrics, furniture and carpet stain protection applications, and food packaging. Other uses included aviation hydraulic fluid, metal plating, electronic circuit board manufacture and as the pesticide active ingredient for some types of ant bait.

PFOS and PFOA were also used in Aqueous Film-Forming Foams (AFFF) for firefighting; these foams were particularly effective at fighting liquid fuel (such as petrol, diesel or oil) fires. New formulations of firefighting foams (and consumer products) are not formulated to contain PFOS or PFOA.

As a result of this widespread use, PFAS are ubiquitous. They can be found at low levels in soils, surface water and groundwater in most urban areas, including in WA, as well as in wastewater effluents and biosolids. For example, a limited assessment of the amount of key PFAS in the environment, undertaken by the [Environment Protection Authority Victoria](#), found PFAS in all types of samples collected (soil, surface water, groundwater, wastewater, biosolids, fish and mussels).

WHY THE FOCUS ON PFAS?

PFAS can accumulate in the bodies of fish, animals and people and have been shown to be toxic to fish and some animals. They are emerging contaminants, which means that knowledge of their ecological and human health effects is still evolving.

PFAS are moderately soluble and highly mobile in water. Once in surface water or groundwater, PFAS can travel long distances. Where high levels of PFAS are present in soil, such as at some firefighting training grounds, PFAS may leach to surface water and groundwater for decades.

Research into potential health effects of PFAS is ongoing around the world. To date there is not enough information available to definitively say what, if any, health effects may be caused by exposure to PFAS.

In studies where large doses of PFAS are given to laboratory animals, possible links with effects on the immune system, liver, reproduction, development and benign (non-cancer) tumours have been identified. However, studies in people have not provided definitive results. PFAS behaves differently in the bodies of animals compared to humans, so effects shown in one animal may not mean the same thing happens in humans.

Possible links between PFOS and PFOA exposure and several health effects have been reported in epidemiological studies around the world. However, many of these findings have been inconsistent, with some studies identifying problems and others finding none. Organisations that study toxic chemicals have concluded that it is not possible to identify any definite links due to problems with study designs and contradictions in study results.

Based on this information, the [Commonwealth Department of Health](#) advises that, in humans, there is no consistent evidence that PFAS cause any specific illnesses, including cancer.

Investigation and assessment of suspected PFAS contamination will enable a better understanding of the extent and distribution of contamination sources. As a precaution, people living in or near an area that has been identified as containing higher than background levels of PFAS, or being contaminated with PFAS, are being advised on steps to take to limit their exposure.

CURRENT STATUS

WHAT IS KNOWN ABOUT WA POPULATION EXPOSURE TO PFAS?

Most Australians are exposed to small amounts of PFAS everyday through exposure to dust, indoor and outdoor air, food, water and contact with consumer products that contain these chemicals. The [Food Regulation Standing Committee](#) has advised that the general population's exposure to PFOS and PFOA is declining, likely reflecting the decline in use of these chemicals since around 2002.

Australian health authorities advise that there is currently no consistent evidence that exposure to PFAS causes adverse human health effects. As a precaution, people living in or near an area with higher than background levels of PFAS, or being contaminated with PFAS, are being advised on steps to take to limit their exposure to below the derived health based guidance values. The WA Department of Health (WA DoH) advises that health impacts are not expected from exposure to PFAS levels generally being detected in Western Australia.

Scheme water supplied by WA public water service providers, such as the Water Corporation, is regularly tested by independent laboratories for contaminants potentially present in the relevant public drinking water source area, and meets Australian Drinking Water Guidelines, as agreed with WA DoH.

People using private bores to meet some of their water needs are advised to follow WA DoH's longstanding advice on [using bore water safely](#) — **bore water should never be used for drinking, bathing, watering edible plants, filling swimming and paddling pools, food preparation or cooking unless it has been tested and treated to the extent necessary for the intended use.** For general information on testing your private bore, see the Department of Water and Environmental Regulation's (DWER) [fact sheet](#). Before taking a sample, it is advisable to contact the laboratory to obtain sample bottles and information on the correct sampling procedure.

WHAT IS HAPPENING AT A NATIONAL LEVEL?

While the legal situation is complex, some state laws do not apply to Commonwealth land or entities.

The WA Government is contributing to the development of an Inter-Governmental Agreement on a National Framework for responding to PFAS contamination, with the Commonwealth and other states and territories. The Inter-Governmental Agreement is intended to guide how jurisdictions will work together to effectively respond to PFAS contamination that crosses jurisdictional boundaries.

The WA Government supports and reiterates the [National Industrial Chemicals Notification and Assessment Scheme's recommendations](#) that:

- PFOS, PFOA and other related chemicals should continue to be restricted to essential uses where less hazardous alternatives are not available;
- PFOS-based fire-fighting foam should only be used in essential applications (that is, not be used for training purposes);
- Industry should actively seek alternatives to and phase out PFAS and PFAS-related substances;
- Existing stocks of PFAS fire-fighting foams should be disposed of responsibly on expiry;
- Importers and users of PFAS should be aware of international activities relating to PFAS;

- Importers should ensure that alternative chemicals are less toxic and not persistent in the environment; and
- Up-to-date information on safe use of PFAS and handling should be provided on labels and Safety Data Sheets.

In April 2017 the Commonwealth Department of Health released [health based guidance values](#) for PFOS, PFOA and PFHxS for use in site investigations and human health risk assessments in Australia.

PFOS and related chemicals were listed under the Stockholm Convention on Persistent Organic Pollutants, a global treaty to protect human health and the environment from the effects of persistent and bio-accumulative chemicals, in 2009. The Commonwealth Department of the Environment and Energy has released a [Regulation Impact Statement \(RIS\)](#) on options for a national phase out of PFOS chemicals. The consultation RIS proposes a national approach to managing PFOS chemicals to minimise future emissions, in accordance with the globally accepted standards established by the Stockholm Convention. The WA Government will make a submission on the RIS before the consultation period closes on 26 February 2018.

The WA Government is also contributing to development of a National Environmental Management Plan (NEMP) for PFAS. This plan will provide a nationally consistent, practical, risk-based framework for the environmental regulation of PFAS-contaminated materials and sites. The PFAS NEMP is being developed as an adaptive plan, able to respond to emerging research and knowledge, and the first version is likely to outline further work to be completed during 2018.

The Commonwealth [Department of Defence is undertaking PFAS investigations in Western Australia](#) at RAAF Base Pearce in Bullsbrook, HMAS Stirling in Rockingham, Gingin Satellite Airfield in Gingin; and RAAF Base Learmonth and Naval Communication Station Harold E. Holt near Exmouth. Relevant WA Government agencies are informed of the progress of these investigations by Defence, and WA Government representatives will continue to attend Defence community information sessions.

The WA Government is also continuing to liaise with other Commonwealth agencies, including the Department of Infrastructure and Regional Development and Airservices Australia, regarding PFAS contamination matters.

WHAT IS HAPPENING IN WA?

Department of Water and Environmental Regulation, in consultation with WA Department of Health

While the legal situation is complex, some state laws do not apply to Commonwealth land or entities. All known or suspected contaminated sites, including PFAS contaminated sites, in WA jurisdiction are regulated under the *Contaminated Sites Act 2003 (CS Act)*.

DWER works closely with WA DoH in administering the CS Act, to ensure sites are appropriately investigated, managed and, where necessary, remediated to protect public health and the environment. Pending publication of the PFAS NEMP, DWER will continue to make regulatory decisions with reference to its [Interim Guideline on the Assessment and Management of PFAS](#) and the [health based guidance values](#).

Under the CS Act, owners, occupiers and persons who have caused or contributed to contamination have a duty to report a known or suspected contaminated site to DWER. If appropriate action to investigate (test soil and water), manage or remediate contamination is not being, or has not been, taken, DWER may give one or more of these persons an Investigation or Clean Up Notice, requiring the work to be carried out.

Summary information (termed a 'Basic Summary of Records' or BSR) on all confirmed contaminated sites (that is, sites classified as *contaminated – remediation required*, *contaminated – restricted use* or *remediated for restricted use* under the CS Act) is publicly available on DWER's [Contaminated Sites Database](#). As at 17 November 2017, PFAS have been identified at the following 15 sites:

- The Department of Fire and Emergency Services (DFES) Training Academy at 547 Dundas Road in Forrestfield. The Academy has been regulated under the Act since 2006 due to soil and groundwater contamination arising from the storage and use of a variety of flammable substances in training exercises. More recent investigations confirmed that PFAS contamination is also present at the site, related to AFFF use. The Academy is classified as *contaminated – remediation required*.
- 521 Dundas Road in Forrestfield (an industrial site adjacent to the Academy) is also classified as *contaminated – remediation required* due to PFAS impacts.
- Two sections (two sites made up of a total of eight parcels of land) of the Perth Airport North Main Drain in South Guildford, on land in state jurisdiction (123 Beverley Terrace and 64 Great Eastern Highway), classified as *contaminated – restricted use*.
- 128 Farrington Road in North Lake (a privately-operated site used for firefighting training activities), classified as *contaminated – remediation required*.
- Part of Varanus Island in the Shire of Ashburton (Crown Reserve No. 33902), classified as *contaminated – remediation required*.
- Part of Port Hedland International Airport (Title 2874/668), classified as *contaminated – remediation required*.
- 18 Kwinana Beach Road in Kwinana Beach (a fuel refinery), classified as *contaminated – remediation required*.
- 14 Leighton Beach Boulevard in North Fremantle (site of two former bulk fuel storage and distribution facilities), classified as *contaminated – remediation required*.
- 200 Barrington Street in Bibra Lake (a former metal recycling facility), classified as *contaminated – remediation required*.
- 1 Bulbey Street and 88 Oliver Street in Bellevue ([a former liquid waste recycling facility](#) destroyed by fire in 2001), classified as *contaminated – remediation required*.
- 207 Burslem Drive, Maddington (an operating service station where a fuel tanker caught fire in 2009), classified as *remediated for restricted use*.
- 153 Port Beach Road in North Fremantle (a former bulk fuel storage and distribution facility), classified as *remediated for restricted use*.
- Former Perth Fire Station and Fire and Emergency Services House at 480 Hay Street in Perth, classified as *remediated for restricted use*.
- 1 Murray St in Perth (neighbouring property to the former Perth Fire Station), also classified as *remediated for restricted use*.

Most PFAS contaminated sites identified in WA to date are associated with historic use of AFFFs. More sites are likely to be added to the [Contaminated Sites Database](#) as investigation results become available.

DWER has commenced investigations of PFAS background levels in the urban environment involving sampling and analysis of soil and groundwater in areas largely surrounded by residential land, and therefore considered unlikely to be directly impacted by any major PFAS sources.

Investigations carried out at Perry Lakes and Lake Claremont in 2017 found no PFAS impacts in soil, soil leachate (a measure of potential risk to surface water or groundwater quality) or groundwater up-gradient of the lakes, or in the surface water of the lakes. However, low-level PFAS impacts were detected in soil leachate and groundwater at locations immediately downgradient of Perry Lakes. Results for PFOS and PFHxS combined at these locations ranged between 0.01 to 0.12 micrograms per litre in soil leachate

(a measure of how much PFOS and PFHxS can leach from the soil in laboratory test conditions) and from 0.01 to 0.03 micrograms per litre¹ in groundwater. The levels in groundwater were well below the [health based guideline value](#) for recreational and non-potable use (0.7 micrograms per litre). The results indicate that lake sediments may act as a 'sink' for diffuse low-level PFAS in the urban setting, which may be transported through stormwater run-off.

DWER also included screening assessment of PFAS levels in a number of waterways within the footprint of the 2016 Yarloop fires, as part of a larger study investigating the environmental impact of bushfire and fire-control. PFOS was found in surface water at concentrations ranging between 0.027 and 0.057 micrograms per litre at two upper catchment sites. These sites were in forested catchments above development, but within the footprint of the fire and the area of fire control measures. PFAS were not found in surface waters of reference sites (outside of the fire affected area), or in lower catchment sites with mining, agriculture and peri-urban land use.

In response to recommendations made by the [Legislative Council Standing Committee on Environment and Public Affairs](#), DWER commissioned a groundwater investigation at a vineyard at 123 King Road in Oakford in May 2017. PFAS were detected in groundwater, although AFFFs do not appear to be a significant source of the substances found. Further information and the [groundwater investigation report](#) are available on [DWER's website](#).

Using its technical expertise and data to assess how PFAS from historical land use activities may move through surface water and groundwater, DWER works closely with WA DoH, the Water Corporation and other water service providers to ensure any potential risks to public drinking water are carefully investigated and managed to safeguard public health. Investigations include a risk assessment based on land uses and targeted water monitoring, as recommended by the Australian Drinking Water Guidelines.

As part of its support for the Cockburn Sound Management Council, DWER arranged for [sampling to measure PFAS levels](#) in the marine waters of Cockburn Sound in January 2017. Concentrations of PFAS were at or below the limits of reporting at all the sites sampled in Cockburn and Warnbro Sounds, indicating that PFAS contamination identified at HMAS Stirling has not impacted water quality in Cockburn Sound.

Department of Fire and Emergency Services

DFES no longer uses AFFF and has not since 2003. In addition to the works underway at its Forrestfield Training Academy, DFES is reviewing its current and former sites for historic AFFF use to determine whether detailed investigations are required and their priority for investigation.

While DFES had initially identified and reported approximately 170 current and former sites across WA where foams containing PFOS or PFOA may have been stored or used, further inquiry has found that one of these sites was leased post 2003 when AFFF was phased out. DFES has commenced preliminary site investigations at an initial 20 sites, including its O'Connor workshop. The findings of these investigations will determine whether further, more detailed studies are required, and they will also be used by DWER to determine the appropriate classification for the site under the CS Act.

In addition, given the possible occupational exposure of firefighters to AFFF prior to 2003, DFES has committed to a program of voluntary blood testing for past and present firefighters (Career and Volunteer). This is consistent with positions adopted by Queensland and the Northern Territory.

DFES is also committed to transitioning to non-fluorinated firefighting foams, subject to trials and validation of their efficacy and safety. As part of this process, DFES will investigate options to safely dispose all old foams and decontaminate its fire appliances.

¹ Analytical results for liquids, such as water samples and "soil leachate" samples, are reported as micrograms *per litre*. Results for solids, such as soil samples, are reported as milligrams *per kilogram* (or micrograms *per kilogram*). A microgram is one-thousandth of a milligram, and one-millionth of a gram.

Department of Biodiversity, Conservation and Attractions

Consistent with its role in the day-to-day management of the Swan Canning Riverpark, the Department of Biodiversity, Conservation and Attractions (DBCA) undertook a screening assessment of PFAS in surface waters at 20 routine monitoring sites throughout the Swan Canning Estuary and at 26 sites within its sub-catchments in December 2016.

PFAS were detected at all locations. Water quality at all 20 routine monitoring sites in the Swan Canning Estuary, and all but two of the sub-catchment sites, met the [health based guidance values](#) for recreational water. Results for PFOS and PFHxS combined at these 44 sites ranged between 0.0003 and 0.11 micrograms per litre. The two sub-catchment sites which exceeded the health based guidance value for PFOS and PFHxS combined in recreational water (of 0.7 micrograms per litre) were the Perth Airport North and South Main Drains, recording concentrations of 5.1 and 1.0 micrograms per litre, respectively. Sampling was repeated in June 2017 and PFAS were again detected at all sites, with similar results for PFOS and PFHxS in the two Perth Airport sub-catchments.

As noted earlier, the portions of the Perth Airport North Main Drain in state jurisdiction are classified as *contaminated – restricted use* under the CS Act. The South Main Drain is classified as *possibly contaminated – investigation required*. A portion of the drain has now been replaced by a sealed pipe, and most of the remainder is fenced and not accessible to the public. The small unfenced section of the South Main Drain is not considered to be a recreational water body. Consequently DWER and WA DoH are satisfied that concentrations of PFAS in the South Main Drain do not pose an unacceptable risk to members of the public, and specific restrictions on use under the CS Act are therefore not required at present.

In line with the Government's precautionary approach to the management of PFAS issues, and although Australian health authorities have advised that there is currently no consistent evidence that exposure to PFAS causes adverse human health effects, DBCA undertook preliminary sampling of black bream and blue swimmer crabs in the Swan Canning Estuary in June 2017. Analysis of these samples indicates that PFAS concentrations in black bream fillets and blue swimmer crab meat were very low. Based on these preliminary data, WA DoH's standing advice that it is safe to eat fish and crabs from the Swan and Canning rivers remains unchanged. Further sampling of black bream, blue swimmer crabs and also western school prawns will begin in November 2017 and continue throughout the summer, with results available in early 2018.

DBCA does not use fluorinated foams or retardants containing PFAS, including PFOS and PFOA, for its prescribed burning or bushfire suppression operations.

ChemCentre

ChemCentre is working with State and Commonwealth Government agencies to assess the potential impacts of PFAS compounds in the environment and on human health. It has developed National Association of Testing Authorities accredited methodologies for the analysis of PFAS in a variety of matrices (such as water and soil).

ChemCentre has also carried out studies to determine typical background levels in soil and water and is collaborating with DBCA and the National Measurement Institute to determine levels in biota.

Forrestfield-Airport Link project

Routine testing commissioned by the Public Transport Authority prior to the start of construction, commenced in 2015 around the Forrestfield-Airport Link project area. Detectable levels of PFAS were identified across the project site.

The Public Transport Authority is working closely with all relevant agencies to ensure appropriate management during construction. It is important to note the presence of PFAS has not been caused by the Forrestfield-Airport Link project.

The Forrestfield-Airport Link project requires the reuse or disposal of nearly one million cubic metres of soil from various excavations and tunnelling works. Some of this soil contains minor yet detectable concentrations of PFAS. The most commonly detected PFAS compound is PFOS, and the maximum concentration detected in soil is 0.006 milligrams per kilogram.

Soil excavated by the Forrestfield-Airport Link project is being temporarily stored to ensure that construction continues to progress on schedule. Temporary storage of soil is being undertaken in accordance with current PFAS environmental management practices and a suite of project-specific environmental management plans.

The temporary soil storage location at 777 Abernethy Road in Forrestfield is classified as remediated for restricted use under the CS Act (and listed on the [Contaminated Sites Database](#)) due to residual contaminants (asbestos containing materials in soil, and metals and nutrients in groundwater) from a former land use – unrelated to the Forrestfield-Airport Link project. Baseline testing for PFAS was undertaken at the site before stockpiling commenced. Levels of PFOS in soil ranged from not detected up to 0.0575 milligrams per kilogram, and in groundwater from 0.003 to 0.083 micrograms per litre.

It is anticipated that the PFAS NEMP will provide general guidance on reuse of soil containing minor concentrations of PFAS, such as that excavated by the Forrestfield-Airport Link project.

The investigations around the Forrestfield-Airport Link project area since 2015 also tested groundwater and surface water in nearby drains. PFAS were detected in groundwater at many locations tested, including at the future Forrestfield Station, near the future Belmont Station in Redcliffe and in Bayswater. Generally, PFAS levels were higher in groundwater in Redcliffe than at other locations. WA DoH has advised that public health exposure can be managed by following its longstanding advice on [using bore water safely](#).

Samples from the Perth Airport South Main Drain contained similar levels of PFAS to those found in DBCA's sampling. Levels of PFOS and PFHxS in the Bayswater Main Drain met the [health based guidance values](#) for recreational water.

Water Corporation

The Water Corporation conducted an initial risk assessment of known potential sources of PFAS to drinking water catchments. The risk assessment was undertaken using information on PFAS contamination sources seen elsewhere in Australia, such as airports and firefighting training facilities. The information from the risk assessment was used to implement targeted sampling for PFOS and PFOA. All results from this program have shown these compounds were below laboratory detection limits.

The Water Corporation is working on a risk-based operational sampling program targeting locations where there is potential risk of PFAS in drinking water. This approach is consistent with how the Water Corporation manages the risk of a broad range of potential contaminants in drinking water sources.

The Water Corporation is also investigating potential PFAS risk in wastewater schemes. This includes collaboration with regulators and the Australian water industry through Water Research Australia.

At the Water Corporation's Beenyup Wastewater Treatment Plant in Craigie, treated wastewater is further treated to drinking water standards, through the Advanced Water Recycling Plant (AWRP), before being used for [groundwater replenishment](#). The Water Corporation tested treated wastewater entering the AWRP for PFOS and PFOA over a six-month period. PFOS was detected once at the limit of reporting (0.01 micrograms per litre) and PFOA was consistently detected at 0.02 to 0.03 micrograms per litre. After further treatment through the reverse osmosis component of the AWRP, PFOS and PFOA were not detected, confirming the effectiveness of the reverse osmosis treatment in removing these chemicals.

WHERE CAN I GET MORE INFORMATION?

Please visit [DWER's PFAS webpage](#), [WA DoH's PFAS webpage](#) or call DWER's Contaminated Sites Information Line **1300 762 982**.