LEGISLATIVE COUNCIL
Question On Notice

Tuesday, 31 October 2017

465. Hon Dr Steve Thomas to the Minister for Environment

I refer to the potential contamination of soil and water by chemicals known as per and poly fluoro alkyl substances (PFAS) found in fire retardant foam, and I ask:

(a) have these substances been discovered in soil or water in Western Australia;
(b) if yes to (a), where have they been found and in what concentrations;
(c) if yes to (b), how have the contaminated materials been managed;
(d) are there any stockpiles or is there any storage of soils or water contaminated by PFAS; and
(e) if yes to (d), are any of these managed or controlled by the Western Australian State Government?

Answer

Per- and polyfluoroalkyl substances (PFAS) have been commonly used in a range of materials and products, including household items, the historical use of firefighting foam on Commonwealth and State land has left a legacy that needs to be carefully understood.

Scientific knowledge about the toxicity of PFAS is still evolving and Australian health authorities have advised that there is currently no consistent evidence that exposure to PFAS causes adverse human health effects. This Government remains vigilant, however. As such, I provide the following information.

(a – c) Yes. PFAS have been found in soil, surface water and/or groundwater at various locations in Western Australia.

These locations are grouped into three categories:

1) sites within State jurisdiction being regulated under the *Contaminated Sites Act 2003* (CS Act);
2) locations where low concentrations of PFAS have been identified through ambient monitoring programs; and
3) Commonwealth land, such as defence bases and certain airports.

Sites within State jurisdiction regulated under the CS Act

The table at Attachment 1 outlines all sites being regulated under the CS Act where perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and/or perfluorohexane sulfonate (PFHxS) have been detected. At sites where PFAS have been found, the concentrations typically vary between individual sample points and/or over time.

Attachment 1 sets out the minimum and maximum detected concentrations for the three most commonly tested PFAS (PFOS, PFOA and PFHxS in soil, surface water and/or groundwater (as relevant) at each site. A brief summary of the management actions required in accordance with the CS Act is also provided.
At many of these sites, other types of contaminants are also present; the classification and management actions consider all types of contaminants at the site.

PFAS identified through ambient monitoring programs

As part of ambient monitoring programs, PFAS have been detected in the Swan Canning Estuary, groundwater near Perry Lakes and in two waterways within the footprint of the 2016 Yarloop fires.

The Department of Biodiversity, Conservation and Attractions 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 and again in June 2017. PFAS were detected at all locations, and all bar two of the sites sampled were within the health-based guidance value for recreational and non-potable water use (i.e. PFOS and PFHxS combined were less than 0.7 micrograms per litre). The two sites outside the health-based guidance value were the Perth Airport North and South Main Drains. The catchment for these drains includes Commonwealth land under Perth Airport. Both main drains are currently regulated under the Contaminated Sites Act (see Attachment 1).

The Department of Water and Environmental Regulation carried out investigations at Perry Lakes and Lake Claremont in 2017 in order to assess potential background PFAS concentrations in an urban setting. Low-level PFAS impacts were detected in groundwater at locations immediately downgradient of Perry Lakes. Results for PFOS and PFHxS combined at these locations ranged from 0.01 to 0.03 micrograms per litre in groundwater. As above, these values are well within the health-based guidance value for recreational and non-potable water use.

The Department of Water and Environmental Regulation also included screening assessment of PFAS levels at four locations in 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 in two brooks in forested areas; PFHxS was not detected. Again, these levels are well below the health-based guidance value for recreational and non-potable water use. PFAS were not found in surface water at the reference site (outside of the fire affected area), or in sites with surrounding mining, agriculture and peri-urban land use.

Commonwealth land

While the legal situation is complex, some State laws do not apply to Commonwealth land or entities. The Department of Water and Environmental Regulation is aware that investigations are being carried out by relevant agencies/entities at Perth Airport, and at the following sites in Western Australia by the Department of Defence:

- RAAF Base Pearce in Bullsbrook;
- Gingin Satellite Airfield;
- RAAF Base Learmonth near Exmouth;
- Harold E Holt Naval Communication Station A and B near Exmouth; and
- HMAS Stirling on Garden Island.

As the investigations are still in progress, reports containing the concentrations found through testing have not yet been finalised or submitted to the Department of Water and Environmental Regulation by the relevant Commonwealth agency/entity.

(d – e) Yes. The Department of Water and Environmental Regulation is aware that excavated soils originating from construction works for the Forrestfield-Airport Link project are being stockpiled at 777 Abernethy Road in Forrestfield. Some of these soils contain low levels of PFAS. The site is Crown land managed by the Public Transport Authority. The Department of Water and Environmental Regulation is not aware of any other stockpiles or storage of soils or water containing PFAS.

Hon Stephen Dawson MLC
MINISTER FOR ENVIRONMENT; DISABILITY SERVICES

PFAS-impacted sites regulated under the *Contaminated Sites Act 2003*

Abbreviations:

PFOS = perfluorooctane sulfonate
PFOA = perfluorooctanoic acid
PFHxS = perfluorohexane sulfonate

ND = not detected above the analytical laboratory's limit of reporting
µg/L = micrograms per litre
µg/kg = micrograms per kilogram

Contaminated site	PFAS concentration range (minimum and maximum)		Management
Future Belmont Station site, Brearley Avenue road reserves, Redcliffe	Groundwater (µg/L) : PFOS: ND to 2.31 PFOA: ND to 0.252 PFHxS: ND to 3.08	Soil (µg/kg): PFOS: ND to 1.1 PFOA: ND PFHxS: ND	• Classified as *possibly contaminated – investigation required.* • Monitoring during construction of the Forrestfield-Airport Link project.
Perth Airport South Main Drain; Redcliffe and Ascot	Surface Water (µg/L) : PFOS: 0.01 to 0.56 PFOA: ND to 0.03 PFHxS: 0.02 to 0.55	Soil (µg/kg): Not applicable	• Classified as *possibly contaminated – investigation required.*
Perth Airport North Main Drain; Crown Reserve Lots Swan River Foreshore; and private commercial properties 44, 54 and 64 Great Eastern Highway, South Guildford	Surface Water (µg/L) : PFOS: 1.8 to 3.3 PFOA: 0.03 to 0.168 PFHxS: 1.8 to 1.8	Soil (µg/kg): Not applicable	• Classified as *contaminated – restricted use.*
Future Forrestfield Station site, Forrestfield (Crown land)	Groundwater (µg/L) : PFOS: ND to 0.24 PFOA: not detected PFHxS: 0.024 to 0.12	Soil (µg/kg): PFOS: ND to 0.6 PFOA: ND PFHxS: ND to 0.8	• Reported under the Act, awaiting classification. • Testing of excavated soil during construction of the Forrestfield-Airport Link project.

Contaminated site	PFAS concentration range (minimum and maximum)	Management
Forrestfield Rail Yard (Lot 15532 on Plan 43224) 882 Abernethy Road, High Wycombe	Groundwater (µg/L) : PFOS: ND to 17.5 PFOA: ND to 0. 133 PFHxS: ND to 2.11 Soil (µg/kg): No data available	• Reported under the Act on 6 November 2017; currently being reviewed for classification.
Bayswater Main Drain, Bayswater	Surface Water (µg/L) : PFOS: 0.038 to 0.09 PFOA: 0.0036 to 0.005 PFHxS: 0.0125 to 0.037 Soil (µg/kg): Not applicable	• Classified as *possibly contaminated – investigation required.*
777 Abernethy Road, Forrestfield	Groundwater (µg/L) : PFOS: 0.003 to 0.083 PFOA: ND to 0.008 PFHxS: 0.003 to 0.15 Soil (µg/kg): PFOS: ND to 57.5 PFOA: ND to 0.7 PFHxS: ND to 6.0 Surface Water (µg/L): PFOS: 0.012 to 0.015 PFOA: 0.002 to 0.003 PFHxS: 0.003 to 0.014	• Classified as *remediated for restricted use* due to residual contaminants (asbestos containing materials in soil, and metals and nutrients in groundwater) from a former land use. • Currently being used for temporary stockpiling of excavated soils from the Forrestfield-Airport Link project. • Reported results are from baseline testing for PFAS, undertaken before stockpiling commenced at the site.
Crown reserve land (Lot 800) Swan River foreshore; Bayswater - part of Forrestfield-Airport Link project	Groundwater (µg/L) : PFOS: ND to 0.04 PFOA: ND to 0.03 PFHxS: ND to 1.6 Soil (µg/kg): PFOS: ND PFOA: ND PFHxS: ND	• Reported under the Act, awaiting classification. • Monitoring during construction of the Forrestfield-Airport Link project.
Department of Fire and Emergency Services (DFES) Training Academy (and affected site) 547 and 521 Dundas Road, Forrestfield	Groundwater (µg/L) : PFOS: ND to 64.4 PFOA: ND to 2.35 PFHxS: no data available Soil (µg/kg): No data available	• Classified under the Act as *contaminated – remediation required.* • Contaminated sites auditor overseeing ongoing investigations and development of a site management plan.

Contaminated site	PFAS concentration range (minimum and maximum)		Management
Former DFES Headquarters (480 Hay Street and 15 and 25 Murray Street) Perth and adjacent 1 Murray Street Perth	Groundwater (µg/L) : PFOS: ND to 2.68 PFOA: ND to 1.78 PFHxS: ND to 5.11	Soil (µg/kg): PFOS: ND to 33 PFOA: ND PFHxS: ND	• The majority of impacted soils have been removed from the former DFES Headquarters; data presented here are post-remediation concentrations. • Classified as *remediated for restricted use.* • Restriction on groundwater use.
Private fire training facility, 128 (Lot 4065) Farrington Road, North Lake	Groundwater (µg/L) : PFOS: ND to 1.67 PFOA: ND to 1.78 PFHxS: ND to 4.66	Soil (µg/kg): PFOS: 1.9 to 1,320 PFOA: 1.6 to 64.1 PFHxS: 0.8 to 89.2	• Classified as *contaminated – remediation required.* • Some partial remedial works have been undertaken at the site. Concentrations reported are post-remediation. • Further investigations underway to delineate the full extent of groundwater impacts. • Remediation Action Plan (RAP) to be developed. • A contaminated sites auditor is overseeing investigations and development of the RAP.
Fuel refinery, 18 Kwinana Beach Road, Kwinana Beach	Groundwater (µg/L): PFOS: ND to 4.93 PFOA: ND to 26.2 PFHxS: ND to 2.29	Soil (µg/kg): No data available	• Classified as *contaminated – remediation required.* • Regular groundwater monitoring required by the site's Part V *Environmental Protection Act 1986* licence conditions.
Former fuel terminal, 153 Port Beach Road, North Fremantle	Groundwater (µg/L): PFOS: ND to 9.83 PFOA: ND to 0.55 PFHxS: ND to 32.5	Soil (µg/kg): PFOS: ND to 600 PFOA: ND to 39 PFHxS: ND to 16	• Classified as *remediated for restricted use.* • Restriction on groundwater use.
Former fuel terminal, 40 Bracks Street, North Fremantle	Groundwater (µg/L) : PFOS: ND to 6.7 PFOA: ND PFHxS: ND to 4.2	Soil (µg/kg): No data available	• Classified as *possibly contaminated – investigation required.* • Investigations and monitoring ongoing; contaminated sites auditor appointed to oversee investigations.

Contaminated site	PFAS concentration range (minimum and maximum)		Management
Former fuel terminals, 14 (Lot 521) Leighton Beach Boulevard, North Fremantle	Groundwater (µg/L) : PFOS: ND to 4.4 PFOA: ND to 0.34 PFHxS: ND to 5.99	Soil (µg/kg): No data available	• Classified as *contaminated – remediation required.* • Recent investigations undertaken; contaminated sites auditor preparing a mandatory auditor's report.
Service station, 207 (Lot 52) Bursiem Drive, Maddington	Groundwater (µg/L): PFOS: ND to 6.93 PFOA: ND to 1.74 PFHxS: ND to 0.06	Soil (µg/kg): No data available	• Operating service station where a fuel tanker caught fire in 2009. • Classified as *remediated for restricted use.* • Land use restricted to current commercial/industrial use as a service station; groundwater use restricted. • Further investigations being carried out both on-site and off-site; contaminated sites auditor appointed.
Karratha Airport, Norman Road, Gap Ridge	Groundwater (µg/L) : PFOS: 2.0 to 6.0 PFOA: 0.47 to 1.99 PFHxS: not reported	Soil (µg/kg): PFOS: 0. 6 to 265 PFOA: ND to 2.4 PFHxS: not reported	• Classified as *possibly contaminated – investigation required.* • Occupier (a Commonwealth entity) working to finalise a Preliminary Site Investigation and develop scope for further investigations.
Port Hedland Airport, Great Northern Hwy, Port Hedland (and affected site)	Groundwater (µg/L) : PFOS: ND to 25,000 PFOA: ND to 1,010 PFHxS: not reported	Soil (µg/kg): PFOS: 20 to 670,000 PFOA: ND to 510 PFHxS: not reported	• Former fire training area is classified as *contaminated – remediation required.* • Current fire training area and an affected site are classified as *possibly contaminated – investigation required.* • Current/former occupier (a Commonwealth entity) working to develop plans for further investigations and remediation.

Contaminated site	PFAS concentration range (minimum and maximum)		Management
Part of Varanus Island; Crown Reserve 33902, Shire of Ashburton	Groundwater (µg/L) : PFOS: ND to 1.17 PFOA: ND to 0.024 PFHxS: ND to 1.68	Soil (µg/kg): No data available	• Classified as *contaminated – remediation required.* • Active remediation to address hydrocarbon contamination underway. • Further investigations required to fully characterise PFAS impacts and assess potential risks.
200 (Lots 39 and 40) Barrington Street, Bibra Lake	Groundwater (µg/L) : PFOS: ND to 0.46 PFOA: ND to 0.07 PFHxS: ND to 0.11	Soil (µg/kg): PFOS: 0.6 to 18 PFOA: ND to 0.6 PFHxS: ND to 1.6	• Former metal recycling facility which received a range of metal waste products including car bodies. • Classified as *contaminated – remediation required.*
123 (Lot 6) King Road, Oakford	Groundwater (µg/L) : PFOS: ND to 0.04 PFOA: ND to 0.08 PFHxS: ND to 0.15	Soil (µg/kg): No data available	• Vineyard near a former composting facility; compost stockpiles stored at the site. • Classified as *possibly contaminated – investigation required.* • Further investigation required to verify results, delineate impacts, and determine whether there is an ongoing source of PFAS at the site.
1 (Lot 99) and adjacent land Bulbey Street, Bellevue	Groundwater (µg/L) : PFOS: ND to 1.46 PFOA: ND to 0.82 PFHxS: ND to 0.63	Soil (µg/kg): PFOS: 0.5 to 14.6 PFOA: ND to 1.8 PFHxS: ND to 1.2	• Former liquid waste recycling facility destroyed by fire in 2001. • Classified as *contaminated – remediation required.* • Remediation works to address chlorinated hydrocarbon and petroleum hydrocarbon contamination being carried out at the site. • Further investigations required to fully characterise PFAS impacts and assess potential risks to the environment.