

19 May 2021

PFAS Investigation at the Country Fire Service (CFS) Brukunga State Training Centre and Surrounds – Community Information Session

Note that this document relates solely to PFAS

What are PFAS?

PFAS stands for 'per-and poly-fluoroalkyl substances'. They are man-made chemicals that have been used for a variety of purposes since the 1950s, including certain types of firefighting foams called AFFF (aqueous film forming foams) – AFFF were used in the past at the CFS State Training Centre in Brukunga.

As PFAS have properties that can make products non-stick, water-repellent and fire, weather and stain resistant, other common uses have included fast food packaging, stain resistant carpets/rugs/furniture, non-stick cookware, personal care and cleaning products as well as water-repellent clothing. They were also used in a range of additional industrial/manufacturing processes. As a result, PFAS are widespread in the environment (throughout the developed world) and may be associated with a variety of sources.

Are PFAS-containing foams still used?

Although significant quantities of PFAS-containing AFFF have not been used at the CFS State Training Centre since 2001, small quantities were still used for portable fire extinguisher training up until January 2020.

PFAS-containing AFFF are no longer used or stored at the CFS State Training Centre.

Why are we investigating PFAS in association with the CFS State Training Centre?

PFAS are known to have been used historically at the CFS State Training Centre and their identified presence in Dawesley Creek in 2019 prompted further environmental investigations, both on the CFS property and within the surrounding area.

PFAS are of concern because they are soluble (in water), mobile and persistent in the environment and are not subject to natural biological degradation processes – as a result they can be found in various media (e.g. soil, surface water and groundwater) and can travel relatively long distances. They can also be taken up by plants and animals, including humans, and are only excreted from the human body over relatively long periods of time.

Various animal studies have found PFAS to have possible links to health effects in laboratory animals – these include increased blood cholesterol and uric acid levels, reduced kidney function, lowered immune system responses, altered levels of certain (e.g. thyroid) hormones, lower birth weights in babies and benign (non-cancerous) tumours.

Although both the South Australian and Commonwealth Departments of Health advise that PFAS have not been proven to cause any specific health effects/illnesses (including cancer) in humans, an abundance of studies are on-going around the world and the current advice is to minimise human exposure to PFAS.

What investigations have been undertaken so far?

The environmental investigations undertaken to date at the CFS State Training Centre have assessed for the presence and concentrations of PFAS in concrete paving (within training 'hotpad' areas) and underground concrete water-storage tanks, stored tank water (used for training purposes), soil and groundwater.

Within the surrounding area, investigations have focussed on the following:

- surface water and sediments from Dawesley Creek and other associated surface water bodies (i.e. Nairne Creek, Mt Barker Creek and the Bremer River);
- groundwater within the surrounding area – including the testing of private residential bores, existing bores associated with the former Brukunga Mine site and more recently installed monitoring bores;
- sludge, sediments and surface water associated with the former Brukunga Mine water treatment plant; and
- selected home-grown produce (i.e. vegetables, fruit, meat) from properties where creek water/groundwater is used for irrigation and/or livestock watering purposes.

The aim of this work was to determine whether the historical use of AFFF at the CFS State Training Centre has resulted in PFAS within the surrounding environment and, if so:

- whether there are any areas of the CFS State Training Centre that could still be acting as an on-going source of PFAS to the environment;
- what parts of the environment are affected by PFAS;
- how far the PFAS had moved from the CFS State Training Centre;
- what the implications are with respect to human health and the environment; and
- what (if any) remediation or management measures are required.

The environmental investigations have been undertaken by the consulting firm GHD, in accordance with a Voluntary Site Contamination Assessment Proposal (VSCAP) agreed between the CFS and the SA EPA. The investigations are also subject to a statutory Contaminated Sites Audit (by Dr Ruth Keogh of Fyfe).

What are the results?

The investigation results have been compared to Australian guidelines developed to be protective of human health and the environment and have been interpreted to indicate the following:

CFS State Training Centre

The concrete paving within the site's hot-pad training areas, the underlying/adjoining soils, the concrete walls of the underground water storage tanks and the water contained therein have all been found to contain residual PFAS.

Surrounding area

Within the surrounding area, PFAS impacts have been identified as follows:

- within surface water and sediments in Dawesley Creek and the Bremer River¹ – although the impacts have been traced approximately 37 km downstream of the site (to Jaensch Road, Hartley (between Callington Road and North Bremer Road), the full extent within the Bremer River has yet to be determined;
- within groundwater beneath the former Brukunga Mine site, the associated water treatment plant area and along the alignment of Dawesley Creek – the extent of the groundwater impacts is considered to have now been delineated; and
- within the ponds and dried waste sludge associated with the Brukunga Mine water treatment plant.

These results have therefore confirmed that the historical use of AFFF at the CFS State Training Centre resulted in the release of PFAS into the surrounding environment – this is thought to have occurred via surface water run-off to Dawesley Creek and stormwater infiltration (from the hotpads) to subsurface groundwater.

¹ Although PFAS have also been detected in the upper reaches of Nairne Creek, Mt Barker Creek and the Bremer River, these impacts are not considered to be associated with the CFS State Training Centre.

However, PFAS has not been detected within any of the home-grown produce (fruit, vegetables and meat from a locally grown lamb) sampled at properties where creek water/groundwater is used for irrigation and/or livestock watering purposes.

What do the results mean?

Human Health

Based on the results of the investigations undertaken to date, there is a potential risk that landowners and occupants of/visitors to properties located in the vicinity of Dawesley Creek, Mt Barker Creek and the Bremer River (i.e. downstream of the CFS State Training Centre) could be exposed to PFAS via the incidental ingestion of creek water/sediments and/or the consumption of aquatic species such as fish and yabbies.

Although home-grown produce testing has not identified the presence of PFAS, only limited testing has been undertaken so far and the risk of PFAS exposure via the consumption of fruit, vegetables and meat irrigated/watered with PFAS-impacted surface water or groundwater has not yet been fully assessed.

Environment

The investigation results have indicated that there is a potential risk to the ecology of Dawesley Creek downstream of the CFS State Training Centre and the downstream reaches of Mt Barker Creek and the Bremer River, where the presence of PFAS-contaminated surface water and/or sediments has been identified.

Advice to landowners and property occupants

Based on the investigation results the following precautionary advice pertains to the creeks downstream of the CFS State Training Centre² – this advice will remain in place at least until the current investigation program has been completed:

As a precaution, given the identified presence of PFAS in Dawesley Creek and downstream sections of Mt Barker Creek and the Bremer River, landowners and occupants of, and visitors to, properties located within the vicinity of Dawesley Creek and the affected sections of Mt Barker Creek and the Bremer River are advised not to use surface water or consume aquatic species (e.g. fish and yabbies). This recommendation is consistent with SA Health advice that surface water from ephemeral creeks should not be used for drinking water without prior treatment.

Individuals with groundwater bores (within the affected area) have been provided with specific advice regarding groundwater use.

Where to from here?

Further assessment is still required to determine how far downstream the PFAS has moved within the Bremer River and to determine the potential risks to the ecology of the creek system – this will involve:

- additional sampling of the creek water and sediments further downstream of the existing sampling locations; and
- a specialist environmental risk assessment of PFAS within the creek system, including testing of aquatic species.

With respect to the management/remediation of the other identified PFAS impacts, the first stage of remediation has already been completed – this involved the recent construction of a water filtration treatment plant on the CFS State Training Centre to remove PFAS from water stored within the concrete tanks (as used for training purposes) and water associated with the former Brukunga Mine water treatment plant system, prior to discharge into Dawesley Creek. Although the current plan is to operate the water

² Note that the Dawesley Creek system downstream of the CFS State Training Centre has also been affected by the former Brukunga Mine and does not constitute a pristine ecosystem.

filtration plant for the next 10 years, the overall period of operation will depend on the results obtained during regular monitoring of the treated water.

The next stage of work also involves identifying and instigating appropriate remediation options for areas of potential on-going PFAS release to the environment, including the PFAS impacted infrastructure and soils at the CFS State Training Centre, and the waste sludge material generated by the former Brukunga Mine water treatment plant and stored within the disused mine.

Potentially useful links

Commonwealth Department of Health:

<https://www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas.htm#pfas>

South Australian Department of Health:

<https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/conditions/chemicals+and+contaminants/pfas/per-+and+poly-fluoroalkyl+substances+pfas>

<https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/public+health/water+quality/bore+water/bore+water>

Safemeat:

https://www.mla.com.au/globalassets/mla-corporate/meat-safety-and-traceability/red-meat-integrity-system/safemeat_issues-brief_lpa-_pfas_may-2019.pdf

South Australian CFS:

https://www.cfs.sa.gov.au/site/about_cfs/pfas.jsp

Contact for Further Information

Brenton Eden

Assistant Chief Officer, Director Operational Training and PD, Frontline Services Support

SA Country Fire Service

Ph: 8398 9968

email: brenton.eden@sa.gov.au