



Per- and Poly-Fluoroalkyl Substances (PFAS) Management and Remedial Options – an update

The Department of Defence (Defence) is researching a number of management and remedial options as part of its national PFAS Investigation and Management program.

About PFAS

Defence commenced its national program to review its estate and investigate and implement a comprehensive approach to manage the potential impacts of PFAS resulting from the historical use of legacy fire fighting foams at some of its bases. These older formulations of foams were once used extensively worldwide and in Australia due to their effectiveness in fighting liquid fuel fires.

These compounds were also used in common household and speciality applications, including in the manufacture of non-stick cookware, fabric, furniture and carpet stain protection applications, food packaging, and in some industrial processes.

PFASs are emerging as a concern around the world because they are persistent in the environment.

From 2004, Defence started phasing out its use of the old foams. There is limited scientific information about the impact of PFAS, or how to remediate soil and water affected by these compounds.

When Defence commenced its investigations into PFAS, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) were the primary contaminants of concern. More recently enHealth has advised perfluorohexane sulfonate (PFHxS) should also be considered and has developed screening criteria for drinking water and recreational water. All Defence environmental investigations into PFAS now consider PFOS, PFOA and PFHxS as the primary contaminants of concern.

Management Overview

Defence's objective is to reduce the movement of, and potential exposure to, PFAS. Consideration will be given to current PFAS impacts in soil, sediment, surface water and groundwater.

Defence's priority is to engage with industry experts both nationally and internationally, to identify the best management and remedial options for PFAS.

Management and Remediation Trials

The following PFAS management options and remedial technologies are currently being trialled by Defence. Once Defence receives the results from trials, further analysis will be undertaken to determine the best management options and remedial options for relevant Defence sites.

Interim Water Treatment Plant

Defence is implementing an Interim Water Treatment Plant (WTP) to treat the outflow of Lake Cochran (RAAF Base Williamtown). The WTP underwent a commissioning and optimisation, which began in October and continued through until early December 2016. The commissioning and optimisation process ensured treated water was below the recommended enHealth interim Drinking Water Guideline values for PFOS, PFOA and PFHxS (enHealth, June 2016), before the WTP discharges water through Dawsons Drain. The WTP will operate for up to 12 months treating the outflow of Lake Cochran.

For further information please refer to *Lake Cochran Interim Water Treatment Plant - RAAF Base Williamtown – an update November 2016*.

Groundwater and Surface Water Trials

Defence is undertaking groundwater and surface water trials using United States based technology. These trials are in the design phase with the technology anticipated to be on-site in early 2017, provided the initial design is determined likely to be effective.

Solidification

Solidification involves mixing a binding agent with affected soil to bind the compounds in a solid block, trapping it in place. Defence undertook solidification trials using source material from RAAF Base Williamtown and the Army Aviation Centre Oakey. Physical and chemical testings have been completed with promising outcomes in certain applications, however further analysis is required to determine utility. For further information, please refer to *Per- and Poly-Fluoroalkyl Substances (PFAS) Management and Remedial Options – Update on Defence Soil Solidification and Stabilisation Trials Factsheet*.

Stabilisation

Stabilisation involves mixing particular materials into affected soil to cause a chemical reaction, which will ensure the compounds are less likely to spread. Defence commenced Stabilisation trial activities in October 2016 using source material from RAAF Base Williamtown and Army Aviation Centre Oakey. For further information, please refer to *Per- and Poly-Fluoroalkyl Substances (PFAS) Management and Remedial Options – Update on Defence Soil Solidification and Stabilisation Trials Factsheet*.

In-situ Oxidation

In-situ oxidation involves applying heat and chemicals to break down PFAS into more environmentally friendly forms.

In-situ Reduction

In-situ reduction involves injecting chemicals into affected soil or groundwater to reduce concentrations of PFAS.

Foam Fractionation / Separation

Foam fractionation/ separation involves generating foam from affected groundwater. The foam containing PFAS can then be collected from the surface and removed to a treatment facility.





Ultrasonification / Sonochemistry

Ultrasonification/ sonochemistry involves using intense ultrasonic-wave energy to change PFAS into more environmentally friendly forms.

Defence have completed trials for In-situ Oxidation, In-situ Reduction, Foam Fractionation/ Separation, Ultrasonification/ Sonochemistry and Fungal Treatment trials.

Trials completed to date have delivered varying results, none of which could be implemented in the field at this time. The trials have not yet proven the effectiveness of these possible solutions, and have not ruled out the potential for these techniques to hasten the spread of contamination. Defence in consultation with its expert consultants are determining which, if any should be progressed further.

Defence is continuing to monitor Australian and international industry progress in the area of PFAS management and remedial technologies and options.

Other Management and Remediation Options

The best management and remedial options for a particular site are determined by site-specific factors, including the site's hydrogeology, the type of contamination, and access to the site.

The environmental investigations currently underway at several Defence sites have provided Defence with significant site-specific information. As a result, a number of management and remedial options can be discounted.

These include:

Above or underground wall or dam

The construction of an above ground or underground wall or dam around Defence sites would not prevent PFAS from moving offsite and into surrounding areas via groundwater. Depending on the hydrogeology of the site, this could result in flooding of the site and eventual overflow above the wall. This flooding would have significant impacts to both Defence capability and commercial operators and/or residents in the vicinity of the site.

Thermal desorption

Thermal desorption has been used to treat a site at RAAF Base Williams Point Cook in Victoria. PFOS and PFOA were treated; however they were not the key concern at this site. Thermal desorption involves using heat to enable the compounds to be separated from the soil. This method was successful for the primary contaminants of concern but is not the most effective, efficient or practical means for PFOS and PFOA soil remediation at this time.

Keeping the Community Informed

The identification of suitable management and remedial options are a priority, and Defence continues to work with domestic and international partners on this matter. Defence is committed to keeping the community informed about the work being undertaken regarding remediation.

As new information becomes available, Defence will update the website, produce fact sheets and hold community information sessions with local communities as required.

Further Information

For further information contact the national PFAS Investigation and Management team on:

Phone: 1800 365 414 (free call during business hours)

Web: <http://www.defence.gov.au/ID/PFOSPFOA>

Email: PFASDefenceCoordination@golder.com.au

Contact details for site-specific project teams can be found on the National PFAS website listed above.

Media enquiries should be directed to Defence Media Operations on (02) 6127 1999 or media@defence.gov.au.

