**PFAS and AFFF**

Aqueous Film Forming Foam (AFFF) is a fire fighting foam used to extinguish liquid fuel fires.

AFFF has been used extensively worldwide, including Australia, since the 1970’s by both civilian and military authorities. Legacy formulations contained some PFAS of concern as active ingredients, including:

- PFOS (perfluorooctane sulfonate)
- PFOA (perfluorooctanoic acid)
- PFHxS (perfluorohexane sulfonate)
From **1970s** Defence commenced use of AFFF containing PFOS/PFOA.

In **2003** Defence and other users became aware that PFOS/PFOA was an emerging persistent organic pollutant.

From **2004** Defence introduced a new foam and commenced phasing out use of the old foams for both training, and emergencies.

**Currently** For emergencies, Defence uses a foam that does not contain PFOS and PFOA as active ingredients.
Defence uses a training foam which does not contain PFOS and PFOA.
Foam is captured and disposed of in accordance with current regulations.
Human Health Risk Assessment (HHRA)


- Defence confirmed that the HHRA would be updated based on any changes made to Australian HHRA guidance or when additional data is available.

- Following an update by Food Standards Australia New Zealand (FSANZ) to the Tolerable Daily Intakes (TDI) recommended for use in Australia, AECOM has prepared a HHRA Sensitivity Assessment report.
Human Health Risk Assessment (HHRA) Sensitivity Assessment

- The Sensitivity Assessment describes how the adoption of the FSANZ TDI affects the conclusions of the 2016 HHRA Report.

- A TDI represents a level of a substance that a person can be exposed to every day of their entire lifetime without appreciable risk to their health. The TDI is based on toxicological studies and incorporates safety factors to account for uncertainty.
Method of Conducting the Sensitivity Assessment

- Adopt the FSANZ TDI for PFOS, PFHxS & PFOA.

- Evaluate changes in the resulting risk estimates, expressed as a Hazard Index (HI), which is the ratio of a person’s estimated long-term average daily intake to the TDI.

- The exposure scenarios used during the sensitivity assessment remained the same as those used during the 2016 HHRA.
  - No updates to the conceptual site model.

- No new data/information incorporated.
Precautionary Recommendations

Continued precautionary recommendations for Army Aviation Centre Oakey:

1. Avoid or minimise the use of groundwater for showering and bathing, filling swimming pools, and children’s wading pools. Avoid or minimise the use of groundwater for consumption of meat from cattle/sheep that drink water with detectable PFAS concentrations.

2. Continue not to drink groundwater.

3. Minimise consumption of fish from local waterways.

4. Minimise consumption of eggs from backyard chickens exposed to water containing detectable PFAS.

5. Avoid or minimise the use of groundwater for showering and bathing, filling swimming pools, and children’s wading pools.

6. Minimise consumption of meat from cattle/sheep that drink water with detectable PFAS concentrations.

7. Minimise consumption of fish from local waterways.
## HHRA Sensitivity Assessment

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Upper Exposure</td>
<td>Typical Exposure</td>
</tr>
<tr>
<td>Incidental ingestion of groundwater as a result of indoor domestic use (excluding drinking groundwater) and outdoor domestic use</td>
<td>Resident</td>
<td>Low &amp; Acceptable</td>
<td>Low &amp; Acceptable</td>
</tr>
<tr>
<td>Consumption of vegetables irrigated with water containing detectable PFAS or grown in soil that has been irrigated with water containing detectable PFAS</td>
<td>Resident</td>
<td>Low &amp; Acceptable</td>
<td>Low &amp; Acceptable</td>
</tr>
<tr>
<td>Consumption of meat from sheep or cattle that have consumed water containing detectable PFAS and/or consumed plants that have accumulated PFAS from irrigation water</td>
<td>Commercial Agricultural Worker</td>
<td>Low &amp; Acceptable</td>
<td>Low &amp; Acceptable</td>
</tr>
<tr>
<td>Consumption of fish from local waterways by recreational fishers</td>
<td>Recreational</td>
<td>Low &amp; Acceptable</td>
<td>Low &amp; Acceptable</td>
</tr>
</tbody>
</table>
# HHRA Sensitivity Assessment

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Upper Exposure</td>
<td>Typical Exposure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upper Exposure</td>
<td>Typical Exposure</td>
</tr>
<tr>
<td><strong>Exposure Pathways – Zone 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidental ingestion of groundwater as a result of indoor domestic use (excluding drinking groundwater) and outdoor domestic use</td>
<td>Resident</td>
<td>Elevated</td>
<td>Elevated</td>
</tr>
<tr>
<td>Consumption of vegetables irrigated with water containing detectable PFAS or grown in soil that has been irrigated with water containing detectable PFAS</td>
<td>Resident</td>
<td>Low &amp; Acceptable</td>
<td>Elevated</td>
</tr>
<tr>
<td>Consumption of fish from local waterways by recreational fishers</td>
<td>Recreational</td>
<td>Low &amp; Acceptable</td>
<td>Elevated</td>
</tr>
</tbody>
</table>

**Note:**
- Elevated indicates higher exposure levels.
- Low & Acceptable indicates acceptable exposure levels.
Current Precautionary Recommendations

- Continue not to drink groundwater in the Investigation Area

- Minimise home grown egg consumption in Zone 1 and Zone 2

- Avoid or minimise using groundwater for bathing, showering, swimming, paddling pools and/or sprinkler play in Zone 2 due to incidental ingestion
Additional Precautionary Recommendations

- Avoid or minimise using groundwater for bathing, showering, swimming, paddling pools and/or sprinkler play in Zone 1 and Zone 2 due to incidental ingestion

- Minimise consumption of the following until additional data can be collected to refine the HHRA:
  - locally caught fish (Investigation Area)
  - home grown vegetables (Zone 1 and Zone 2)
  - home grown red meat (Zone 1 and Zone 2)
Next Steps
Environmental Investigation

A scope of work has been developed to address data gaps and refine the following reports:

- Environmental Site Assessment
- Human Health Risk Assessment
- Preliminary Ecological Risk Assessment

In addition, an ongoing monitoring plan will be developed for PFAS impacted areas off base
Environmental Investigation

Tasks commenced since January 2017:

- Collection of yabbies and mussels from Oakey Creek.
- Habitat and bird survey.
- Fruit and vegetable PFAS uptake study.
- Chicken egg PFAS uptake study.
Environmental Investigation

Sampling completed to 29 March 2017:

<table>
<thead>
<tr>
<th>Residential sampling (completed since November 2016)</th>
<th>Environmental Investigation sampling (completed since January 2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of samples: <strong>121</strong>:</td>
<td>Total number of environmental samples: <strong>613</strong></td>
</tr>
<tr>
<td>• 13 tank</td>
<td>• 434 soil</td>
</tr>
<tr>
<td>• 44 bore</td>
<td>• 42 surface water</td>
</tr>
<tr>
<td>• 64 other samples (e.g. soil, sediment, biota, pool water, tap water).</td>
<td>• 19 sediment samples</td>
</tr>
<tr>
<td></td>
<td>• 118 groundwater samples</td>
</tr>
</tbody>
</table>

Total number of animal specimens collected: **66**

• 20 yabbies
• 14 prawn/shrimp
• 26 fish
• 2 mussels
• 4 hares
PFAS Response Management Activities

- Town Water Connections
- Groundwater Treatment Plant (Demonstration Unit)
- Soil Solidification and Soil Stabilisation Trials
- Drain Maintenance and Management Activities
- Removal of Source Areas
Need More Information?

Phone: 1800 136 129 free call
(Monday to Friday, 8.30am to 5pm)

Email: defence.oakey.anz@aecom.com

Website: http://www.defence.gov.au/ID/Oakey

Mail:
Army Aviation Centre Oakey
Environmental Investigation Project
C/O AECOM Pty Ltd
PO Box 1307
Fortitude Valley Qld 4006

Community Support:
• Community Wellness Program
• Department of Human Services Community Liaison Officer

Department of Health:
Phone: 1800 941 180
Email: health.PFAS@health.gov.au.
Questions?
Thank you for your attendance