About the preliminary Human Health Risk Assessment findings

Defence is currently conducting a Human Health Risk Assessment (HHRA) as part of the environmental investigation into per- and poly-fluoroalkyl substances (PFAS) at and around RAAF Base Amberley.

The aim of the HHRA is to provide a better understanding of where exposure risks to PFAS may be elevated for people within the Investigation Area.

This factsheet provides some of the preliminary findings for the HHRA which is expected to be completed in the first quarter of 2019.

The preliminary HHRA findings presented here focus on how people may be exposed to PFAS in off-Base areas within the Investigation Area.

What has been involved in the HHRA so far?

Information and results that were collected from the Preliminary Site Investigation and Detailed Site Investigation have been reviewed to identify what exposure pathways require further assessment as part of the HHRA.

Further sampling of soil, sediment, surface water, groundwater and biota have also been conducted as part of the HHRA.

This includes a review of PFAS concentrations against relevant screening level guidelines.

Where concentrations of PFAS are below the screening level guidelines, exposures are not considered elevated and no further evaluation was required to be conducted.

Information obtained from completed Water Use Surveys has been used to identify ways in which the community could be exposed to PFAS in the environment.

Examples include consuming PFAS impacted bore water or swimming in a local waterway that contains PFAS. At this stage, the preliminary HHRA findings only consider activities that are known to occur at this time.

How are exposure risks assessed?

An assessment of exposure risks is conducted by comparing the potential intake of PFAS from exposure pathways (such as ingestion of PFAS impacted water) with the adopted Tolerable Daily Intake (TDI). Developed by Food Standards Australia New Zealand (FSANZ), the TDI is the level of a chemical that a person can be exposed to every day of their entire lifetime without appreciable risk to their health. The PFAS TDI is specifically used for conducting assessments at contaminated sites to assess exposure risks.

Where potential exposures are calculated to be below the TDI, it can be concluded that exposures are “low and acceptable”. Where potential exposures are calculated to be above the TDI, exposures to PFAS have the potential to be “elevated”. As a result, risk mitigation or management measures may be required.

Assessment of Multiple Exposures

The HHRA considers how people may be exposed to PFAS during different activities that may occur in the Investigation Area.

In some cases, these scenarios involve people being exposed to PFAS through a combination of multiple activities. Exposure risks to PFAS will be less than indicated, when multiple activities are not undertaken.

The potentially elevated multiple exposure activities are restricted to people occupying properties in Areas 1 and 2 of the Investigation Area.

Figure 1: RAAF Base Amberley Investigation Area
Preliminary HHRA areas

The preliminary findings of the HHRA have been presented for five different areas. These areas have been defined based on a number of factors including their position in relation to waterways, concentrations of PFAS measured in the environment and the number of samples analysed in each area. The areas are consistent with the areas presented as part of the Detailed Site Investigation.

Preliminary findings of the HHRA

The preliminary findings of the HHRA have found that there is the potential for exposure to PFAS to be elevated in Area 1 and Area 2. The preliminary findings of the HHRA are summarised in Table 1.

Table 1: Preliminary findings of the HHRA summary table

<table>
<thead>
<tr>
<th>Exposures that may occur in areas investigated (where PFAS impacts are present)</th>
<th>AREA 1</th>
<th>AREA 2</th>
<th>AREA 3</th>
<th>AREA 4</th>
<th>AREA 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking tank water</td>
<td>✓</td>
<td>#</td>
<td>NA</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Incidental direct contact with soil or sediment</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Incidental direct contact with groundwater</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Incidental direct contact with surface water</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Swimming in waterways</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Consumption of home-grown chicken eggs</td>
<td>1</td>
<td>✓</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Consumption of home-grown fruit/vegetables</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Consumption of fish</td>
<td>6</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Swimming in waterways + home-grown chicken eggs</td>
<td>1</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Swimming in waterways + home-grown fruits &amp; vegetables</td>
<td>✓</td>
<td>✓</td>
<td>NA</td>
<td>✓</td>
<td>NA</td>
</tr>
<tr>
<td>Home-grown chicken eggs + home-grown fruits &amp; vegetables</td>
<td>1</td>
<td>✓</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Swimming in waterways + home-grown chicken eggs + home-grown fruits and vegetables</td>
<td>7</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

![Figure 2: Preliminary HHRA areas](image)

**Figure 2: Preliminary HHRA areas**

**Preliminary findings of the HHRA**

The preliminary findings of the HHRA have found that there is the potential for exposure to PFAS to be elevated in Area 1 and Area 2. The preliminary findings of the HHRA are summarised in Table 1.

- **Indicates exposure risks are calculated to be low and acceptable**
- **Indicates exposure risks are calculated to be potentially elevated**

1. # Further investigation is being undertaken at one property.
2. "Incidental direct contact" means swallowing of, and skin contact with, water during activities including wading in waterways or the use of water in sprinklers, wading pools or stock troughs, or for irrigation
3. Assumes swimming occurs on 52 days per year (around 1 day per week) for 0.5 to 1.5 hours for adults and for 0.5 hour for children under five years of age
4. Assumes an adult or child consumes 365 eggs per year (1 egg per day), and all eggs consumed are home-grown
5. Based on the analysis of home-grown fruit and vegetables collected within the off-base Investigation Area
6. Based on preliminary sampling results and precautionary advice from Queensland Government released in June 2018
7. Based on exposures for each individual activity are summed. Assumed a child undertakes all activities for 5 years and an adult undertakes all activities for 35 years.

NA = Activities not currently undertaken in relevant area or no fish / crustacean data available for the relevant area.
Eating fish from Warrill Creek and the Bremer River

In April 2018, as part of the HHRA, initial testing for PFAS was conducted on seafood (mullet, catfish and eel) in the Bremer River and Warrill Creek. The results of this testing were provided to Queensland Health.

Based on an assessment of the results, Queensland Health advised the community in June 2018 not to consume fish caught in the Investigation Area. This advice applies to fish caught in the Bremer River and Warrill Creek near RAAF Base Amberley.

This interim advice currently remains in place and is a precautionary approach to minimise potential PFAS exposure until further testing and analysis is completed.

Further sampling of other species of more popular edible fish has been carried out in October 2018 and results will be presented as part of the HHRA report.

Consumption of home slaughtered beef

The information obtained from community surveys has indicated that most people within the off-Base Investigation Area do not consume home-grown beef.

Where no consumption of home-grown beef occurs, there are no exposure risks from this pathway as the exposure pathway is incomplete.

Home consumption of beef is known to occur at several properties within the Investigation Area and further evaluation of potential exposures at these properties is currently underway. These findings will be released as part of the HHRA.

Next steps

The HHRA and an Ecological Risk Assessment (ERA) are expected to be completed in the first quarter of 2019.

Upon completion of the detailed environmental investigation, the findings will be used to develop a PFAS Management Area Plan, to manage any elevated risks of PFAS contamination and outline ongoing monitoring at the site.

Government Guidance

All detailed environmental investigations are undertaken in accordance with the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (NEPM). The NEPM was established by Commonwealth legislation and incorporated into the laws of each of the States and Territories to provide a nationally consistent approach in the assessment of site contamination.

The Commonwealth Department of Health established an Expert Health Panel to advise the Australian Government on the potential health impacts associated with PFAS exposure and identify priority areas for further research.

The Panel's findings support the previous Environmental Health Standing Committee’s (enHealth) advice in 2016 that there is no consistent evidence that exposure to PFAS causes adverse human health effects. However, because these substances persist in humans and the environment, enHealth recommends that human exposure is minimised as a precaution.

Further information can be found via:


Health PFAS Information Line: 1800 941 180

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