Army Aviation Centre Oakey Environmental Investigation

Human Health Risk Assessment - Sensitivity Assessment

The Department of Defence (Defence) has engaged an independent environmental consultant to complete a Sensitivity Assessment as part of the Army Aviation Centre Oakey (AACO) Environmental Investigation. This Sensitivity Assessment is an addendum to the 2016 Human Health Risk Assessment (HHRA) and provides additional guidance about precautionary recommendations for the Oakey Investigation Area.

This Sensitivity Assessment considers the Hazard Assessment Report – Perfluorooctane sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), Perfluorohexane sulfonate (PFHxS), released by Food Standards Australia New Zealand (FSANZ).

The FSANZ Report contains Toxicity Reference Values (TRV) for PFOS and PFOA, expressed as Tolerable Daily Intakes (TDI). 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.

The Sensitivity Assessment will assist Defence to understand how the FSANZ TDI may affect the conclusions of the HHRA, published in August 2016.

Human Health Risk Assessment 2016

The 2016 HHRA assessed the potential risks to human health associated with current exposure to PFAS within the Investigation Area. It concluded that for the typical person living, working or undertaking recreation activities within the Investigation Area, there is a “low and acceptable” risk to health from current and ongoing exposure to PFAS in the environment, provided that they continued to follow the precautionary recommendation to not use groundwater for drinking purposes.

A precautionary approach to minimise future PFAS intakes was advised because:

- Modelling indicated that there are theoretical scenarios that could be associated with elevated risks to health; and
- The Oakey community may have PFAS concentrations in blood serum from past exposure that are greater than expected background exposure concentrations.

The 2016 HHRA made a number of recommendations related to using bore water and consuming home grown produce for residents living in Groundwater Zone 1 and Groundwater Zone 2 in the Investigation Area.

Based on the findings of this Sensitivity Assessment, a 2017 HHRA Addendum has been developed to build upon the 2016 HHRA.

Sensitivity Assessment 2017

Precautionary Recommendations

The 2017 HHRA Addendum makes the following precautionary recommendations:

- Continue not drinking groundwater in the Investigation Area;
- Minimise home grown egg consumption in Zone 1 and Zone 2;
- Avoid or minimise using groundwater for bathing, showering, home swimming, paddling pools and/or sprinkler play in Zone 1 and Zone 2; and
- 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 2)
  - home grown red meat (Zone 1 and 2).

Groundwater, Zone 1, Zone 2 and the broader Investigation Area are shown on the map on the next page. Groundwater, Zone 1, Zone 2 and the Investigation Area have not changed since the 2016 HHRA.

Outcomes of Sensitivity Assessment – Breast Milk

Current enHealth [2016] guidance states, “the significant health benefits of breast feeding are well established and far outweigh any potential health risks to an infant from any PFOS or PFOA transferred through breast milk”.

Exposure to PFAS through breastfeeding was also considered in the Sensitivity Assessment. It was found that exposure to PFAS through breastfeeding alone is not estimated to exceed the FSANZ TDI. However, the combination of exposure to PFAS through breastfeeding, and subsequent exposure from all other potential pathways, could potentially result in exceedances of the FSANZ TDI. The potential for this to occur can be minimised by following the above precautionary recommendations. An exceedance of the TDI does not mean that adverse health effects will occur.
Amended Precautionary Recommendations for the Investigation Area

**LEGEND**
- Drainage channel
- Watercourse/water body
- DRAIN 1
- DRAIN 2
- DRAIN 2 overlaps DRAIN 1
- DRAIN 3
- DRAIN 4
- Estimated PFOS+PFHxS Concentration Ranges (μg/L)
  - 0.1-1500
  - 0.1-60
  - 1.01-10
  - 0.07-1.0
- Limit of Reporting - 0.07
- Inferred impacted groundwater extent
- based on available data
- Investigation Area
- Groundwater ‘Zone 2’
- AECO Base Boundary

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**GROUNDWATER ZONE 1 AREA**
- **AECOM 2016 HHRA precautionary recommendations**
  - Continue not to drink groundwater
  - Minimise consumption of eggs from backyard chickens exposed to water containing detectable PFAS

**GROUNDWATER ZONE 1 AREA**
- **AECOM 2017 Addendum precautionary recommendations**
  - Avoid or minimise the use of groundwater for showering and bathing, filling swimming pools and children’s wading pools, sprinkler play
  - Minimise consumption of vegetables irrigated using water with detectable PFAS concentrations
  - Minimise consumption of meat from cattle/sheep that drink water with detectable PFAS concentrations
  - Minimise consumption of fish from local waterways

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**GROUNDWATER ZONE 2 AREA**
- **AECOM 2016 HHRA precautionary recommendations**
  - Continue not to drink groundwater
  - Minimise consumption of eggs from backyard chickens exposed to water containing detectable PFAS

**GROUNDWATER ZONE 2 AREA**
- **AECOM 2017 Addendum precautionary recommendations**
  - Minimise consumption of vegetables irrigated using water with detectable PFAS concentrations
  - Minimise consumption of meat from cattle/sheep that drink water with detectable PFAS concentrations
  - Minimise consumption of fish from local waterways

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**ENTIRE INVESTIGATION AREA**
- **AECOM 2016 HHRA precautionary recommendations**
  - Continue not to drink groundwater

**ENTIRE INVESTIGATION AREA**
- **AECOM 2017 Addendum precautionary recommendations**
  - Minimise consumption of eggs from backyard chickens exposed to water containing detectable PFAS concentrations

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**Pathways changed as a result of adopting FSANZ TDI**

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<tbody>
<tr>
<td></td>
<td></td>
<td>Upper Exposure</td>
<td>Typical Exposure</td>
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<tr>
<td><strong>Exposure Pathway - Zone 1</strong></td>
<td></td>
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<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 cattle/sheep that drink water with detectable PFAS concentrations</td>
<td>Commercial Agricultural Worker</td>
<td>Low &amp; Acceptable</td>
<td>Low &amp; Acceptable</td>
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<td>Consumption of fish from local waterways by recreational fishermen</td>
<td>Recreational</td>
<td>Low &amp; Acceptable</td>
<td>Low &amp; Acceptable</td>
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<tr>
<td><strong>Exposure Pathway - Zone 2</strong></td>
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<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>Low &amp; Acceptable</td>
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**Unchanged HHRA Outcomes**

**Unchanged from Low and Acceptable PFAS Exposure:**
- Dermal contact with groundwater
- Incidental ingestion of, and dermal contact with, soil and sediment
- Inhalation of dust from soil and sediment
- Incidental ingestion and dermal contact with surface water
- Consumption of milk from cattle
- Consumption of fruit and vegetables, meat from sheep or cattle and fish from local waterways (typical exposure).

**Unchanged from Elevated PFAS Exposure:**
- Ingestion of groundwater
- Incidental ingestion of groundwater (upper exposure in Zone 2)
- Consumption of eggs from chickens.
Next steps

Further Considerations
The results of this Sensitivity Assessment provide an improved understanding of the potential human health risks to identified people or groups of people (receptors) within the Investigation Area. Defence will undertake further assessment to address limitations in the current understanding of PFAS impacts within the Investigation Area for:

- Locally caught fish (Investigation Area)
- Home grown vegetables (Zone 1 and 2)
- Home grown red meat (Zone 1 and 2).

The outcomes of this Sensitivity Assessment will inform ongoing environmental monitoring and future management decisions in relation to PFAS on, or in the vicinity of the base. Depending on the outcome of these additional investigations, it may be necessary to revise the 2016 HHRA further to quantify changes to currently identified potential human health risks.

Management Options
Defence continues to engage with industry experts both nationally and internationally and is working collaboratively with the Queensland Government to explore a number of short and long-term PFAS management options. These include research into potential remediation technologies such as soil solidification and stabilisation.

Field trials commenced for some of these options in April 2016. More information on these management options can be found at: http://www.defence.gov.au/id/Oakey/Guidance.asp

Further information

Water assistance
Defence’s first priority continues to be that Oakey community members have access to an alternative source of drinking water. If you rely on bore water for drinking, or drink water sourced from a rainwater tank that contains, or has contained, bore water please contact 1800 136 129 to discuss possible management strategies.

Keeping the community informed
Defence is committed to regularly updating the community throughout the investigation. The project website will be updated as the investigation progresses. Community information sessions, direct mail and factsheets will be provided as new information becomes available. Enquiries or requests relating to individual properties will be considered on a case-by-case basis.

Queensland and Local Government
Defence is working collaboratively with a number of Queensland (QLD) and local government agencies.

- QLD Department of Environment and Heritage Protection: 13 74 68
- QLD Department of Natural Resources: 13 74 68
- QLD Department of Agriculture and Fisheries: 13 25 23
- QLD Department of Health: 13 43 25 84
- Darling Downs Hospital and Health Service (Oakey Hospital): 07 4691 4888
- Darling Downs Mental Health Acute Care Team (24/7): 07 4616 5210
- Toowoomba Regional Council: 131 872

Contact the project team

Phone: 1800 136 129 freecall (business hours)
Email: defence.oakey.anz@aecom.com
Post: Army Aviation Centre Oakey Environmental Investigation Project C/AECOM Australia Pty Ltd PO Box 1307 Fortitude Valley Qld 4006

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

Contact Commonwealth Department of Health

Phone: 1800 941 180
Email: health.PFAS@health.gov.au