

Summary of RNZAF Base Ohakea PFAS Investigation: Comprehensive Site Investigation Report

The New Zealand Defence Force commissioned a Comprehensive Site Investigation Report (CSIR) from consultants Pattle Delamore Partners Ltd for the RNZAF Base Ohakea PFAS Investigation.

The objectives of that report were to collate and compare all on-site (RNZAF Base Ohakea) and off-site (neighbouring properties) PFAS samples collected, assess the current likely status of the PFAS plume and use that information to predict whether the situation will improve, worsen or stay the same in future.

The report has now been completed. This document is a summary of that report.

Background

PFAS

Per- and Poly-fluoroalkyl Substances (PFAS) are a group of several thousand human-made compounds used in the manufacture of a wide variety of household and commercial products.

PFAS compounds, in particular PFOS and PFOA, were used in the manufacture of Aqueous Film Forming Foams (AFFF) during the 1960s. They were used in international aviation because these foams put out liquid fuel fires quickly, improving safety for passengers, air crew and firefighters.

AFFF containing PFOS and PFOA was used on the Base for firefighting, fire prevention and firefighting training since the 1980s until about 2002.

PFOS and PFOA are persistent in the environment and in the human body and so are of concern nationally and internationally. They are resistant to environmental degradation.

In 2006, New Zealand prohibited the importing and manufacturing of firefighting foams containing PFOS or PFOA. Since 2011, no import, manufacture or use of PFOS has been permitted in New Zealand and the use of PFOA is restricted.

The New Zealand Defence Force has been advised by our suppliers that since 2002 they have not supplied any foam products containing PFOS or PFOA above trace levels.

Guidelines and Health

In New Zealand the Interim Drinking Water Guideline is a combined concentration of PFOS + PFHxS of 0.07ug/Litre. To address the potential for measurement errors at such low concentrations NZDF has used a combined concentration of 0.06ug/Litre in reporting and decision making.

Based on current information, the advice of health officials is that there is no acute health risk to people in the areas impacted by PFAS, but in specific instances more detailed local advice may be

required. Currently there is no consistent evidence that environmental exposures at the low levels New Zealanders are generally exposed to will cause harmful effects.

Summary

NZDF has been investigating the potential for contamination of the ground, water and biota on RNZAF Base Ohakea and beyond associated with the use and storage of firefighting foam containing per- and poly-fluoroalkyl substances (PFAS). Investigations have identified PFAS in soil and water on the Base, as well as in the surrounding environment and neighbouring properties.

Key findings

- Based on a comparison of on and off Base sample results, the majority of PFAS remains on the Base.
 - The size of the PFAS plume is currently 1100ha to 1600ha ha and is estimated to contain 50kg to 70 kg of PFOS+PFHxS.
 - The key receptors of the PFAS are surface water bodies and wells within 2km to 3km SSW of the Base.
 - The plume (that is the area containing PFAS in groundwater) is moving 50-100 metres per year.
 - The plume is bounded by, and unlikely to move past, the Makowhai Stream.
 - In general PFAS concentrations in surface water decreased off Base.
 - On Base Ohakea, PFOS concentrations were higher than any other PFAS compound.
 - PFOS was also present in greater concentrations in biota and sediment sampled off the Base than other PFAS compounds.
 - The exception to that was Makowhai Stream where lower concentrations of PFOS were observed closer to the Base and the highest concentrations approximately 1.5km downstream from the Base. Concentrations decreased again further downstream.
 - PFOS concentrations in the Makowhai Stream was higher in drier summer months.
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Sampling

An extensive sampling programme has been carried out at the Base (since 2015) and at neighbouring properties. Three rounds of testing were completed on neighbouring properties during 2017-18, the results of which were reported back to landowners and occupiers after each round.

During the entire sampling programme 297 groundwater samples and 147 surface water samples were collected and analysed for PFAS. Soil, sediment, animal and plant samples were also collected from various locations for testing. PFAS was detected (above and below guidelines) in varying levels in all of these substances, except goat's milk. The findings were:

Groundwater

- Of the 297 groundwater samples collected (56 on Base, 241 off Base), PFOS was detected in 73 percent of the samples collected on the Base and 44 percent of samples collected off the Base.
- Of those 241 off Base samples, 65 samples collected from 19 groundwater bores were above the drinking water guidelines. Eight of those bores were used for drinking water.

Surface water

- A total of 147 samples were collected (25 on Base and 122 off Base).
- These samples were measured against the ANZECC 95% ecological guidelines.
- Fourteen of the 25 on Base samples and 31 off Base samples exceeded the ecological guidelines for PFOS.

Sediment

- Nineteen (3 on Base, 16 off Base) sediment samples were collected from storm water infrastructure on the Base and storm water drains, ponds and natural waterways outside the Base.
- PFOS was detected in all 3 samples collected on the Base and 7 of the samples collected off Base. None exceeded screening values.

Soil

- Thirty-four samples were collected on Base for testing. PFAS was detected in 26 samples, none of which exceeded the soil screening guideline values for commercial/industrial areas for the sum of PFOS + PFHxS.

Fish

- Seven fish samples were collected at five locations. All samples were above the FSANZ human health trigger levels for investigation. The highest concentration of PFOS + PFHxS was found in a carp.

Watercress

- Six samples were collected off the Base. PFAS was detected in two samples, one sample (collected from a roadside drain), exceeded the FSANZ human health trigger level for investigation.

Eggs

- Eggs from a nearby farm were tested for PFAS. Of the 31 samples collected, PFAS was detected in 29 of them, seven were above the FSANZ human health trigger level for PFOS + PFHxS. Advice was provided to the owner of the chickens regarding consumption of eggs.

Meat

- Eight meat samples were collected from private properties. PFAS was not detected above the FSANZ human health trigger level for investigation in any of them.

Offal

- Two samples of mammalian offal tissue were collected off Base, neither of which were above the FSANZ human health trigger level for investigation.

Milk

- Two samples were collected from a nearby farm. No PFAS compounds were detected.

Predictions and Interpretation

As part of the CSIR, our consultants carried out some modelling to determine how far the PFAS plume is likely to travel and how long it might persist in the environment. The modelling is based on a best estimate but contains significant uncertainty.

- The PFAS plume is expected to persist for many decades with PFOS and PFHxS levels greater than 0.06ug/L. The worst case scenario is that it will be around for more than 125 years.
- The PFAS plume is formed from multiple individual soil sources on Base where AFFF was historically used.
- PFAS concentrations off Base generally decreased with distance with the exception of PFHxS. PFHxS can form due to the breakdown of other PFAS compounds but is also a component of the legacy AFFF. It is difficult to know whether the recorded concentration of PFHxS is primarily from direct application or from transformation.
- The leading edge of the plume is expected to advance 50m to 100m a year.
- The width of the plume is expected to diminish and become narrower and decrease in size in 50 – 75 years.
- It is expected that the plume will not move outside a block bounded by the Makowhai Stream and the Rangitikei River.