briefing note
321
June 2016

A Toxic Legacy from Firefighting Foams

Australian communities and environmental systems adjacent to Defence sites, airports and firefighting training centres have been contaminated by toxic chemicals.

Mark Taylor is a Professor in the Department of Environmental Science at Macquarie University and was appointed by the NSW Environment Minister, Mark Speakman, to conduct an independent review of the Environmental Protection Agency's management of sites contaminated by PFOS/PFOA and, in particular, its response to the Williamtown incident. Isabella Consenza is a lawyer acting as a consultant to this review. Mark and Isabella's interim report has now been released and this article from the July/August 2016 Australasian Science *summarises their key findings. The review will conclude with a final report to the Minister for the Environment in the coming months.*

Over the past 12 months there has been a significant rise in awareness in Australia of the impact of perfluorinated chemicals on ground and surface water, soils, food and human health.

Perfluorinated chemicals have a wide range of industrial applications because of their resistance to heat, water and oil. Since the middle of the 20th century the compounds have been used for a myriad of industrial functions and consumer products, including carpets, clothing, upholstery, food paper wrappings, non-stick cookware (e.g. Teflon™), photographic materials, Scotchgard™ and related goods used to protect fabrics, firefighting foams and metal plating.

Perfluorinated chemicals are persistent, bio accumulative and toxic. They have been found at low levels in the environment, in human populations and wildlife in distal parts of the globe such as the Arctic. As a result, a number of national and international government agencies and industry bodies have banned or limited their use.

Although perfluorinated chemicals are both persistent and pervasive, specific human exposure pathways are not well understood and require further research. In fact, the “safe” or hazardous level of exposure and its specific causal link to human health outcomes remain under debate.

In Australia, a Senate inquiry earlier this year identified significant contamination issues at a range of Commonwealth, state and territory locations. The contamination is predominantly linked to the use of firefighting foams, which previously contained perfluorooctane sulfonate (PFOS) and perfluoro -octanoic acid (PFOA).

These issues have arisen in part because there are no current national environmental standards for PFOS and PFOA, so their presence was not considered in environmental assessments. In addition, state and territory authorities are unable to regulate contamination emanating from Commonwealth land onto state or territory land.

Substantial community and regulatory concern has arisen in regard to PFOS/PFOA contamination across the nation. For example, contamination at Williamtown in NSW has led to the closure of important fishing grounds at Port Stephens. In addition, food produced in the area affected by groundwater contamination is currently deemed unfit for consumption.

There have been some heated debates about testing blood for PFOS and PFOA. While blood tests can provide a measure of exposure, they do not currently predict the level of actual health risk. Nevertheless, unless the body burden of perfluorinated chemicals is measured there will be no impetus to conduct future human health studies nor will the data exist to interpret the range and consequence of prior exposure levels. Blood tests could identify who is potentially at risk and what they might need to do to eliminate their exposure pathways.

The lack of certainty about the "safe" or hazardous level of exposure to perfluorinated chemicals and a specific causal link to human health outcomes has, to some extent, stymied regulatory responses and exacerbated community concerns about the possible effects of exposure.

Nevertheless, in response to the potential adverse human health effects from PFOS and PFOA exposures, the US Environmental Protection Agency revised downwards its health advisory guidelines as recently as 19 May 2016 to 70 parts per trillion (0.07 µg/L) for both chemicals.

This means that Australia is now effectively two steps behind the USA because:

- Australia has still not set any national guidance values; and
- the US EPA has now revised and substantially lowered the health advisory values it originally issued on 8 January 2009 (0.2 µg/L and 0.4 µg/L for PFOS and PFOA, respectively).

The new US EPA advisory values are significantly lower than those promulgated by Victorian and Western Australia environmental authorities for PFOS and PFOA in 2015 and 2016, respectively.

The environmental health literature is replete with examples of suspect chemicals that avoided proper regulation and assessment because of an absence of research demonstrating adverse effects. There are recurrent themes where early concerns about various toxic chemicals and related compounds were subsequently justified after extensive

environmental and epidemiological research. The emerging evidence suggests that PFOS and PFOA are on the same trajectory.

Two critical gaps in environmental protection and management have emerged from the "recent" discovery of PFOS and PFOA contamination. First, Australia needs national environmental standards for PFOS/PFOA, and these need to represent international best practice. Second, the activities of Commonwealth agencies that may cause contamination on non-Commonwealth land need more effective regulation.

In addition, it is imperative that a standard human health assessment for PFOS/PFOA is developed and agreed upon (e.g. tolerable daily intake or blood testing). This will allow affected individuals to understand their current exposure levels and, as research evolves, their lifetime risk.