

Risk-Based Assessment, Management and Remediation of PFAS-Contaminated Soil and Groundwater

Peter Nadebaum, Therese Hammond, Eric Friebe, and Jill Woodworth
(GHD Pty Ltd, 180 Lonsdale Street, Melbourne, Vic Australia
Joytishna Jit and Bruce Kennedy (CRC CARE, Mawson Lakes SA, Australia)

Per- and poly-fluoroalkyl substances (PFAS) have been identified as contaminants of emerging concern in Australia. They are known to be persistent, bioaccumulative and potentially toxic, and have been found to be present at concentrations of potential concern at a number of sites, particularly where there has been historical use of fire fighting foams containing these contaminants and their precursors. Industry and public awareness of the presence of PFOS and PFOA particularly has been growing rapidly, with understanding of the effects and screening criteria being published both in Australia and internationally on a frequent basis.

The development of national guidance on the assessment and management of PFAS-contaminated soil and groundwater has been the subject of intense interest over the past few years, with various agencies proposing guideline criteria for waters and soils. Some of these criteria are below the level of detection, making their application particularly difficult. In parallel with this, CRC CARE has been undertaking a project to provide national guidance on the assessment, management and remediation of PFAS contamination, with a working group comprising representatives of regulatory agencies, industry and research organizations. A draft and interim guide was published in early 2017, and a revised document is being considered. In early 2018 the Heads of EPA published a PFAS National Environment Management Plan (NEMP), and this provides criteria and guidance on the management of PFAS-contaminated sites. There are many issues that need to be considered in the development of guidance, some of the most important being the large number of PFAS compounds, the potential for transformations to occur, their toxicity, the importance of bioaccumulation and indirect exposure in addition to direct exposure, difficulty of treatment to a level that will meet cleanup criteria, the fear and concern of potentially-affected communities, and the extent to which it is necessary to adopt a precautionary approach to reflect uncertainty and the possibility that there will be adverse effects. The authors have been involved in the assembly of information and guidance that will assist practitioners, regulators and site owners to effectively assess, manage and remediate soil and groundwater contaminated with PFAS compounds using a risk-based approach. It is expected that the information will assist remediation decision-making, and potentially reduce the cost of managing contaminated soil and groundwater.

In particular, information is included on:

- (a) The extent and magnitude of PFAS contamination in Australia;
- (b) Toxicity, bioaccumulation and persistence;
- (c) Impacts on beneficial uses, with a focus on soil, groundwater and receiving waters;
- (d) Ecological and human health screening levels that are included in the NEMP, and those that have been developed by CRC CARE, including information on the rationale for development, assumptions and uncertainties;
- (e) Important considerations in developing conceptual site models for PFAS;
- (f) The approach being taken and recommended for assessing and managing PFAS contaminated sites; and
- (g) The technologies and practicable management and remediation strategies that can be used to reduce the risks to an acceptable level.

The presentation will outline the current state in Australia relating to guidance on PFAS, the criteria that have been developed for assessing the contamination, and the approaches being adopted to address the problem.