Submission No 6

INQUIRY INTO INQUIRY INTO PFAS CONTAMINATION IN WATERWAYS AND DRINKING WATER SUPPLIES THROUGHOUT NEW SOUTH WALES

Organisation: The Water and Carbon Group

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PFAS Inquiry

The Water and Carbon Group Response

To	Select Committee on PFAS Contamination in Waterways and Drinking Water Supplies Throughout New South Wales
From	The Water and Carbon Group
Date	24 October 2024
Subject	Response to senate inquiry into PFAS contamination in waterways and drinking water supplies throughout New South Wales

1. Introduction

The Water and Carbon Group (WCG) is an Australian company that specialises in the design, construction and operation of integrated low energy and natural infrastructure for wastewater treatment. We focus on the reuse and disposal of complex waste waters with experience delivering PFAS treatment projects. PFAS are ubiquitous in the natural environment, however elevated concentrations that can pose a risk to human and environmental health can be observed at point sources where waste streams are concentrated.

A key focus for WCG has been assisting state and local governments with managing PFAS contamination at landfill sites across Australia and North America, utilising industry-leading technologies such as the in-house developed and patented low energy evaporative fractionation (LEEF) technology. This is a highly effective form of foam fractionation (FF), which is the only effective low-energy, low-waste solution for highly contaminated waste streams.

2. Terms of reference addressed

The information provided in this memorandum responds to some of the terms of reference (k) and (l) which are outlined below:

> (k) international best practices for water treatment and filtration, and the environmentally sound management and safe disposal of PFAS.
>
> (l) the effectiveness of remediation works on specific sites and international best practices for remediation and management of contaminated sites.

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3. Response

The international best practice for PFAS water treatment, including the environmentally sound management and safe disposal of PFAS is highly dependent on the source and subsequent chemistry of the water to be treated. WCG have a range of proven and available, 'ready to deploy' technologies to manage PFAS contamination in water streams ranging from surface water run-off or clean water to heavily contaminated streams such as landfill leachate. These technologies are summarised below with links to case studies demonstrating the effectiveness of remediation works and international best practice for management of contaminated sites.

3.1 Filtration with specialty media:

This technology is a modular, containerised system that is scalable to meet any treatment requirement and can be deployed to treat PFAS from contaminated water sources and capture it on the solid filtration media.

The specialty media can include activated carbon or ion-exchange resin and is suitable for meeting the most stringent of PFAS discharge criteria such as drinking water, as well as reducing PFAS below levels that are detectable by analytical laboratories.

A case study on the implementation of a filtration-based system, designed operated and built by WCG is provided on our website at the following link:

Case Study: https://waterandcarbon.com.au/projects/pfas-ontaminated-stormwater-treatment/

3.2 Foam fractionation

Foam fractionation (FF) has quickly become the leading technology for managing heavily contaminated water streams, such as landfill leachate, that are not suitable for filtration due to the presence of other co-contaminants and complex water chemistry. This can lead to faster media blockage, passivation, saturation, and therefore require highly frequent change-out and disposal of filtration media, usually back to the landfill. This is also not cost effective.

In FF, PFAS is separated out from the contaminated liquid into a foam which is collapsed into a low volume, concentrated liquid waste stream that is stored or disposed of using proprietary PFAS destruction technologies. FF is an adsorption process, but unlike carbon or resin, is not impacted in any way by complex background chemistry or contaminants. It removes up to 100% of the long chain PFAS that are linked to human and ecology health risks.

WCG have developed the LEEF system, designed using the principles of FF, which has been deployed at various sites across Australia and North America to manage PFAS contaminated landfill leachates. Example case studies on the application of the LEEF system to manage PFAS contamination are available at the following links:

Case Study 1: https://waterandcarbon.com.au/projects/tackling-pfas-with-city-of-darwin/

Case Study 2: https://waterandcarbon.com.au/projects/bethlehem-landfill-protects-water-quality/

3.3 Reverse Osmosis (RO)

In cases where regulators are targeting a greater suite of PFAS compounds, including shorter chain compounds that are not efficaciously removed using adsorption processes, membrane systems are the only option for complex wastewater streams. Reverse osmosis (or nanofiltration in some instances) is a pressure driven process where salts and contaminants are rejected at a membrane surface. An example of reverse osmosis is seawater desalination, which provides significant global drinking water supply.

In RO systems for contaminated water sources, like landfill leachate, extremely high pressures are required because of the high salinity and contamination from organics and nutrients, however the final treated water is of very high purity. RO does, however, produce significantly higher waste streams containing the concentrated salts and PFAS, up to 40% of the treated inflow. This waste volume can be further reduced by other high energy processes such as thermal evaporation.

WCG, with its technology supply partners, have a specialised team that has worked for more than 25 years with landfill leachate and other industrial wastewater, deploying reverse osmosis plants and nanofiltration plants. The application of this technology to meet landfill leachate treatment requirements can be observed at over 50+ operational sites across the world.

We thank the committee for the review and of this submission and would be more than happy to address any clarifications which may arise.

Regards