



## Research | Solutions | Education | Services

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# Sustainable environment solutions: crcCARE technology portfolio

crcCARE is a partnership of organisations dedicated to developing new ways of dealing with and preventing contamination of soil, water and air including solid and liquid waste management.

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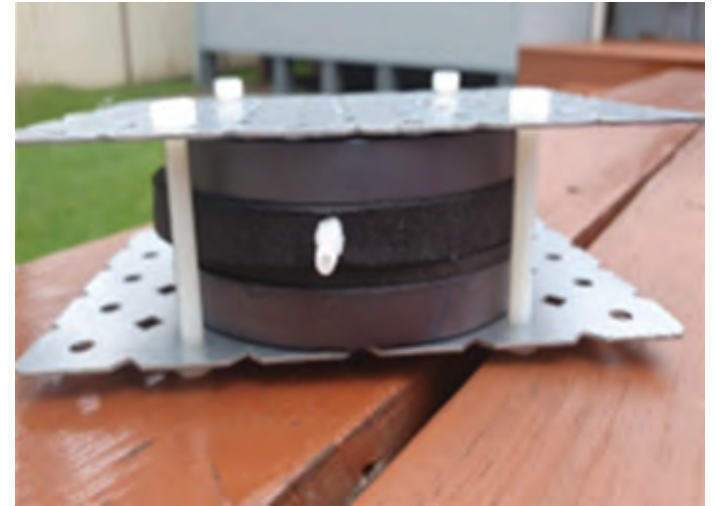
CRC for **Contamination Assessment**  
and **Remediation of the Environment**

**[www.crccare.com](http://www.crccare.com)**

# LLCARE: Protecting our environment through remediation of landfill leachate

When landfills are exposed to rainwater or moisture, they can leach hazardous pollutants, such as microplastics and per- and polyfluorinated substances (PFAS), into the surrounding environment. This can be harmful to human health and ecosystems.

To prevent the leaching of dangerous chemicals, crcCARE has developed LLCARE. This technology uses advanced oxidation technology, coupled with nanosorption (adsorption of contaminants on the nanoscale), to effectively remove PFAS, microplastics and other contaminants from the leachate. The green, cost-effective and easy-to-use technology can be used to remove harmful chemicals from other forms of wastewater, making it a versatile approach to environmental remediation.



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# TWCARE: Removing PFAS for safer drinking water.

PFAS have been detected in drinking water around the world and are associated with harmful side effects. However, removal of PFAS from tap water can be difficult and expensive.

TWCARE is an easy-to-use device that can be installed in kitchen taps to enable on-site removal of PFAS from drinking water. Each device is fitted with a cartridge that effectively removes different types of PFAS, producing safe drinking water. The device can be readily monitored on a smartphone app, which alerts the user when the cartridge needs replacing. The used cartridges can be sustainably recycled by crcCARE.



# Renewing landscapes by treating lead in contaminated soil.

The soil surrounding shooting ranges can become contaminated with toxic heavy metals such as lead. To be safely used again, the soil must be remediated to remove the heavy metals.

crcCARE has developed Heavy Particle Concentration (HPC) technology to extract lead particles from soil using a machine fitted with a triple-helix spiral belt. crcCARE optimised the different parameters of the process, including the machine inclination, feed rate, belt speed, water content, and position of the front wash bar. As a result, crcCARE has successfully remediated more than 3000 m<sup>3</sup> of lead-contaminated shooting range soil in Queensland and Western Australia.





# Breathe easy: Online monitoring of volatile organic compounds for healthier environments

Volatile organic compounds (VOCs) can pollute the groundwater and soil surrounding residential areas. They can contaminate indoor air, where exposure for sustained periods can be hazardous to people at high concentrations. Measuring VOC concentrations is difficult, with traditional monitoring approaches often time-consuming and labour-intensive.

crcCARE's online VOC monitoring system remotely and continuously measures VOC concentrations and fluctuations in real-time to determine how they are influenced by environmental factors. The monitoring system is highly sensitive and can detect VOCs at extremely low concentrations. The system is cost-effective and easily installed beneath buildings for long-term monitoring of VOC concentrations and their relationship with soil temperature, moisture and air pressure.



# Empowering environmental remediation of well-known and emerging contaminants

PFAS and other emerging contaminants pose a major risk to our health and ecosystems. However, scientific knowledge about the appropriate management of these contaminants is lacking.

crcCARE is working to better understand and assess the exposure, toxicity, and risks associated with sites contaminated with PFAS and other contaminants to enable the development of more efficient environmental remediation technologies. By bringing together expertise from a range of disciplines, crcCARE offers risk-based management of existing and emerging contaminants to provide safer, greener, and smarter remediation technologies for healthier environments.



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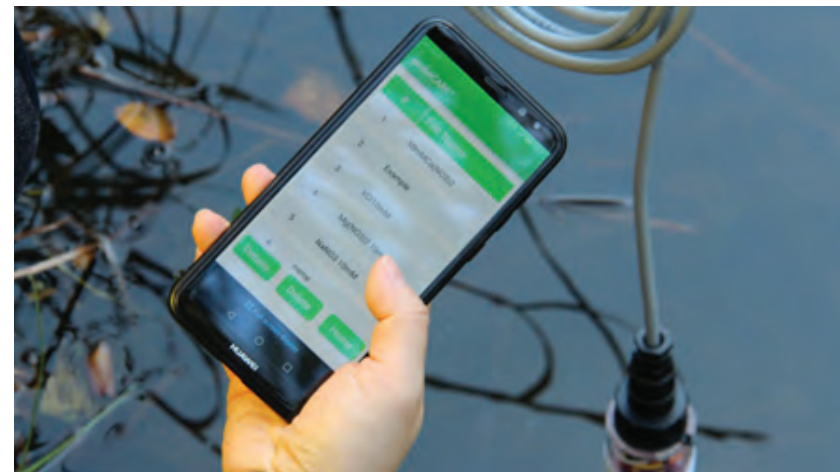


Innovative science  
for a cleaner planet

# probeCARE™: real-time monitoring of water quality

Agricultural fertilisers can significantly affect the quality of irrigation water, leading to increased concentrations of sodium, potassium, calcium, chloride and nitrate ions. Changes in certain ion levels, coupled with soil erosion and drainage, can have downstream consequences. However, monitoring of ion concentrations by farmers can be challenging.

probeCARE™ uses an array of sensors coupled with a Bluetooth signal-logging device and smartphone app to remotely measure ion levels in water. This technology can measure the levels of multiple ions in complex solutions simultaneously. It enables real-time monitoring of water quality, giving farmers the ability to effectively manage their fertilisation strategies.





# astkCARE: a test kit for rapid PFAS detection at your fingertips

PFAS can contaminate soil and groundwater, posing hazards to people and the environment. However, on-site measurement of PFAS concentrations by environmental practitioners can be challenging.

astkCARE (anionic surfactant test kit) can detect PFAS and provide semi-quantitative information on PFAS concentrations. This simple and quick method uses anionic surfactants – molecules with a negatively charged, water-attracting head and a long, water-repelling tail – to detect and measure PFAS. It uses a colour-changing indicator and smartphone to provide an easy way to monitor these chemicals. While this test is not as sensitive as sophisticated instruments, it does provide a first pass for the presence of PFAS in water.



[www.crcCARE.com](http://www.crcCARE.com)



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# purgeCARE: a filter-based clean-up tool for purged water

Purged water generated from onsite groundwater sampling can contain harmful chemicals such as PFAS, total petroleum hydrocarbons (TPH) and trichloroethylene (TCE). Common current practices to dispose of the contaminated purged water involve discarding it onsite, resulting in soil contamination, or transporting it off-site for professional disposal.

purgeCARE is an environmental clean-up tool that uses filter-based technology to extract, bind, and remove PFAS, TPH and TCE contaminants from purged water. It is cost-effective, easy to use and highly reliable. purgeCARE also allows purged water to be filtered on the spot, where the resulting clean water can be safely returned to the environment.



# gwsCARE: a versatile instrument for groundwater sampling

Environmental consultants, regulators and researchers need to regularly monitor contamination in groundwater. However, conventional sampling methods are often slow and labour-intensive.

gwsCARE is a versatile device that can be used to rapidly sample contaminated groundwater. It allows for more streamlined sampling of groundwater using an easy to operate valve system that can be applied to a wide range of applications. gwsCARE can be used for monitoring PFAS and hydrocarbons in groundwater, non-routine sampling of surface water and fauna living in underground water systems, monitoring low-yield wells, and multiple discrete-interval groundwater sampling.



# nano-matCARE: locking up PFAS in contaminated concrete

The production and use of PFAS compounds can be harmful to human health and the environment when they leach into groundwater, soil, air and concrete.

nano-matCARE™ is a powder made from nano-sized particles derived from natural clay. The powder is easily mixed into contaminated concrete to safely lock up PFAS and prevent it from leaching into the environment. nano-matCARE™ is a more cost-efficient alternative to traditional concrete destruction and disposal, providing a safe way to minimise danger from PFAS-contaminated concrete.





# matCARE™: clay-based technology for remediation of PFAS from water

Many firefighting foams contain PFAS due to their high heat, oil and water resistance. However, these foams can contaminate the surrounding soil and water with PFAS, contributing to harmful effects on people and the environment.

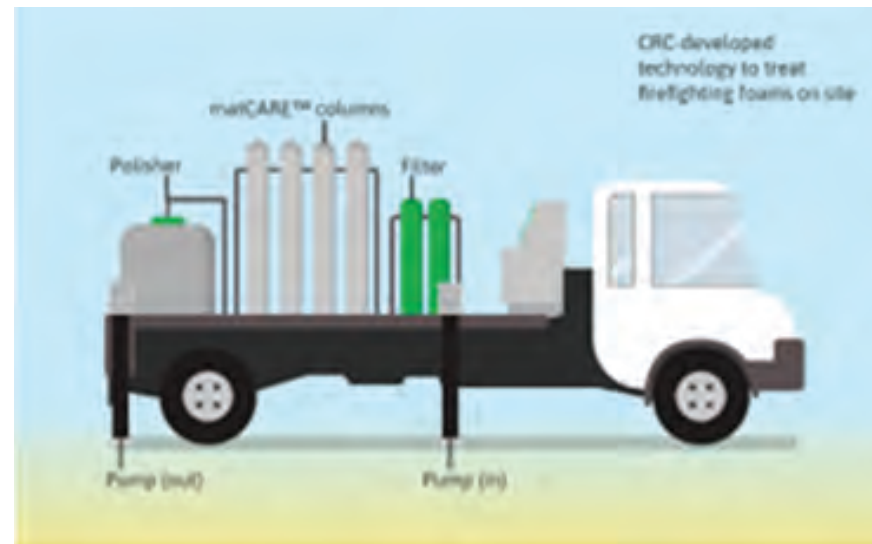
matCARE™ is a modified clay that locks up PFAS and its derivatives in contaminated soil and water. It is highly effective at cleaning wastewater contaminated with PFAS from firefighting foam. It can reduce PFAS concentrations to well below the safety threshold for drinking water set by the United States Environmental Protection Agency. matCARE™ is cost-effective and sustainable. It has already been used to remediate more than 4 million litres of PFAS-contaminated water.



# A mobile solution for large-scale PFAS pollution

PFAS-containing aqueous film-forming foams (AFFFs) used for firefighting can pollute nearby soil and water. To reduce the harmful effects of these chemicals, large scale remediation is required, but this can be difficult without purpose-built technologies.

crcCARE has developed a mobile remediation plant to treat sites contaminated with PFAS, particularly those exposed to AFFFs. The mobile remediation technology uses a pump that sucks in contaminated water and passes it through a filter made from matCARE™ granules, designed to irreversibly bind and neutralise the PFAS. The resulting clean water is then returned to the environment. Small-scale plants are available for lease or purchase.



# Groundwater modelling: harnessing data for groundwater challenges

Predictive modelling can be an important tool to provide insights into the fate and transport of PFAS and other contaminants in groundwater.

Using state-of-the-art technology and software, crcCARE offers tailored solutions to challenges related to groundwater modelling. They offer services such as groundwater data screening, analysis and mapping using web-based mapping software (ArcGIS), development of groundwater models using the groundwater flow model MODFLOW, development of groundwater level and quality monitoring tools using machine learning, and technical report writing, editing and reviewing.





# Minimising methane: cattle feed using modified clay

Methane is a potent greenhouse gas, responsible for over 30% of the observed increase in global temperatures. Agriculture, particularly livestock, is one of the main sources of methane emissions.

crcCARE has developed a cattle feed supplement using modified natural clays. The feed supplement reduces methane emissions from cattle without harming their health or reducing nutrition. The supplement could help significantly reduce greenhouse gas emissions from agriculture.

