



PFAS Capability Statement

Water Treatment
Solutions



Welcome to Synergen Met

A responsible cleantech company that creates sustainable solutions to real world problems.

About Us

Synergen Met is a world-leading thermal plasma technology specialist. We use our award-winning technology to create sustainable solutions to some of the world's biggest environmental problems.

Headquartered in Brisbane, Australia, our business is made up of a team of world renowned scientific minds, who have more than 150 years of collective experience working in the global mining, engineering, sustainability and renewable sectors.

We aim to make the world a cleaner place helping industries detoxify and decarbonise the environment with every application.

At Synergen Met our Environment division specialises in:

- ▶ Toxic waste destruction and industrial wastewater treatment, especially for PFAS, chlorinated chemicals, heavy metals and ammonia.
- ▶ Treatment of industrial wastewater, landfill leachate, groundwater and surface water.

Our Values



Innovative

To inspire our customers and communities



Collaborative

To find the best solutions



Driven

To make those solutions meaningful



Integrity

To be clear and honest in all that we do

Our Vision

To make the world a cleaner place.

Environment Team



Dr Pradeep Shukla
PhD MTech BEng RPEQ

General Manager

A world-leading expert and highly experienced in chemical technology development, Dr Shukla is a chemical engineer with over 20 years of research and industry experience. Key knowledge of plasma pyrolysis and foam fractionation technologies, he has co-authored over 50 publications and collaborated with patents for Synergen Met's proprietary foam adsorption and plasma destruction processes.



Dr Tom Buckley
PhD MIEAust BEng(Hons)

Senior Project Engineer

Experienced engineer who has been responsible for designing, delivering, and operating water treatment projects across a range of fields including contaminated PFAS waste. Tom has hands-on experience operating and optimising water treatment and recycling plants.



Ansh Nandanwar
BEng

Project Engineer

Chemical engineer with hands-on experience in designing, delivering, and operating water treatment projects and PFAS remediation projects. Ansh has been responsible for pilot testing and process development for projects involving processes such as RO, VSEP, foam fractionation and plasma pyrolysis.

Capabilities

- ▶ Hazardous and toxic waste treatment solutions using proprietary plasma technology with complete removal of environmental contaminants
- ▶ Water quality sampling and monitoring programs
- ▶ Contaminated solid solvent washing followed by the treatment of liquids
- ▶ Water quality testing followed by trial demonstration of on-site waste management solutions
- ▶ Consulting services on wastewater management solutions
- ▶ Ammonia removal from landfill leachate



Synergen Met is the first and only Australian company that designs and manufactures thermal plasma process technology for toxic waste treatment. We have also developed numerous innovative processes for the treatment of contaminated wastewater, including the FOAM-ARISe process for Absorption-based Rapid Interstage Separation of PFAS from liquids.

The process enables the removal and concentration of PFAS from the contaminated liquid and is:



Compact

Minimal foot print and ease of establishment.



Economic

Remote operation with minimal human intervention.



Transportable

Process built and contained within standard lockable shipping containers.



Efficient

Concentration factors of 1,000 to 10,000 dependent on treatment outcomes and contamination levels.



Modular

Scalable for the intended treatment volumes and flow rates.



Flexible

Can be combined with other treatment technologies.



Emissions Free

Zero PFAS air emissions.

Tailored Water Treatment Solutions

Synergen Met's unique strength is our diverse portfolio of modular, in-house developed and tested advanced treatment technologies, allowing us to craft tailor-made solutions to meet the distinct needs of each project. Our team of seasoned professionals and world-leading technical experts, leverage our expansive toolkit to deliver sustainable, efficient, and cost-effective solutions, to complex remediation challenges.

Landfill Leachate PFAS Project

Waste Treatment: Landfill leachate with high PFAS loading

Location: Brisbane, Australia

Outcome: Continuous operation at 1,000 L per hour; PFAS free stream for discharge with individual PFAS species (PFOS, PFOA and PFHxS) concentration well below the laboratory detection limit and the Australian NEMP-PFAS guideline levels for drinking water. Complete destruction of PFAS concentrate with over 99.9% efficiency.

ARISE Plant Specifications	20ft Plant
Treatment capacity	35 – 100 litres per minute (up to 144,000 L/day for 24hr period)
Footprint (width x length)	2.5 m X 6 m
Weight	< 9 000 kg
In-built pre-treatment unit	Optional
Water Chemistry	Suitable for treating ground water, landfill leachates or surface waters
Control System	Compatible with remote monitoring and operation through secure SCADA interface as needed. Annual and monthly maintenance program.
Electrical Requirements	Conventional 3-phase
Weight	< 9 000 kg (20ft container)
PFAS concentrate concentration factor	1,500x – 10,000x

“This outcome is significant to our company, as we have a number of closed landfills with elevated levels of PFAS in landfill leachate. Synergen Met’s project showed us that these contaminants can be efficiently removed at the source, providing a technological solution for our wastewater treatment partners and our landfills, with offsite destruction of PFAS ending the contamination cycle completely.”

- Client Testimony

PFAS Species	Removal Capability (%)
Perfluorooctane sulfonic acid (PFOS)	100*
Perfluorooctanoic acid (PFOA)	100*
Perfluorohexane sulfonic acid (PFHxS)	100*
6:2 fluortelomer sulfonate (6:2 FTS)	100*
Perfluorononane sulfonic acid (PFNS)	100*
Perfluorononanoic acid (PFNA)	100*
Perfluorodecane sulfonic acid (PFDS)	100*
Perfluorodecanoic acid (PFDA)	100*
Perfluoroheptane sulfonic acid (PFHpS)	100*
Perfluoroheptanoic acid (PFHpA)	100*

The FOAM ARISe capability is proven with 100% PFAS removal.

The FOAM-ARISe process is able to completely remove all long-chain PFAS to below the analytical limit of detection (LOD). Shorter-chain PFAS including perfluoropentane sulfonic acid (PFPeS) and perfluorohexanoic acid (PFHxA) are also readily removed by the system with >50% removal. The removal of short-chain PFAS including perfluorobutane sulfonic acid (PFBS) and perfluorobutanoic acid (PFBA) can also be increased through the addition of co-additives to the process, or through Synergen Met's patented process (currently under development). The modular nature of the FOAM-ARISe process allows for the operating parameters and energy consumption to be adjusted to directly meet the needs of the site, providing an economic benefit to the client.

Synergen Met is the only Australian company offering a turnkey process for the remediation of PFAS contaminated water sources, such as landfill leachate. By coupling the removal process with the thermal plasma destruction process, the holy grail of PFAS treatment is achieved bringing an end to the PFAS contamination cycle by transforming the PFAS into a non-toxic solution. This is achieved without involving adsorption media such as activated carbon and ion exchange resins that require later disposal to landfill.

**PFAS removal is subject to the chemistry of the water being treated. 100% removal is based on prior performance treating the listed compounds to below the analytical limit of detection (LOD) of 0.01 µg/L.*



CASE STUDY

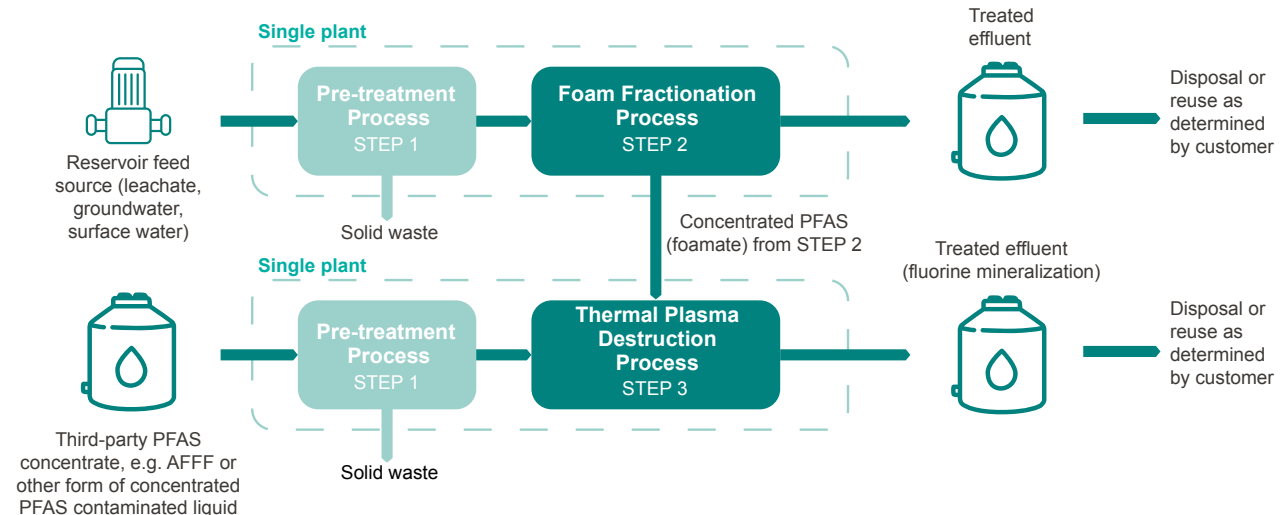
Green Waste Recycling PFAS Treatment Trial

Waste Treatment: Green waste process leachate with low PFAS loading

Location: Brisbane, Australia

Outcome: Autonomous continuous operation 5,500 L per hour; PFAS free stream for discharge with individual PFAS species concentration well below the Australian NEMP-PFAS guideline levels for drinking water.

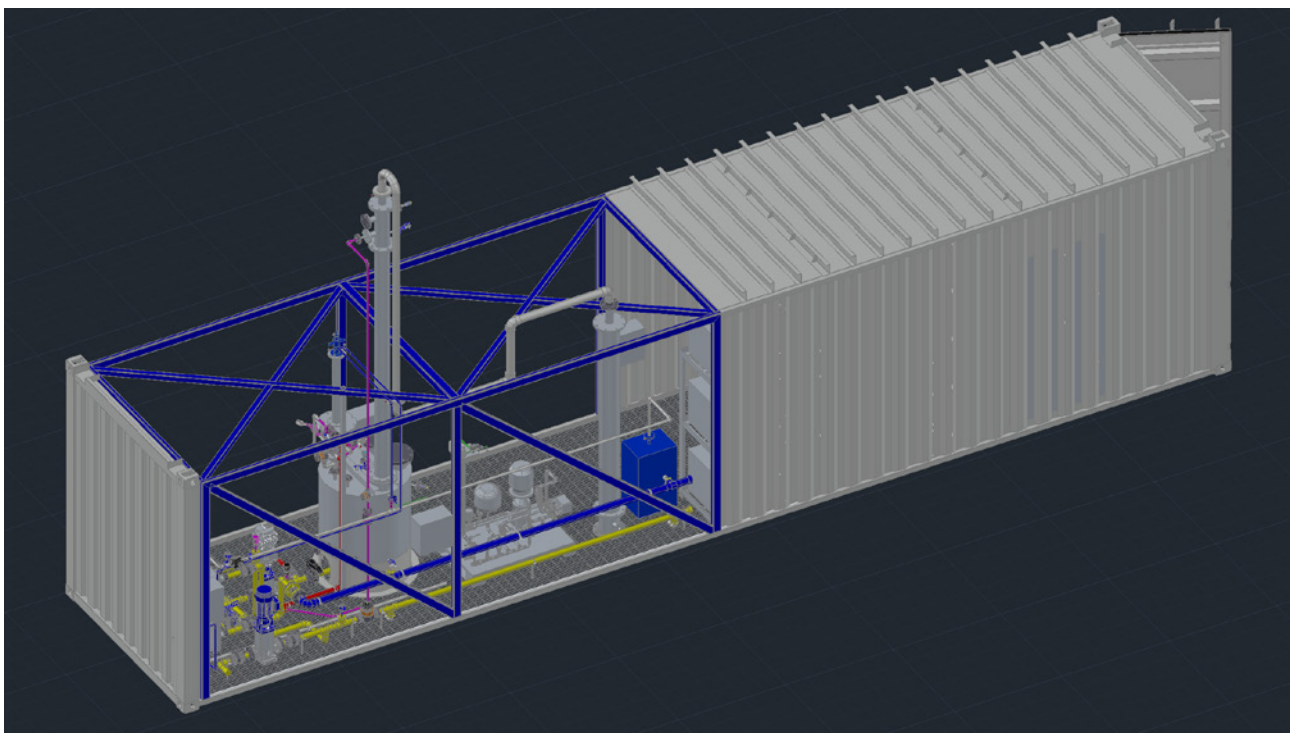
“Previous treatment processes have been cost prohibitive for us when only very small volumes of contaminated water required treatment. What Synergen Met’s trial showed was that these contaminants can be efficiently and economically removed at the source efficiently and at minimal cost.”



With our purpose to make the world a cleaner place, Synergen Met has developed the world's first complete mineralisation technology to completely destroy any and all PFAS compounds.

Synergen Met's thermal plasma technology can end the PFAS contamination cycle at commercial scale. The process can destroy AFFF, PFAS concentrates, PCB's and other hazardous pollutants with zero toxic pollutants in the plant effluent.

- ▶ Emissions free - the plasma gas condenses at the exit of the reactor.
- ▶ No recombination – high temperature process (> 2500°C) to ensure complete PFAS molecule breakdown with all fluorinated, chlorinated and other halogenated chemicals destroyed without exception.
- ▶ Efficient mineralisation - fluorine (and even chlorine) converts to harmless mineral salts such as NaF or CaF₂ (>99.9% mineralization).
- ▶ Combustion Free – no hydrocarbon fuel used, no recombination species, or products of incomplete combustion.



No more PFAS concentrates or PFAS saturated media to be stored in landfill for future generations to remediate.

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