

# Some **Elephants** **in the Room:** PFAS and Biosolids



Kei ō tātou  
Ringaringa  
te ānāmata  
The future is  
in our hands

**27–30  
MAY  
2024**

CLAUDELANDS, HAMILTON

## **Treatment Options for PFAS and POPs in future NZ**

By:

**Lindsay Strachan**

The background of the slide is a close-up photograph of several red grapes. The grapes are out of focus, creating a bokeh effect with soft, blurred circles of red and purple. A semi-transparent white rectangular box is centered over the image, containing the title and list.

# **Persistent Organic Pollutants (POPs) in New Zealand**

- ☐ Dioxins
- ☐ Polychlorinated biphenyls (PCBs)
- ☐ Per- and poly-fluoroalkyl substances (PFAS)

# Overview

1. What's being said?
2. What's the concern?
3. How do we in NZ prepare, to treat PFAS?
4. What are we doing?
5. Conclusions



**BENEATH  
THE SURFACE**



# **Biden-Harris Administration Finalizes First-Ever National Drinking Water Standard to Protect 100M People from PFAS Pollution**

As part of the Administration's commitment to combating PFAS pollution, EPA announces \$1B investment through President Biden's Investing in America agenda to address PFAS in drinking water

10 April 2024

# Consultants working for DEFRA and the Environment Agency (UK):

- Sampled from operational and closed landfills developed between the 1960s to the present day
- To provide an “overall picture” of the chemical substances found in the landfill leachate

**“You would have thought that someone in the Environment Agency would be sitting up and taking notice with PFAS readings coming back hundreds of times higher than safe limits for drinking”**

- Fish Legal

In one landfill, ENDS found that the total PFAS sum in a raw leachate sample was recorded to be

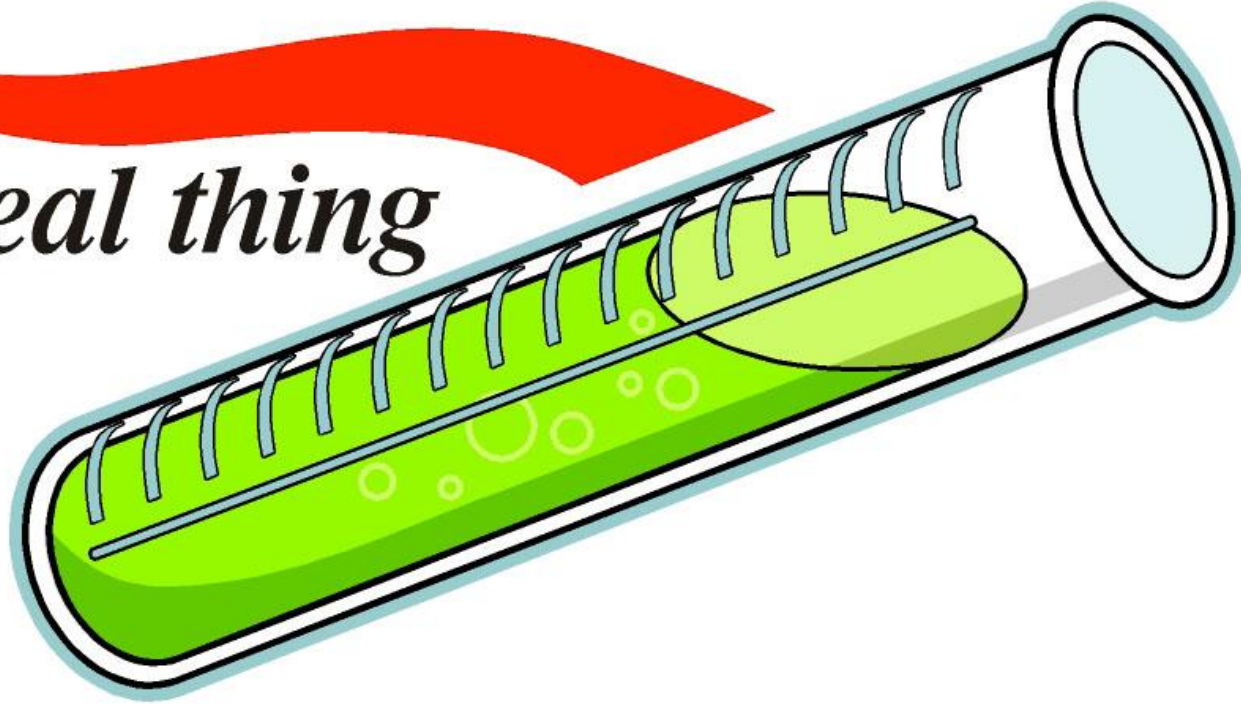
**105,910 ng/l**

- 62,096 ng/l (PFAS)
- 26,900 ng/l (PFOA)
- 2,460 ng/l (PFOS)
- **1,000 ng/l (PFAS)**

Typical Trade Waste Acceptance in **Australia**

# Leachale

*it's the real thing*





**Current Treatment Method**

# PFAS Treatment Options

## Treatment vs Separation

# PFAS Treatment Options

- **Biological Treatment:** enriched acclimatised activated sludge + varied process steps
- **Microbial Capsules + Alginate gels:** PFOS-reducing bacteria

**Treatment**

**Treatment**

# PFAS Treatment Options

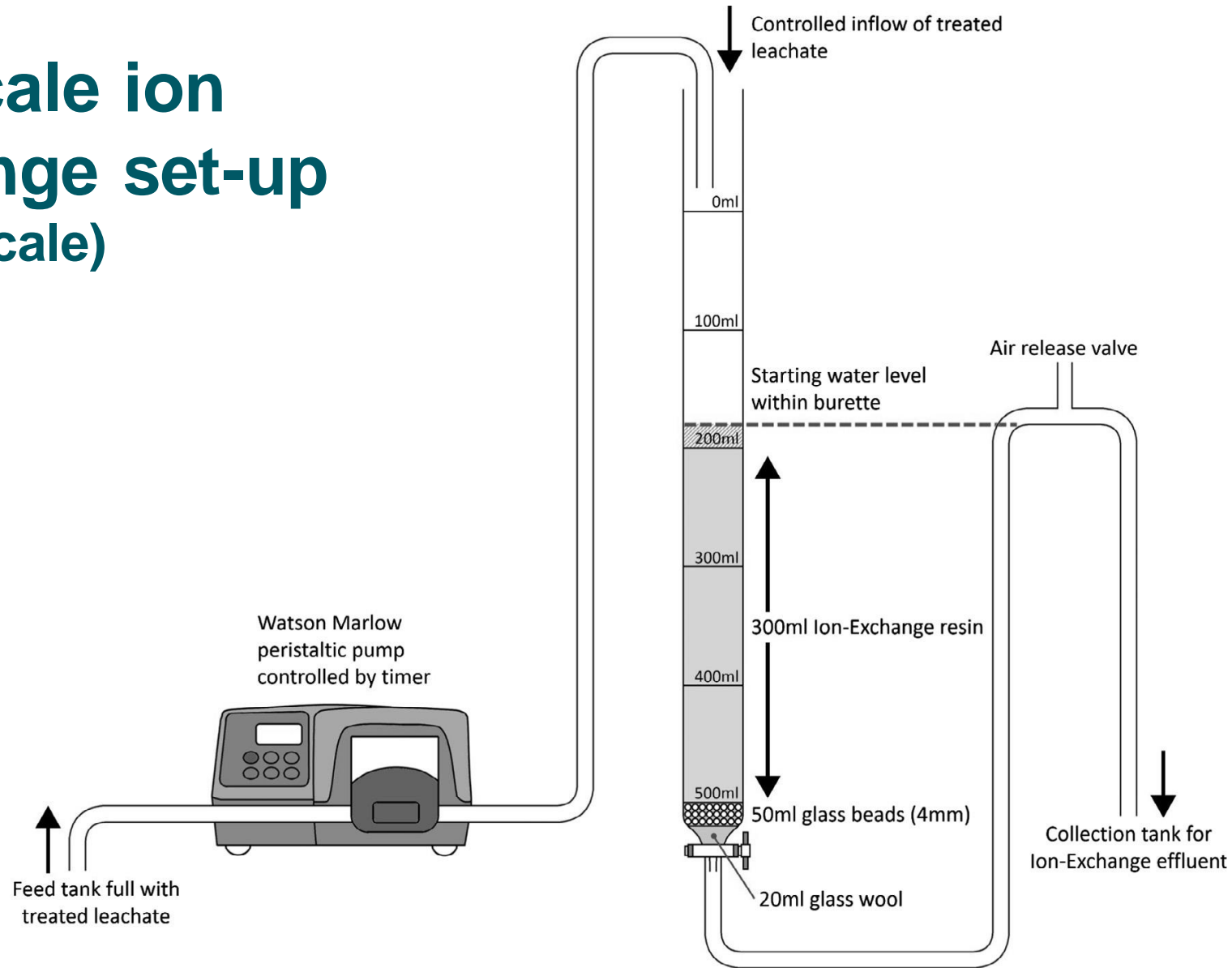
- |                                 |  |                   |
|---------------------------------|--|-------------------|
| ▪ <b>Carbon Sorption:</b>       | activated Carbon (for long chains i.e. PFOA)<br>Waste concerns                   | <b>Separation</b> |
| ▪ <b>Ion Exchange:</b>          | non-regenerable ion resins chemical waste<br>Waste concerns                      | <b>Separation</b> |
| ▪ <b>Carbon Ion Exchange:</b>   | granular activated carbon filter + ion exchange<br>(removal of short chain PFAS) | <b>Separation</b> |
| ▪ <b>Reverse Osmosis (RO):</b>  | short and long chain PFAS<br>Waste concerns                                      | <b>Separation</b> |
| ▪ <b>Evaporation Processes:</b> | Waste concerns   | <b>Separation</b> |





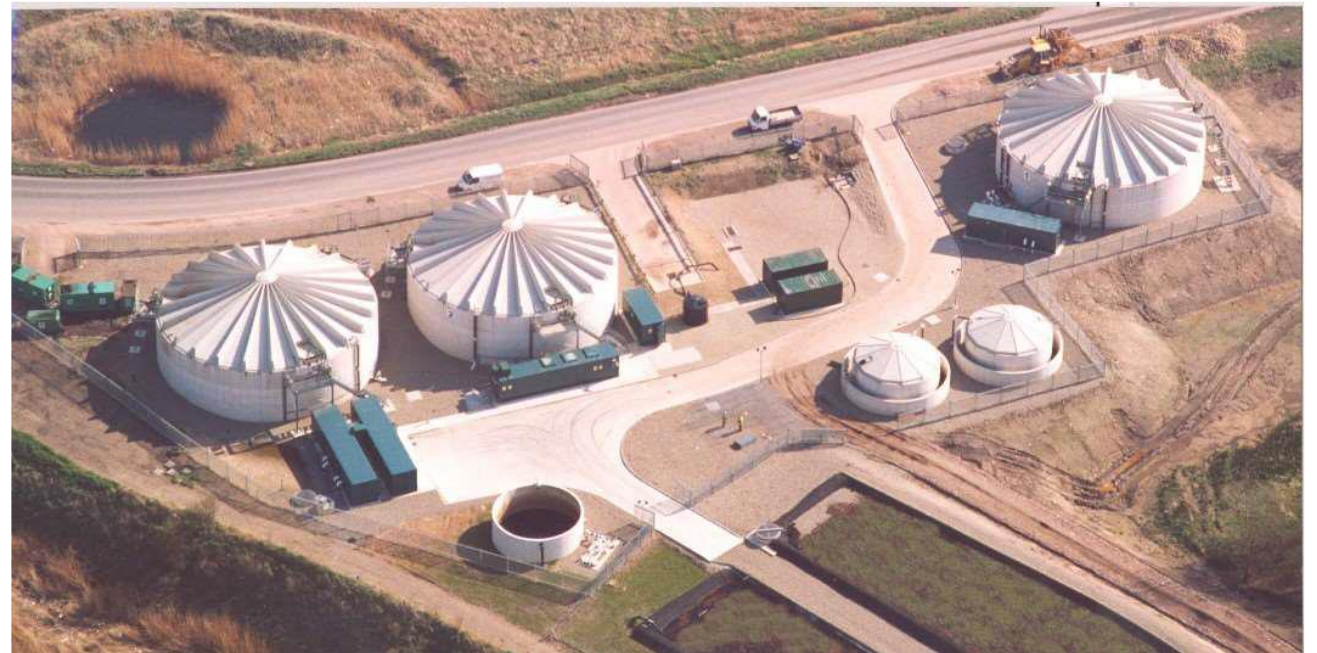


# Lab-scale ion exchange set-up (not to scale)



# Full Scale Leachate Treatment: Tried and Tested





# Conclusions

1. PFAS is of significant concern (bioaccumulation)
2. Landfill leachate is transported off-site to WWTPs (Dilution Solution)
3. There are several treatment options for PFAS
4. Biological treatment systems offer robust effective pre-treatment
5. Treatment trials research at the University of Waikato



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