Supercritical Water Oxidation (SCWO)

Destruction of PFAS contaminated municipal sludge

The Problem

- Environmental pollution is costing society billions of dollars every year.
- Sewage treatment plants generate millions of tons of sludge, release pathogens, pharmaceuticals or persistent chemicals such as PFAS. These contaminants are limiting reuse and driving up treatment and disposal costs.
- 4.5 billion people lack access to safely managed sanitation and clean water. Decentralized treatment is the only viable option to solve the sanitation crisis.
- Worldwide industry generates billions of tons of toxic wastes. Transport onsite and disposal is hazardous and expensive.

What is SCWO?

- SCWO is an advanced oxidation technology very effective at treating concentrated wet waste.
- It renders wastewater sludge, biosolids and highly concentrated industrial wastes into clean water, reusable energy, and inert gases and solids.
- SCWO utilizes the unique properties of water above its critical point (374°C and 221 bar) to rapidly convert organic waste to clean water, inert solids and gases, and reusable heat with >99% reduction in solids volume.
- The system has been successfully demonstrated at scale in >100 runs and thousand hours of operation.
- The system is modular and prefabricated, so it can be cost effectively shipped, installed and operated onsite within the footprint of an existing site.

374Water Inc

- 374Water is a social impact, cleantech company spun off Duke University and based in Durham, NC.
- It is commercializing a novel approach to supercritical water oxidation packaged in prefabricated modular systems for on-site waste processing.

SCWO Destroy Persistent Chemicals

- Per- and polyfluoroalkyl Substances (PFAS) is a group of man-made chemicals that includes PFOA, PFOS, and others.
- They originate from manufacturing and processing facilities, airports and military installations that use firefighting foams.
- Persistent in the environment and in the human body
- Can lead to increased cholesterol levels, low infant birth weights, effects on the immune system, cancer (for PFOA), and thyroid hormone disruption (for PFOS).

Pollutant | Influent | Effluent |
--- | --- | --- |
PFOS | 110,000 ng/l | 0.65 ng/l |
PFOA | <6200 ng/l | 3.15 ng/l |
PFAS (24 derivatives) | 29.1 ng/l | 374 Water Inc

Case Study

Client: Small Scale Municipality
Location: Maine, USA
Application Type: Lime stabilized Sludge Contaminated with PFAS

99.95% PFAS destruction

- The SCWO system effectively treated contaminated sludge and destroyed PFAS below the regulatory limits. Treatment was stable, reliable and effective. There were no signs of enhanced corrosion.

Nix Treatment Systems

- Mass produced, prefabricated, containerized system

<table>
<thead>
<tr>
<th>Model</th>
<th>Daily Capacity Nominal (wet tonne)</th>
<th>Cost (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nix6</td>
<td>5.1</td>
<td>$2M</td>
</tr>
<tr>
<td>Nix30</td>
<td>25.5</td>
<td>$4.5M</td>
</tr>
<tr>
<td>Nix200</td>
<td>170</td>
<td>$17.2M</td>
</tr>
</tbody>
</table>

The Future

- SCWO is a disruptive and proven technology with the potential to shift the global waste treatment paradigm toward one that supports the United Nations Sustainable Development Goals (SDGs).

© 374Water Inc. 2020