

PFAS

Slashing the costs to a “forever” problem

ECOTHOR®-AOP

HIGHLIGHTS :

- Known as “forever chemicals”, PFAS are pollutants which persistent in the environment, leading to increase rates of cancer along with many other health problems.
- PFAS has been found in surface water, groundwater, wastewater, and landfill leachate.
- Adsorption media (granular activated carbon or ion exchange resin) costs for treating concentrated effluents (50,000 to 1,000,000 ppt) can be enormous - US\$100-\$300 per gram of PFAS removed.
- ECOTHOR®-AOP, a commercially available electro-oxidation system, when coupled with adsorption media, can remove >> 99% of PFAS at a dramatically reduced OPEX (80-90% reduction vs media alone).



What are PFAS?

Per- and polyfluoroalkyl substances (PFAS) are a large group of environmentally-persistent, highly stable man-made chemicals which have been used in household goods and industrial products for their hydrophobic, oleophobic, lubrication, or non-flammable properties – fire-fighting foams, anti-stick coating on cookware, water-repellant clothing, etc.



Why are they harmful?

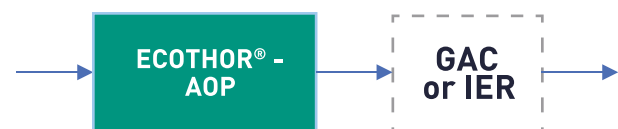
There is evidence that continued exposure above specific levels to certain PFAS may lead to adverse health effects. Very low doses in drinking water have been linked to an increased risk of cancer, reproductive and immune system harm, liver and thyroid disease, and other health problems.

The Challenge

1. Carbon-Fluorine bonds are very hard to break
2. PFAS can be adsorbed by granular activated carbon (GAC) or ion exchange resin (IER) but long chains block adsorption sites, reducing capacity and increasing costs (consumables + disposal or regeneration).

The Solution

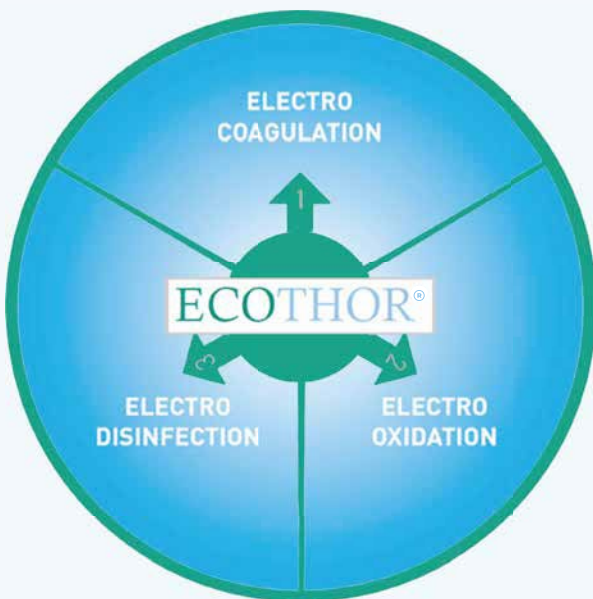
Initial treatment with ECOTHOR®-AOP, with complete and partial oxidation of PFAS compounds. The remaining traces of PFAS molecules are adsorbed by a filtering media (GAC or IER)



For concentrated streams of
50,000 – 1,000,000 ppt PFAS
OPEX Reduction of 80-90%
achievable versus adsorption
media only



ECOTHOR®-AOP is a patented, cost-effective, and environmentally-sound process for the treatment and removal of recalcitrant compounds. Electro-oxidation is an electrokinetic treatment process whereby an electric current is applied across two electrodes to produce oxidants. This allows for the destruction of numerous types of toxic, recalcitrant organic substances via multiple oxidizing mechanisms. The E2metrix electro-oxidation technology does not use hazardous chemicals and does not produce any solid or liquid waste. Catalytic materials and electrodes are selected depending on the treatment application. E2metrix's technology is protected by an extensive patent portfolio.



E2METRIX is a Sherbrooke, Quebec-based water and wastewater treatment systems company with a focus on **ECOTHOR®**, a “plug & play”, proprietary, award-winning electrotechnology process for treating process water along with industrial and municipal wastewater, either at a greenfield or an existing site. The modular **ECOTHOR®** reactor can be operated alone or in a bank of multiple reactors to treat wastewater discharge flows from as low as 500 to 500,000 gpd and more to target removal of contaminants including, ammonia nitrogen, phosphorus, suspended solids, metals (ex. Zn, Cu, Ni, As, Se, Mn, Fe, etc.), C10-C50 hydrocarbons, cyanides/thiocyanates, fats/oils & greases, pathogens/bacteria, emerging contaminants (including hormones, pharmaceuticals, PFAS), fluorides, and others.

Low Cost of Ownership	Multiple Contaminant Removal
Fully Automated with Remote Operation	Compact – Small Footprint & Modular
On/Off Capabilities	No moving parts

