Powerful Water Treatment
Zero Compromise

EC AOP technology for mining, energy, industrial and environmental applications

Electro Catalytic AOP

How does it work?

Combines Ozonation & Electro-Oxidization in the presence of the catalyst, the process breaks down dissolved particles to form charged radicals & ions, which are then rendered insoluble.

The chemistry involved in free-radical water treatment process, such as the AOP, is sufficiently complex that true optimisation of the processes is often difficult without the use of kinetic models, or by performing feasibility studies.

The extremely high level of catalytic activity is comparable to related methods, such as supercritical water oxidization and wet -air oxidization.

Electro Catalytic AOP

The Process

- The Lotic EC-AOP unit manufactures its own ozone on-site. This is a necessity, since ozone has a half -life of 20 to 30 minutes.
- Once created, the ozone is pumped into the AOP reactor, along with the fluid.
- Inside the reactor, the ozone completes some very important tasks.

Ozone – Powerful Oxidant

Oxidants can react with a variety of impurities such as metal salts, organic matter including micro-organisms, hydrogen and hydroxide ions.

Key Ingredient

Excess ozone is created to react with the electro catalyst in the reactor. The resulting reaction is the production of the main ingredient, hydroxyl radicals.

Oxidants Breakdown

As reactions occur, the ozone and hydroxyl radicals naturally break down and produce hydrogen peroxide and atomic oxygen as by-products – two more oxidants. These components continue oxidation of the fluid.

Final Result

When reactions are complete, contaminants have been mineralized and oxidants have been degregated into H_2O, O_2 important tasks. and CO_2.

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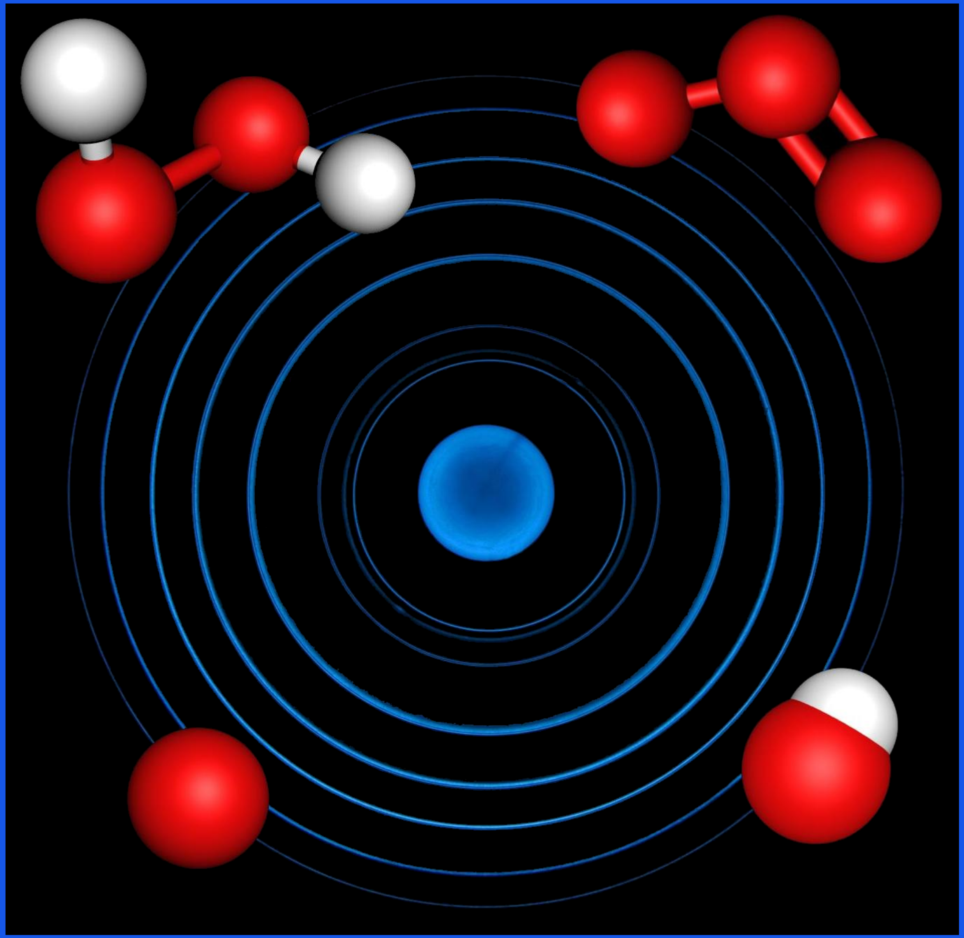
Watch the Process

Electro Catalytic AOP

Oxidizing Agents

- Atomic Oxygen
- Hydrogen Peroxide
- Ozone
- Hydroxyl Radicals

These four powerful oxidizing agents are engaged in the EC-AOP reactor, breaking down contaminants in an environmentally friendly way, which results in a large decrease in organics, sludge, and other residual pollutants, toxins and chemicals



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Why ·OH Radicals?

The Hydroxyl Radical

One of nature's most powerful oxidizing agents. It easily & instantaneously reacts with surrounding dissolved chemicals, commencing a cascade of oxidation reactions which ultimately fully breaks down and mineralizes the molecule.

Reaction process

Reduces the concentration of contaminants from hundreds of PPM to less than 5 PPB, which significantly lowers COD and TOC.

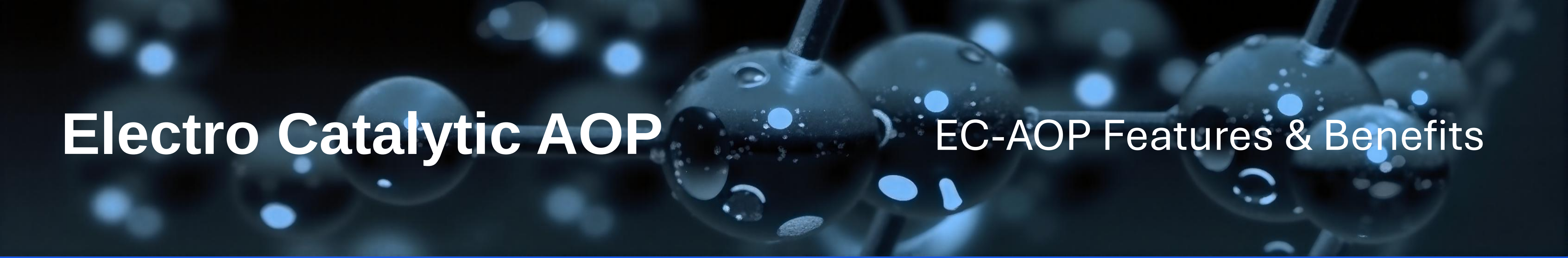
Hydroxyl Radicals

Highly effective in the oxidative destruction of common organic pollutants, such as pesticides, pharmaceutical compounds, dyes, and petroleum-based byproducts. **Hydroxyl Radicals** do not discriminate, which allows it to react with almost every aqueous pollutant.

Final Product

The reduction process of •OH is H_20, which reduces by-product sludge and does not introduce new hazardous elements into the fluid.

Oxidant	Redox (V)
OH	2.80
·O	2.42
O_3	2.07
H_2O_2	0.87



Electro Catalytic AOP

EC-AOP Features & Benefits

- No moving parts
- Electro-Catalytic Advanced Oxidation (EC-AOP)
- Chemical-free/minimised treatment process
- Modular and scalable design, compact footprint
- Automated PLC control with remote monitoring
- High oxidation potential (hydroxyl radicals)
- Integrated solids removal
- Energy-efficient operation
- Robust to influent variability
- Fast reaction times

- Minimal user interaction for service and maintenance
- Achieves rapid, high-efficiency breakdown of complex contaminants (e.g. BOD, COD, PFAS, hydrocarbons)
- Reduces chemical handling, transport, and ongoing consumable costs
- Easily sized to suit everything from pilot trials to full-scale industrial flows
- Reduces operator burden and enables real-time performance tracking
- Saves valuable real estate – ideal for retrofits, remote locations, or mobile setups
- Destroys recalcitrant organics that conventional systems struggle with
- Eliminates the need for additional clarifiers or DAF systems
- Low OPEX compared to thermal or intensive chemical alternatives
- Consistent performance across a wide range of industrial wastewater types
- Enables high-throughput treatment in short residence time applications

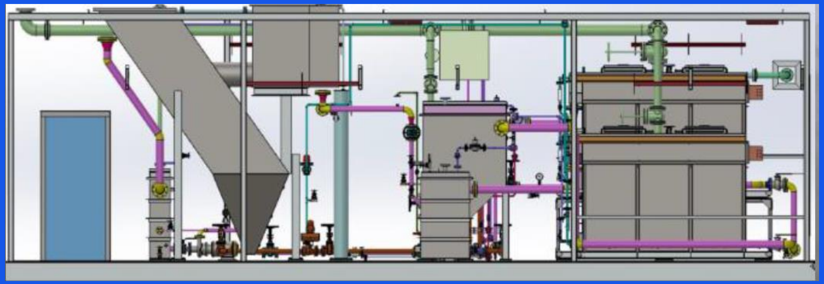
Electro Catalytic AOP

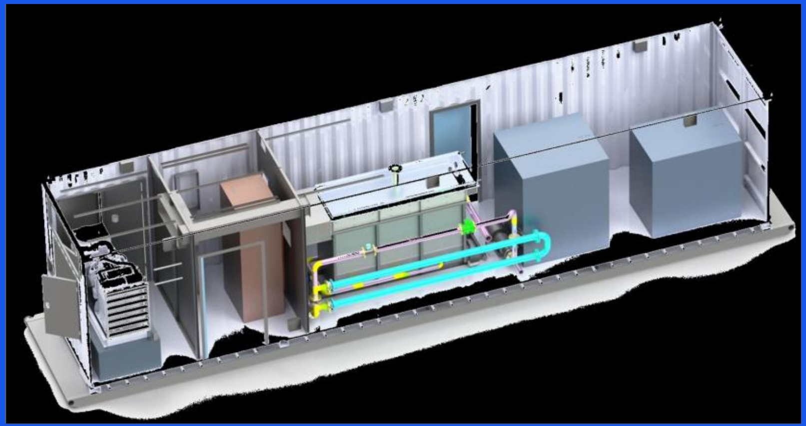
EC-AOP Target Contaminants

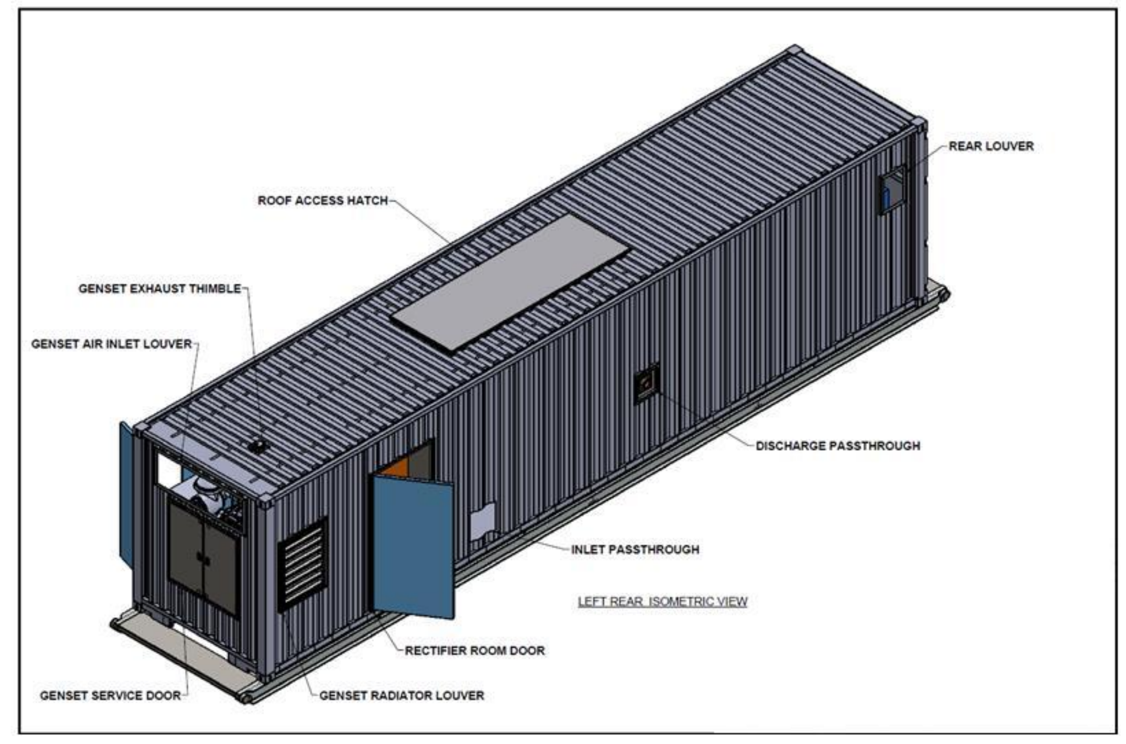
- Kills bacteria & pathogens by destroying cell walls
- Eliminates existing Hydrogen Sulfide (H_2S)
- Treats out ammonia
- Oxidizes iron (Fe2) and heavy metals
- Reduces NORMS
- Eliminates or reduces BOD, COD & TOC
- Hydrocarbon & VOC removal
- Breaks down pharmaceuticals
- Breaks down pesticides
- Breaks down chlorocarbon, aromatics, phenolics, dyes, petroleum constituents
- Removal of suspended & colloidal solids
- Breaks oil/water emulsions – oxidizes and removes lower percentile oil constituents
- Removes fats, oils & greases
- Removes complex organics
- Reduces phosphates and nitrogen levels
- Achieves either total separation/precipitation of dissolved organics or achieve complete mineralization

Electro Catalytic AOP

EC-AOP Typical Set-Up







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EC-AOP Typical Set-Up

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EC-AOP Typical Specifications

Portable Skid or Seacan
Mounted systems - 2.4m x 12m x 2.9m 378 litres (22.71m3/hr.), and 16.3-ton dry weight.

Portable units can be daisy-chained together for increased flow rates, or large units can be built to achieve greater flow rates. Standard Product Line flow rates - 190/378/2460 litres (50/100/650gpm).

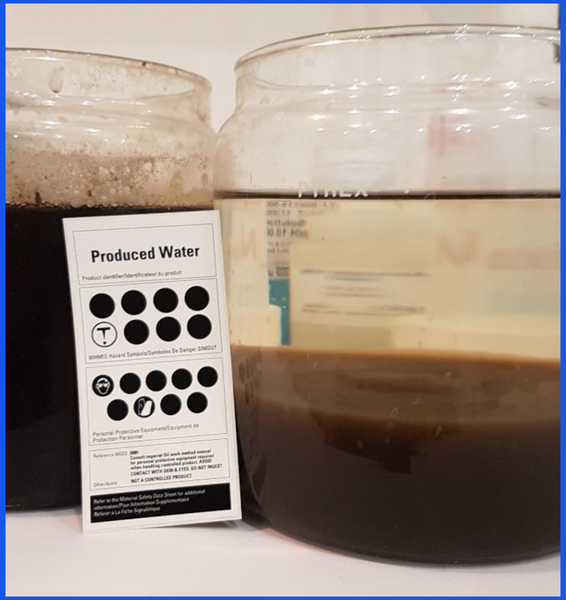
Reactor tanks - customised to required flow rates. Reactor tank sizes vary, typical 2460 litre (650gpm) reactor 2.4m x 4.7m. Multiple tanks in tandem to achieve very large process volumes.

Standard 12m process centre provides 378 litre (100gpm) flow rate.

Electro Catalytic AOP

EC-AOP 3rd party Analysis

Production Water #1 – SAGD (Steam-Assisted Gravity Drainage)



Parameter	Control	Treated Sample	Removal
Tannin (mg/L)	168	32	80.9%
Magnesium (mg/L)	45	19	58.1%
Calcium (mg/L)	349	17	95.2%
Silica (mg/L)	136	2	98.5%
Hardness (mg/L)	393	36	90.9%
Alkalinity(mg/L)	363	97	73.3%

Production water: High silica removal, hardness reduction, immediate sludge flocculation

Electro Catalytic AOP

EC-AOP 3rd party Analysis

Production Water #2 – SAGD (Steam-Assisted Gravity Drainage)

Production water: High silica removal, hardness reduction, immediate sludge flocculation

Parameter	Control	Treated Sample	Removal
Tannin (mg/L)	158	0	100%
Magnesium (mg/L)	48	5	89%
Calcium (mg/L)	307	80	74%
Silica (mg/L)	142	1	99%
Hardness (mg/L)	351	87	75%
Alkalinity(mg/L)	634	350	45%

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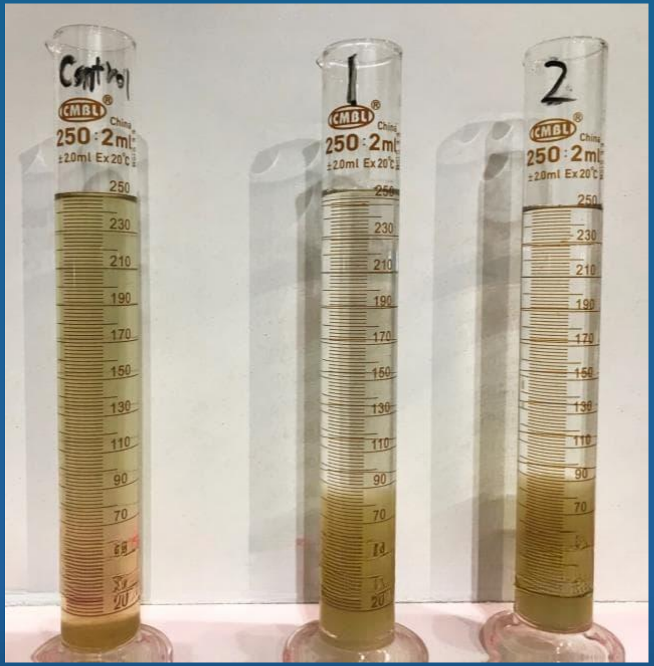
EC-AOP 3rd party Analysis

Municipal Wastewater



Municipal wastewater: High silica removal, hardness reduction, immediate sludge flocculation

Parameter	Control	Treated Sample	Removal
COD (mg/L)	149	34	76.5%
BOD (mg/L)	13	6	53.8%
TSS (mg/L)	41	9	78.0%
Ammonia (mg/L)	12.8	12.4	3.1%
TKN (mg/L)	17.3	13.5	22.0%
Phosphorous (mg/L)	812	212	73.9%
Calcium (mg/L)	77.2	34.5	55.3%
Magnesium (mg/L)	44.2	21.7	50.9%
Hardness (mg/L)	375	176	53.1%
Alkalinity (mg/L)	300	178	40.7%
Total Coliform (CFU/100mL)	20	1	95.0%
E.coli. (CFU/100mL)	10	1	90.0%

Contaminant Removal Efficiency — LOTIC EC-AOP Case Studies

Parameter	Before EC-AOP	After EC-AOP	% Removed
Aldrin (Pesticide)	0.063	0.001	98.40%
Aluminum	224	0.69	99.70%
Aldrin (Pesticide)	0.063	0.001	98.40%
Arsenic	0.076	<0.0022	97.10%
Barium	0.0145	<0.0010	93.10%
Benzene	90.1	0.359	99.60%
BOD	100	12	88.00%
Boron	4.86	1.41	70.80%
Cadmium	0.1252	0.0062	95.00%
Calcium	1321	21.4	98.40%
Chlorpyrifos (Pesticide)	5.87	0.01	99.80%
Chromium	1.05	0.034	96.80%
Cobalt	0.1238	0.0214	82.70%
Copper	0.793	0.0662	91.70%
Cyanide (Free)	723	<0.020	99.90%
Cypermethrin (Pesticide)	0.143	0.0032	97.80%
DDT (Pesticide)	0.261	0.002	99.20%
Diazinon (Pesticide)	34	0.05	99.90%
Ethyl Benzene	428	0.372	99.90%
Fluoride	1.1	0.415	62.30%
Gold	5.7	0.24	95.80%
Iron	68.34	0.1939	99.70%
Lead	1.06	0.0218	97.90%
Lindane (Pesticide)	0.143	0.0031	99.30%
Magnesium	13.35	0.018	99.90%
Manganese	2.2	0.0148	99.30%
Mercury	0.73	<0.0031	99.60%
Molybdenum	0.65	0.0112	98.30%
MP-Xylene	41.68	0.057	99.90%
MTBE	21.58	0.076	99.60%
Nickel	1.86	0.07	96.20%
Nitrate	116	2.6	77.80%
Nitrite	21	1.4	93.30%
Nitrogen TKN	1118.88	59	94.70%
NTU (Turbidity)	35.34	0.25	99.30%
O-Xylene	191	0.416	99.80%
PCB (Arochlor 1248)	0.20007	<0.0001	99.90%
Petroleum Hydrocarbons	12000	0.2	99.90%
Phosphate	28	6	78.60%
Platinum	0.25	0.006	97.60%
Potassium	2000	1160	42.00%
Propetamphos (Pesticid	0.007	0.0044	94.00%
Selenium	68	38	44.00%

Variation in contaminant removal performance is primarily influenced by differences in the water matrix. In low-strength industrial or synthetic test waters, where target pollutants are present in trace concentrations and organic loading is minimal, the LOTIC EC-AOP system demonstrates exceptionally high removal efficiencies—often exceeding 95%—for heavy metals, pesticides, and persistent organics. In high-strength wastewater streams such as municipal or agricultural effluent, elevated levels of COD, BOD, suspended solids, and nutrients like ammonia and TKN can reduce treatment efficiency. These compounds consume oxidants, compete for reactive sites, and may require longer contact times or additional treatment steps, resulting in lower overall removal rates in these more complex matrices.

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