AEC
AQUEOUS ELECTROSTATIC CONCENTRATOR
CASE STUDY

BioLargo Aqueous Electrostatic Concentrator (AEC) PFAS Removal System

Effective in removing PFAS from brackish water to non-detect

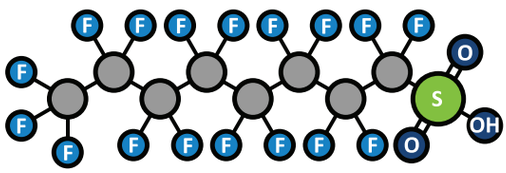
SUMMARY:

A large municipality in California needed a treatment process to remove per- and polyfluoroalkyl substances from their water. BioLargo's Aqueous Electrostatic Concentrator (AEC) was tested and found to remove all ten PFAS compounds from their water to below non-detect levels. Unlike carbon filtration or ion exchange, the AEC generates little PFAS-laden waste and is highly tolerant of varying water quality.

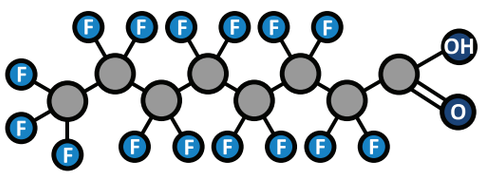
THE PROBLEM:

The municipality's drinking water wells were contaminated with ten different per- or polyfluoroalkyl substances (PFAS), water pollutants of rapidly escalating regulatory concern. Traditional decontamination technologies like carbon filtration and ion exchange are expensive, inefficient and not well suited to treating water of this quality, generating large amounts of PFAS-contaminated solid waste. In this case the municipality set a very high target to reduce the PFAS to non-detect levels, which is difficult to achieve and maintain with traditional treatment processes.

PFOS



PFOA



Per- and polyfluoroalkyl substances (PFAS) are man-made chemicals that contaminate 60% of public wells in the US. They are linked to myriad adverse health effects. New regulatory efforts made one municipality search for a better treatment alternative to traditional technologies ion exchange or carbon filtration.

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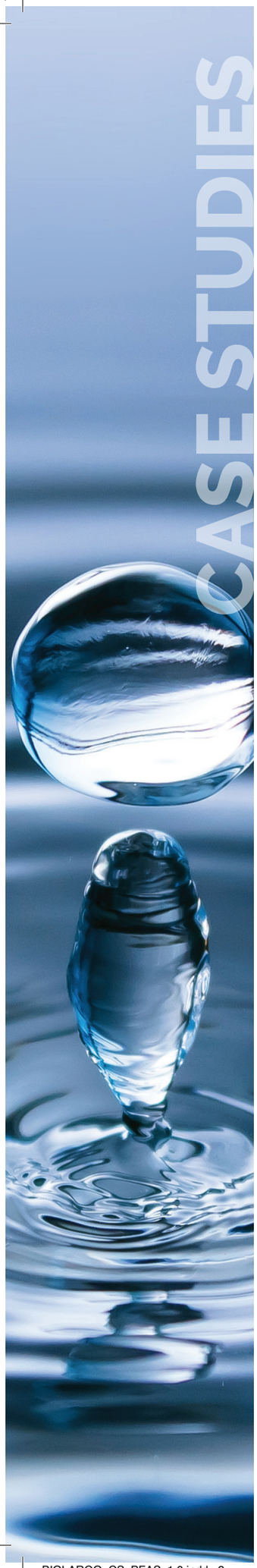

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THE SOLUTION:

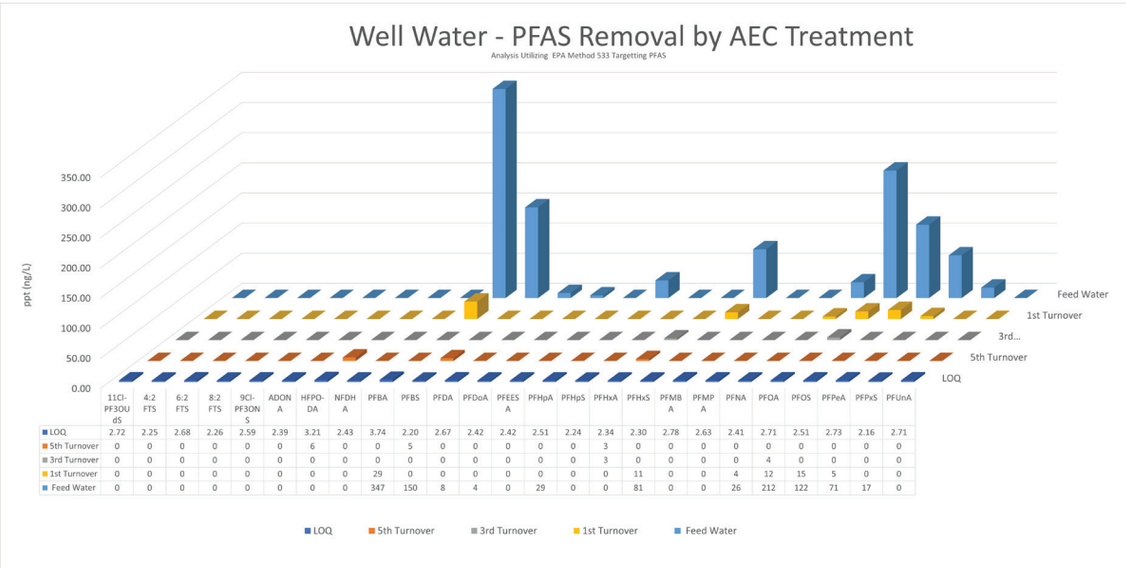
The municipality and BioLargo Engineering, Science & Technologies, LLC (BLEST) agreed to assess treatment of their PFAS-contaminated water by BioLargo's Aqueous Electrostatic Concentrator (AEC), a patent-pending system that exploits the unique properties of PFAS molecules to rapidly and effectively deposit them onto proprietary membranes.

Totes of PFAS-laden water were sent to the BLEST facility in Oak Ridge, TN. After the baseline water chemistry was analyzed, the system parameters of the AEC were selected to optimize PFAS removal. All water analysis was completed and verified by the University of Tennessee.

To assess the range of treatment performance provided by the AEC, the municipality's water was passed through the system either once, three times, or five times. Water samples were collected before treatment and after each subsequent pass through the system.

RESULTS OF THE CASE STUDY:

Of the ten different PFAS compounds identified in the municipality's water, the AEC reduced five of them to below the limits of quantification ("non-detect") in a single pass, with the other five being reduced to non-detect after the third pass. No PFAS compounds tested required five passes to reduce to non-detect levels.



	11Cl-PF3OUdS	4:2 FTS	6:2 FTS	8:2 FTS	9Cl-PF3ONS	ADONA	HFPO-DA	NFDHA	PFBA	PFBS	PFDA	PFDoA	PFEESA	PFHpA	PFHpS	PFHxA	PFHxS	PFMBA	PFMPA	PFNA	PFOA	PFOS	PFPeA	PFPxS	PFUnA
LOQ	2.72	2.25	2.68	2.26	2.59	2.39	3.21	2.43	3.74	2.20	2.67	2.42	2.42	2.51	2.24	2.34	2.30	2.78	2.63	2.41	2.71	2.51	2.73	2.16	2.71
5th Turnover	0	0	0	0	0	0	6	0	0	5	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
3rd Turnover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	4	0	0	0	0
1st Turnover	0	0	0	0	0	0	0	0	29	0	0	0	0	0	0	0	11	0	0	4	12	15	5	0	0
Feed Water	0	0	0	0	0	0	0	0	347	150	8	4	0	29	0	0	81	0	0	26	212	122	71	17	0

Electrical usage of the unit remained steady in the first stage and dropped significantly in the additional stages when used in series, meaning increases to operating costs of the system resulting from additional passes are marginal. System cleaning was initiated after 300 hours to reduce the impact of scaling. Its efficacy, low operating costs, and feasible operating parameters prove the technology is commercially viable for use at this water district.

For more information about BioLargo's AEC technology, go to biolargoengineering.com or email tonya.chandler@biolargo.com

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