

## Background

The City of Plains, Texas, required a reliable and sustainable drinking water solution to address naturally occurring arsenic and fluoride present in its groundwater supply. Regulatory compliance, operational simplicity, and lifecycle cost reduction were key drivers for the project. The City selected Purifics' Continuous Ultra-Filtration (**Cuf**<sup>®</sup>) technology to replace conventional adsorption media-based treatment, which typically requires frequent media replacement, backwashing, and strict temperature control.

This project represents Purifics' second arsenic-removal installation in the state of Texas and is part of a growing portfolio of **Cuf**<sup>®</sup> drinking water systems deployed to address complex water contaminants.



## Treatment Challenge

Groundwater characterization identified that approximately 75% of the total arsenic was present as As(III), a form that traditionally requires pre-oxidation prior to removal when using media-based systems. The city sought a treatment process that could:

- Remove arsenic and fluoride (without pre-oxidation) in a single unit operation
- Eliminate adsorption media, its replacement, and backwash requirements
- Minimize chemical usage and operator intervention
- Maintain low operating costs over the life of the plant

## Pilot Program Overview

An on-site **Cuf**<sup>®</sup> pilot verification program was conducted at the City of Plains in accordance with TCEQ approval to validate treatment performance, optimize operating parameters, and support full-scale design. The pilot included three phases: (1) process optimization, (2) a 30-day sustained operating period at optimized conditions, and (3) post-operation verification following TMP maintenance rinses to confirm no irreversible membrane fouling.

The pilot program operated for a total of 4,766 hours and demonstrated stable, continuous performance under real groundwater conditions. All pilot objectives were achieved, including sustained arsenic and fluoride removal with filtrate concentrations well below their respective MCLs, operator training, and regulatory coordination.

Parameter (mg/L)	Influent	Post CUF
<b>Fluoride</b>	3.65	1.7
<b>Arsenic</b>	0.012	<0.003

Pilot results validated full-scale design parameters and directly supported the selection of the DM36 **Cuf**<sup>®</sup> system for permanent installation.





## Drinking Water Purification Solution

Purifics supplied a DM36 **Cuf**<sup>®</sup> drinking water system with a treatment capacity of 560 gallons per minute (gpm), operating at a flux of 250 GFD. The full-scale system design is based directly on the validated pilot operating parameters.

A key advantage of the **Cuf**<sup>®</sup> process is its ability to remove arsenic and fluoride without adsorption media and without the need for pre-oxidation, eliminating operational limitations including:

- Backwashing
- Bed fluffing
- Media replacement
- Performance degradation due to temperature fluctuations



By continuously removing suspended and dissolved contaminants through a proprietary in-situ process, the system delivers consistent treated water quality while operating continuously at a fixed dosage. No chlorine or other oxidants were required during piloting or full-scale design. The system is fully automated, requires no pH adjustment during treatment, and operates continuously with minimal operator involvement. This installation represents Purifics' 12th drinking water plant based on the Cuf process.

## Cost & Operational Benefits

The **Cuf**<sup>®</sup> process significantly reduces both capital and operating costs when compared to conventional treatment approaches. Key benefits include:

- Total operating cost of approximately \$0.08/1,000 gal.
- Fully automated operation with minimal operator oversight
- Elimination of media replacement costs
- Compact system footprint
- No chemical oxidants or pH adjustment required

## Project Status

The DM36 **Cuf**<sup>®</sup> system for the City of Plains is anticipated to star-up by the end of Q1 2026.

