

# PFAS Removal by TFN RO Membranes

Per — and Polyfluoroalkyl Substances (PFAS)

**LG NanoH<sub>2</sub>O™** thin-film nanocomposite (TFN) reverse osmosis membrane technology has been tested at sites across the U.S. contaminated with PFAS with proven results as an effective treatment solution for reducing PFAS to non-detect levels.



**NanoH<sub>2</sub>O™**

North Carolina

## Brunswick County Northwest Water Treatment Plant

PFAS contamination of the Cape Fear River by a manufacturer of GenX (PFOA alternative) located 80 miles northwest of the water treatment plant. A pilot study was conducted to evaluate RO for expansion of the existing 24 MGD conventional treatment plant to incorporate a 36 MGD reverse osmosis system for effective PFAS removal.



Table 1: Pilot Description

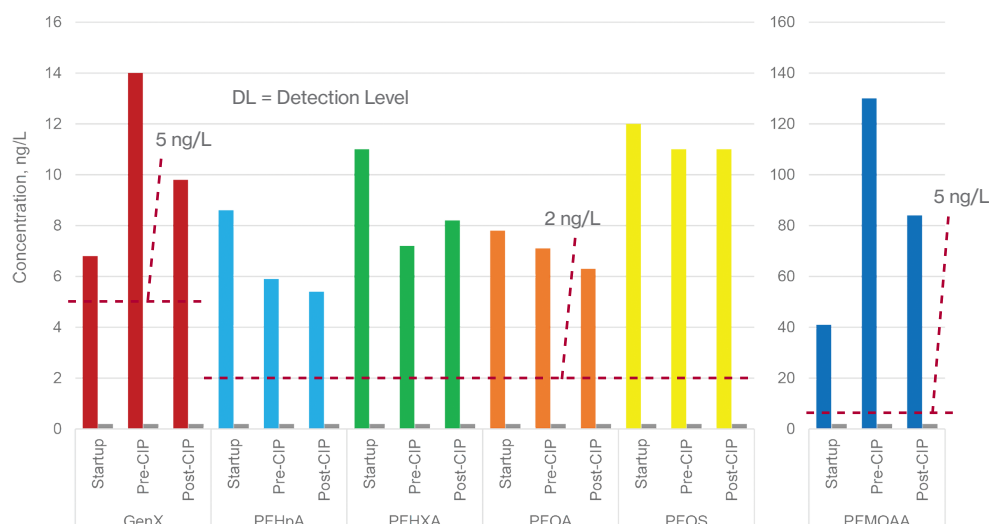
|                   |                                  |
|-------------------|----------------------------------|
| Duration          | Dec 2018 – Mar 2019              |
| Feed water intake | NWTP effluent                    |
| Configuration     | 2:1 skid, 8M (4-inch element)    |
| System recovery   | 85-92%                           |
| System capacity   | 20.1 gpm (110 m <sup>3</sup> /d) |
| System flux       | 14.2 gfd                         |
| Membrane model    | Energy-saving LG BW 4040 ES      |
| Feed pressure     | 140–170 psi                      |

Table 2: Pilot Objectives

| Target contaminants   | Treatment goals               |
|-----------------------|-------------------------------|
| GenX                  | <5 ng/L (RL) or >95% removal  |
| PFMOAA and other PFAS | < 5 ng/L (RL) or >90% removal |

- LPRO system evaluated to be about 20% less expensive to operate vs. GAC over 25-year period
- When completed in 2024, BCNWTP will be the first surface water treatment facility in the U.S. to use reverse osmosis to remove PFAS

BCNWTP Contaminant Removal via TFN Membrane



GenX and other PFAS concentrations are non-detect in the permeate after treatment with RO.

## Georgia

# Bruce Hamler Water Treatment Facility

PFAS contamination of the Oostanaula and Etowah Rivers by various carpet manufacturers. The 18 MGD water treatment facility currently treats the surface water via conventional methods using flocculation, settling, and filtration.



### Dominant PFAS contaminant in feed water

- PFBS (Perfluorobutanesulfonic acid), PFHxA (Perfluorohexanoic acid)

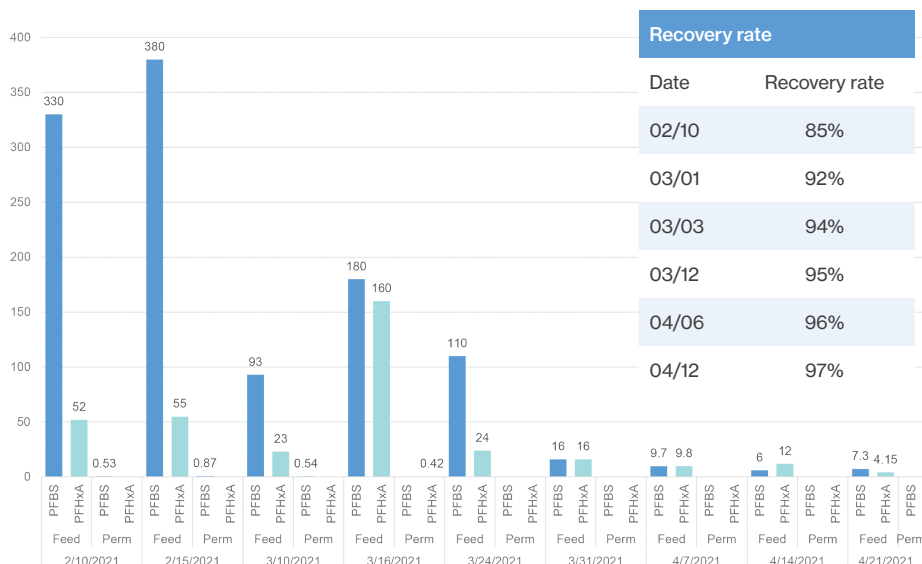
### RO pilot objectives<sup>1</sup>

- Demonstrate steady removal of 25 PFAS compounds, including short-chain compounds, to non-detectable levels
- Achieve the highest possible recovery rate
- Determine critical design parameters for full-scale implementation

<sup>1</sup> Rotec Flow-Reversal RO technology applied to the pilot system by AdEdge Water Technologies to reduce the risk of RO scaling, increase recovery rate, and lower concentrate volume

Table 3: RO Pilot Description

|                   |                             |
|-------------------|-----------------------------|
| Duration          | 2/10/2021 – 4/24/2021       |
| Feed water intake | Surface water               |
| Configuration     | 3:2:1 skid, 8M, FR-RO       |
| System recovery   | Up to 97%                   |
| System capacity   | 22–23 gpm                   |
| System flux       | 8.1 gfd                     |
| Membrane model    | Energy-saving LG BW 4040 ES |
| Feed pressure     | 60–80 psi                   |



### RO pilot results

- FR-RO system using energy-saving LG NanoH<sub>2</sub>O™ RO membranes exceeded target criteria for 25 PFAS compounds
- PFBS: 99.42% rejection, 94% recovery
- PFHxA: 99.74% rejection, 95% recovery
- Complete removal of PFAS achieved at 97% recovery with stable flux and differential pressure

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