

Presentation of Final Report

Northwest Water Treatment Plant Treatment Evaluation
Brunswick County, NC

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**CDM
Smith**

Summary of Target Contaminants

- Northwest WTP will require Advanced Treatment to remove target contaminants

Primary Target Contaminants

Per- and Poly-fluoroalkyl Substances (PFAS)

- GenX and other PFAS compounds
 - PFMOAA, PFMOPrA, PFMOBA, PFPrOPrA (GenX), PFO2HxA, etc.
- Nafion by-products
- Other identified PFAS compounds
- Additional PFAS compounds not yet identified



Secondary Target Contaminants

- 1,4-Dioxane
- Pharmaceuticals and Personal Care Products (PPCPs)
- Endocrine Disrupting Compounds (EDCs)
- Pesticides and Herbicides
- NDMA, Brominated DBPs
- Other identified compounds
- Additional compounds not yet identified

LPRO Pilot – Example PFAS Test Results

Parameter	Filtered Water Concentration	RO Treated Water	Calculated Removal %
Gen X	7 – 12 ng/L	ND	--
Nafion Byproduct 1 & 2	ND	ND	--
PFMOAA	320 – 750 ng/L	ND – 11 ng/L	98%+
PFO2HxA	12 – 26 ng/L	ND	--
PFHxA	19 – 20 ng/L	ND	--
PFPeA	16 - 17 ng/L	ND	--
PFOS + PFOA	26 ng/L	ND	--
Sum (45) of PFAS Tested	423 – 892 ng/L	ND – 11 ng/L	--

LPRO Pilot – Example Test Results

Parameter	Filtered Water Concentration	RO Treated Water	Calculated Removal %
1,4-Dioxane (industrial chemical)	3.2 µg/L	0.2 µg/L	94%
Carbamazepine (seizure medicine)	13 ng/L	ND	--
Atrazine (herbicide)	58 ng/L	ND	--
Cotinine (metabolite of nicotine)	15 ng/L	ND	--
DEET (insect repellent)	44 ng/L	ND	--
Simazine (herbicide)	57 ng/L	ND	--
Tris (1,3 dichloro-2-propyl)phosphate (pesticide, flame retardant)	120 ng/L	ND	--

Economic Comparison of Advanced Treatment Options

	Low Pressure Reverse Osmosis (LPRO)	Ozone/BAF - GAC	GAC/IX/UV-AOP
Total Capital Costs	\$ 99 M	\$ 99 M	\$ 84 M
25-yr Present Worth of Annual Costs	\$ 59 M	\$ 95 M	\$ 93 M
Total 25-yr NPW (Capital + Annual O&M)	\$ 158 M	\$ 194 M	\$ 177 M

- Capital and O&M costs based on removal of >90% of each target contaminant

Recommendations of Final Report

- Expand the capacity of the Northwest WTP to meet water demands
- Implementation of Low-Pressure Reverse Osmosis (LPRO) Advanced Treatment

Parameter	Capital Cost
Expansion of Northwest WTP	\$38 M
LPRO Advanced Treatment	\$99 M
TOTAL CAPITAL COST	\$137 M

LPRO is Recommended for the following reasons:

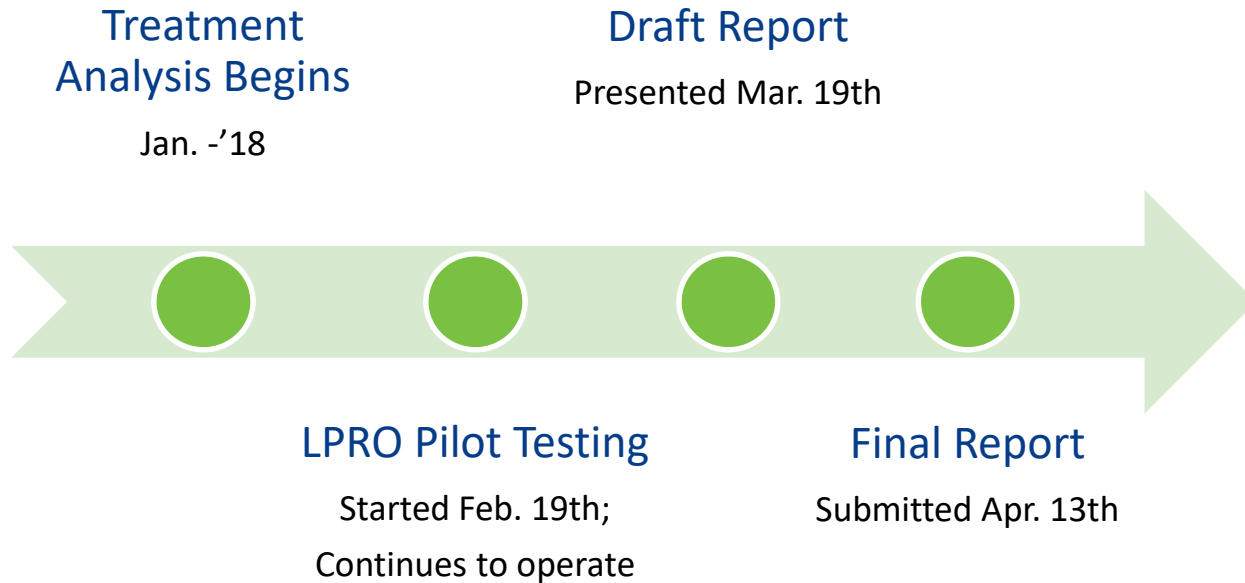
- ✓ LPRO results in the best removal of PFAS and other Target Contaminants (GenX, Nafion-BPs, Total PFAS, 1,4-Dioxane, etc) at the NWTP
- ✓ LPRO is the most Cost-Effective advanced treatment technology for removing 90% or more of the Target Contaminants (25-yr NPW) at the NWTP
- ✓ Provides best protection against unidentified contaminants and spills/spikes in the Cape Fear River

Opportunities for Cost Savings During Preliminary Engineering

- Project capital costs presented are conservative and based on achieving a better than 90% removal of contaminants.
- LPRO is constructed modularly, which allows for deferred installation of treatment modules.
- Potential of blending groundwater with LPRO treated water could save capital cost.

*Recommended to evaluate these cost saving opportunities in the Preliminary Engineering Phase.

Northwest WTP Advanced Treatment Study



NEXT STEPS

- Complete pilot testing
- Submit NPDES permit application
- Preliminary and Final Design
- Bidding & Construction



Questions?

