


# PFAS Removal From Municipal Drinking Water

## March 12, 2019

EnvironmentalSolutions@evoqua.com / (844) 216-3224

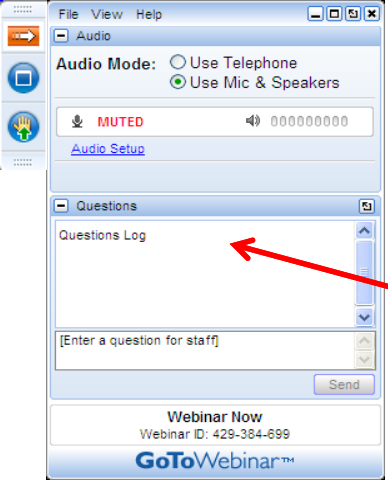


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## How to Participate Today



- **Audio Modes**
  - Listen using Mic & Speakers
  - Or, select "Use Telephone" and dial the conference (please remember long distance phone charges apply).
- **Submit your questions using the Questions pane.**
- **A recording will be available for replay shortly after this webcast.**



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## Presentation Overview

- Evoqua Overview and Capabilities
- Every Community's Water is Unique
- About Carbon
- About Reactivation
- Kennebunkport, ME
- About Ion Exchange
- Stratmoor Hills, CO
- Mobile / Emergency Solutions
- Financing Options
- Questions



**John Lombardo**  
Product Manager

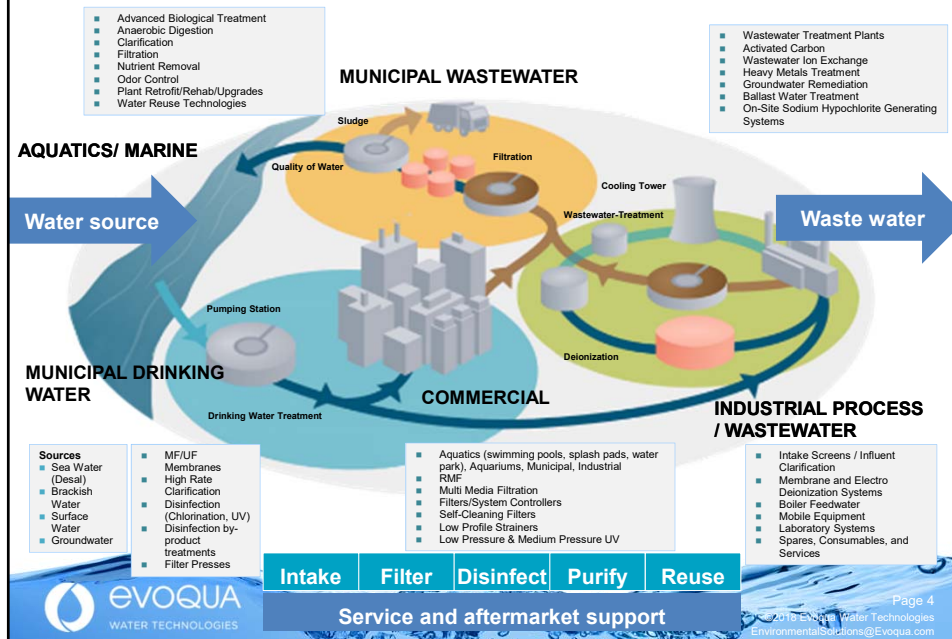


**Caitlin Berretta**  
Technical Business  
Development Manager

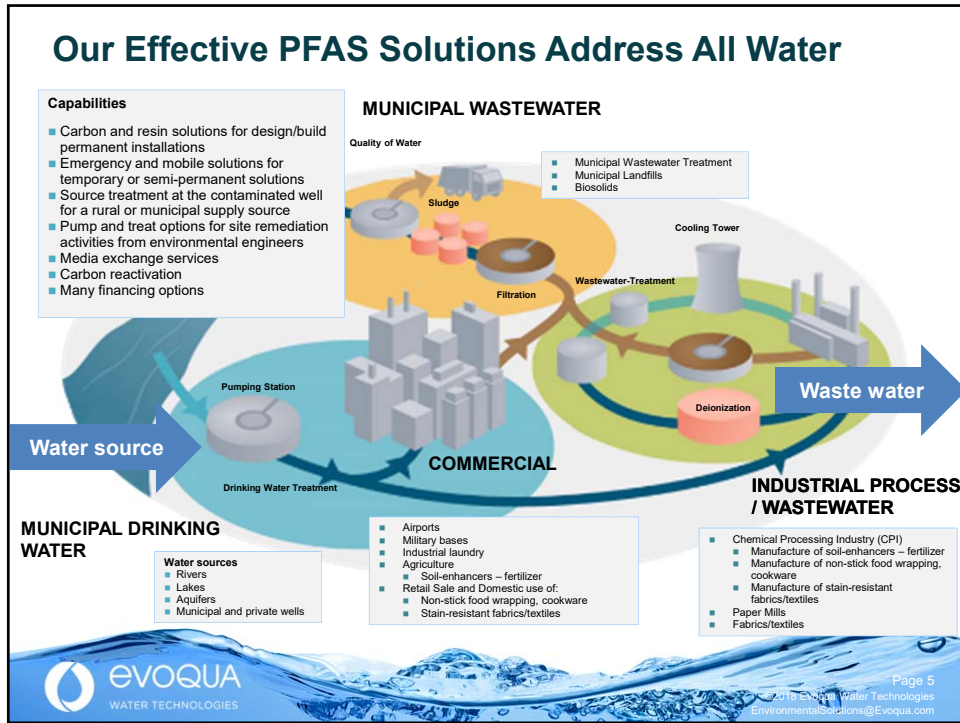


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## Solutions That Span The Water Cycle



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## Permanent, Emergency and Mobile Treatment

*Media and services group, keeping customers safe, sustainable, and compliant, by removing organic and inorganic contaminants from water and vapor streams.*





**Key Contaminants:**

- PFAS
- TCE/PCE
- MTBE
- 1,4-Dioxane
- Arsenic
- Iron/Manganese
- Perchlorate
- Nitrate
- Chrome VI
- ...many more

**Key Evoqua Products/Services:**

- Granular Activated Carbon (GAC) and Reactivation Services
- Ion Exchange and Regeneration Service
- Advanced Oxidation Process (AOP)
- Adsorptive Media
- Emergency and mobile services
- Many financing options

**Municipal and Industrial:**

- Municipal drinking water plants
- Drinking water wells
- Superfund sites
- Oil and Gas
- Brownfield cleanup
- Landfill leachate

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## What are Perfluoroalkyl Substances or PFAS?

- Per- and polyfluoroalkyl substances (PFAS) are used to make everyday products resistant to stain, heat, oil, grease, and water.

- These include:

- PFOA (perfluorooctanoic acid)



- PFOS (perfluorooctane sulfonic acid)



- Carbon-fluorine bond is one of the strongest in chemistry: very stable compound!



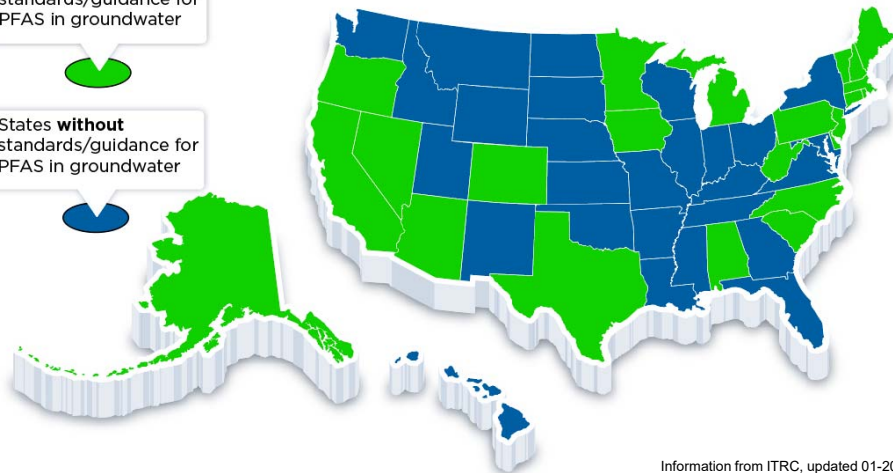
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## PFAS Regulatory Landscape

States **with** standards/guidance for PFAS in groundwater



States **without** standards/guidance for PFAS in groundwater

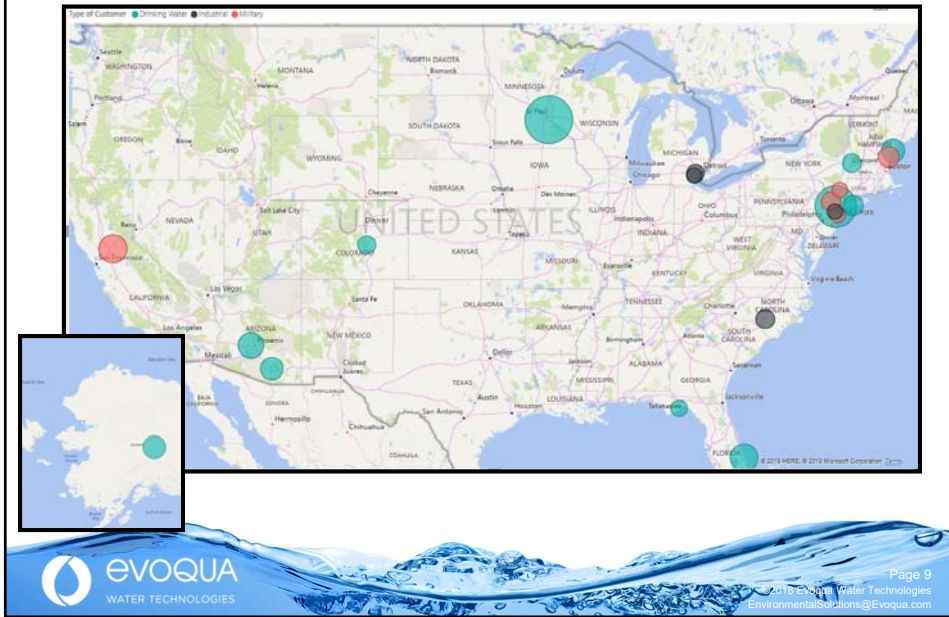


Information from ITRC, updated 01-2019



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## >30 PFAS Installations Nationwide



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## Every Community's Water Is Unique

- Two communities may have the same contaminant in their water, but use different water treatment solutions.
- Selecting a treatment solution should take into account each community's individual water quality and treatment needs.



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## Performance Testing

- Pilot (shown right) or bench scale testing can be used to test the effectiveness of the technology for contaminant removal before a full-scale system is installed for community's drinking water.
- Accelerated bench scale testing can simulate months of runtime within days.



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## PFAS Removal Solutions: About Carbon



- Named Best Available Technology by EPA for Organic Contaminant Removal.
- Removes other organic contaminants, in addition to PFAS (e.g., personal care products, pharmaceuticals).
- Spent carbon can be reactivated and reused.
- Minimal maintenance.

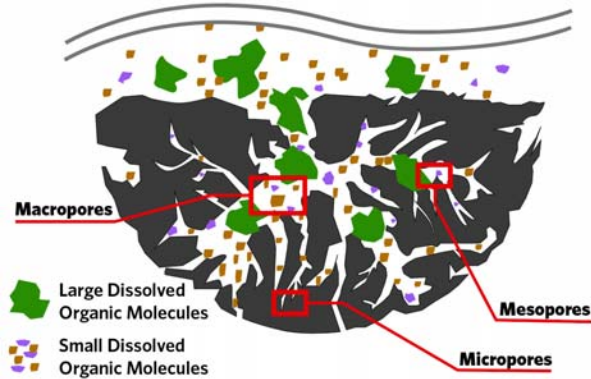


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## Why Granular Activated Carbon (GAC) Works

- GAC is a highly porous media with large surface area for contaminant adsorption.
- All carbon is not created equal.
- Performance determined by porosity and surface chemistry.
- Evoqua helps to match the user with the best performing GAC for their application.



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## Reactivation Heat Destroys PFAS And More

- **Evoqua offers turnkey NSF potable-certified reactivation service in Darlington, PA\*.**
- **Reactivation:**
  - Thermal destruction of PFAS and other adsorbed organic contaminants.
  - Economical alternative to re-bedding with virgin carbon.
  - Recycles a valuable resource.
  - Reduces generator's liability for the spent carbon.



Darlington, PA

**\*NSF 61-certified potable reactivation available**



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## Kennebunk, Kennebunkport & Wells Water District (KKWWD)



- PFOA and PFOS found in source well.
- Concentrations were below the EPA Health Advisory Limit at 50 ppt.
- KKWWD shut the well down voluntarily and looked for a treatment solution.



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## KKWWD Tested Multiple Carbon Systems



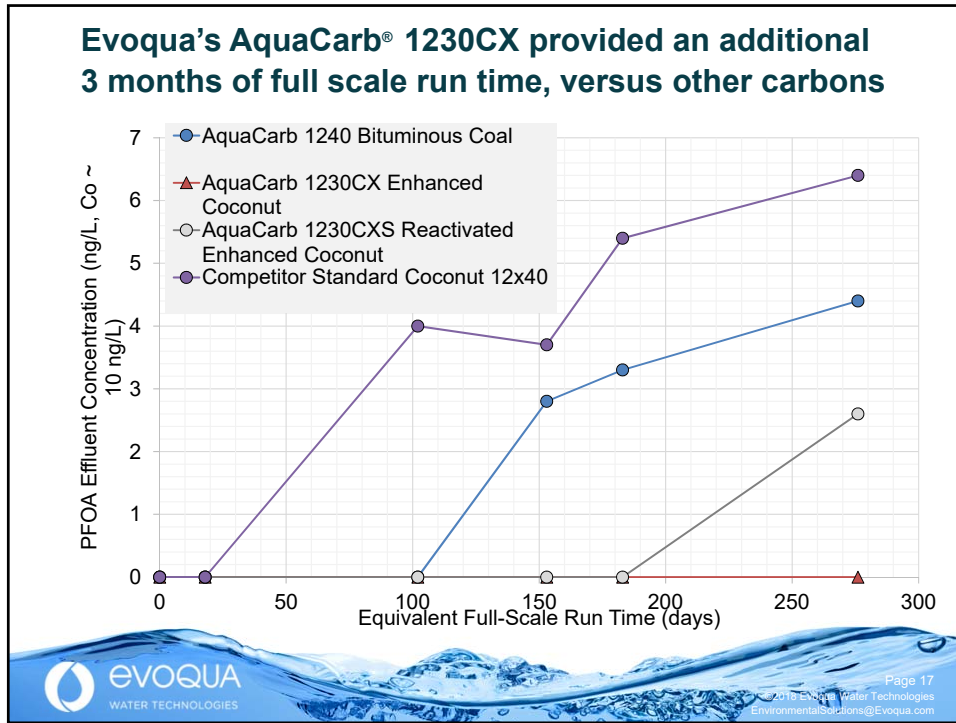
- Evoqua advised KKWWD to pilot test several types of carbon to determine which performed best given their local water chemistry.
- The results showed that the Evoqua's carbon made from coconut provided an additional 3 months of full scale run time, versus other carbons.
- KKWWD installed a full-scale high pressure vessel system to remove PFAS from the water.



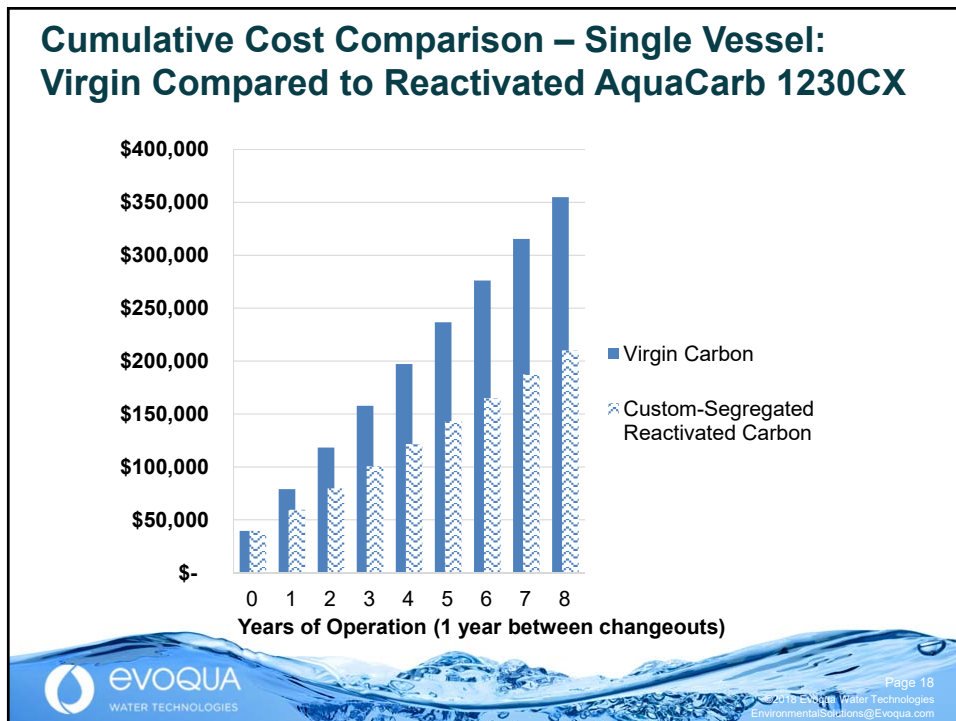
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## KKWWD System Performs As Requested



- “Our goal now is to continuously produce drinking water with non-detect levels,” says KKWWD, Superintendent. **“With Evoqua’s lead-lag system we should have no problem.”**
- The impact to ratepayers is about \$0.03 - \$0.04/day – customers won’t see the increase for several years.
- “It’s still cheaper than buying water from an outside water utility and it keeps us independent,” Norm Labbe, KKWWD, Superintendent.



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## PFAS Removal Solutions: About Ion Exchange Resin



- Smaller system footprint if space is an issue.
- Lifecycle costs are easier to predict.
- Spent resin can be incinerated, destroying the contaminants (PFAS).
- Minimal maintenance

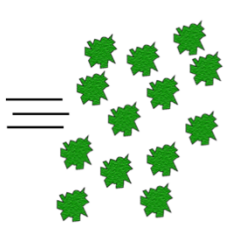


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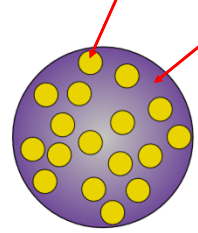
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## What Is Ion Exchange And How Does It Work

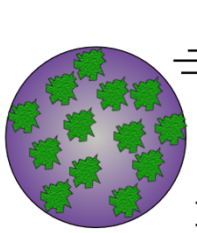
Contaminants



Chloride





Resin Bead



The ion exchange happens here

- Ion Exchange, or IX, is based on the principle of exchanging a harmless ion for the contaminant.







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## A Community Like Yours: Stratmoor Hills, CO



- Detections for PFAS were greater than 70 ppt.
- Local Air Force Base is source of PFAS contamination.
- Aquifer that supplies several communities, affected.
- Treating water for:
  - Perfluorooctanoic acid (PFOA)
  - Perfluorooctanesulfonic acid (PFOS)
  - Perfluoroheptanoic acid (PFHpA)



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## Stratmoor Hills Water District Tested Then Installed A Proven Solution

- Water district took a recommendation to use ion exchange resin.
- The configuration had been proven earlier in a community using the same aquifer source.
- Speed of delivery and a smaller footprint were required.



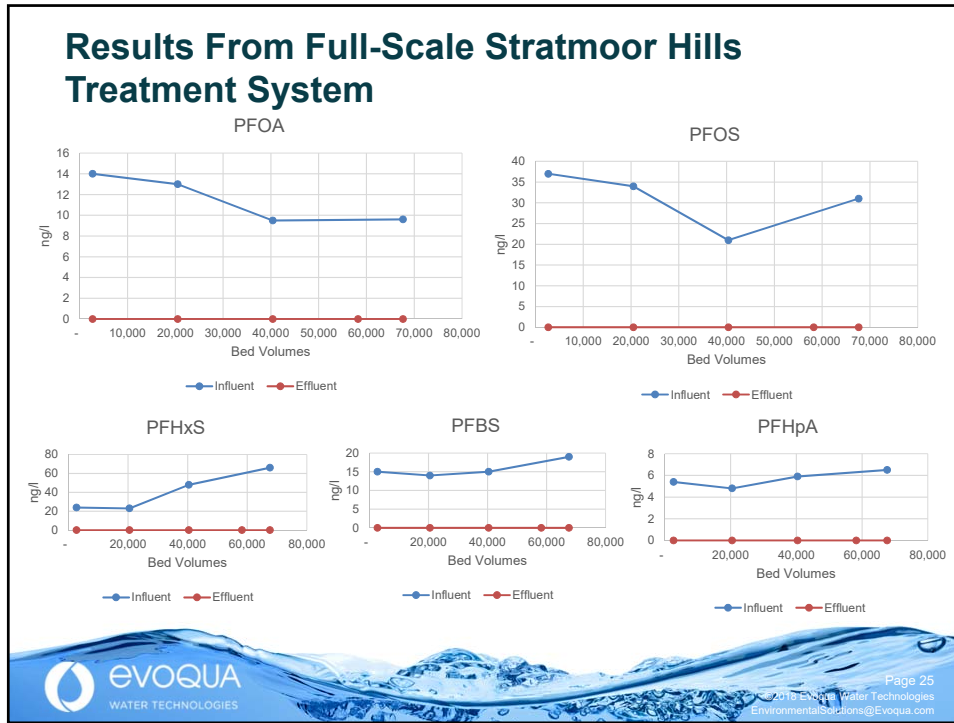
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## PFAS levels “...pretty much nonexistent...”

- Quickly and safely installed.
- Processes 350 gpm.
- **“It’s been fantastic ever since it went online,”** says District Manager of Stratmoor Hills Water District.
- Removes PFAS to levels below detection limits of 2 ppt.



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### PFAS Is Also Addressed With Mobile Units

*When your water cannot be interrupted*

- Drinking water
  - Emergency response
  - Temporary or semi-permanent connection
- Industrial process water
  - Emergency response
  - Temporary or semi-permanent connection




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## 9 Mobile PFAS Solutions Currently Deployed



The image shows two Evoqua mobile water treatment units on a trailer. To the right is a map of the United States with red circles indicating deployment locations: 1 in Kentucky, 1 in Tennessee, 2 in Michigan, 1 in Minnesota, 1 in New York, and 1 in Alaska.

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## Emergency Treatment in Pownal, VT

- PFOA was detected in the drinking water and as a result, a district in Pownal, VT serving 150 people was put under a “do not drink” order.
- Evoqua was able to quickly mobilize a GAC system to treat the water.



<http://www.mynbc5.com/article/governor-drinks-pownal-water-to-prove-its-safe/3032663>



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## Summary: Your Water Is Unique

- We customize a solution just for your community based on local water conditions.



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## We Are Easy To Do Business With

- Our priorities are community safety and the environment.
- We take quick action to ensure clean, safe water.
- National coverage – big cities, small towns.
- We have easy financing options for your community or application:
  - Lease-to-own
  - Rental
  - Capital purchase
  - Build/Own/Operate



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WHAT CAN WE DO FOR YOUR COMMUNITY?

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