WHO WE ARE...
Corporate Profile

Who Is Calgon Carbon Corporation

- World’s largest producer of Granular Activated Carbon
- Solves customer purification and separation problems with an array of technologies
- Water treatment is core competency with a diverse product portfolio

$619.8 million
2017 net sales

75 years
experience

1,400+ employees

25 offices
sales and service

20 facilities
Manufacturing, reactivation, equipment

240 patents
Removing PFAS for 15 Years

Our Experience with PFAS Removal

• Granular Activated Carbon (GAC) and CCC’s Equipment Line are proven treatment solutions for PFAS removal
• Over 45 installations for PFAS removal across the United States
• Offer complete solution including activated carbon, ion exchange resin, equipment, on-site installation and exchange services, reactivation and financing.

Proven products and solutions for drinking water, wastewater, remediation and POET

Carbon reactivation to thermally destroy PFAS and enable the reuse of activated carbon

Unrivaled technical service

Laboratory & field testing for tailored solutions

Applications Engineers and R&D team dedicated to solving customer problems
Calgon Carbon PFAS Treatment Locations

45+ Installations Across the U.S.
PFAS Removal: GAC
• Influent PFAS: PFOA (920 ng/L), PFOS (800 ng/L)
• Influent TOC: 1.42 mg/L
• EBCT: 10 minutes
Removal of various PFAS using Filtrasorb

- Influent PFAS: PFOA, PFOS, PFHxA, PFHxS, PFBA, PFBS (200 ng/L each)
- Influent TOC: 0.16 mg/L
- EBCT: 10 minutes
• Influent PFAS: PFOA, PFOS, PFHxA, PFHxS, PFBA, PFBS (200 ng/L each)
• Influent TOC: 0.16 mg/L
• EBCT: 10 minutes
## Widefield Pilot System Details

<table>
<thead>
<tr>
<th>Pilot System</th>
<th>Media</th>
<th>Column Diameter (in.)</th>
<th>Bed Length (in.)</th>
<th>Empty Bed Contact Time (min.)</th>
<th>Bed Volumes Per Hour (BV/hr.)</th>
<th>Flow Rate (gpm)</th>
<th>Linear Velocity (gpm/sf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Filtrasorb® 400 carbon</td>
<td>4</td>
<td>108</td>
<td>10</td>
<td>6.4</td>
<td>0.58</td>
<td>6.65</td>
</tr>
<tr>
<td></td>
<td>Purolite CalRes 120 resin</td>
<td>4</td>
<td>36</td>
<td>2.61</td>
<td>23</td>
<td>0.73</td>
<td>8.37</td>
</tr>
<tr>
<td>#2</td>
<td>Dow PSR2-Plus resin</td>
<td>2</td>
<td>24</td>
<td>2</td>
<td>29.4</td>
<td>0.16</td>
<td>7.33</td>
</tr>
<tr>
<td></td>
<td>APR-1 resin</td>
<td>2</td>
<td>24</td>
<td>2</td>
<td>29.4</td>
<td>0.16</td>
<td>7.33</td>
</tr>
<tr>
<td>#3</td>
<td>Dow CalRes 2109 resin</td>
<td>2</td>
<td>36</td>
<td>1.44</td>
<td>40</td>
<td>0.34</td>
<td>15.5</td>
</tr>
</tbody>
</table>
• Influent Concentrations: (ng/L)
  PFBS – 50, PFHxS – 100, PFHpA – 14, PFOS – 100, and PFOA-25
IX Pilot Column Comparison
PFAS 5 (CT) + GenX

Source: CFPUA Workshop: Update on Removal of GenX and Other PFAS – Black & Veatch – Dated 4/5/18
Economic Comparison: GAC vs. IX
10-Year Life Cycle Cost Comparison

**Scenario 1**
- GAC is 20% Lower

**Scenario 2**
- IX is 3% Lower

Basis: 1.5 MGD with (2) M10S at 10 min EBCT for GAC and (1) M10S at 2.5 min for IX
Final Takeaways
Final Takeaways

Both GAC & IX are effective for removal of PFAS

- Long and short chain
- Service life varies by compound and background water quality

Performance dictates long term costs

- Not all media is created equal
- Testing is required to accurately predict service life and determine lowest cost solution