DuPont Ultrafiltration Treats Municipal Wastewater Reused by Arizona Community

DuPont UF replaces existing competitor UF system to provide more output with reduced costs

DuPont Water Solutions, a business unit of The DuPont Chemical Company, provided Ultrafiltration Membrane Technology to treat tertiary effluent for water reuse through aquifer recharge in Fountain Hills, Arizona. The town of Fountain Hills relies on water reclamation to maintain aquifers at sufficient levels while preserving their drinking water. The reclaimed water is then reused by residents and businesses by pulling it back up from the aquifer through municipal wells at a different location.

The existing microfiltration system had modules with 50 m² of membrane area to produce 2.5 MGD. The plant capacity was increased to 4.95 MGD using the larger, more efficient DUPONT™ SFD-2880 Module with 77 m² of membrane area. The hydrophilic PVDF fibers used in the DuPont modules facilitate easy cleaning and long term performance at a flux of 36 gfd. Producing twice the clean water with fewer modules in the same building footprint, the overall capital cost of the project was cheaper to build new skids with DuPont modules than to replace existing modules.

Upgrading the existing microfiltration membrane with DuPont’s 0.03 µm pore size PVDF hollow fiber ultrafiltration membrane has increased the rejection of bacteria and viruses. This has allowed the plant to cut costly feed water chlorination, reducing the formation of hazardous disinfection byproducts such as trihalomethanes (THM) helping to create a safe, long term water supply.

<table>
<thead>
<tr>
<th>Performance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Modules</td>
<td>162 SFD-2880 Modules</td>
</tr>
<tr>
<td>Design Flux</td>
<td>36 gfd (61.2 lmh)</td>
</tr>
<tr>
<td>Plant Capacity</td>
<td>4.95 MGD (782 m²/hr)</td>
</tr>
<tr>
<td>Recovery</td>
<td>94.30%</td>
</tr>
<tr>
<td>Filtrate Quality</td>
<td>Turbidity &lt;0.1 NTU 100% of the time</td>
</tr>
</tbody>
</table>

Fast Facts

Country: USA  
End-User: Fountain Hills Sanitary District  
Start-Up Date: September 2013  
Temperature: 77°F (25°C)  
Feed Water Source: Municipal Wastewater Tertiary Effluent
<table>
<thead>
<tr>
<th>Operating Conditions</th>
<th>Frequency</th>
<th>Duration</th>
<th>Chemical Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtration</td>
<td>–</td>
<td>40 min</td>
<td>None</td>
</tr>
<tr>
<td>Air Scour</td>
<td>Every 40 min</td>
<td>30 s</td>
<td>None</td>
</tr>
<tr>
<td>Backwash</td>
<td>Every 40 min</td>
<td>30 s</td>
<td>None</td>
</tr>
<tr>
<td>Forward Flush</td>
<td>Every 40 min</td>
<td>60 s</td>
<td>None</td>
</tr>
<tr>
<td>CEB</td>
<td>Oxidant every 24 hours</td>
<td>15 min</td>
<td>1000 ppm NaOCl</td>
</tr>
<tr>
<td>CIP</td>
<td>Every 30 days, typically longer</td>
<td>3 hr</td>
<td>0.2% HCl, 0.1% NaOH, 0.2% NaOCl</td>
</tr>
</tbody>
</table>

**Wastewater Treatment Process**

```
Raw Wastewater
    ↓
Screening
    ↓
Grit Removal
    ↓
Aeration Basins
    ↓
Clarifiers
    ↓
Tertiary Filters
    ↓
Strainer
    ↓
DUPONT™ Ultrafiltration
    ↓
UV Disinfection
    ↓
Aquifer Injection
```
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