Pilot Studies of Combined Sewer Overflow Treatment Using Cloth Media Filtration Technology

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Presentation Outline

• Combined Sewer Overflow Treatment

• Cloth Media Filtration

• Rock River Water Reclamation District Study

• Rushville, IN Pilot Study

• Summary
Combined Sewer Overflow Treatment
Filtration CSO Treatment Objectives

- CSO communities across the country are being required to add some degree of treatment for CSO events.
- Cloth media filtration along with UV disinfection is being considered to meet some of these treatment objectives.
- Advantages of this technology include automatic start up and a small footprint.
- Filters can be located at treatment plants or remote sites.
CSO / Stormwater Treatment
Example of a Typical Flow Scheme

- 5 MGD Ave Dry Weather Capacity
- 10 MGD Peak Plant Capacity
- 20 MGD Storm Event
Cloth Media Filtration
Filtration Goals

• Maximize
  • Removal of solids
  • Hydraulic throughput

• Minimize
  • Backwash
  • Maintenance
Providing Adaptive Water Management Solutions
How Cloth Media Filters Work
How Cloth Media Filters Work

Filtrate

Unfiltered Water

OptiFiber® Cloth Media
Filtration Continues During Backwash

Providing Adaptive Water Management Solutions
How Cloth Media Filters Work
OptiFiber Pile Cloth Media
Media Options

OptiFiber PA2-13®

OptiFiber PES-13®
OptiFiber Pile Cloth Media

Media Options

OptiFiber PES-14®
Rock River Water Reclamation District
CSO/Stormwater Treatment
Rock River Water Reclamation District

Raw Sewage → Screen (¼ inch openings) → Grit Removal → Filtration
CSO/Stormwater Treatment
RRWRD Test Results – OptiFiber (PA2-13)
OptiFiber® Pile Cloth Media
RRWRD Test Results – Microfiber (PES-14)
CSO/Stormwater Treatment
RRWRD Test Results – Microfiber (PES-14)
CSO/Stormwater Treatment
Lessons Learned from Preliminary Testing

• Automatic, instantaneous startup & sampling
• More space under the disks to allow for grit
• Extra depth at the top to allow for scum, plastics, debris
• Surface cleaning (scum removal trough)
• Account for backwash sent to the wastewater plant
Rushville, IN
CSO Study
Rushville, IN

• 42 year old facility
• One active CSO Outfall (CSO 101)
• Averages 11 CSO events/year
• Eliminate all untreated discharges from 1-yr, 1-hr events
• 5-Month Study by AASI
CSO Study
CSO 101 Outfall, Rushville IN

TSS Probe
Level Switch
Transfer Pump
CSO Study
Aqua MiniDisk® Nominal 100,000 gal/day Filter

• Flow Meters
• Chem Feed (Option)
• Composite Samplers
• On-line TSS
CSO Study

Five CSO Events, Rushville, IN

1. May 16, 2015
2. June 30, 2015
4. July 12, 2015
5. July 13, 2015
TSS Removal – Event 1
Rushville CSO Study (May 16, 2015)

Alum Added
TSS Removal – Event 2
Rushville CSO Study (June 30, 2015)

Alum Added
No Chemicals Added
TSS Removal – Event 3
Rushville CSO Study (July 7, 2015)

No Chemicals Added
TSS Removal – Event 4
Rushville CSO Study (July 12, 2015)

No Chemicals Added
TSS Removal – Event 5
Rushville CSO Study (July 13, 2015)

No Chemicals Added
# Summary - TSS Removal

Rushville CSO Study – All Events

<table>
<thead>
<tr>
<th>CSO Event</th>
<th>Date</th>
<th>Average Influent TSS (mg/L)</th>
<th>Average Effluent TSS (mg/L)</th>
<th>Average TSS Removal (%)</th>
<th>PEAK VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ALL DATA</td>
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<td>PEAK VALUES</td>
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<tr>
<td></td>
<td></td>
<td>Average</td>
<td></td>
<td>Average</td>
<td>TSS Removal (%)</td>
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<tr>
<td>1</td>
<td>May 16, 2015</td>
<td>141</td>
<td>5.2</td>
<td>96</td>
<td>350</td>
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<td>2</td>
<td>June 30, 2015</td>
<td>114</td>
<td>4.8</td>
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<td>340</td>
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<td>4.9</td>
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</table>

Alum dosed during week 1 and 2 only
BOD$_5$ Removal – Event 1
Rushville CSO Study (May 16, 2015)

Alum Added
BOD$_5$ Removal – Event 2
Rushville CSO Study (June 30, 2015)

- Alum Added
- No Chemicals Added
BOD$_5$ Removal – Event 3
Rushville CSO Study (July 7, 2015)

No Chemicals Added
**BOD₅ Removal – Event 4**
Rushville CSO Study (July 12, 2015)

No Chemicals Added
BOD$_5$ Removal – Event 5
Rushville CSO Study (July 13, 2015)

No Chemicals Added
## Summary – BOD₅ Removal
### Rushville CSO Study – All Events

<table>
<thead>
<tr>
<th>CSO Event</th>
<th>Date</th>
<th>Average Influent BOD (mg/L)</th>
<th>Average Effluent BOD (mg/L)</th>
<th>Average BOD Removal (%)</th>
<th>PEAK VALUES</th>
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<tbody>
<tr>
<td></td>
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<td>Influent BOD (mg/L)</td>
<td>Effluent BOD (mg/L)</td>
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<td>Influent BOD (mg/L)</td>
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<tr>
<td>1</td>
<td>May 16, 2015</td>
<td>87</td>
<td>3.5</td>
<td>96</td>
<td>381</td>
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<tr>
<td>2</td>
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<tr>
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<tr>
<td>5</td>
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<td>73</td>
<td>18.1</td>
<td>75</td>
<td>81</td>
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Alum dosed during week 1 and 2 only
Total P Removal – Event 1
Rushville CSO Study (May 16, 2015)

Alum Added
Total P Removal – Event 2
Rushville CSO Study (June 30, 2015)
### Summary
Rushville CSO Study – All Events

<table>
<thead>
<tr>
<th>Parameter</th>
<th>With Alum Addition</th>
<th>Without Chemical Addition</th>
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<tbody>
<tr>
<td></td>
<td>Influent (mg/L)</td>
<td>Effluent (mg/L)</td>
</tr>
<tr>
<td><strong>Total P</strong> (mg/L)</td>
<td>1.29</td>
<td>0.11</td>
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<td><strong>Turbidity</strong> (NTU)</td>
<td>43.9</td>
<td>1.9</td>
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<tr>
<td><strong>UVT</strong> (%)</td>
<td>64.3</td>
<td>86.9</td>
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<tr>
<td><strong>NH4-N</strong> (mg/L)</td>
<td>2.5</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Alum dosed during week 1 and 2 only
Summary
CSO/Stormwater Treatment
Cloth Media Filtration Advantages

• Better treatment than enhanced settling
• No chemical required
• Removal without contacting the media
• No complicated startup, shut-down
• Multi-Use Option (use as primary or tertiary filter in dry conditions)
• Small Footprint, easy to enclose (remote areas)
Questions?

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