Nutrient Removal and Wet Weather Flow Management
How to Optimize Both in Sequencing Batch Reactors

TRANSFORMING WATER. ENRICHING LIFE.

How to Participate Today

• Audio Modes
  • Listen using Mic & Speakers
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Submit your questions using the Questions pane.

• A recording will be available for replay shortly after this webcast.
Presenters

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Issue: Wet Weather Flows are Increasing, Nutrient Limits Decreasing

• Combined stormwater sewers and systems with I&I both see higher flows during storm events
• Coupled with stricter nutrient limits, this is a serious issue
• Thousands of SBR installations nation wide
What is an SBR?

Conventional System
- Multiple structures
- Fixed tank volume

Sequencing Batch Reactor
- One basin accomplishes equalization, aeration, nutrient removal, and clarification
- Time = Flexibility
Experience: Over 35 years and 700 SBR Installations

Jet Tech
an EVOQUA technology

OMNIFLO® SBR Process
A single cycle for each reactor consists of five discrete periods:

- Fill
- React
- Settle
- Decant
- Idle
True-Batch Process: Only one basin fills at any time

Benefits include:

• Complete Biological Nutrient Removal (BNR)
  • TN < 5 mg/l
  • TP < 1 mg/l
• No short circuiting for optimal effluent quality
• Improved settling

Problem: True-Batch SBRs Suffer Under Wet Weather Flows

• All flow goes to only one basin at a time
• True-Batch SBRs have the highest influent hydraulic loading rates per surface area
• Sending >300% of design flow to one tank can disrupt the sludge blanket, resulting in poor effluent quality
SBR Wet Weather Flow Management: Traditional Approach

- Additional tank volume
  - influent equalization tanks
  - additional freeboard in SBR tank
- Compress cycles to accommodate higher flow rates
- Decant while filling in the same SBR tank

Solution: Evoqua’s OMNIFLO® SBR MAX Control Strategy

- Maximize buffering capacity of the plant by using all SBR volume
- Maintain effluent quality with proper hydraulic design

<table>
<thead>
<tr>
<th></th>
<th>Omniflo &lt;300%</th>
<th>Omniflo MAX 300% - 500%</th>
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</thead>
<tbody>
<tr>
<td>Influent EQ Tank</td>
<td>✗</td>
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<tr>
<td>Additional Freeboard</td>
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<td>Compress Cycles</td>
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<tr>
<td>Open all Influent Valves</td>
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Solution: Evoqua’s OMNIFLO® SBR MAX Control Strategy

OMNIFLO® SBR MAX:

- Below ~300% design flow rate the system operates in True-Batch mode
- Above 300%, the system automatically opens all influent valves
- When wet weather flows subside, True-Batch SBR operation resumes
OMNIFLO® SBR MAX: Achieve BNR and Improve Wet Weather Flow Management

- Innovative control strategy monitors influent flow and automatically adjusts sequence of operations
- Improve process control of existing SBRs
- No additional infrastructure required for wet weather flow management for new plants
- Achieve high quality biological nutrient removal during average flows by using true batch process
- Optimize wet weather flows by distributing to all SBR basins
Thank You

• Contact us
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