Commercial Multi-Stage Separation System Case Studies
Livestock and Poultry Environmental (LPE) Learning Community Educational Webcast Series
Newtrient LLC
January, 2019

Developing Manure Management Systems

• No single source to identify best technologies
• Technology types should be sorted by impact on specific operational and environmental critical indicators
• Assist the dairy industry in making decisions in area of specific concern
• Newtrient is expanding its Technology Catalog to include Newtrient’s Evaluation and Assessment of Technology (NEAT) Matrix

Today’s Focus: Fine solids separation

The archived presentation is available at:
https://articles.extension.org/pages/21819/chronological-webcast-archive
**Fine Solid Separation - Polymer Assisted Dewatering**

**Dissolved Air Floatation (DAF)**
Physical and chemical removal of fine solids by floating with very fine air bubbles assisted by polymers or coagulants.

**Moving Disc Press**
A cylinder made up of many vertically arranged plates that uses an auger to force out the water. Back-pressure is maintained on the material in the cylinder, may or may not be assisted by polymers or coagulants also used for dewatering following other fine solids separation systems.

**Incline Screen**
Similar to slope screens but with finer screens and equipped with sprayers or vibrators for continuous cleaning, usually used with polymers or coagulants.

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**Step 1: Coarse Solid Separation**

**Slope Screen**
Sloped wedge wire screens that diluted manure is pumped over to remove the coarse solids, often followed by screw presses or rollers to remove additional water.

**Screw Press**
A wedge wire screen cylinder that manure is forced through by an auger to force out the water. Back pressure is maintained on the material in the cylinder by means of a gate or gates at the discharge of the cylinder.

**Rotary Drum Screen**
Rotating drums of wedge wire or screen that manure is pumped through to remove the liquid, often followed by screw presses or rollers to remove additional water.

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**Step 2 - Polymer or Coagulant Flocculation**
Introduction of select chemicals to induce small suspended particles to bind together into larger particles or flocs in order to increase their mass and decrease their buoyancy.
### Step 3 - Separation
Use of physical or mechanical systems to induce the larger particles or flocs to float or sink, leading to separation and removal of free water.

![Image of separation process](https://example.com/separation_image.png)

### Step 4 - Dewatering
Use of physical or mechanical systems to further compress larger particles or flocs in order to drive water out that was inside the flocs.

![Image of dewatering process](https://example.com/dewatering_image.png)

### Polymer Assisted Dewatering

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Established technology</td>
<td>• Medium/High OpEx</td>
</tr>
<tr>
<td>• High phosphorus impact</td>
<td>• Volume dependent system</td>
</tr>
<tr>
<td>• Medium CapEX</td>
<td>• flush manure collection</td>
</tr>
<tr>
<td>• Medium GHG reduction</td>
<td>• drives up CapEx and OpEx</td>
</tr>
<tr>
<td>• Medium odor reduction</td>
<td>• Further treatment required</td>
</tr>
<tr>
<td>• Byproduct is not organic</td>
<td></td>
</tr>
</tbody>
</table>

![Image of polymer assisted dewatering](https://example.com/polymer_dewatering_image.png)

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Polymer Assisted Dewatering Performance

<table>
<thead>
<tr>
<th></th>
<th>Pounds per 1,000 gallons Effluent</th>
<th>Pounds per ton Solids</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Solids</td>
<td>TNK</td>
</tr>
<tr>
<td></td>
<td>91</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>TKN</td>
<td>P2O5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>P2O5</td>
<td>K2O</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>2</td>
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Livestock and Poultry Environmental Learning Community Webinar Series

January 18, 2019

Technology Catalog: Go-to Technology Resource

Technology Vendor Information

“NEWTRIENT Recognized” SEAL

Business Insights

Technical Insights

Case Studies

9-Point Scoring

Critical/Environmental Indicators

Commercial Multi-Stage Separation System Case Studies

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