Why Dewater?
Why Dewater?

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Why Dewater?

<table>
<thead>
<tr>
<th>Rates &amp; fees</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The following rates and fees are for 2009.</strong></td>
</tr>
<tr>
<td><strong>Disposal Rate</strong></td>
</tr>
<tr>
<td>10.2 cents per gallon. We weigh each load and charge $0.012230 per pound</td>
</tr>
<tr>
<td>discharged. This covers domestic septic tank waste and portable toilet</td>
</tr>
<tr>
<td>waste, up to 2% solids.</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
</tr>
<tr>
<td>Annual fee: $200/year/truck</td>
</tr>
<tr>
<td>Initial setup fee: $50/truck</td>
</tr>
</tbody>
</table>

**Related information**

- Septage acceptance guidelines
- King County Wastewater Treatment Division finances and budget
Why Dewater?

1) WWTP tipping fees are more than cake disposal
2) It costs less to truck solids than to truck water

![Disposal Costs Table](image)

Based on 20,000 GPD avg. daily disposal
What are the costs?

Apart from the purchase cost, labor and consumables are the biggest component of the daily operation.

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</tr>
<tr>
<td>Maintenance cost (other)</td>
<td>0.35</td>
</tr>
</tbody>
</table>
What are consumables?

Chemicals for conditioning, wash water, and the hidden cost of re-treating solids.

<table>
<thead>
<tr>
<th>polymer cost</th>
<th>$2.00 per lb at 100 active</th>
</tr>
</thead>
<tbody>
<tr>
<td>typical dose:</td>
<td>16 lbs per dry ton</td>
</tr>
<tr>
<td></td>
<td>375 dry tons annually</td>
</tr>
<tr>
<td></td>
<td>$12,000.00 annual polymer costs</td>
</tr>
<tr>
<td>for every 1 lb extra polymer</td>
<td>$750.00 extra annual cost</td>
</tr>
<tr>
<td>example at 25 lbs per dry ton:</td>
<td>$19,500.00 annual polymer costs</td>
</tr>
<tr>
<td></td>
<td>$7,500.00 annual savings</td>
</tr>
</tbody>
</table>
What are consumables?

Chemicals for conditioning, wash water, and the hidden cost of re-treating solids.

An average homeowner in the Manhasset-Lakeville Water District paid a water tax of $200 and a $1.35 per 1,000 gallons of metered water. Some consumers are buying bottled water that often sells for more than $1 per half-liter. By comparison, a half-liter of Manhasset-Lakeville Water costs less than a penny.
What are consumables?

Chemicals for conditioning, wash water, and the hidden cost of re-treating solids.
What are the costs?

Every 1% drier cake represents more money.

<table>
<thead>
<tr>
<th>Cake Disposal Costs</th>
<th>Wet tons for each technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boxes</td>
</tr>
<tr>
<td>Cake dryness -&gt;</td>
<td>18%</td>
</tr>
<tr>
<td>Dry tons produced:</td>
<td>375</td>
</tr>
<tr>
<td>Tipping fees per wet ton:</td>
<td>$ 75.00</td>
</tr>
<tr>
<td>Total tipping fees -&gt;</td>
<td>$ 156,250</td>
</tr>
<tr>
<td>Transport costs at $1.75/mi -&gt;</td>
<td>4,385</td>
</tr>
<tr>
<td>Total landfill costs -&gt;</td>
<td>$ 160,615</td>
</tr>
<tr>
<td>Total savings using Rotary Press -&gt;</td>
<td>$ 64,246</td>
</tr>
</tbody>
</table>
What are the costs?

The dewatering process is to remove solids, so capture efficiency is very important.

<table>
<thead>
<tr>
<th>Typical 95% capture rate as a baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>For every 1,000 gallons of sludge</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>if 1% less efficient capture</td>
</tr>
<tr>
<td>if 2% less efficient capture</td>
</tr>
<tr>
<td>if 3% less efficient capture</td>
</tr>
<tr>
<td>if 4% less efficient capture</td>
</tr>
<tr>
<td>if 5% less efficient capture</td>
</tr>
<tr>
<td>if 7.5% less efficient capture</td>
</tr>
<tr>
<td>if 10% less efficient capture</td>
</tr>
<tr>
<td>if 15% less efficient capture</td>
</tr>
</tbody>
</table>
What are the costs?

<table>
<thead>
<tr>
<th>Cost to treat solids, per lb</th>
<th>$0.29</th>
<th>$0.18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical 95% capture rate as a baseline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For every 1,000 gallons of sludge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If 1% less efficient capture</td>
<td>$0.32</td>
<td>$0.34</td>
</tr>
<tr>
<td>If 2% less efficient capture</td>
<td>$0.64</td>
<td>$0.68</td>
</tr>
<tr>
<td>If 3% less efficient capture</td>
<td>$2.96</td>
<td>$1.02</td>
</tr>
<tr>
<td>If 4% less efficient capture</td>
<td>$4.27</td>
<td>$1.36</td>
</tr>
<tr>
<td>If 5% less efficient capture</td>
<td>$5.59</td>
<td>$1.69</td>
</tr>
<tr>
<td>If 7.5% less efficient capture</td>
<td>$7.30</td>
<td>$2.54</td>
</tr>
<tr>
<td>If 10% less efficient capture</td>
<td>$9.10</td>
<td>$3.39</td>
</tr>
<tr>
<td>If 15% less efficient capture</td>
<td>$47.78</td>
<td>$5.96</td>
</tr>
</tbody>
</table>

Based on 90% vs 95% capture: $7,901.70 extra running cost.

Based on 85% vs 95% capture: $15,615.41 extra running cost.
Overview of Rotary Press

*Outstanding Features:*
- Completely enclosed minimal odors
- Few moving parts = few wear parts
- Low energy requirement
- Fully automatic, with smooth operation with changing sludge quality, feed rate
- Low speed < 3 rpm
- Low polymer consumption
- High Capture Rate – typically 95% or greater
- Only dewatering press designed to operate without wash water
- Only dewatering press that can expand
Filtering Elements

Non-clogging design; does not require washwater (5 mins per day).
Inspection
Principle of operation

- SLUDGE
- STATIC MECHANICAL COMPONENT
- ROTATING MECHANICAL COMPONENT
- DEWATERING SLUDGE (CAKE)
- FILTRATE FLOW

Diagram showing the process of filtration and dewatering with various components labeled.
Expandable Presses

1 to 2-channel expandable

4 to 6-channel expandable
Typical Results (Deschambeault, QC)
Data shown per one channel

<table>
<thead>
<tr>
<th>Total solids Feed % TS (Average)</th>
<th>Percent of total %</th>
<th>Sludge Flow GPM</th>
<th>Cake production lbs/hr</th>
<th>Cake dryness %</th>
<th>Capture Rate % SS</th>
<th>Number of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 # TS &lt; 1.0% (0.46)</td>
<td>35</td>
<td>59</td>
<td>123</td>
<td>40.5</td>
<td>90.6</td>
<td>36</td>
</tr>
<tr>
<td>1.0 # TS &lt; 2.0% (1.05)</td>
<td>51</td>
<td>55</td>
<td>262</td>
<td>40.2</td>
<td>91.0</td>
<td>56</td>
</tr>
<tr>
<td>TS ≥ 2.0% (3.98)</td>
<td>14</td>
<td>59</td>
<td>1067</td>
<td>38.9</td>
<td>91.1</td>
<td>15</td>
</tr>
</tbody>
</table>
## Typical Results (Deschambeault, QC)

<table>
<thead>
<tr>
<th>Sample</th>
<th>Total Solids</th>
<th>( \text{BOD}_5 ) Raw sludge mg/liter</th>
<th>( \text{COD} ) Raw sludge mg/liter</th>
<th>( \text{BOD}_5 ) Filtrate mg/liter</th>
<th>( \text{COD} ) Filtrate mg/liter</th>
<th>Cake Solids %</th>
<th>Capture Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.16%</td>
<td>7903</td>
<td>23,467</td>
<td>989</td>
<td>1408</td>
<td>50%</td>
<td>98.3%</td>
</tr>
<tr>
<td>2</td>
<td>1.26%</td>
<td>6523</td>
<td>17,280</td>
<td>918</td>
<td>2176</td>
<td>54.5%</td>
<td>96.7%</td>
</tr>
<tr>
<td>3</td>
<td>0.8%</td>
<td>5197</td>
<td>10,880</td>
<td>858</td>
<td>1484</td>
<td>45.3%</td>
<td>92.4%</td>
</tr>
<tr>
<td>4</td>
<td>1.58%</td>
<td>8827</td>
<td>17,621</td>
<td>867</td>
<td>1856</td>
<td>50%</td>
<td>96.8%</td>
</tr>
<tr>
<td>5</td>
<td>0.79%</td>
<td>4566</td>
<td>10,432</td>
<td>391</td>
<td>1216</td>
<td>24%</td>
<td>97.6%</td>
</tr>
<tr>
<td>Mean results</td>
<td>1.31%</td>
<td>6503</td>
<td>15,936</td>
<td>804</td>
<td>1628</td>
<td>44.76%</td>
<td>96.4%</td>
</tr>
</tbody>
</table>
## Typical Results (Deschambeault, QC)

<table>
<thead>
<tr>
<th>Element</th>
<th>Raw Sludge mg/kg (PPM)</th>
<th>Filtrate mg/kg (PPM)</th>
<th>Cake mg/kg (PPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K (Potassium)</td>
<td>85.5</td>
<td>58.9</td>
<td>349.2</td>
</tr>
<tr>
<td>Ni (Nickel)</td>
<td>0.3</td>
<td>Not detected</td>
<td>10.9</td>
</tr>
<tr>
<td>Cu (Copper)</td>
<td>5.2</td>
<td>0.12</td>
<td>152</td>
</tr>
<tr>
<td>Zn (Zinc)</td>
<td>12.3</td>
<td>0.3</td>
<td>326.4</td>
</tr>
<tr>
<td>P (Phosphorus)</td>
<td>71.5</td>
<td>36.8</td>
<td>1136.9</td>
</tr>
<tr>
<td>Pb (Lead)</td>
<td>2.58</td>
<td>Not detected</td>
<td>55.34</td>
</tr>
<tr>
<td>Cd (Cadmium)</td>
<td>0.12</td>
<td>Not detected</td>
<td>2.26</td>
</tr>
<tr>
<td>Total nitrogen</td>
<td>460</td>
<td>240</td>
<td>7480</td>
</tr>
<tr>
<td>Ammoniacal nitrogen</td>
<td>320</td>
<td>220</td>
<td>1280</td>
</tr>
</tbody>
</table>
Typical Results (St. Joseph de Beauce, QC – 2001-2005)
Typical Results (St. Joseph de Beauce, QC – 2001-2005)

Filtrate BOD5 and COD - Mg/L

Sample

BOD 5

COD

Mg/L

0 5 10 15 20 25 30 35

0 500 1000 1500 2000 2500 3000 3500
What are the costs?

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</tr>
<tr>
<td>To attain 20,000 gal/day</td>
<td></td>
</tr>
<tr>
<td>Capital cost</td>
<td>17.32</td>
</tr>
<tr>
<td>Financing cost</td>
<td>2.36</td>
</tr>
<tr>
<td>Operator cost (assuming operator at $12.00 per hour plus benefits, attending operation 2 hrs/day)</td>
<td>1.78</td>
</tr>
<tr>
<td>Chemical (polymer) cost</td>
<td>3.93</td>
</tr>
<tr>
<td>Power cost</td>
<td>0.06</td>
</tr>
<tr>
<td>Maintenance cost for press</td>
<td>0.71</td>
</tr>
<tr>
<td>Maintenance cost (other)</td>
<td>0.35</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td><strong>$26.53</strong></td>
</tr>
<tr>
<td></td>
<td><strong>$26.58</strong></td>
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Apart from the purchase cost, labor and consumables are the biggest component of the daily operation.

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<td>3.93</td>
<td>5.22</td>
</tr>
<tr>
<td>Power cost</td>
<td>0.08</td>
<td>0.11</td>
</tr>
<tr>
<td>Maintenance cost for press</td>
<td>0.71</td>
<td>0.85</td>
</tr>
<tr>
<td>Maintenance cost (other)</td>
<td>0.35</td>
<td>0.42</td>
</tr>
</tbody>
</table>

$6.83 to $8.12 / 1,000 gal
City of Deschambault
Septage Treatment Facility
Deschambault, Quebec, Canada

- Process: Septage sludge
- Plant capacity: Flow 96 m³/d or 25 363 GD (8 hrs)
- Rotary Press: 1 unit model 1-1200/1250A
  Commissioned 1993
- Performances:
  - Feed concentration 1-7% (TS)
  - Throughput 3.8 t/d (8hrs)
  - Capture rate 95% (SS)
  - Cake dryness 35% (TS)
- Special feature: Complete dewatering system was supplied skid-mounted to "plug and start"
MUNICIPALITÉ DE ST-JOSEPH DE BEAUCHE (QC)

- Process: Septage sludge
- Rotary Press: 1 unit
  Model: 1-1200/1500A
  Commissioned: 2002
- Performances:
  - Feed sludge 3.3% (TS)
  - Throughput 3.3 dry t/d (8hrs)
  - Capture rate 96% (SS)
  - Cake dryness 30% (TS)
CLEAN EARTH LTD
Saint John (NB)

- Process: Septage sludge
- Rotary Press: 1 unit
  Model: 1-1200/1500A
  Commissioned: 2001
- Performances:
  - Feed sludge 4.8% (TS)
  - Throughput: 3.2 dry t/d (8hrs)
  - Capture rate: 96% (SS)
  - Cake dryness: 25% (TS)
Clean Earth
Fredericton (NB) Canada

- Process: Septage Sludge

- Rotary Press: 1 unit
  Model 1 (2)-900/2000 CV
  Supplied with conveyor system
  Commissioned: 2005

- Performances:
  - Sludge Total Solid: 1 to 3 % (TS)
  - Throughput: 1.8 dry t/d/press (8hrs)
  - Cake dryness: 35 % (TS)
  - Capture rate: 98.5 % (TSS)
Bio-Waste Processing
Milford (IN) USA

- Process: 75% Septage Sludge, 25% grease trap waste and other trucked-in sludges

- Rotary Press: 1 unit
  Model 2 (3)-900/3000 CV – expandable unit
  Supplied with complete skid, polymer system, compressor and conveyor system
  Commissioned: 2007

- Performances:
  - Feed concentration: 1 to 3 % (TS)
  - Throughput: 20,000 GPD (8hrs); 30,000 GPD – future expansion
  - Cake dryness: 35 % (TS)
  - Capture rate: 95 % (TSS)
Complete Skid – mounted and wired prior to shipment
Bio-Waste Processing
Milford (IN) USA
Bio-Waste Processing
Milford (IN) USA
Bio-Waste Processing
Milford (IN) USA
Hapchuk Hauling Services
(Liquid Assets Disposal inc., Wheeling WV)

- **Process**: Septage & Grease Trap Waste

- **Rotary Press**: 1 Unit
  Model 4(6)-900/6000CV
  Commissioned: 2008

- **Performances**:
  - Feed concentration: 1-6 % (TS)
  - Throughput: 9.5 dry tons/day
  - Cake dryness: 34-47 % (TS)
  - Capture rate: 96-98 % (TSS)
Hapchuk Hauling Services
(Liquid Assets Disposal inc., Wheeling WV)
ATP Dewatering
Palmetto (FL)

• Process: Various (mobile dewatering)
• Rotary Press: 1 unit
  Model 2-900/2000CV
  Commissioned: 2006
• Special Feature: Mobile unit, ISO-container mounted
ATP Dewatering
Palmetto (FL)
MRC Vallée de la Gatineau
Septage Treatment Facility
Kazabazua, Quebec, Canada

- **Process:** Septage sludge
- **Plant capacity:**
  Flow 82 m³/d (8 hrs)
- **Rotary Press:** 1 unit
  Model 1(2)-1200/3000A
  Commissioned in 2005
- **Performances:**
  - Feed concentration: 2.7% (TS)
  - Throughput: 2.2 t/d (8 hrs)
  - Capture rate: 98.8% (SS)
  - Cake dryness: 43.7% (TS)
- **Special feature:**
  - Dewatering system
  - Biosolid composting
Services Sanitaires G. Campbell inc. 
Cowansville (Quebec) Canada

• Process: 
  Septage sludge

• Rotary Press: 1 unit  
  Model 2-1200/3000A  
  supplied with conveyor system  
  Commissioned: 2006

• Performances:
  - Sludge total solid: 2% (TS)
  - Throughput: 3.3 dry t/d/press (8hrs)
  - Capture rate: 92% (TSS)
  - Cake dryness: 43% (TS)
Bourgoyne’s Bay WWTP
CRD – Saltspring Island, BC, Canada

- Process: Septage and WAS
- Plant capacity: 4,000 people flow 5,500 m³/yr or 0.48 MGD
- Performances:
  - Feed concentration 2% (TS)
  - Throughput 35 GPM
  - Capture rate: 96% (SS)
  - Cake dryness 28% (TS)
- Special feature: Rotary press feeding a composting facility with filtrate polishing by MBR
Campor inc. - Site 1
Riviere-du-Loup, Quebec, Canada

- Process: Septage sludge
- Rotary Press: (1) Unit
  Model 3-900/3000CV
  Commissioned: October 2008

- Performances:
  - Feed concentration: 1.5% (TS)
  - Throughput: 3.2 t sèches / j (8 hrs)
  - Cake dryness: 32% (TS)
  - Capture rate: 97% (TSS)
Services Sanitaires Gerard Fortin (Quebec)

- Process: Septage sludge
- Performances:
  - Feed concentration: 5.0% (TS)
  - Production: 4.0 dry tons/day (8 hrs)
  - Cake dryness: 25% (TS)
  - Capture rate: 95% (TSS)

Return to Septage sludge installation
Depot Rive-Nord (EBI), Quebec

- Process: Septic sludge
- Rotary Press: (2) Units
  Model 3-900/3000CV
  Commissioned: June 2009

- Performances:
  - Feed concentration: 1.8 % (TS)
  - Throughput: 7.2 dry tons/day (8 hrs)
  - Cake dryness: 32 % (TS)
  - Capture rate: 97 % (TSS)
Campor inc. - Site 2
Riviere-du-Loup, Quebec, Canada

- Process: Septage sludge
- Rotary Press: (1) Unit
  Model 3-900/3000CV
  Commissioned: June 2009

- Performances: (To follow after June 2009)
  - Feed concentration: 2 % (TS)
  - Throughput: 3 dry tons/day (8 hrs)
  - Cake dryness: 32 % (TS)
  - Capture rate: 97 % (TSS)
Super Soil Systems
Clinton, NC

- Process: Pig manure
- Plant capacity: 20,000 GPD

- Rotary Press: 1 unit
  Model 2-900/2000CV
  Commissioned: 2006

- Performances:
  - Feed concentration: 2 % (TS)
  - Throughput: 50 GPM
  - Cake dryness: 28 % (TS)
  - Capture rate: 95 % (SS)

- Special feature: Trailer mounted unit
Questions?

$$$