I. Brief snapshot of the plant

<table>
<thead>
<tr>
<th>Design capacity</th>
<th>46,000 PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual loading</td>
<td>55,000 PE</td>
</tr>
<tr>
<td>Biological wastewater treatment</td>
<td>• P-Elimination</td>
</tr>
<tr>
<td></td>
<td>• Intermittent denitrification</td>
</tr>
<tr>
<td></td>
<td>• Downstream P-precipitation (Fe³⁺)</td>
</tr>
<tr>
<td></td>
<td>• Sludge age: 15 – 20 days</td>
</tr>
<tr>
<td>Sludge treatment</td>
<td>• No Primary sludge</td>
</tr>
<tr>
<td></td>
<td>• Thickened waste activated sludge</td>
</tr>
<tr>
<td>Separate waste activated sludge thickening</td>
<td>• Static thickening</td>
</tr>
<tr>
<td>Degradation of volatile solids (VS)</td>
<td>• 75% of dry solids (before trial)</td>
</tr>
<tr>
<td>Digested sludge dewatering</td>
<td>• Centrifuge</td>
</tr>
<tr>
<td>Sludge disposal</td>
<td>• Agriculture</td>
</tr>
</tbody>
</table>

II. Objective of the ultrasound application

- Improve aerobic sludge stabilization, avoid the construction of an additional activated sludge tank
- Combat bulking sludge Improvement of dewaterability for the reduction of disposal costs

III. Preliminary trial of the ultrasound disintegration system

- Test phase of three months (December 2002 – February 2003)
- 30% of the total TWAS flow was treated with one ultrasound unit à 5 kW, 24 h/d in operation, treated TWAS was returned to the aerobic tank (Figure 1)
IV. Results

- Intensified aerobic sludge stabilization:
  - 20% reduction of sludge amount for disposal (Figure 2)
- Combat bulking sludge:
  - Destruction of the bulking sludge
  - Reduction of the sludge volume index from 140 ml/g to 85 ml/g

V. Full-scale installation

Since June 2003 the ultrasound system is implemented on Leinetal WWTP.

Figure 1: Scheme of sludge treatment on Leinetal WWTP
Figure 2: Waste activated sludge mass for disposal over time

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