ULTRAWAVES ULTRASOUND SYSTEM FOR IMPROVEMENT OF ANAEROBIC DIGESTION ON WASTE WATER TREATMENT PLANTS

Bamberg WWTP

I. Specification of the plant

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Design capacity</td>
<td>230,000 PE</td>
</tr>
<tr>
<td>Actual loading</td>
<td>280,000 PE</td>
</tr>
<tr>
<td>Sludge treatment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>∙ Primary sludge (PS) and thickened waste activated sludge (TWAS)</td>
</tr>
<tr>
<td>Separate WAS thickening</td>
<td></td>
</tr>
<tr>
<td></td>
<td>∙ Centrifuge</td>
</tr>
<tr>
<td>Anaerobic sludge stabilization</td>
<td>3 digesters (2 x 2,000 m³, 1 x 1,000 m³)</td>
</tr>
<tr>
<td>Hydraulic retention time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>∙ 18 days (2003)</td>
</tr>
<tr>
<td>Degradation of volatile solids (VS)</td>
<td>∙ 34% (2003)</td>
</tr>
<tr>
<td>Sludge disposal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>∙ Incineration after dewatering</td>
</tr>
</tbody>
</table>

II. Objective of the ultrasound application

- Intensification of anaerobic digestion process
- Reduction of volatile solids concentration
- Increase of biogas production

III. Installation of the Ultrawaves ultrasound system

- Installation of 2 Ultrawaves ultrasound systems (2 x 5 kW) for test in May 2002
- 30% of total TWAS flow treated with ultrasound
IV. Results of ultrasound treatment

- Construction of a new digester (est. investment costs: 2.5 million euros) was avoided
- Intensification of sludge digestion: degradation of VS increased from 34% to 58% (see figure 2)
- Quality of digested sludge: reduction of the VS (as per cent of DS) from 60% to 54%
- Biogas production: increase of 29%

V. Full-scale installation

Two Ultrawaves ultrasound systems (2 x 5 kW) are in operation since August 2004. In the beginning the recommended stream (30% of the total TWAS flow) was treated during 8 hours a day. The thickening process was automated to operate 24 hours a day. Today the treated stream amounts to 80% of the total TWAS flow.

*Figure 1: Sludge flow sheet of Bamberg WWTP and integration of ultrasound system (US)*
Figure 2: Bio gas production and degradation of volatile solids on Bamberg WWTP

Contact:

Ultrawaves GmbH
Wasser & Umwelttechnologien
Kasernenstraße 12
21073 Hamburg, Germany
E-Mail: info@ultrawaves.de
Phone: +49 (0)40 325 07 203
Fax: +49 (0)40 32507 204
www.ultrawaves.de

Kläranlage Bamberg
Mr. Wolff
Rheinstrasse 4
96052 Bamberg, Germany
E-Mail: klaerwerk@stadt.bamberg.de
Phone: +49 (0) 951 87 72 70
Fax: +49 (0) 951 87 72 07