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Improvement of aerobic sludge stabilization by ultrasound technology

Leinetal WWTP, Germany

I. Brief snapshot of the plant

- **Design capacity**
  46,000 PE
- **Actual loading**
  55,000 PE
- **Biological waste water treatment**
  P-Elimination
  Intermittent denitrification
  Downstream P-precipitation by Fe^{3+}
  Secondary clarification
- **Sludge treatment**
  No primary sludge
  Thickened waste activated sludge
- **Separate waste activated sludge thickening**
  Static thickening
- **Aerobic sludge stabilization**
  Sludge age: 15 – 20 days
- **Volatile solids (VS)**
  75% VS as per cent of dry solids
  (before preliminary trial)
- **Digested sludge dewatering**
  Centrifuge
- **Sludge conditioning**
  Calciumcarbonat added
- **Sludge disposal**
  Agriculture

II. Objective of the ultrasound sludge disintegration

- Improve aerobic sludge stabilization
  Avoid the construction of an additional aerobic tank
- Combat bulking sludge

III. Preliminary trial of the ultrasound disintegration system

- Test phase of three months (December 2002 – February 2003)
- 30% of the total TWAS flow were treated with 1 ULTRAWAVES US unit à 5kW, operating 24 hours per day. The treated TWAS was returned to the aerobic tank (Fig. 1)

IV. Results of the preliminary trial

- Intensified aerobic sludge stabilization
  20% reduction of sludge amount for diposal (Fig. 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 ULTRAWAVES ultrasonic system is implemented on Leinetal WWTP.

VI. Payback time

Based on these results, payback time of total investment costs is calculated with less than three years. The construction of an additional aerobic tank could be avoided.

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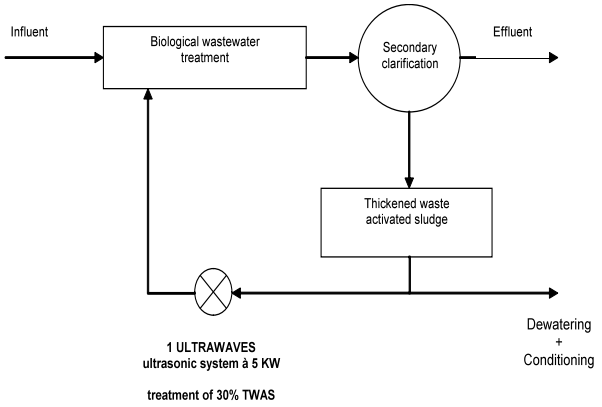

Fig.1: Scheme of sludge treatment on Leinetal WTTP

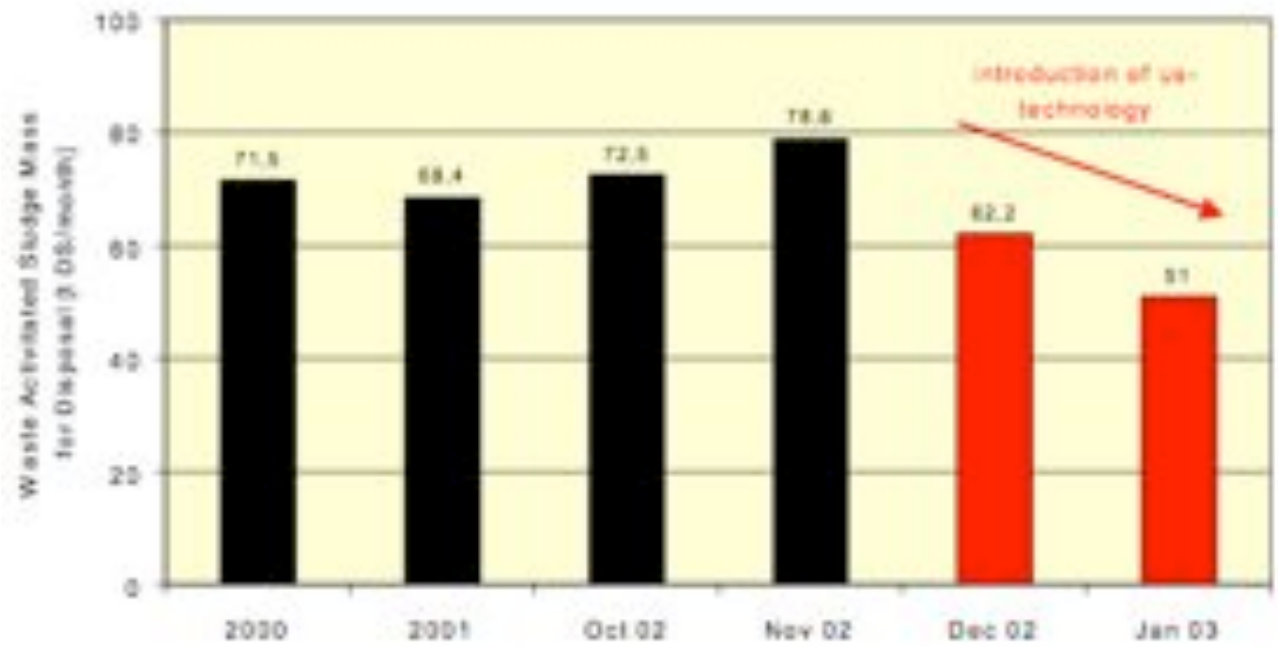

Fig. 2: Thickened waste activated sludge mass for disposal