Sludge Dewatering Using Decanter-Centrifuges

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Outline

- Background
- The Problem
- The Solution
- Milestones
- Mass Balance
- Commissioning Test Results
Background

Dhahran Wastewater Treatment Operations
Background
Background

North Wastewater Treatment Plant
Outline

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The Problem

- Urbanization
- Increased Capacity
- Reduced Footprint
The Solution

- Alternate Means of Decanting
- Installation of Odor Control
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Milestones

- Aug 2007: Alfa Laval (ALME) met Dar Al Riyadh and Aramco
- Nov 2007: main contractors bidding
- Feb 2008: contract awarded to Al Suwaidi Industrial Services Ltd. (SIS)
- Jul 2009: equipments delivered
- Oct 2009: operators training
- Dec 2009: initial site testing / commissioning
- Feb 2010: hands-on training & decanters put into operation (semi-automatic)
- Mar 2010: decanters fully commissioned and handed-over
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Mass Balance

**Mass Balance Calculation**

**Sludge Feed**
- Flow rate: 50.00 m³/h
- DS % in: 1.25 % wt
- Density: 1.05 kg/l
- Mass flow: 656.25 kg/h

**Diluted Solution**
- Flow rate: 2.08 m³/h
- Active concentration: 0.25 %

**Dilution Water**
- Flow rate: 1.04 m³/h

**Polyelectrolyte Dose**
- Concentration of solution: 0.50 %
- Activity (trade product): 100.00 %
- Active concentration: 0.50 %
- Density (trade product): 1.00 kg/l
- Dosing rate (100% active): 8.00 kg/t DS
- Total flow rate (PE + water): 1.05 m³/h
- Water flow rate: 1.04 m³/h
- Mass flow (trade product): 5.25 kg/h
- Flow rate (trade product): 5.25 l/h
- Mass flow (active polymer): 5.25 kg/h

**Liquid Outlet (Centrate)**
- DS % out: 0.02 % wt
- Suspended solids: 200 mg/l
- Flow rate: 46.92 m³/h
- Recovery SS: 99.97 %
- Mass flow SS: 9.38 kg/h

**Solids Outlet (Sludge Cake)**
- DS % out: 22.00 % wt
- Flow rate: 2.96 m³/h
- Mass flow: 652.12 kg/h
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Solids discharge
(21 ~ 24 % dryness)

Liquid discharge
(50 ~ 220 mg/l TSS)
Mar 2010 Commissioning Test Results (average of 14 test-runs * Note)

- Sludge Flow = 49.09 m$^3$/h
- Polymer Flow = 1.12 m$^3$/h at 0.5%
- Feed Sludge = 1.26 TS %
- Centrate quality = 220.86 mg/l TSS
- Cake dryness = 21.93 TS %
- Polymer Dosage = 9.20 kg/t TS
- Solids Recovery = 98.24 %

*Note: 12 runs at 2900 rpm (3061xG), 2 runs at 2500 rpm (2275xG)
Thank you !!!
Aerobically Digested Sludge

MLE Process

NOT USED