Disposal Challenge to Opportunity

Biofuel and Bioproducts from Wet and Gaseous Waste Streams: Market Barriers and Opportunities

June 6 & 7, 2017

Great Lakes Water Authority

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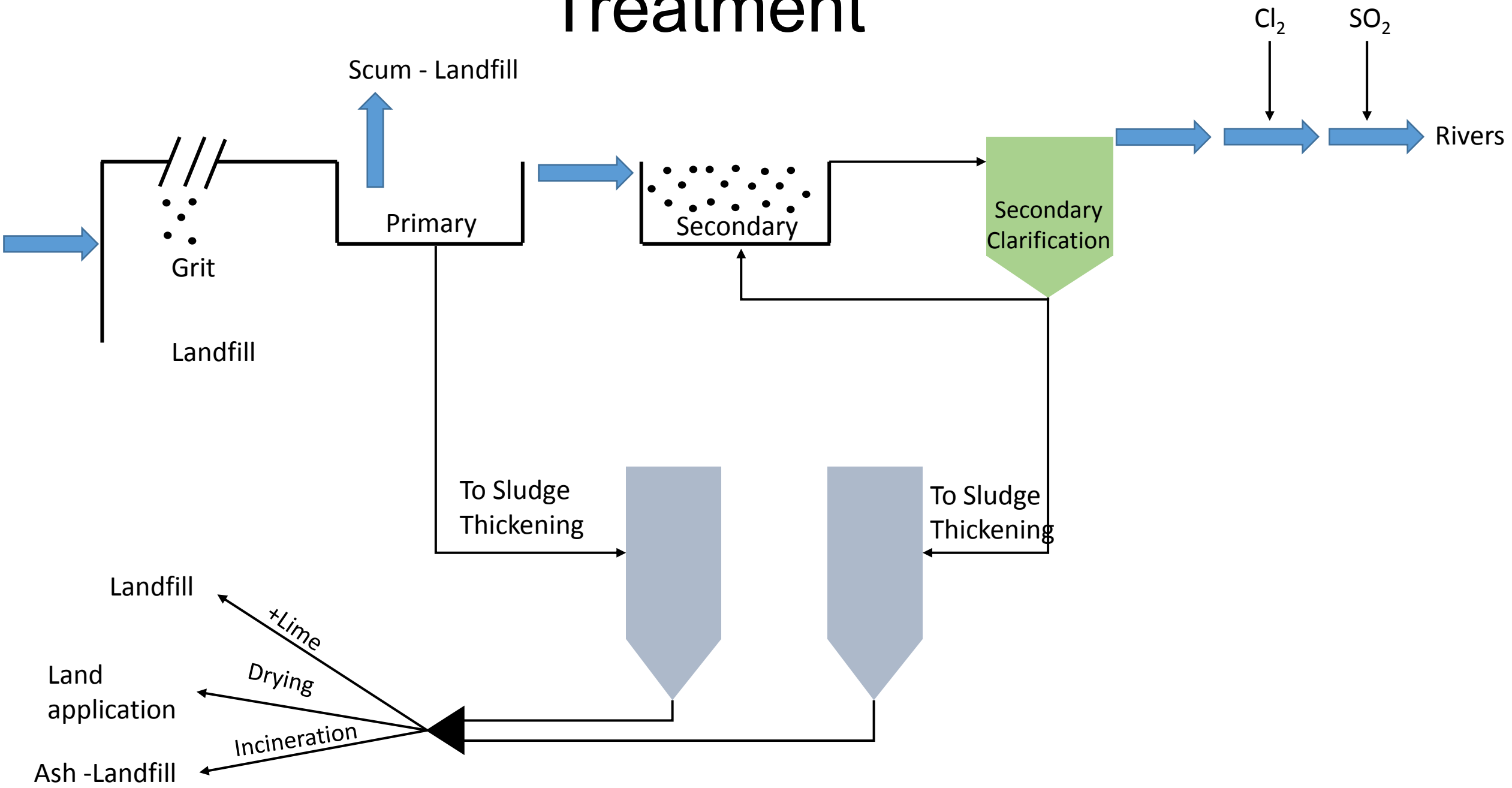
GLWA
Great Lakes Water Authority

Conventional Wastewater Treatment



GLWA Water Resources Recovery Facility

- 675 MGD Avg – up to 930 MDG full primary and secondary
- 1.7 Billion wet weather
- 450 Dry Tons per day Biosolids
  - 320-1100 dry tons per day
- 100 dry tons Secondary (Waste Activated)
  - 70-75% Volatile
  - Thickened 2 – 2.5%
- 350 dry tons Primary
  - 60-65% Volatile (wet weather 50-55%)
  - Thickened 5- 6%
  - At 9 – 10% Problematic
- Sludge flow 2.5 – 3 MGD
- Belt Filter Presses – 25-30% solids

Size Perspective

- 16 Main Lift Pumps – 800- 1250 hp Largest 200 MGD
  - Installed capacity – 1803 MGD
- Primary Clarification
  - 12 Rec @ 90 MGD 273 ft x 112 ft x 14ft
  - 6 circulars @ 180 MGD 250 ft dia x 11ft
- 5 ILP – 2,500 hp 365 MGD ea
- 4 covered aeration decks 310 MGD ea
- Oxygen pipeline 600 tpd
- 25 Final clarifiers 200 ft x 15.5 ft – 40 MGD
- Return sludge 25-50% of influent
- Chlorine gas and sulfur dioxide
  - 90 ton railcars
- 22 Belt Filter Presses 2tph
- 8 Incinerators 2.2 tph
- 12 centrifuges
- Biosolids drying 4 trains @ 105 tpd
- Complex system of belts BFP, Incinerators and off loading
- 3 Pug mills and lime handling

Costs - Rough

- Operating Costs $600-800 /MG
- Annual Capital $150 Million
- Biosolids Drying $13 M/year (220 dtd) + extra volume + utilities
  - 243 Kwh/dt, 89.4 Therms/dt
- Incinerator approx. $1000/day/unit at temp.
- Polymer $0.09lb use 200 lb/dt
- Lime $147/ton @8% (wet) to landfill
- Hauling $10.00/ton; Landfill $31.00/ton
- Ash $15 haul and dispose
- Electricity $13 Million/yr.

Feedstocks for Biofuels production

- Characteristics of waste stream
  - Percent solids, presence of undesirable materials (inerts, rags), quantity
  - Availability certainty
  - BTU potential
  - Location

- Conversion process requirements
  - Percent solids required, consistency of feedstock, handling systems needed (conveyors, pumps), odor control
  - Location

Wet Feedstocks - Handling

Wet Feedstocks Receiving

How much handling?

Wet Feedstocks - weather

Site Aesthetics and Odor Control

Maintenance considerations

Dry Solids Handling

Handling of residuals to land application

When things go wrong

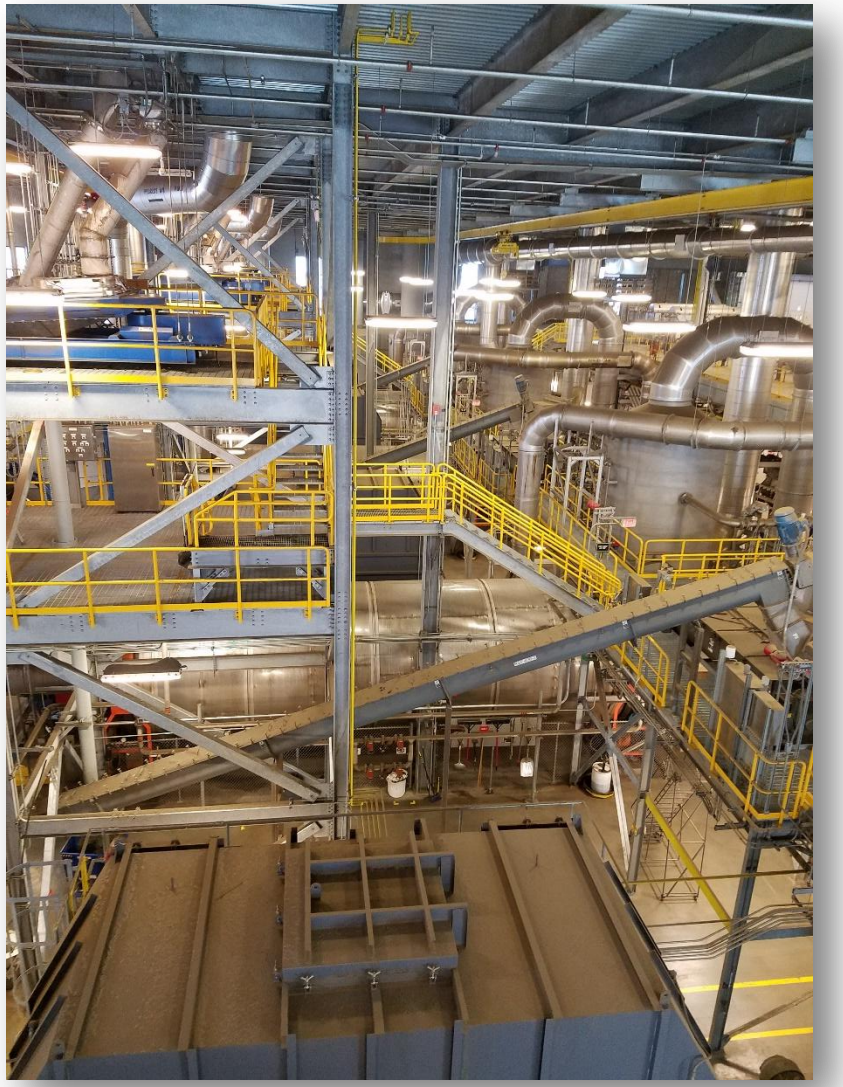
How bad can it get?

If it can it will


320
KOMATSU

Exterior of biosolids drying facility

Interior biosolids drying

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