NAWT
Septage Processing
Introduction to owning a Facility

Your Problem
Mixed waste
{Your truck}

- Solids
- Liquid

Current Practices
- 25% of US Households use Onsites for infrastructure
- 114.8 Million Households
  - [2010 census]
- 28.7 Million homes
  - Assuming 1,000 gal tanks & 3 year service
  - $9,855,000,000 gallons per year

Survey about Storage
- 11 States responded
- 1 to Unknown numbers of Facilities
- 10,000 gal to No maximum
- Fees None to $500
- 4 required training [7 didn’t]

Thinking about Cost
Your Resources
- Options
- Future
Your Costs
- Do you know?
- Looking ahead
Dealing with Septage

Operation models

- **Handling**
  - Complete discharge
  - Land application

- **Treatment**
  - Thickening
  - Dewatering
  - Other products

- **Finished Product handling**
  - Effluent
  - WWTP Discharge
  - Effluent Treatment
  - Solids

Facility Outline

**Odor Control**

- Processing: Solid waste, Grass, Storage
- Transfer, Thickening, Dewatering
- Solids, Effluent, Treatment

SCREENING AND DIRECT DISCHARGE TO WWTP

TRANSFERRING TO WWTP
Thickening
Dewatering
Further treatment
Class A
Composting

NEW PRODUCT

Two products
Solids
Class B
Class A
Water
Waste strength
BOD
TSS
FOG

Two products
Solids
Class B
Class A
Water
Waste strength
BOD
TSS
FOG

Septage Treatment Levels
Class A
- Set treatment level
- Methods & testing
- Marketable product
- No tracking of final resting
Class B
- 503 Regulations
- Records & Reporting
Your Vision

Your Markets
Your Regulations
Your Resources

YOUR VISION: ROAD MAP

Visioning

Business
- Management
- Septage
- Biosolids (Sludge)
- Small community systems

Best Choice:

Total Costs
- Bottom line
- YOUR Costs

The Next Steps
- Planning
- Buying
- Building
- Operating

Throw it on the wall & see what sticks

PLANNING AND ENGINEERING

YOUR FACILITY PLAN
- Interviewing your team
  - Engineering
  - Banking
  - Marketing
Engineer
- Permitting
- Design
- Costs
- Operation
- Learning vs. Knowing
- Fighting vs. Following

Your Equipment
- Matches your Plan
- Matches your Budget
- New or Used
- Good deals

Trucks & Things

Your Truck(s) {Equipment}
- Old ~ New
- Full dump
- Tip able
- Recycling
- Vac all

Match the Truck to the Job

Full Dump
Other tools & Jobs

Recycling Trucks

- Returning water to the Tank
- Sensor operation
- Juggler
- Screening separation
- Simon Moos
- New Tech
- SludgeNet

Juggler J10-A -- Juggling - 3 simple steps!!

Step 1
Supernatant is drawn up.

Step 2
Sludge and scum are drawn up.

Step 3
Supernatant is treated and returned to tank.
Filter System

Separation

Vac all

BUILDING & OPERATION

- Your Choices
- It will take time
- You will be the EXPERT
General Engineering

Gravity is Your Friend

Grit is a Problem

Safety

In your Company

- Safety Plan
  - Fire Medical
  - Personal Protection
  - Clothing
- Spill Plan
  - Waste
  - Perception

Parent failing to comply with “Safety Plan”

Any Questions?

AFRA
Polymer

A polymer is a chain of organic molecules made up of many repeating units.

\[(\text{CH}_2 - \text{CH}_3)^n \quad \text{CH}_2 - \text{CR}^m \]

\[
\begin{align*}
\text{C}=\text{O} & \quad \text{C}=\text{O} & \quad \text{CH}_3 \\
\text{NH}_2 & \quad \text{HN-(CH}_3)^3 & \quad \text{N-CH}_3 \\
& \quad \text{CH}_3 & \quad +
\end{align*}
\]

Ex. A PAM cationic polymer

Mixing

A place to take a peak

STORAGE

Benefits of Storage

‘Bigger is better’
- Early helps
- Operation
- Performance
- More consistent
- Cost?
**Flexibility**
- Dealing with Issues
  - Weather
  - Breakdowns
  - Piping
  - Bad Loads
  - Plan for receiving
  - pH

**Sources of Odors**
- Inorganic
  - Hydrogen Sulfide
  - Ammonia
- Organic
  - Protein breakdown

**Odor Control SUMMARY**
<table>
<thead>
<tr>
<th>Compounds Treated</th>
<th>Hydrogen Sulfide</th>
<th>Organic Odors</th>
<th>Ammonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Adsorption</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Wet Scrubber</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Biofiltration</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**An Example**

**Thanks to:**
BAY PRODUCTS, INC.
You

- 3,000 gallon truck
- Looking at:
  - Using the City
  - Using Land Application
  - Your Own Facility

PUBLICLY OWNED TREATMENT WORKS (POTWs)

- Head of Plant

PUBLICLY OWNED TREATMENT WORKS (POTWs)

- Septage Receiving Area

PUBLICLY OWNED TREATMENT WORKS (POTWs)

- Economic Elements
  - Disposal Fee
    - Per Load 5 cents/gal - 3,000 gal $150.00
  - Truck Time
    - Time Additional 1 hour @80.00/hr $80.00
  - 24/7 Facility – Yes
  - Total Cost for 3,000 Gallons $230.00
    - Per 1,000 gallons $230/3 = $76.67
    - Per Gallon $230/3,000 = $0.07667

PUBLICLY OWNED TREATMENT WORKS (POTWs)

- Economic Elements
  - Disposal Fee
    - Per Gallon
    - Per Load
    - Honor System
  - Truck Time
    - Distance
    - Time
    - Driver cost
  - 24/7 Facility
    - Need Storage [Holding Tank]

LAND APPLICATION
12 CFR Part 503 (USEPA)

Screening
Class B Biosolid
Pollutant Limits
Pathogen and Vector Attraction Reduction
pH 12 for 30 minutes or,
Inject or,
Incorporate within 6 hours
Recordkeeping

Economic Elements
- Land Cost
- Equipment
  - Screening
  - Tankage w/mixing
  - Lime Storage
  - Spreading Equipment
- Lime
- Trucking/Application
- Volume to be disposed
- Recordkeeping

Volume to be Disposed 5,200,000 gal/yr
Land Cost None
Equipment $50,000 10 yr
- Screening
- Tankage w/mixing
- Lime Storage
  - Spreading Equipment
- Lime 25# per 1,000 gal @ $150.00/ton
- Trucking 1 hr turnaround @ $ 80.00
- Recordkeeping
### Land Application

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cost</th>
<th>Per</th>
<th>Cost Per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>$50,000</td>
<td>10 Years</td>
<td>$5,000</td>
</tr>
<tr>
<td>Lime</td>
<td>$150 per Ton</td>
<td>25 lb per 1,000</td>
<td>5,200,000 lbs = $9,750</td>
</tr>
<tr>
<td>Trucking</td>
<td>$80.00/hr</td>
<td>1 hr per 3,000 gal</td>
<td>5,200,000/3,000 = 1,733 trips</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td></td>
<td>$153,350</td>
</tr>
<tr>
<td><strong>Cost Per 1,000</strong></td>
<td></td>
<td></td>
<td>$29.49</td>
</tr>
<tr>
<td><strong>Cost Per Gal</strong></td>
<td></td>
<td></td>
<td>2.949 Cents</td>
</tr>
</tbody>
</table>

### Privately Owned Dedicated Facility

**Economic Elements**
- Planning/Engineering
- Permitting
- Funding
- Capital Reimbursement Fee
- Equipment Selection
- Operational Costs

**THINK! ... What are your Resources?**

<table>
<thead>
<tr>
<th>Solids</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime Stabilization</td>
<td>Land Apply</td>
</tr>
<tr>
<td>Thickening</td>
<td>Land Apply</td>
</tr>
<tr>
<td>Dewatering</td>
<td>Land Apply</td>
</tr>
</tbody>
</table>

### Facility Outline

#### Odor Control

- **Receiving**
- **Processing**
  - Solids
  - Effluent
  - Treatment
- **Final Resting**

### Dedicated Facility Technologies

- **Unit Processes**
  - Screening/Grit Removal
  - Equalization Tankage
  - Dewatering
    - Polymer Addition
  - Sludge
    - Further Treatment
  - Filtrate
    - Further Treatment
  - Odor Control
DEDICATED FACILITY TECHNOLOGIES

Economics of Construction
- Land & Building $400,000
- Screen/Grit Removal 50,000
- Dewatering Equipment 100,000
- Tankage 50,000
- Odor Control 25,000
- Engineering & Permits 30,000
- Plumbing & Electrical 40,000
$695,000

Disclaimer: Costs May Vary Considerably

Capital Reimbursement Fee
- Defined in Sewer Use Ordinance
- Usually $3,500 per EDU

Example:
- 228 gallons per day (gpd) is an EDU
- 20,000 gpd or 20,000/228 = 87.72 EDUs
- 87.72 EDUs x $3,500 per EDU = $307,020

Note: Costs May Vary Considerably

Economic Elements
- Cost to Construct $695,000
- Capital Fee [WWTP] 307,020
- $1,002,020

Assume 20 year Payback @ 6.5% Interest
12 Payments per year = $89,650

Economics of Annual Costs for 20,000 gpd
- Payback of Capital Costs $89,650
- Sewer Discharge Fees @ $.005 26,000
- Sludge Disposal @ $35.00/ton 75,900
- Utilities 8,000
- Chemicals (Polymer/Lime) 9,750
- Permit & Analysis 3,000
- Repair & Maintenance 5,000
- Wages & Benefits 40,000
- Insurance 5,000
- Cost of Property 10,000
5,200,000 Gal per year at 5.2 cents/gallon $272,300

SUMMARY

Disposal Costs Based on 20,000 Gallons Per Day

<table>
<thead>
<tr>
<th>POTW</th>
<th>7.667</th>
<th>cents/gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Application</td>
<td>2.284</td>
<td>cents/gal</td>
</tr>
<tr>
<td>Dedicated Facility</td>
<td>5.24</td>
<td>cents/gal</td>
</tr>
</tbody>
</table>

Dedicated Facility Technologies

Economics of Construction
- Land & Building $400,000
- Screen/Grit Removal 10,000
- Dewatering Equipment 150,000
- Tankage 50,000
- Odor Control 25,000
- Engineering & Permits 30,000
- Plumbing & Electrical 40,000
$705,000

Disclaimer: Costs May Vary Considerably
**Dedicated Facility Technologies**

- Economics of Annual Costs for 20,000 gpd
  - Payback of Capital Costs: $90,550
  - Sewer Discharge Fees @ $0.005: $26,000
  - Sludge Disposal @ $35.00/ton: $75,900
  - Utilities: $8,000
  - Chemicals (Polymer/Lime): $8,000
  - Permit & Analysis: $3,000
  - Repair & Maintenance: $5,000
  - Wages & Benefits: $40,000
  - Insurance: $5,000
  - Cost of Property: $4.53
  - Sludge Disposal @ $35.00/ton:

<table>
<thead>
<tr>
<th>Disposal Costs Based on 20,000 Gallons Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>POTW</td>
</tr>
<tr>
<td>Land Application</td>
</tr>
<tr>
<td>Dedicated Facility</td>
</tr>
</tbody>
</table>

5,200,000 Gal per year at 5.2 cents/gallon: $272,300

**Summary**

**More Info?**

Water Environment Federation
Septage Handling
Manual of Practice No. 24
1-703-684-2400
www.wef.org/applications/publications/