NAWT
Septage Processing

Introduction to owning a Facility

National Association of Wastewater Transporters, Inc.
Thanks
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

Receiving
- Solid waste
- Grit
- Storage

Processing
- Transfer
- Thickening
- Dewatering

Final Resting
- Solids
- Effluent
- Treatment
SCREENING AND DIRECT DISCHARGE TO WWTP
TRANSFERRING TO WWTP
DEWATERING TREATMENT FACILITY

- Thickening
- Dewatering
- Further treatment
  - Class A
  - Composting

NEW PRODUCT
Final Resting
Final resting place

- 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
Beneficial Reuse thru the Soil & Beyond

Land Application
Your Vision

Who you are and where you are going
Visioning

- Your Markets
- Your Regulations
- Your Resources

YOUR VISION: ROAD MAP
Business

- Management
- Septage
- Biosolids {Sludge}
- Small community systems

Best Choice:
The Next Steps

- Planning
- Buying
- Building
- Operating

Throw it on the wall & see what sticks
Total Costs

Bottom line

YOUR Costs
PLANNING AND ENGINEERING

- **YOUR FACILITY PLAN**
- Interviewing your team
- Your Company
  - Accountant
  - Engineering
  - Banking
  - Attorney
  - Marketing
Engineer

- Permitting
- Design
- Plans
- Costs
- Operation
- Learning vs. Knowing
- Fighting vs. Following
Flexibility

- Piping
- Lines
- Technology adds
BUILDING & OPERATION

Your Choices

It will take time

You will be the EXPERT
General Engineering
Gravity is Your Friend
Grit is a Problem

- Earlier is better
- Deal with trash
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
A polymer is a chain of organic molecules made up of many repeating units.

\[
\text{Ex. A PAM cationic polymer}
\]

\[
(CH_2 \neg CH)_n - (CH_2 - CR)_m
\]

C=O   C=O   CH₃

NH₂   HN-(CH₂)₃-N-CH₃

+     CH₃
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

Thanks to:
BAY PRODUCTS, INC.
## Odor Control SUMMARY

### Compounds Treated

<table>
<thead>
<tr>
<th></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
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 Gallon
    - Per Load
    - Honor System
  - Truck Time
    - Distance
    - Time
    - Driver cost
  - 24/7 Facility
    - Need Storage [Holding Tank]
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
LAND APPLICATION
LAND APPLICATION

- 40 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
LAND APPLICATION
Land Application
LAND APPLICATION
LAND APPLICATION

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

- **Economic Elements**
  - 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

## Disposal Costs Based on 20,000 Gallons Per Day

<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>$150 per Ton</td>
<td>25 # per 1,000</td>
<td>$ 9,750</td>
</tr>
<tr>
<td></td>
<td>$150 per Ton</td>
<td>5,200 x 25 lbs = 130,000 lbs</td>
<td>$ 9,750</td>
</tr>
<tr>
<td>TRUCKING</td>
<td>$80.00/hr</td>
<td>1 hr per 3,000 gal</td>
<td>$ 138,600</td>
</tr>
<tr>
<td></td>
<td>$80.00/hr</td>
<td>5,200,000/3,000= 1,733 trips</td>
<td>$ 138,600</td>
</tr>
<tr>
<td>TOTAL COST</td>
<td></td>
<td></td>
<td>$ 153,350</td>
</tr>
<tr>
<td>COST PER 1,000</td>
<td></td>
<td></td>
<td>$ 29.49</td>
</tr>
<tr>
<td>COST PER GAL</td>
<td></td>
<td></td>
<td>2.949 Cents</td>
</tr>
</tbody>
</table>
Privately Owned Dedicated Facility
Dedicated Facility Technologies

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

THINK! … What are your Resources?

<table>
<thead>
<tr>
<th></th>
<th>Solids</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lime Stabilization</strong></td>
<td><strong>Land Apply</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Thickening</strong></td>
<td>Land Apply</td>
<td>POTW</td>
</tr>
<tr>
<td><strong>Dewatering</strong></td>
<td>Land Apply</td>
<td>Landfill</td>
</tr>
<tr>
<td></td>
<td>Composting Heat Drying etc</td>
<td>POTW</td>
</tr>
</tbody>
</table>
Facility Outline

Odor Control

Receiving
- Solid waste
- Grit
- Storage

Processing
- Transfer
- Thickening
- Dewatering

Final Resting
- Solids
- Effluent
- Treatment
DEDICATED FACILITY TECHNOLOGIES

- Unit Processes
  - Screening/Grit Removal
  - Equalization Tankage
  - Dewatering
    - Polymer Addition
  - Sludge
    - Further Treatment
  - Filtrate
    - Further Treatment
  - Odor Control
## Dedicated Facility Technologies

<table>
<thead>
<tr>
<th>Economics of Construction</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land &amp; Building</td>
<td>$400,000</td>
</tr>
<tr>
<td>Screen/Grit Removal</td>
<td>50,000</td>
</tr>
<tr>
<td>Dewatering Equipment</td>
<td>100,000</td>
</tr>
<tr>
<td>Tankage</td>
<td>50,000</td>
</tr>
<tr>
<td>Odor Control</td>
<td>25,000</td>
</tr>
<tr>
<td>Engineering &amp; Permits</td>
<td>30,000</td>
</tr>
<tr>
<td>Plumbing &amp; Electrical</td>
<td>40,000</td>
</tr>
</tbody>
</table>

**Total: $695,000**

Disclaimer: Costs May Vary Considerably
Capital Reimbursement Fee
- Defined in Sewer Use Ordinance
- Usually ____ Dollars per ____ Gallons per Day (EDU-Equivalent Dwelling Unit)

Example:
- $3,500 per EDU
- 228 gallons per day (gpd) is an EDU
- Say 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
## Dedicated Facility Technologies

### Economic Elements

- **Cost to Construct**: $695,000
- **Capital Fee [WWTP]**: $307,020

**Total**: $1,002,020

Assume 20 year Payback @ 6.5% Interest

12 Payments per year = $89,650
### Dedicated Facility Technologies

#### 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

Total Annual Costs: $272,300

- **5,200,000 Gal per year at 5.2 cents/gallon**
### SUMMARY

<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>
## Dedicated Facility Technologies

### Economics of Construction

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land &amp; Building</td>
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<tr>
<td>Plumbing &amp; Electrical</td>
<td>40,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$705,000</strong></td>
</tr>
</tbody>
</table>

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 @ $.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**: $235,550

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>Method</th>
<th>Cost</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>POTW</td>
<td>7.667</td>
<td>cents/gal</td>
</tr>
<tr>
<td>Land Application</td>
<td>2.494</td>
<td>cents/gal</td>
</tr>
<tr>
<td>Dedicated Facility</td>
<td>4.53</td>
<td>cents/gal</td>
</tr>
</tbody>
</table>
MORE INFO?

Water Environment Federation
Septage Handling
Manual of Practice No. 24
1-703-684-2400
www.wef.org/applications/publications/
Questions
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.
Juggler J10-A  Juggling - 3 simple steps!!

Step 2
Sludge and scum are drawn up.
Juggler J10-A  Juggling - 3 simple steps!!

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