NAWT
Septage Processing

Introduction to owning a Facility

National Association of Wastewater Transporters, Inc.
Thanks

RESERVED
EXALTED
RULER
Your Problem

Mixed waste
{Your truck}

Solids

Liquid
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

Receiving

- Solid waste
- Grit
- Storage

Processing

- Transfer
- Thickening
- Dewatering

Final Resting

- Solids
- Effluent
- Treatment

Odor Control

Storm water
SCREENING AND DIRECT DISCHARGE TO WWTP
TRANSFERRING TO WWTP
Processing
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
Land Application

Beneficial Reuse thru the Soil & Beyond
Your Vision

Who you are and where you are going
Visioning

- Your Markets
- Your Regulations
- Your Resources

YOUR VISION: ROAD MAP
Management
Septage
Biosolids {Sludge}
Small community systems

Best Choice:

Tony Fyle
1-800-545-2225
963-2225
Nisswa, MN
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
Polymer

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

\[(\text{CH}_2 - \text{CH})_n - (\text{CH}_2 - \text{CR})_m\]

\[\text{C=O} \quad \text{C=O} \quad \text{CH}_3\]
\[\text{NH}_2 \quad \text{HN}-(\text{CH}_2)_3-\text{N}-\text{CH}_3\]
\[\text{CH}_3\]

Ex. A PAM cationic polymer

Allows for Separation
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 (POTW)
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 \( \text{\$150.00} \)

- **Truck Time**
  - Time Additional 1 hour \( @80.00/hr \) \( \text{\$80.00} \)

- **24/7 Facility – Yes**

- **Total Cost for 3,000 Gallons** \( \text{\$230.00} \)
  - Per 1,000 gallons \( \text{\$230/3= \$76.67} \)
  - Per Gallon \( \text{\$230/3,000 = \$0.07667} \)
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

<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>TRUCKING</td>
<td>$80.00/hr</td>
<td>1 hr per 3,000 gal</td>
<td>5,200,000/3,000= 1,733 trips</td>
</tr>
<tr>
<td>TOTAL COST</td>
<td></td>
<td></td>
<td><strong>$ 153,350</strong></td>
</tr>
<tr>
<td>COST PER 1,000</td>
<td></td>
<td></td>
<td><strong>$ 29.49</strong></td>
</tr>
<tr>
<td>COST PER GAL</td>
<td></td>
<td></td>
<td><strong>2.949 Cents</strong></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>Lime Stabilization</td>
<td>Land Apply</td>
<td>Land Apply</td>
</tr>
<tr>
<td>Thickening</td>
<td>Land Apply</td>
<td>POTW</td>
</tr>
<tr>
<td>Dewatering</td>
<td>Land Apply</td>
<td>Landfill</td>
</tr>
<tr>
<td></td>
<td>Composting, Heat Drying etc</td>
<td>POTW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Land Apply</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

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

Total: $695,000

Disclaimer: Costs May Vary Considerably
Dedicated Facility Technologies

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
### Economic Elements

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost to Construct</td>
<td>$ 695,000</td>
</tr>
<tr>
<td>Capital Fee [WWTP]</td>
<td>$307,020</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1,002,020</strong></td>
</tr>
</tbody>
</table>

Assume 20 year Payback @ 6.5% Interest

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

### Economics of Annual Costs for 20,000 gpd

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payback of Capital Costs</td>
<td>$ 89,650</td>
</tr>
<tr>
<td>Sewer Discharge Fees @ $.005</td>
<td>26,000</td>
</tr>
<tr>
<td>Sludge Disposal @ $ 35.00/ton</td>
<td>75,900</td>
</tr>
<tr>
<td>Utilities</td>
<td>8,000</td>
</tr>
<tr>
<td>Chemicals (Polymer/Lime)</td>
<td>9,750</td>
</tr>
<tr>
<td>Permit &amp; Analysis</td>
<td>3,000</td>
</tr>
<tr>
<td>Repair &amp; Maintenance</td>
<td>5,000</td>
</tr>
<tr>
<td>Wages &amp; Benefits</td>
<td>40,000</td>
</tr>
<tr>
<td>Insurance</td>
<td>5,000</td>
</tr>
<tr>
<td>Cost of Property</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 272,300</strong></td>
</tr>
</tbody>
</table>

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

<table>
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<tr>
<th>Disposal Costs Based on 20,000 Gallons Per Day</th>
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<tbody>
<tr>
<td>POTW</td>
</tr>
<tr>
<td>7.667 cents/gal</td>
</tr>
<tr>
<td>Land Application</td>
</tr>
<tr>
<td>2.284 cents/gal</td>
</tr>
<tr>
<td>Dedicated Facility</td>
</tr>
<tr>
<td>5.24 cents/gal</td>
</tr>
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### Dedicated Facility Technologies

#### Economics of Construction

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<th>Cost</th>
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<tr>
<td>Screen/Grit Removal</td>
<td>$10,000</td>
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<tr>
<td>Dewatering Equipment</td>
<td>$150,000</td>
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<td>Tankage</td>
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<td><strong>Total</strong></td>
<td><strong>$705,000</strong></td>
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Disclaimer: Costs may vary considerably.
## Dedicated Facility Technologies

### Economics of Annual Costs for 20,000 gpd

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<td>5,000</td>
</tr>
<tr>
<td>Cost of Property</td>
<td>4.53     $235,550 $10,000</td>
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<td>5,200,000 Gal per year at 5.2 cents/gallon</td>
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<td>4.53</td>
<td>cents/gal</td>
</tr>
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MORE INFO?

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

Your Resources
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
Juggling J10-A -- Juggling - 3 simple steps !!
Step 2
Sludge and scum are drawn up.
Step 3
Supernatant is treated and returned to tank.
Filter System
Separation
Vac all