Evaluating Costs as Part of the Decision Making Process

Presented by

Tom Ferrero

February 25, 2009
OVERVIEW

- Publicly Owned Treatment Works (POTWs)
- Land Application
- Dedicated Septage Facilities
- Economic Elements
- Business Plan – Decision by $
PUBLICLY OWNED TREATMENT WORKS (POTWs)

• Head of Plant
PUBLICLY OWNED TREATMENT WORKS (POTWs)

- Septage Receiving Area
PUBLICLY OWNED TREATMENT WORKS (POTW's)

- Economic Elements
  - Disposal Fee
    - Per Gallon
    - Per Load
    - Honor System
  - Truck Time
    - Distance
    - Time
  - 24/7 Facility
    - Need Holding Tank
PUBLICLY OWNED TREATMENT WORKS (POTWs)

- **Economic Elements**
  - **Disposal Fee**
    - Per Load 5 cents/gal - 3000 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
LAND APPLICATION
LAND APPLICATION

• Economic Elements
  - Land Cost
  - Equipment
    • Screening
    • Tankage w/mixing
    • Lime Storage
    • Spreading Equipment
  - Lime
  - Trucking
  - 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>
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<tr>
<td></td>
<td></td>
<td>5200 x 25 lbs = 130,000 lbs</td>
<td></td>
</tr>
<tr>
<td>TRUCKING</td>
<td>$80.00/hr</td>
<td>1 hr per 4,000 gal</td>
<td>$ 104,000</td>
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<tr>
<td></td>
<td></td>
<td>5,200,000/4,000 = 1300 trips</td>
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</tr>
<tr>
<td>TOTAL COST</td>
<td></td>
<td></td>
<td>$ 118,750</td>
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<tr>
<td>COST PER 1,000</td>
<td></td>
<td></td>
<td>$ 22.84</td>
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<tr>
<td>COST PER GAL</td>
<td></td>
<td></td>
<td>2.284 Cents</td>
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</table>

Disposal Costs Based on 20,000 Gallons Per Day
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>Solids</th>
<th>Liquid</th>
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<tbody>
<tr>
<td><strong>Land Apply</strong></td>
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<tr>
<td><strong>Thickening</strong></td>
<td>Land Apply</td>
</tr>
<tr>
<td><strong>Dewatering</strong></td>
<td>Land Apply</td>
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<tr>
<td></td>
<td>Composting</td>
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<tr>
<td></td>
<td>Heat</td>
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<td></td>
<td>Drying etc</td>
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<tr>
<td><strong>POTW</strong></td>
<td>Landfill</td>
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<tr>
<td><strong>POTW</strong></td>
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<tr>
<td><strong>Land Apply</strong></td>
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</tbody>
</table>
DEDICATED FACILITY TECHNOLOGIES

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

• Thickening
  - Add Lime and/or
  - Add Polymer
DEDICATED FACILITY TECHNOLOGIES

- Thickening
  - Add Lime and/or
  - Add Polymer
  - Gravity Belt
**DEDICATED FACILITY TECHNOLOGIES**

- **Thickening**
  - Add Lime and/or
  - Add Polymer
  - Gravity Belt
  - Drum Thickener
DEDICATED FACILITY TECHNOLOGIES

- Thickening
- **Dewatering Equipment**
  - Belt Press
  - Screw Press
  - Rotary Press
  - Rotary Drum Vacuum Filter
  - Recessed Cavity Plate & Frame
  - Container Filter
  - Centrifuge
DEDICATED FACILITY TECHNOLOGIES

Belt Press
Dedicated Facility Technologies

Screw Press
DEDICATED FACILITY TECHNOLOGIES

Rotary Press
DEDICATED FACILITY TECHNOLOGIES

Rotary Drum Vacuum Filter
DEDICATED FACILITY TECHNOLOGIES

Recessed Cavity Plate & Frame
DEDICATED FACILITY TECHNOLOGIES

Container Filter
DEDICATED FACILITY TECHNOLOGIES

Container Filter
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
**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

- Cost to Construct $695,000
- Capital Reimbursement Fee $307,020

$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

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

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<tr>
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<td>Land Application</td>
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<tr>
<td>Dedicated Facility</td>
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</tbody>
</table>
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

Total: $705,000, Costs May Vary Considerably
## 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)**: $9,750
- **Permit & Analysis**: $3,000
- **Repair & Maintenance**: $5,000
- **Wages & Benefits**: $40,000
- **Insurance**: $5,000
- **Cost of Property**: $235,550

### Summary:
- **Total Annual Costs**: $272,300
- **5,200,000 Gal per year at 5.2 cents/gallon**: $272,300
## SUMMARY

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<tr>
<td>POTW</td>
</tr>
<tr>
<td>7.667 cents/gallon</td>
</tr>
<tr>
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</tr>
<tr>
<td>2.284 cents/gallon</td>
</tr>
<tr>
<td>Dedicated Facility</td>
</tr>
<tr>
<td>4.53 cents/gallon</td>
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</tbody>
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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/
NAWT 4th Annual Waste Treatment Symposium
October 9-10, 2009
Orlando, FL

NAWT Thanks Select Processing for hosting the 2009 Treatment Symposium
Evaluating Costs as Part of the Decision Making Process

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