



2009 Pumper and Cleaner
Environmental Expo International

Evaluating Costs as Part
of the Decision Making Process

Presented by
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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 (POTWs)

- 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

Disposal Costs Based on 20,000 Gallons Per Day

PARAMETER	COST	PER	Cost Per Year
EQUIPMENT	\$50,000	10 Years	\$ 5,000
LIME	\$150 per Ton	25 # per 1,000 5200 x 25 lbs = 130,000 lbs	\$ 9,750
TRUCKING	\$80.00/hr	1 hr per 4,000 gal 5,200,000/4,000 =1300 trips	\$ 104,000
TOTAL COST			\$ 118,750
COST PER 1,000			\$ 22.84
COST PER GAL			2.284 Cents

DEDICATED FACILITY TECHNOLOGIES

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

DEDICATED FACILITY TECHNOLOGIES

THINK! ... What are your Resources?

	Solids		Liquid		
Lime Stabilization	Land Apply				
Thickening	Land Apply	POTW		POTW	Land Apply
Dewatering	Land Apply	Composting Heat Drying etc	Landfill	POTW	Land Apply

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



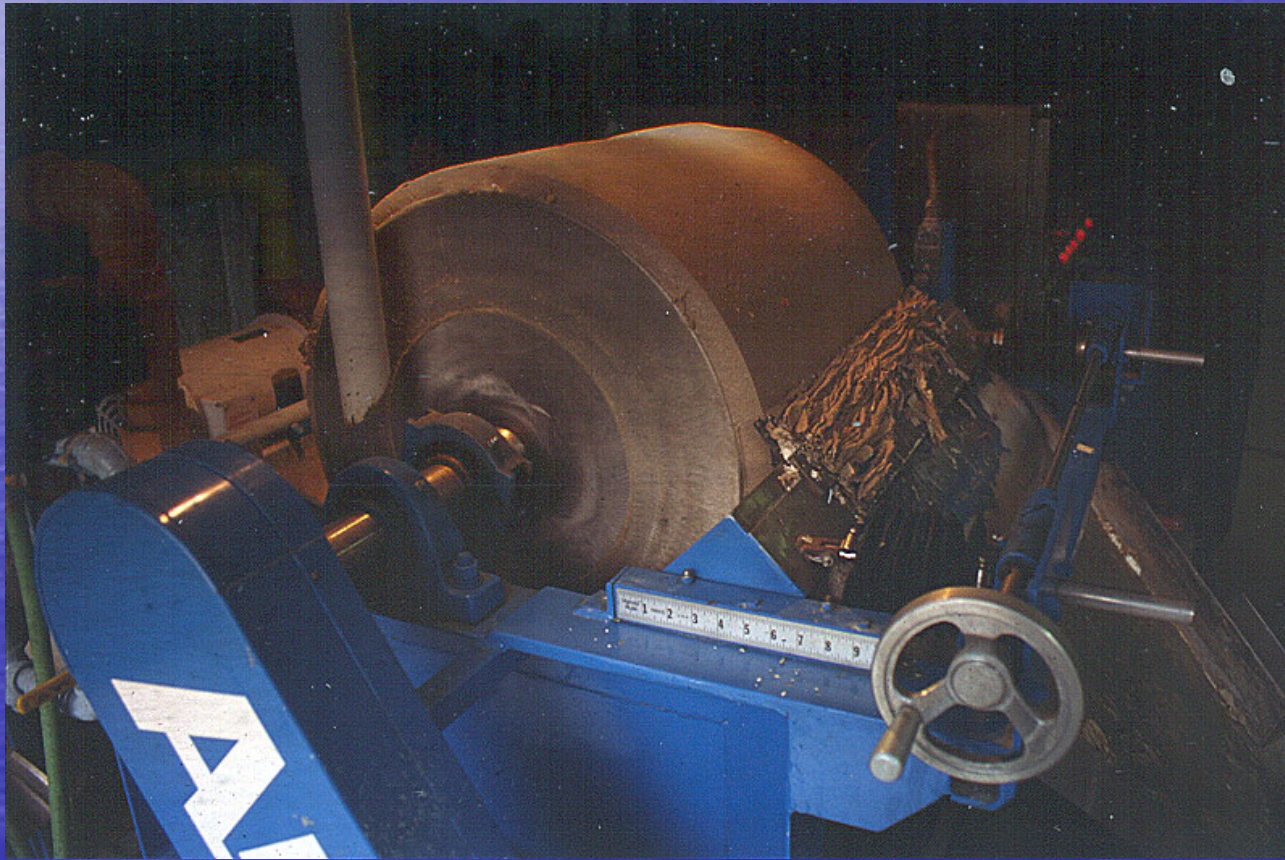
DEDICATED FACILITY TECHNOLOGIES

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	<u>40,000</u>
	\$ 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
- $87.72 \text{ EDUs} \times \$ 3,500 \text{ per EDU} = \$ 307,020$

Note: Costs May Vary Considerably

DEDICATED FACILITY TECHNOLOGIES

- Economic Elements

– Cost to Construct	\$ 695,000
– Capital Reimbursement Fee	<u>307,020</u>
	\$ 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

Disposal Costs Based on 20,000 Gallons Per Day

POTW	7.667	cents/gallon
Land Application	2.284	cents/gallon
Dedicated Facility	5.24	cents/gallon

DEDICATED FACILITY TECHNOLOGIES

- Economics of Construction

– Land & Building		\$ 400,000
– Screen/Grit Removal	10,000	50,000
– Dewatering Equipment	150,000	100,000
– Tankage		50,000
– Odor Control		25,000
– Engineering & Permits		30,000
– Plumbing & Electrical		<u>40,000</u>
	705,000	675,000

Disclaimer: Costs May Vary Considerably

DEDICATED FACILITY TECHNOLOGIES

- Economics of Annual Costs for 20,000 gpd

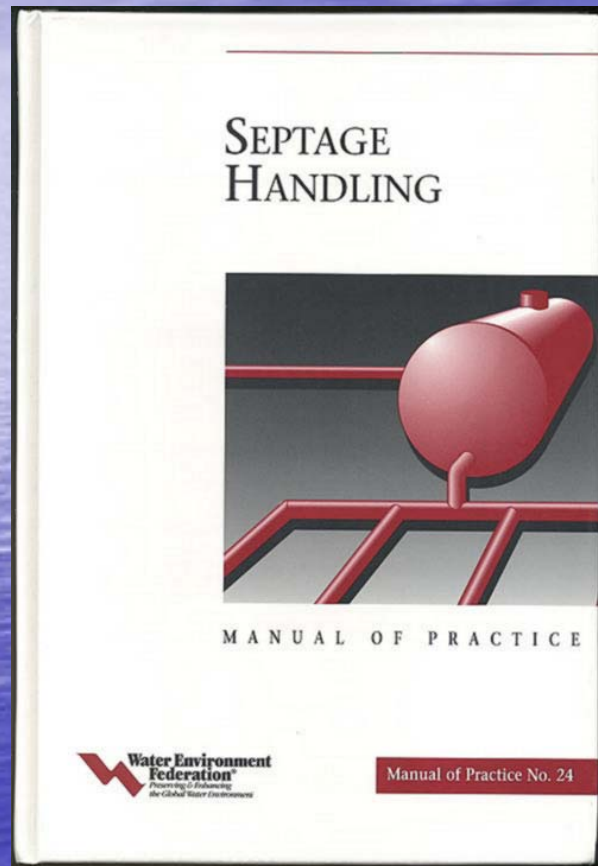
– Payback of Capital Costs	90,550	\$ 89,650
– Sewer Discharge Fees @ \$.005		26,000
– Sludge Disposal @ \$ 35.00/ton	40,000	75,900
– Utilities		8,000
– Chemicals (Polymer/Lime)	8,000	9,750
– Permit & Analysis		3,000
– Repair & Maintenance		5,000
– Wages & Benefits		40,000
– Insurance		5,000
– Cost of Property	4.53	235,550
		<u>10,000</u>
5,200,000 Gal per year at 5.2 cents/gallon \$ 272,300		

SUMMARY

Disposal Costs Based on 20,000 Gallons Per Day

POTW	7.667	cents/gallon
Land Application	2.284	cents/gallon
Dedicated Facility	4.53	cents/gallon

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

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Orlando, FL

NAWT Thanks Select Processing for
hosting the 2009 Treatment
Symposium



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