

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

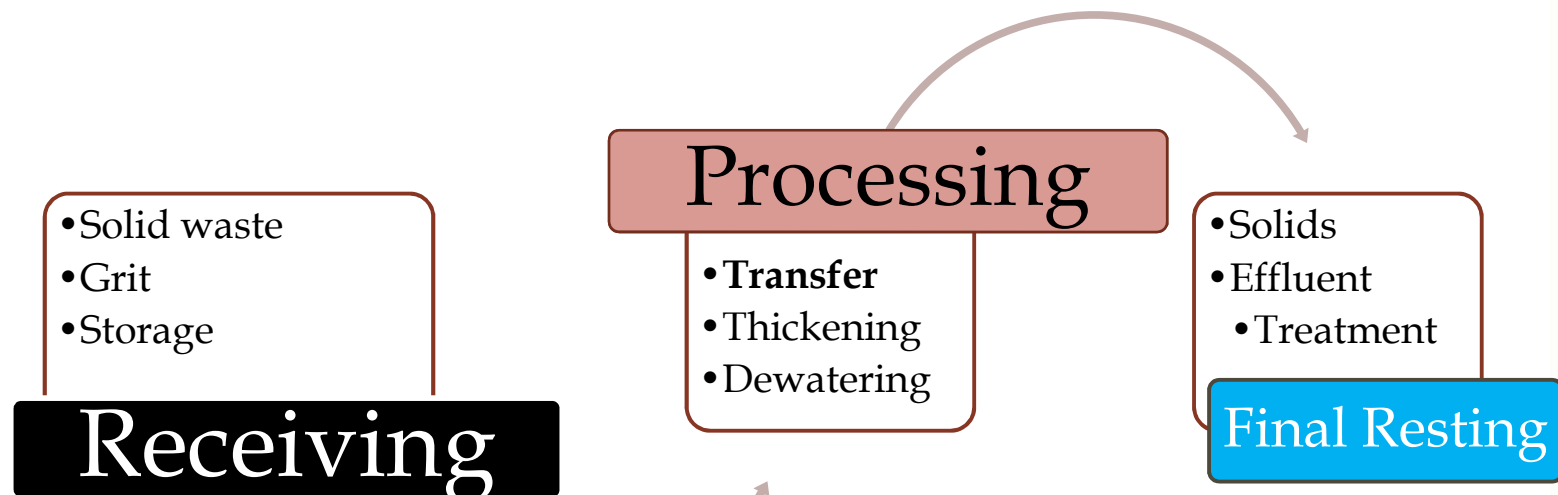


- ❧ Handling~
 - ❧ Complete discharge
 - ❧ Land application
- ❧ Treatment
 - ❧ Thickening
 - ❧ Dewatering
 - ❧ Other products
- ❧ Finished Product handling
 - ❧ Effluent
 - ❧ WWTP Discharge
 - ❧ Effluent Treatment
 - ❧ Solids

Facility Outline



Odor Control



Storm water



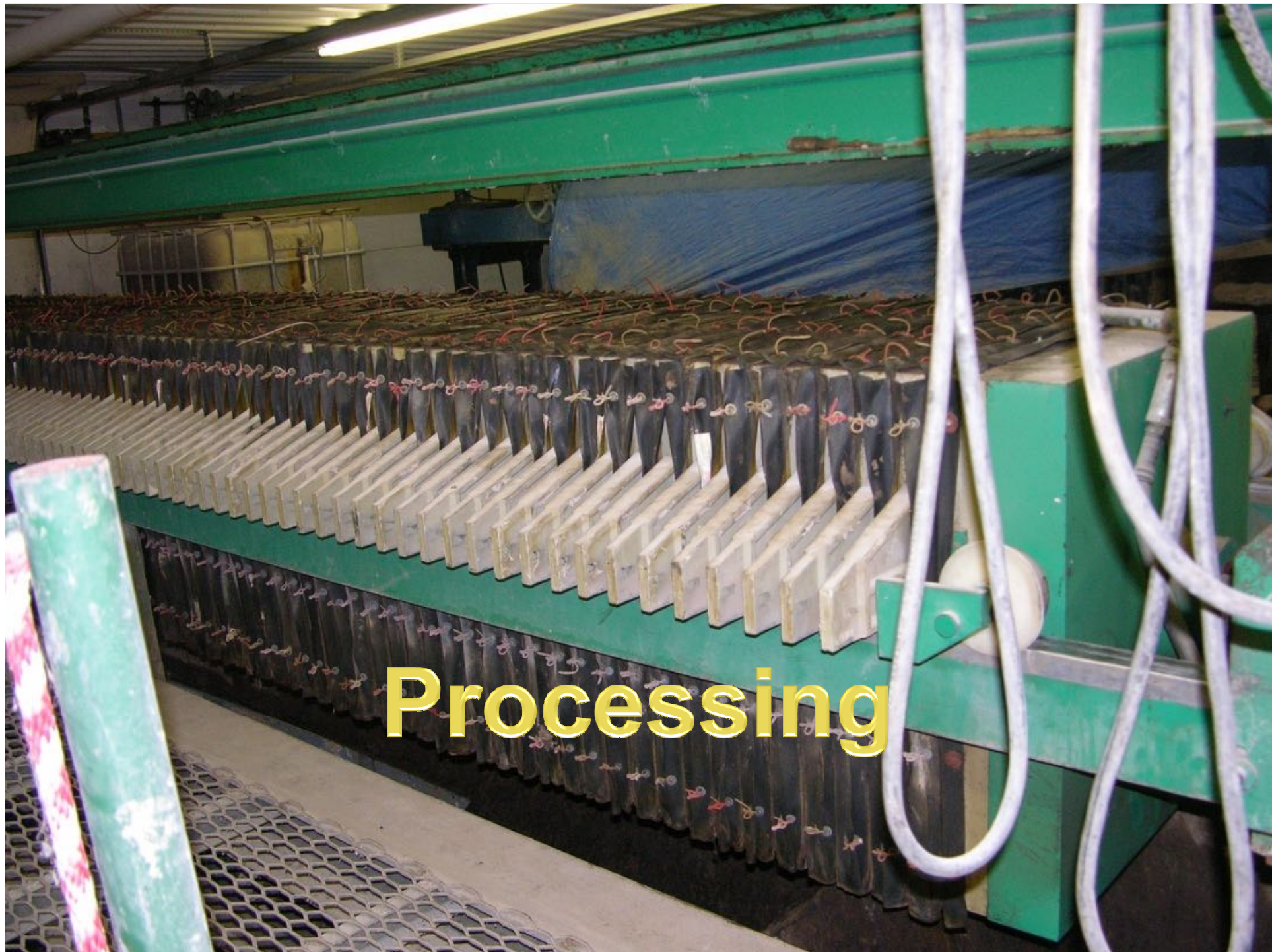
Receiving

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

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



CONTRACT

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”



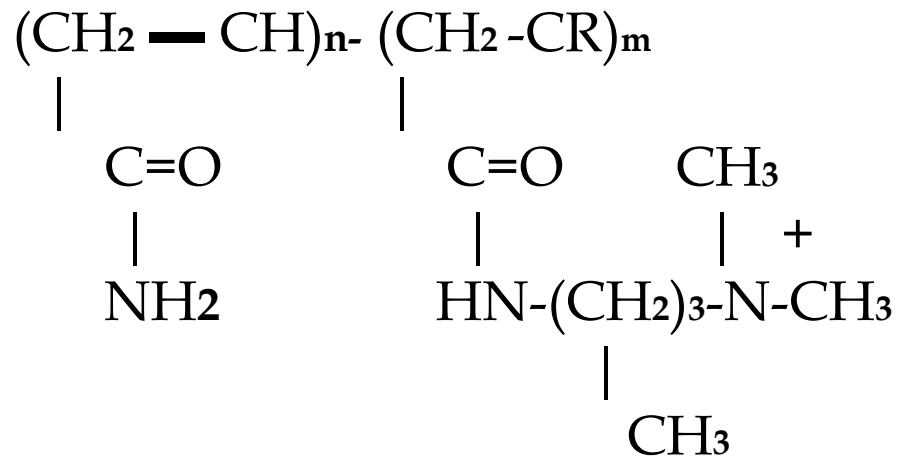
Any Questions?

AFRA

Polymer



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



Ex. A PAM cationic polymer

Allows for Separation

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

	Hydrogen Sulfide	Organic Odors	Ammonia
Carbon Adsorption	X	X	
Wet Scrubber	X	X	X
Biofiltration	X	X	X

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

CR



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			
PARAMETER	COST	PER	Cost Per Year
EQUIPMENT	\$50,000	10 Years	\$ 5,000
LIME	\$150 per Ton	25 # per 1,000 5,200 x 25 lbs = 130,000 lbs	\$ 9,750
TRUCKING	\$80.00/hr	1 hr per 3,000 gal 5,200,000/3,000= 1,733 trips	\$ 138,600
TOTAL COST			\$ 153,350
COST PER 1,000			\$ 29.49
COST PER GAL			2.949 Cents

PRIVATELY OWNED DEDICATED FACILITY



DEDICATED FACILITY TECHNOLOGIES

❧ Economic Elements

❧ Planning/Engineering

❧ Permitting

❧ Funding

❧ Capital Reimbursement Fee

❧ Equipment Selection

❧ Operational Costs

DEDICATED FACILITY TECHNOLOGIES

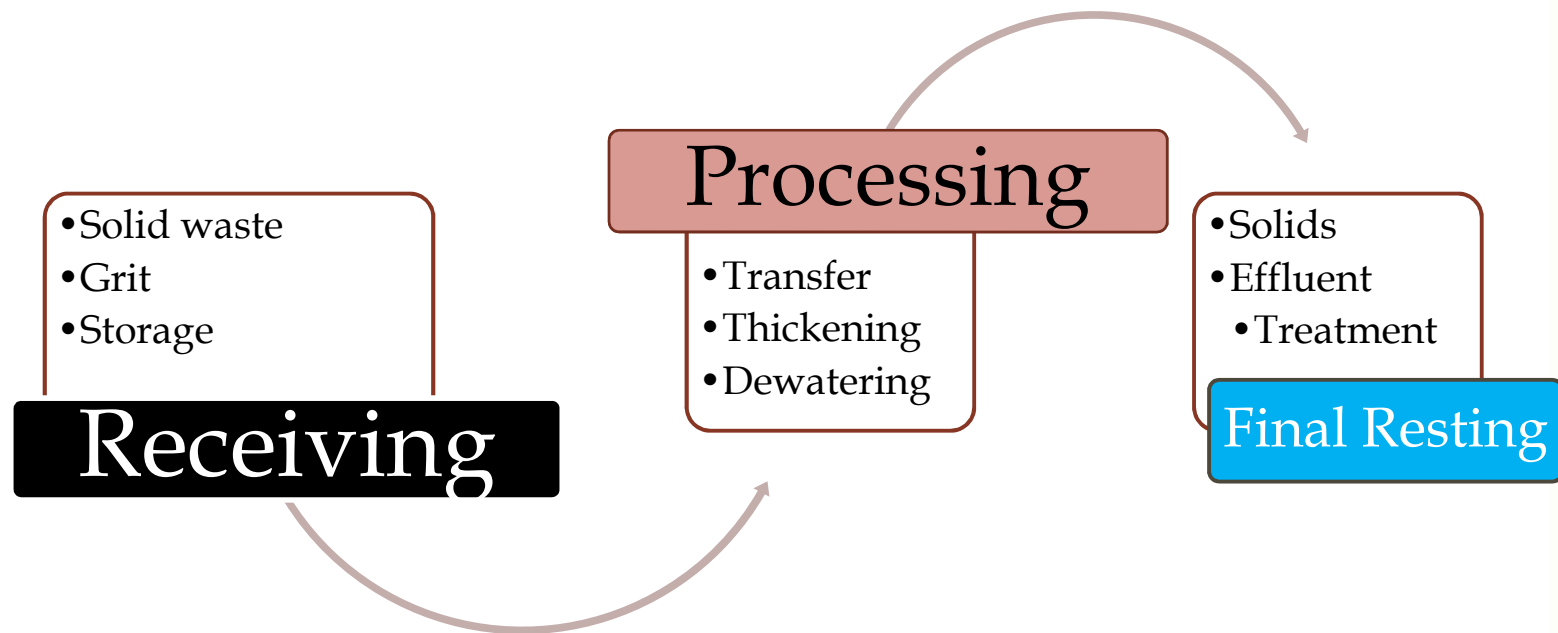
THINK! ... What are your Resources?

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

Facility Outline



Odor Control



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	<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 Fee [WWTP]	<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	<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/gal
Land Application	2.284	cents/gal
Dedicated Facility	5.24	cents/gal

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	\$ 695,000

Disclaimer: Costs May Vary Considerably

DEDICATED FACILITY TECHNOLOGIES

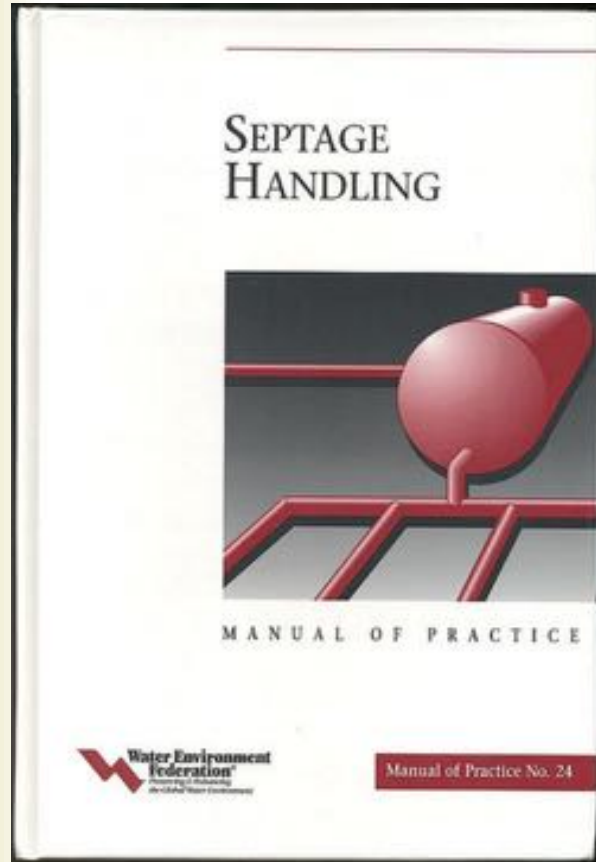
☞ Economics of Annual Costs for 20,000 gpd

☞ 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/gal
Land Application	2.494	cents/gal
Dedicated Facility	4.53	cents/gal

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

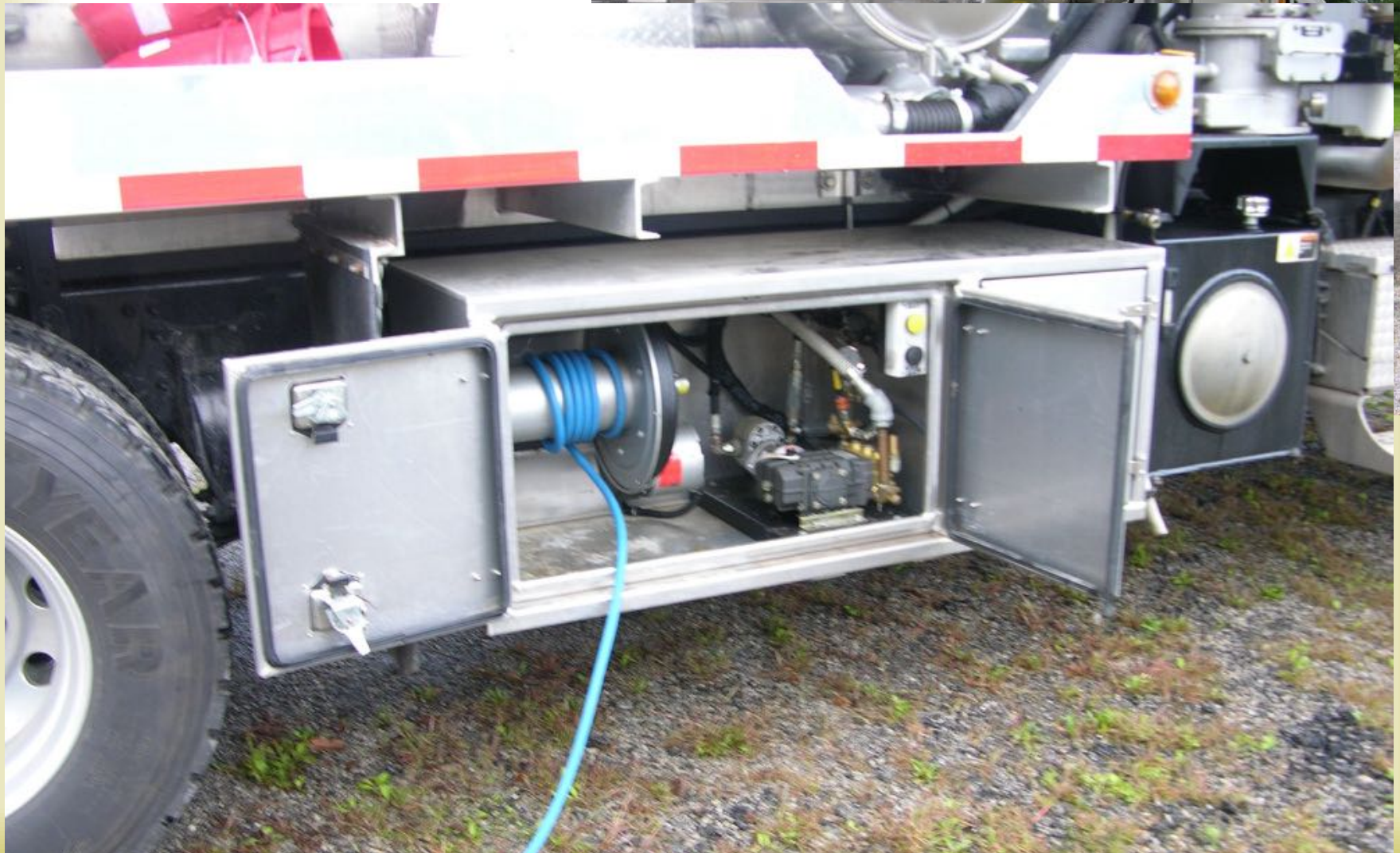


Match the Truck to the Job

Full Dump



Other tools & Jobs



Crustbuster

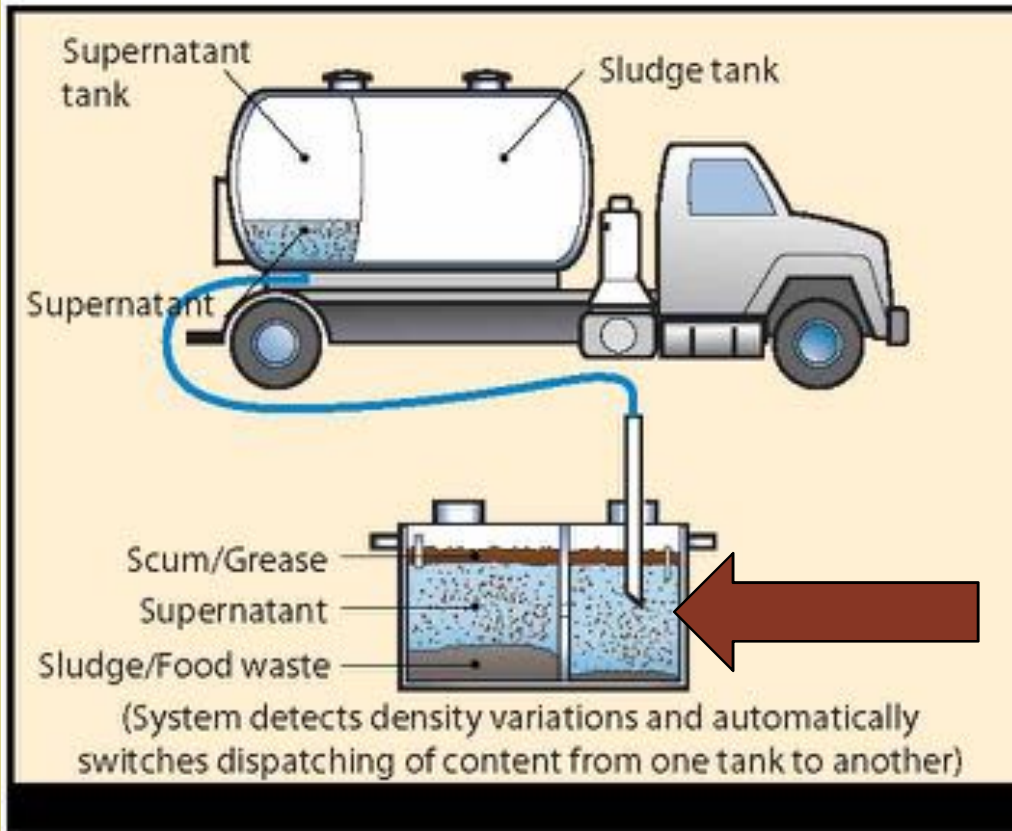


Recycling Trucks



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

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



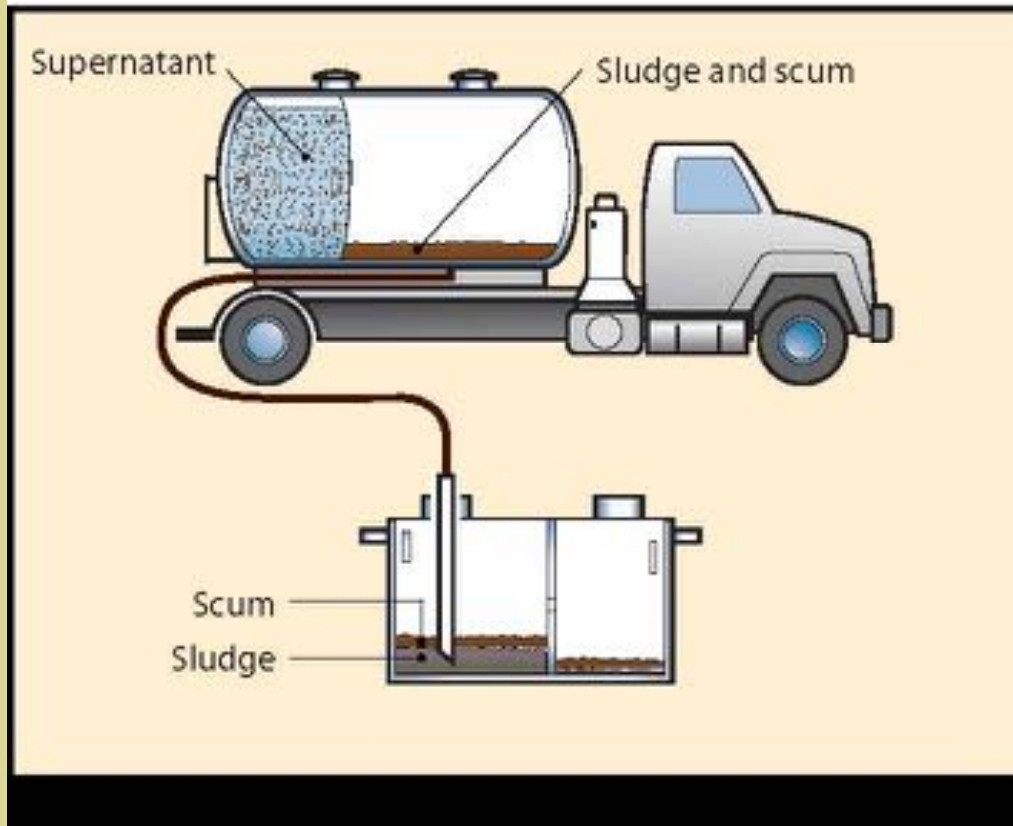
Step 1

Supernatant is drawn up.

 **Juggler™**



Juggler J10-A Juggling - 3 simple steps !!

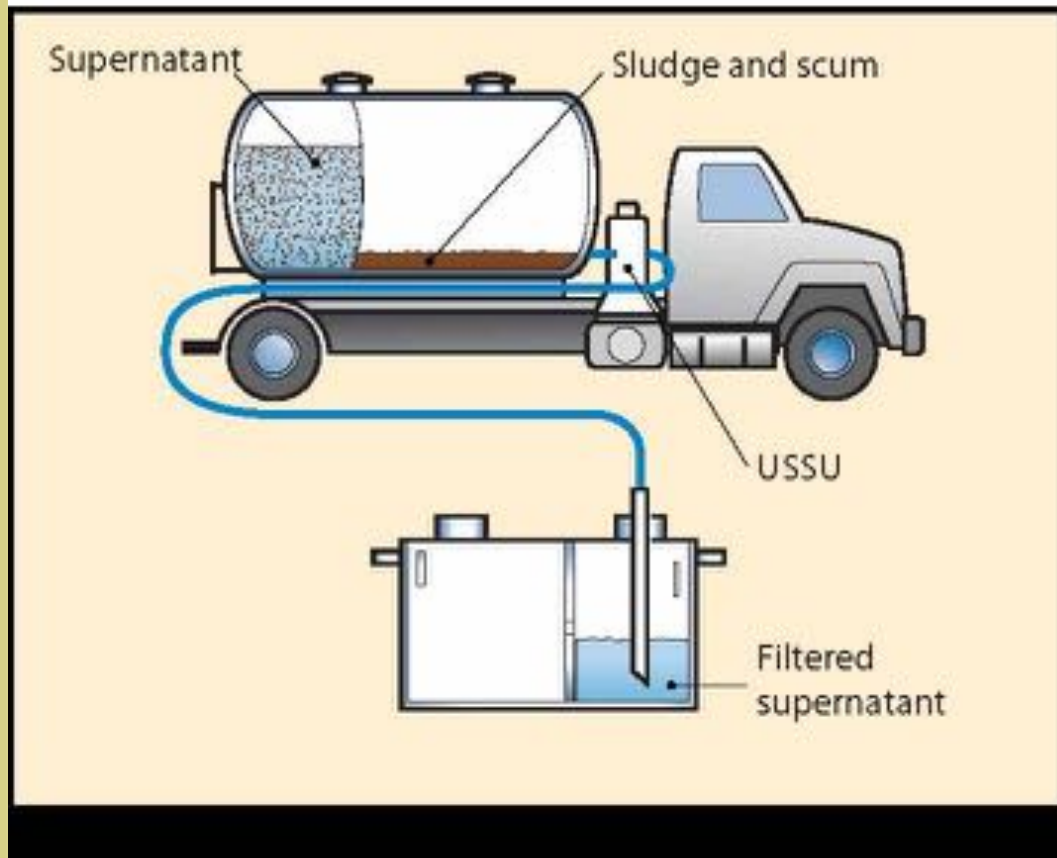


Step 2
Sludge and scum are drawn up.

 **Juggler™**



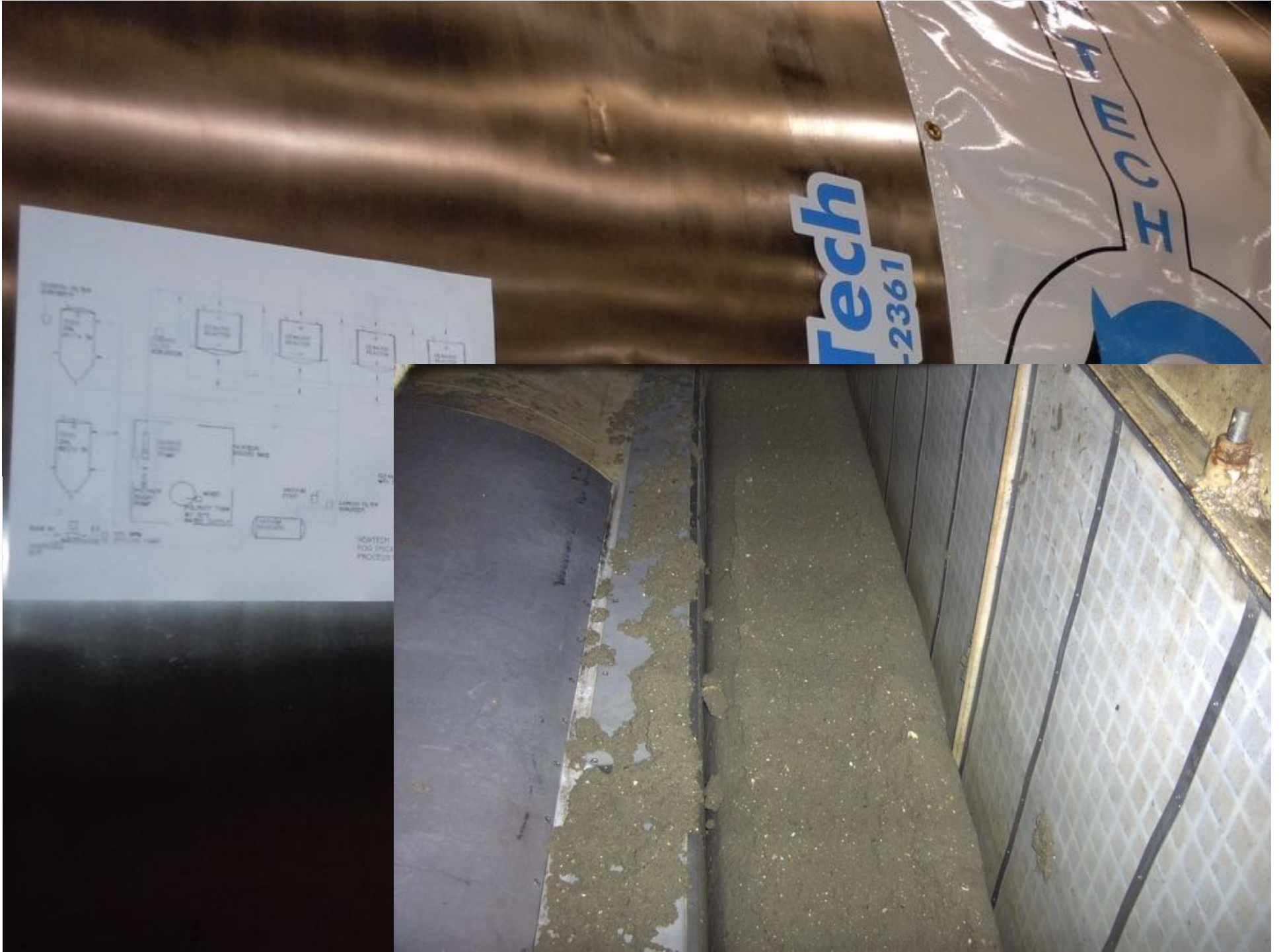
Juggler J10-A Juggling - 3 simple steps



Step 3
Supernatant is treated and returned to tank.

Filter System





Separation



Vac all



