Cost Effective Operation and Low Carbon Footprint for Solids Reduction Using Thermal Drying

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Thermal Drying of Wastewater Sludge to a Class A Biosolids

- Decision to Change the Process
- Evaluation
- Cost Effective Analysis
- Process of Thermal Drying
- Actual Costs
- Carbon Footprint of Drying

The Decision to Change a Process

- Can’t Keep up with Volume - Thin Solids
  - WW Process to Thickener
  - Thickener to Digester
  - Digester to Dewatering
- Aerobic/Anaerobic Digester Hydraulically Overloaded
- Low Volatile Solids Destruction

The Decision to Change the Process

- Required 120 days of Storage
- Loss of Land Application Sites Close to the WWTP
  - Encroaching Development
  - Phosphorous Rule
  - Wetlands
  - Site Rules & Loadings
- Land Application and Hauling Equipment Become Inadequate

Additional Issues

- Aerobic Digestion
  - Thin Sludge
  - Winter Operation
- Anaerobic Digester Mixing & Heating
  - Mixing Unit Maintenance
  - Heating Problems due to Older Heat Exchangers
  - Heat Recirculation Problems due to Rags and Debris

The Evaluation

1. Review Existing Operation & Volumes
2. Future Growth (Volumes & Regs.)
3. Review EPA & 503 Rules (Updates)
4. Class A or Class B
5. Evaluation of Solids Handling & Storage Alternatives
6. Evaluation of Biosolids Land Application Alternatives
7. Something Innovative?!
8. Recommendations

Cost Comparison

- Class B Digestion and Storage

  Total Project Cost

  $5,430,600

  Annual Cost to City

  $526,400
- Thermal Drying

  Total Project Cost

  $4,264,582

  Annual Cost to City

  $437,361

Benefits Thermal Drying

- Low Volume of Solids to Remove
- >80% Reduction (>90% Solids)
- Operators have Control over Sludge
- No More Daily Sludge Removal
- Operate Dewatering and Drying 4 to 6 days a month
- Farmer Acceptability

The Result

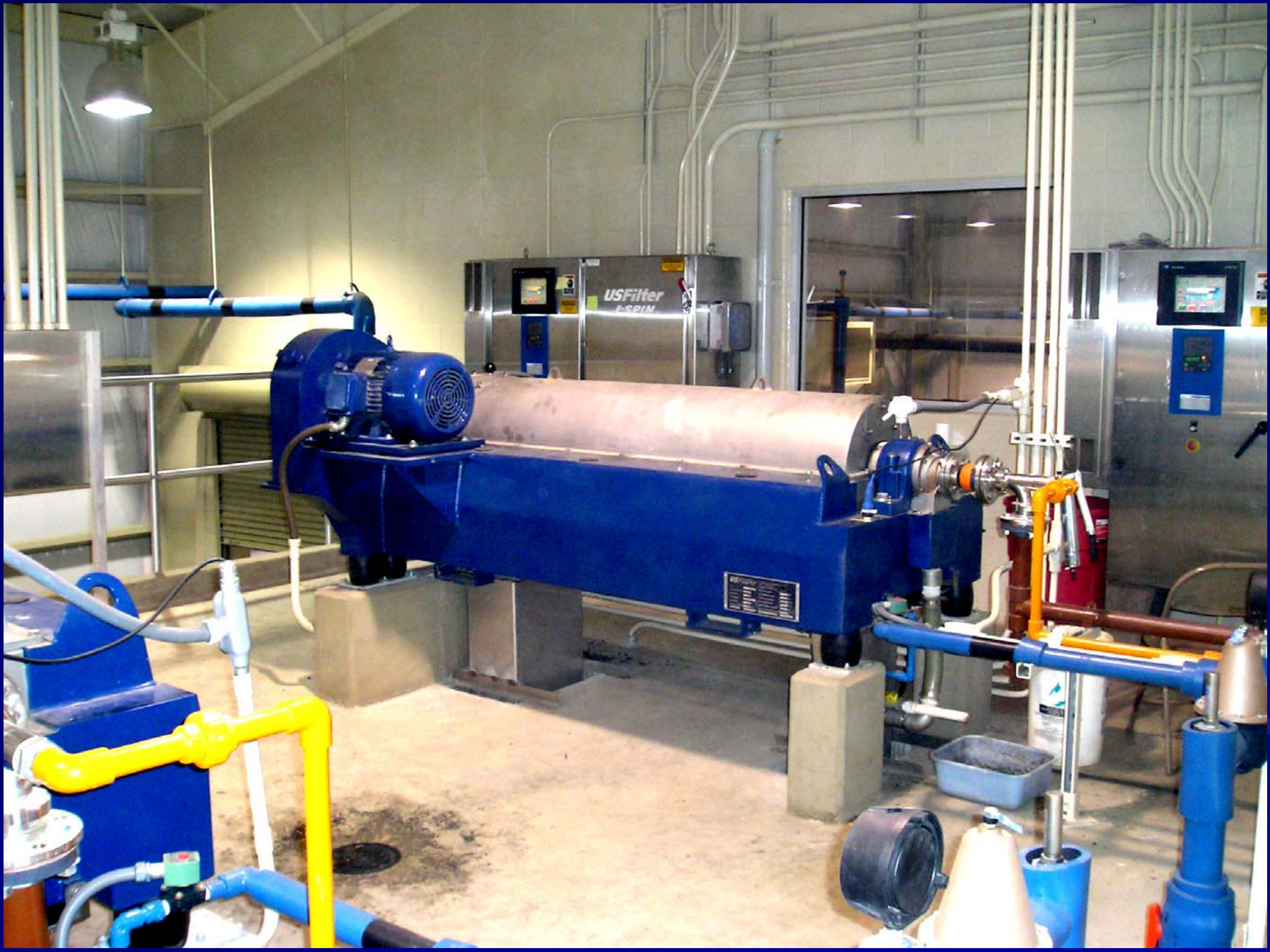
Drying Sludge Means Big Volume Reduction

Energy Costs

- Natural gas, methane, propane, fuel oil or waste heat from generation
- All major dryer manufacturers use about the same energy-Fenton guarantees less than 1,600 BTU/#H2O at 16% solids.
- SludgeMASTER batch system is energy efficient due to quick heat up.
- Electricity is for motors and controls- say $2.50 per wet ton (about $ .08/kWhr).

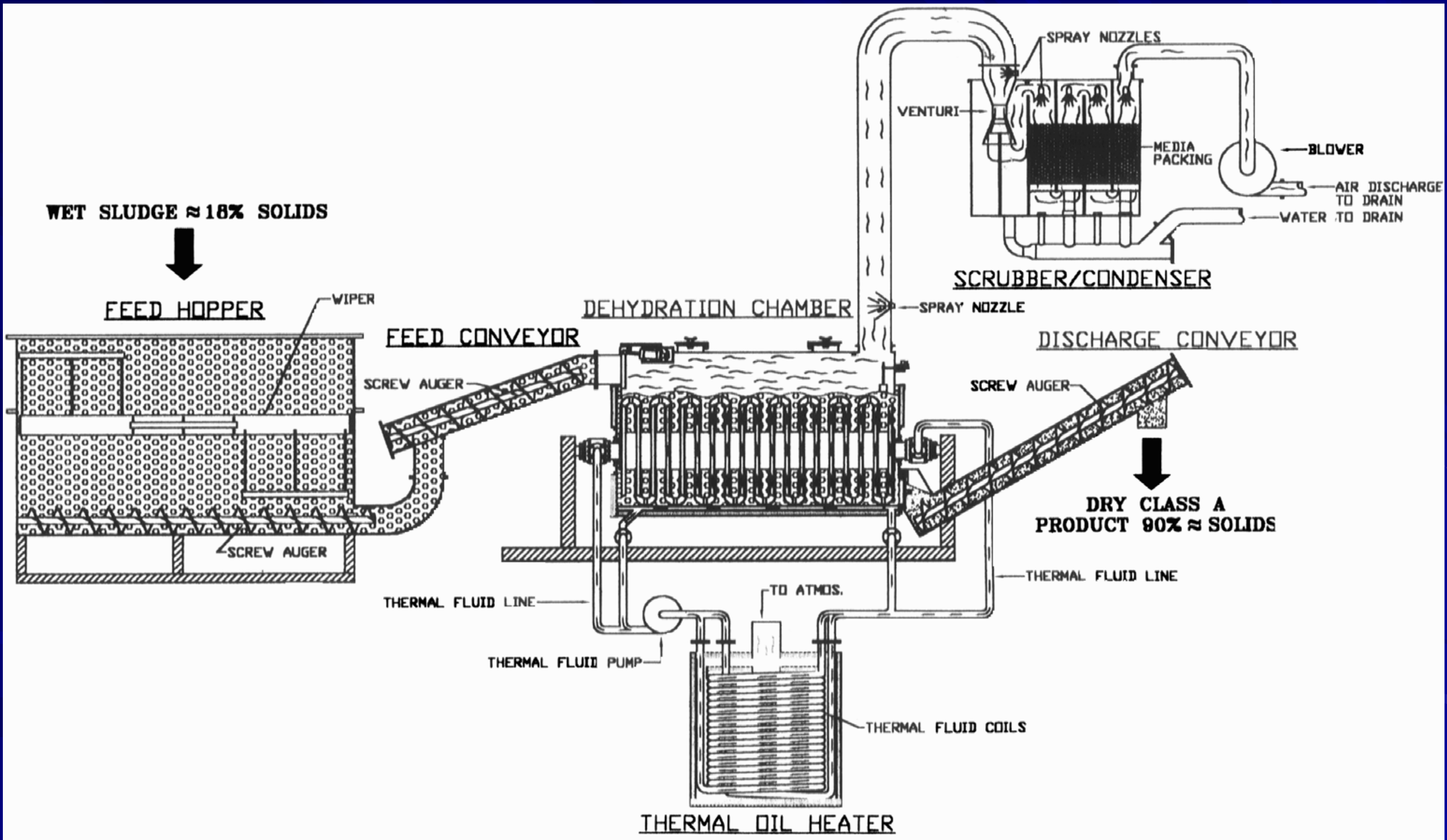
Dewatering & Drying Building

Centrifuge Area



Sludge Cake Storage Bin

Process Diagram



Thermal Dryer

Dryer Control

Thermal Fluid Heat Exchanger

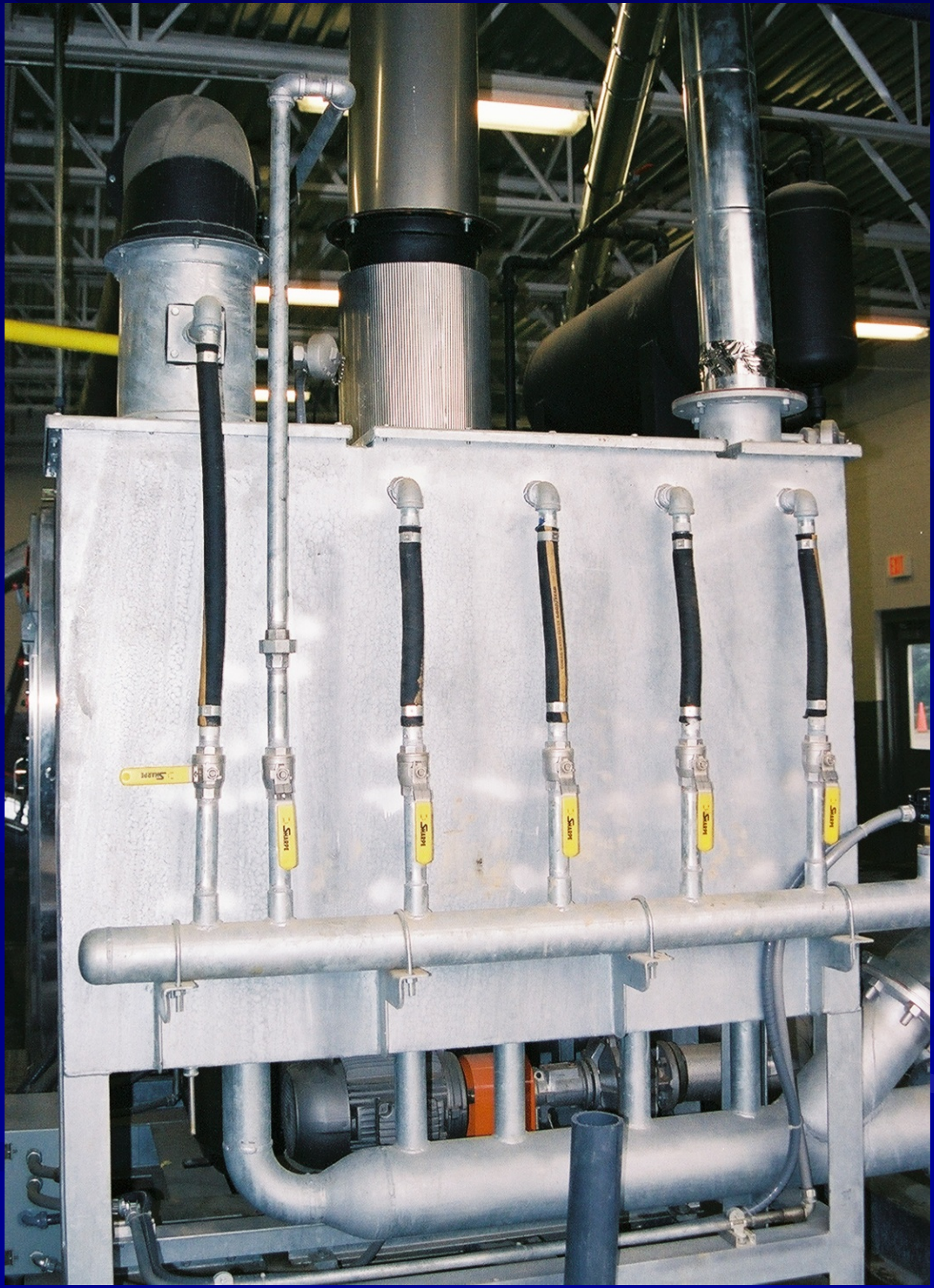
Thermal Fluid circulated through dryer shell and turning rotor.

Thermal fluid pumped through rotor of Dryer

Internal Rotor Assembly

NPW Pressure System

Wet scrubber/ condenser



Bio Filters

Roll-on; roll-off with cover.

The Cost of Operation

Power

Natural Gas

Manpower (Hours)

Hauling to Land Application

The Carbon Footprint

Carbon as CO_2

Power

Natural Gas

Questions?

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Imagine the results!

Thank You

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