

# Breakthrough On-Site Leachate Treatment Technology



# Presentation Outline

- Leachate Treatment Options
- Project Development
- Design Features
- Performance



# Common Off-Site Treatment Option

- Direct Discharge or Haul to Sewage Plant

Typically Lowest Cost Option



# Common On-Site Treatment Options

- Combined Phys-Chem Biological
- Reverse Osmosis
- Evaporation
  1. Conventional with Heat Exchangers
  2. Submerged Combustion



# Key Reasons for Limited Acceptance of Available On-Site Options

- Not Competitive With Sewage Plant
- Costly Periodic Maintenance
- Sensitivity to Changes in Feed Quality



# Key Reasons for Limited Acceptance of Available On-Site Options

- Limited Volume Reduction
- Complex Analytical and Other Technical Support
- Limited Experience



# Two Targeted Markets

1. Landfill leachate treated with the use of landfill gas
2. Landfill leachate treated with the use of exhaust gas from power projects

# Distilling A Challenge to Simple Elements

## Why Evaporation Was Chosen

- Highly Insensitive to Feed Characteristics
- High Levels of Volume Reduction
- Minimal Analytical Support Required
- Relatively Small Footprint





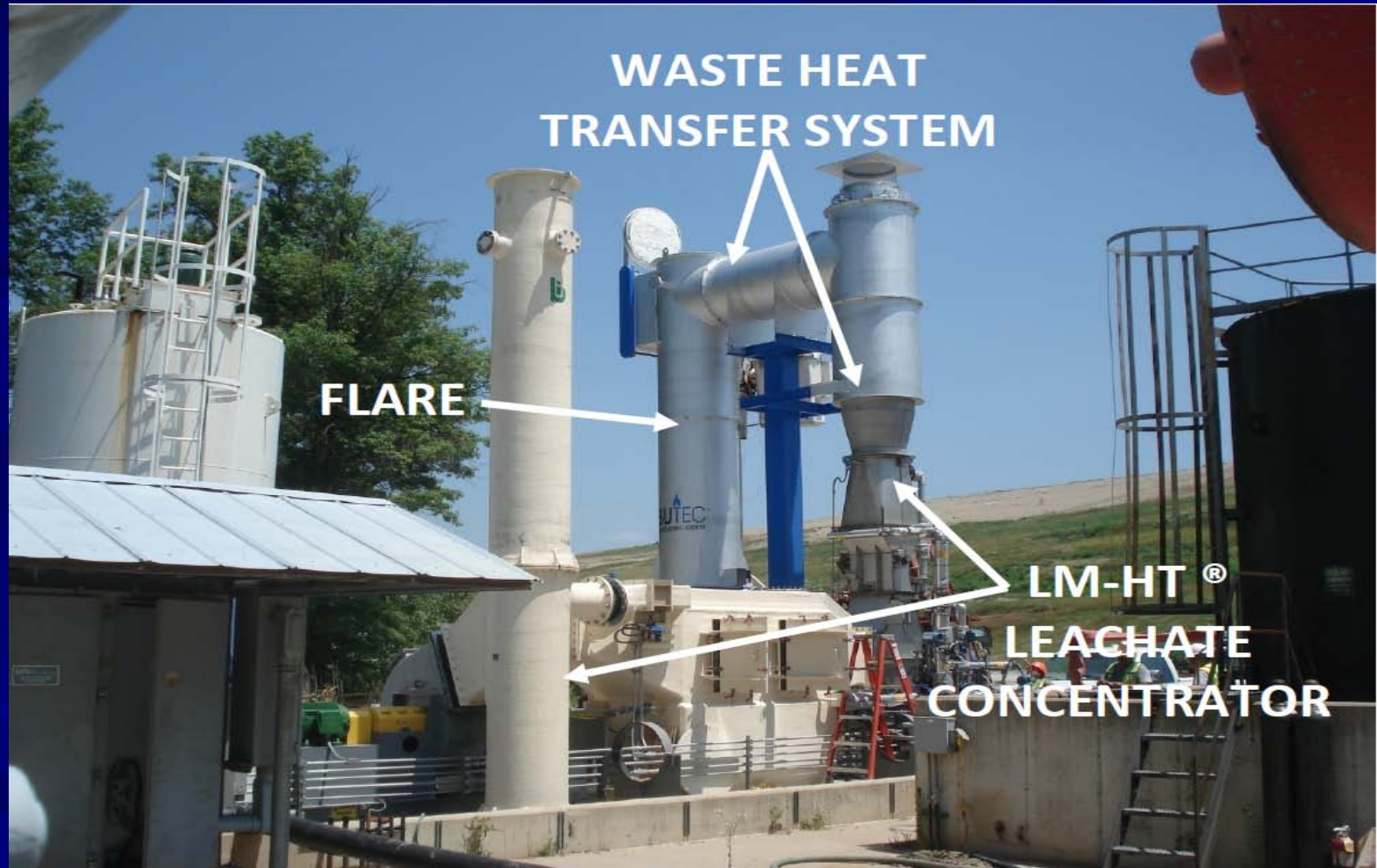
# Design Features

- Waste Heat and/or Direct-Fired Burners
- Direct Contact Heat Exchange
- Seamlessly Convert Power Plants to CHP
- Low Temperature Operation

# Easy To Operate & Maintain

- Programmable logic control
- Complete data records stored in PLC
- Push button start – stop
- Typically 2 hours per day operator time

# Simple, Reliable & Robust

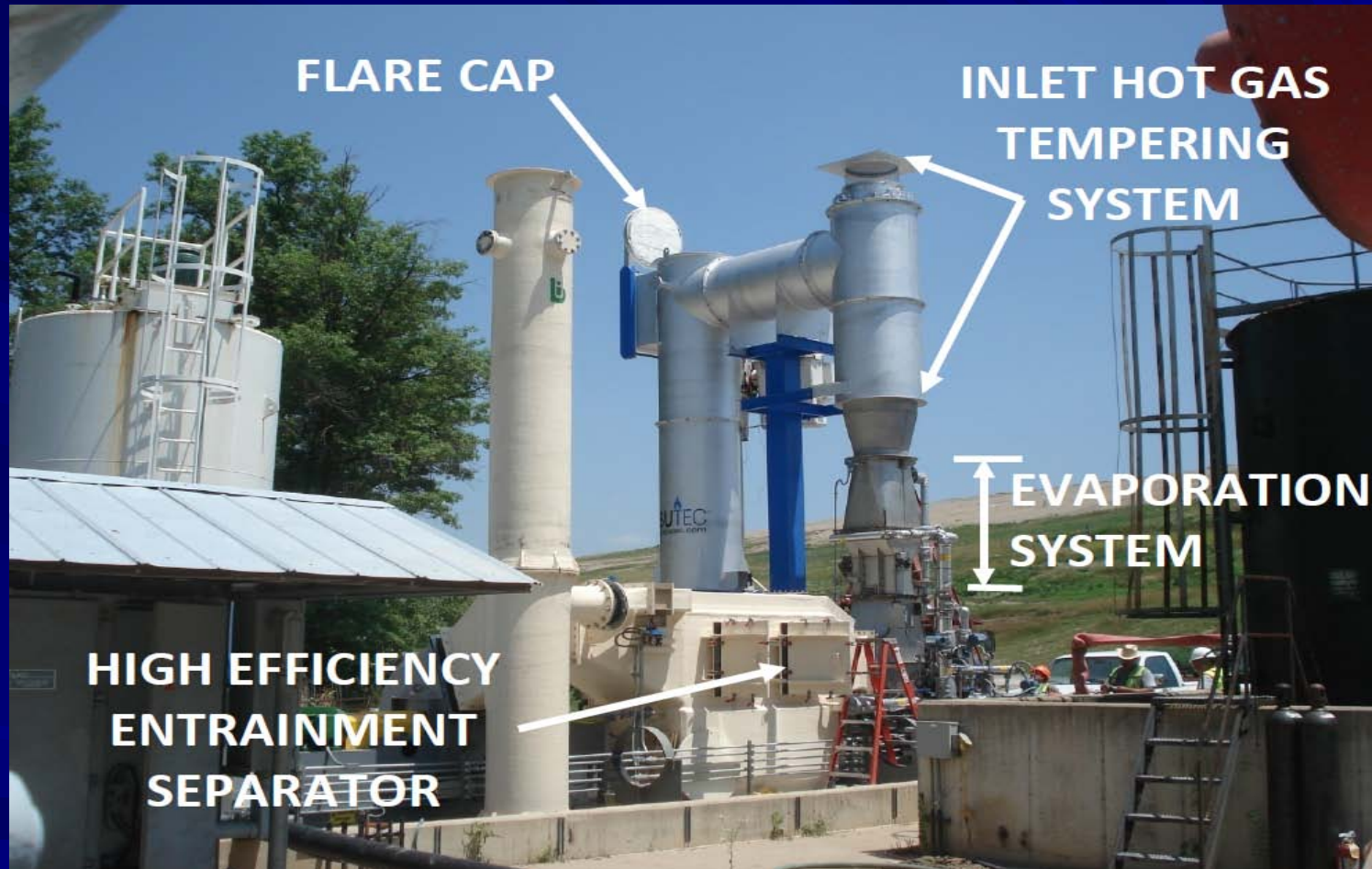


# Simple, Reliable & Robust

## Evaporative Section



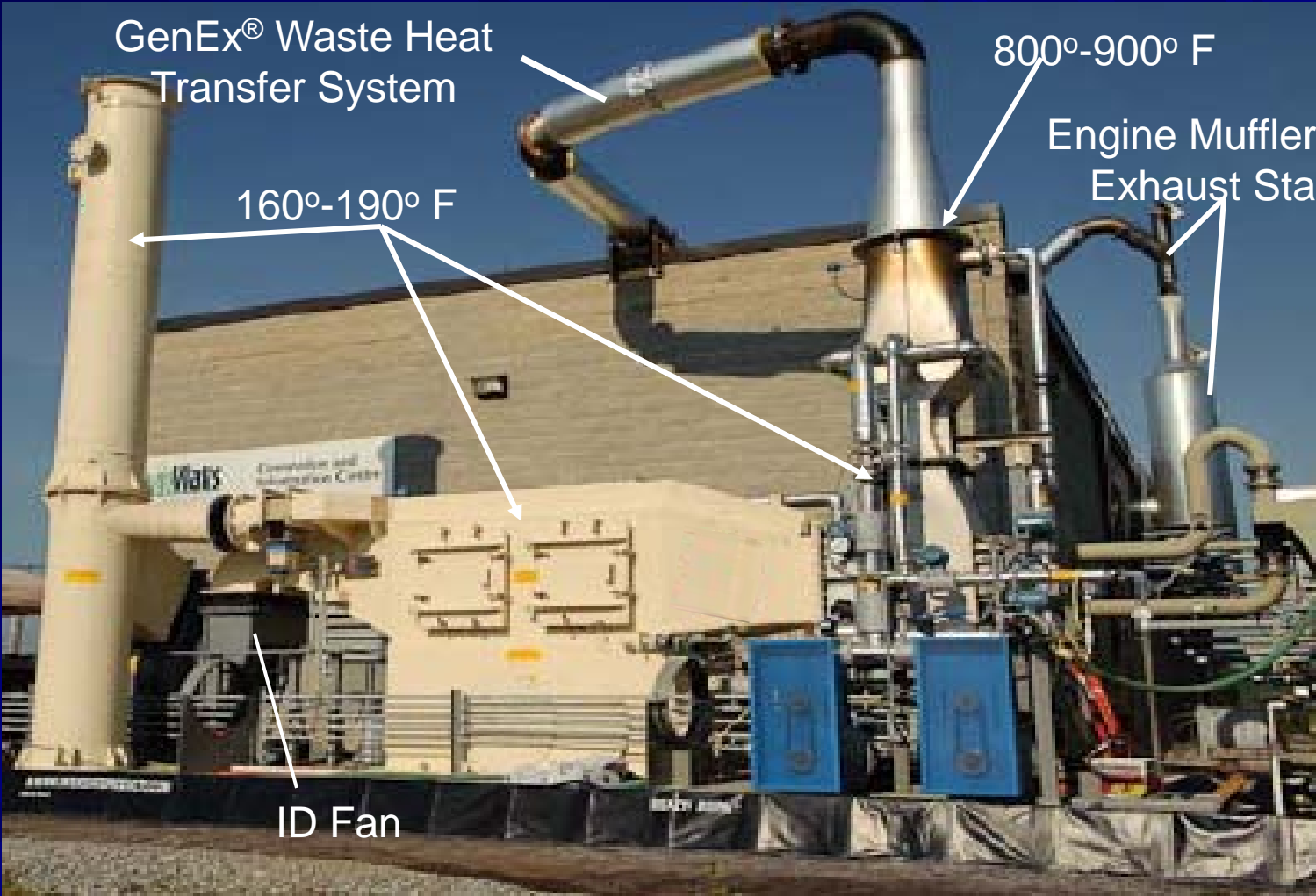
# Simple, Reliable & Robust



# Simple, Reliable & Robust



# Simple Conversion of New or Existing Power Plants to Combined Heat & Power (CHP)



<sup>4</sup> GenEx is a trademark and service mark of Heartland Technology Partners, LLC

# 1<sup>ST</sup> Successful Waste Heat Evaporation Demonstration – July 2009



Waste heat  
provided by  
Caterpillar 3516  
Internal  
Combustion  
Engine

Waste Management, Inc.  
Liberty Landfill, Buffalo, Indiana



# 1<sup>st</sup> Commercial Turbine Project



Waste heat  
provided by Solar  
Centaur 40  
Turbine

Project  
developed by  
Heartland  
Technology  
Partners, LLC

Commissioned  
January 2011

1<sup>st</sup> Commercial Turbine Project  
Owned by Waste Management, Inc.'s Turnkey  
Landfill – Rochester , New Hampshire

# 1<sup>st</sup> Commercial Waste Wood Fueled Project



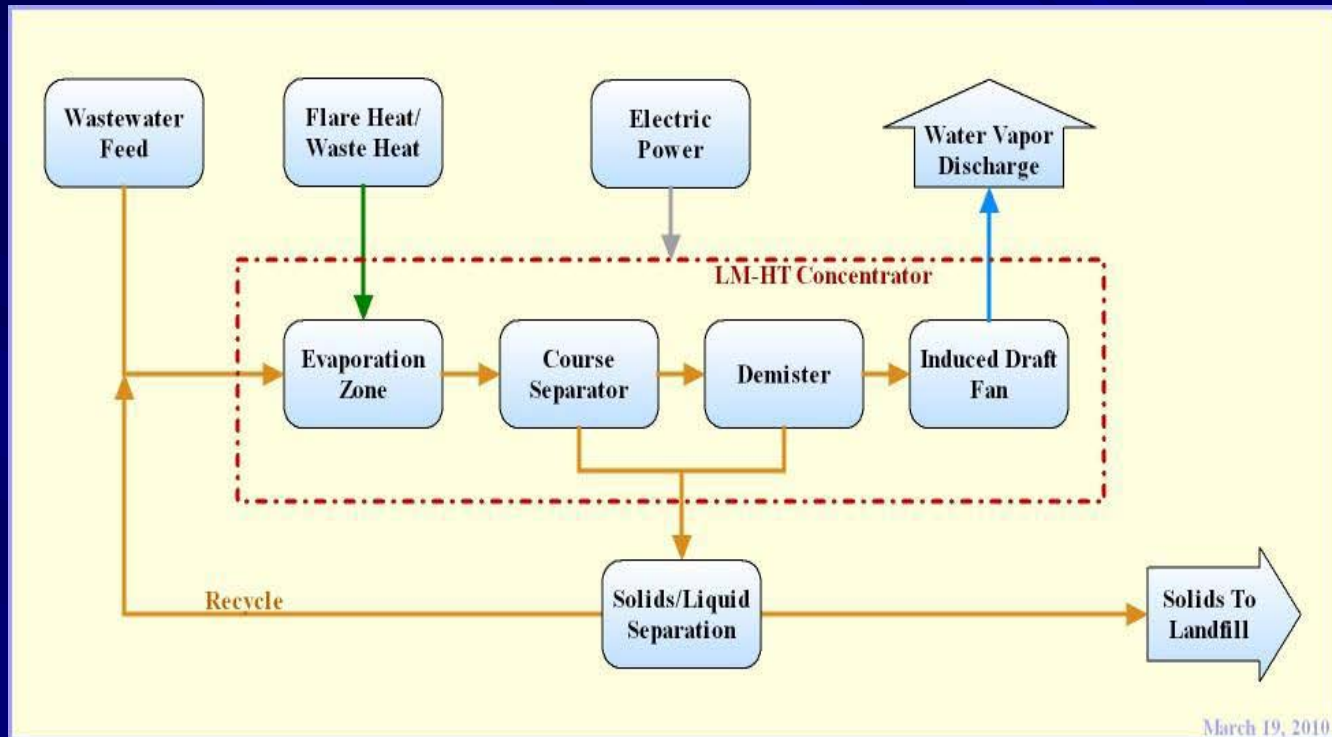
Waste heat  
provided by wood  
burner

Project  
developed by  
Heartland  
Technology  
Partners, LLC

Commissioned  
January 2011

Owned by Converted Organics Inc.'s Wastewater  
Treatment Division – South Canyon Landfill,  
Glenwood Springs, Colorado

# Process Flow



# Design Features

- Minimum Process Fluid Holdup – Low Momentum Feature (LM)
- High Turbulence – Key to Managing Suspended Solids (HT)
- One Fan and One or Two Pumps – No Moving Internal Parts
- Multiple Quick Opening Access Doors to Process



# Leachate Field Tests - Flare

- Processed Leachate at Design Rate
- Consistently Reduced Volume by 97+%
- 12,000 GPD = < 360 GPD Residual
- Non-Hazardous Residue By TCLP
- Residual Virtually Non-Odororous
- Met All Conditions of Permit
- Emissions Verified by Stack Tests



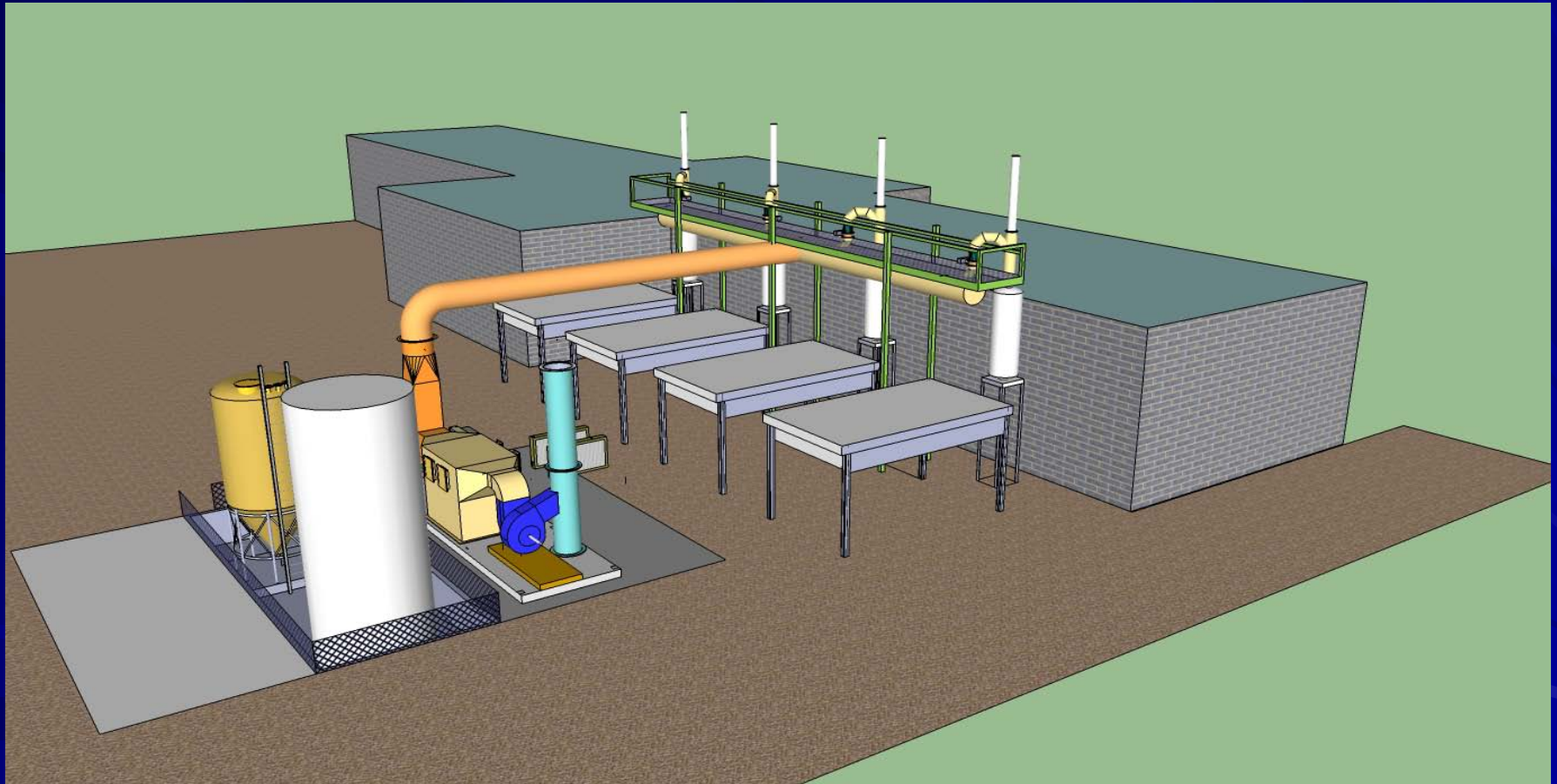
Residual From One Tank Wagon  
Collected In 200 Gal Poly Tank

# Leachate Field Tests – Engine

- Processed Leachate at Design Rate
- One G3516LE Engine = 4,200 GPD
- Equivalent of 5,000 GPD/MW
- NO Interference With Engine Performance



# Leachate Field Tests – Engine



# Typical thermal needs

- Caterpillar 3516 = 4,200 gallons per day
- Caterpillar 3520 = 8,400 gallons per day
- Turbine = 10,000 gpd per mega watt
- 250 C F M = 10,000 gallons per day



# Thank You !

*“Your Interest in Our Technology and  
Services Is Greatly Appreciated”*

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