Leachate Evaporation in the Southeast

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Outline

• Leachate: Where Does It Come From?
• Leachate Management Challenge
• Current Leachate Evaporation Technologies
• Regulations and Permitting
• Performance
• Lessons Learned
Leachate: Where Does It Come From?

- Leachate from the Bottom of the Landfill
  - Moisture content of MSW ~ 25% to 30%
  - 500 tpd of waste equates to 30,000 gpd primary water

- Secondary Water
  - Stormwater infiltration
  - 50-acre footprint @ 25% infiltration yields 18 million gpy (2013)
Leachate Management Challenge

- By-product of waste disposal and management
  - Water entrained in waste
  - Leachate recirculation
- By-Product of operating in the weather
- Cost of disposal
  - POTW cost
  - Transportation
  - Potential for disposal surcharges
  - Permitting and exposure regulatory liabilities to discharge
- Disposal options limited and can change
  - POTW may be constrained by volume or discharge limits
Leachate Treatment Options

• Traditional Industrial Wastewater Treatment Processes
  – Physical
  – Biological
  – Chemical

• Alternate Treatment Technologies
  – Phytoremediation
  – Constructed Wetlands
  – Leachate Evaporation

Trucking is often involved
Evaporation 101

- Each gallon of water has 3,780 grams
- Each cubic foot of air will only hold so much
- The dew point is the *temperature* at which the *water vapor* in a sample of *air* at constant *barometric pressure* *condenses* into liquid water at the same rate at which it evaporates
- If the humidity is at 60%, then only 40 percent is left for available evaporation
- Typical 10 micron particle at 10 foot elevation in 3 mile per hour wind has the capability to travel 1,050 feet
Leachate Evaporator Commercial System Examples

- Portable Sprayers
- Stationary Mechanical Units
- Heat Applied Units
  - Direct Heat
  - Waste Heat
Apex Specification

- 25hp motor
- Flow rate of 85 gallons per minute
- 7.5hp pump creates 60-80psi of pressure
- Water plume travels 25 feet – 35 feet vertically
- Available only on floats
- 20 inch fan
- 1 inch stainless steel round spray manifold with 36 - 3/16 inch orifices
Portable Sprayers

Some Considerations:
- Best in low humidity environments
- Mindful of Potential Fallout/Overspray
- Potential negative image for neighbors
- Workers
- Subject to wind gusts
- Clogging
- Portability
- Fuel costs
- Environmental Permitting
New Waste Concepts

“Spinning Baskets”

NWC: Two Main Evaporation Methods

- **Cocoon System**
  - Done inside a structure to prevent off-site migration
  - Easy to install

- **Lily Pad System**
New Waste Concepts

- Rotary Misting – 2 Stage Atomization
- Motors: Electric / Hydraulic / Pneumatic
New Waste Concepts
“Spinning Baskets”

Some Considerations:
- Can be connected to met station; if not, best in low humidity environments
- Design not prone to clogging
- Typically no portability
- Requires regular service
- Scalable
- Electrical service
- Wind fence recommended
- Environmental Permitting
Heat assisted discharge
Heat assisted discharge
Heat assisted discharge
Heat assisted discharge
Heat assisted discharge

Some Considerations:

– High Evaporative Potential (~20,000-40,000 gpd)
– 24 Hour Service Capability
– High Capital Requirements
– Contracted Operation
– Environmental Permitting
  • Emissions Quantification (esp., PM, VOC)
  • MSW Federal NSPS Applicability
  • Lack of Regulatory Familiarity
– Residuals Management
– Maintenance (Heat + Moisture = Maintenance Concerns)
– Plume Image
Leachate Evaporators

- Why should I care?
- Do they really work?
- Which one is right for me?
- What is required?
- Does it make sense?
When Does Leachate Evaporation Make Sense?

• When the landfill is paying more than 6-8 cents per gallon for treatment (including trucking costs)

• When the landfill has no other treatment or disposal options

• When the facility is overwhelmed with leachate and trucking can’t keep up

(con’t on next slide)
When Does Leachate Evaporation Make Sense? (con’t)

- When the treatment plant cuts the amount of leachate loads it will accept daily or stops all together

- When the landfill is flaring LFG at 350 scfm or more and has no end use plans. Plus the current flare on site must be able to handle the turndown ratio (or be taken into account)
Lessons:

• Manage Leachate…Prevention is the first step

• Very Site Specific

• Permitting…Go Big!

• No Silver Bullet
Thank You

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