Leachate Management for MSW Landfills

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What is Leachate?

- Infiltrated water percolates through waste materials, resulting in the leaching of organic and inorganic compounds
Leachate Management Includes

- Leachate Collection
- Leachate Treatment;
- Leachate Disposal

Key Factors that Influence Leachate Composition

- Waste Composition and Age
- Climate
- Operational Parameters (e.g., daily cover, sludge placement, gas collection, air injection, etc)
Leachate Treatment/Disposal

- Off-site Treatment/Disposal at Wastewater Treatment Plant (WWTP)
- On-site Treatment Using Wetland System or other methods (aeration)
- On-site leachate evaporation using landfill gas energy
- Leachate Recirculation

Wastewater Treatment Plant Option

- Requires a separate discharge permit
- Can be expensive ($0.02 to $0.10/gallon)
- 10,000 gal/day x $0.05/gal = $500/day ~ $175,000/year
- Restrictions on BOD, COD, ammonia, etc. levels
- Most commonly used option in the U.S.
- CE 483?
On-Site Treatment – Aerobic Ponds

- Shallow ponds (<1 m deep)
- Light penetrates to bottom
- Active algal photosynthesis
- Organic matter converted to CO₂, NO₃⁻, HSO₄⁻, HPO₄²⁻, etc.

Wetland System
Wetland System

- Uses wetland plants to treat leachate (e.g., phragmites, cat tails)
- This technology is still in the research phase (may not be able to treat all constituents)
- Requires enough ground area for construction
- Leachate is treated by filtration, adsorption, and reactions with the soil, roots, and bacteria in the root system