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Returning Landfill Leachate to FGD – Management of Process Issues

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Characteristics of Landfill Leachate Water

- Can contain heavy metals, TDS and FGD chemical constituents
- Likely will not be able to discharge directly after new ELG rules are in place
- Can be used as make up to FGD but quality of water may limit where it can be used (e.g., may result in scaling if used for ME wash water)
- Treatment will improve quality of water which may make water more suitable for FGD use, but this is expensive

Difference in Properties for Gypsum and Fixated Waste Placed in Landfill

- Gypsum typically placed in landfill with no fixation or stabilization
- Will contain 10% to 20% free moisture (scrubber liquor)
- Experience has shown that dilution of soluble ions in leachate for gypsum waste is two to three times
- Fixated waste, normally calcium sulfite, has been mixed with fly ash and lime and has undergone a cementaous reaction
- Dilution of soluble ions in leachate for fixated waste is typically eight to ten times

How Much Water Are We Talking About?

Definitions:

Leachate – Water collected and removed from leachate collection drainage layer near bottom of landfill

Hazardous Contact Water – Precipitation that has been in contact with active open area of landfill. This cannot be discharged

Non-hazardous Contact Water – Precipitation that has been in contact with covered area of landfill. This can be discharged

Assumptions for Analysis:

- Total landfill area is 255 acres
- Maximum open and active area = 60 acres; 195 acres will have intermediate cover
- Waste height of non-open area of landfill = 115 feet; Waste height of open area – variable
- Annual precipitation = 38”

Results of Analysis

- Hydrologic Evaluation of Landfill Performance (HELP) prediction model used to determine leachate production
- Leachate production:
  - Yearly volume for 60 acre active open area = 268 cf
  - Yearly volume for 195 with intermediate cover = 63,933 cf
  - Total volume of leachate = 64,201 cf/yr;
  - 1,316 gal/day
- Hazardous contact water production for 60 acres of open landfill plus concrete pad
  - 9,586,830 cf/yr
  - 196,464 gal/day
- Combined leachate and hazardous contact water
  - 197,780 gal/day
  - 137 gpm

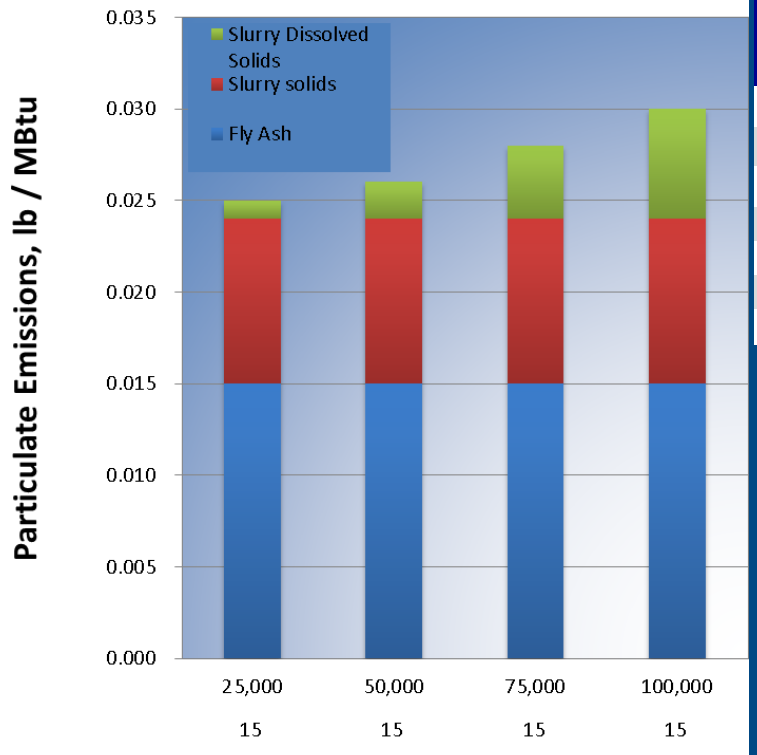
What Can Be Done With The Water?

- Cannot be discharged under new ELG rules
- Best and lowest cost option is to return water to FGD
- Treatment is a much poorer choice
- Water leaving FGD
  - Evaporation: 1 to 1.5 gpm/MW
  - Free moisture in byproducts
  - Liquid purge
- Water entering FGD
  - ME wash water
  - Reagent slurry
  - Seal water
  - Other miscellaneous low volume streams
  - Other plant streams?
  - Leachate and contact water?

Potential Process Issues

- Increase in soluble ions and TDS
  - Possible detrimental affects on performance and corrosion potential
- Positive water balance
  - Can be mitigated by good operating and maintenance practices
- Increase in PM emissions

Affect of TDS on PM Emissions



ME Carryover, gpm/sft	0.00015	0.00015	0.00015	0.00015
Slurry Solids, Wt.%	15	15	15	15
Slurry Dissolved Solids, ppm	25,000	50,000	75,000	100,000
Fly Ash, lb / MBbtu	0.015	0.015	0.015	0.015
Solids Carryover, lb / MBtu	0.009	0.009	0.009	0.009
Dissolved Slurry Carryover, lb / Mbtu	0.001	0.002	0.004	0.006
Total Particulates, lb / MBtu	0.025	0.026	0.028	0.030

Summary

- Return of water from landfill to scrubber is an attractive option, but process issues must be considered
- Rain events cannot be planned or scheduled so capabilities to store water from the landfill must be included
- Scrubber water balance must be controlled and managed so that return of water does not cause balance to be positive

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