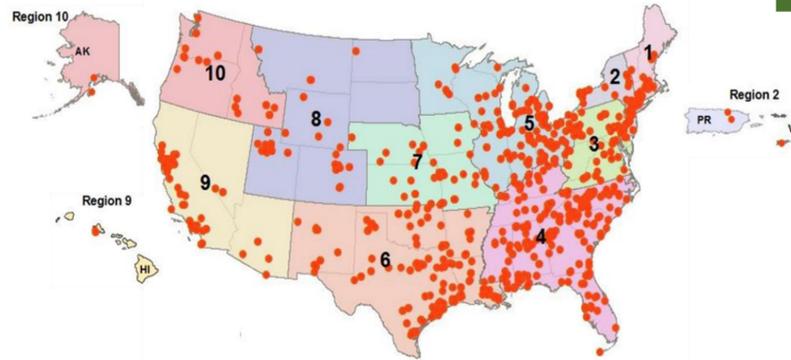




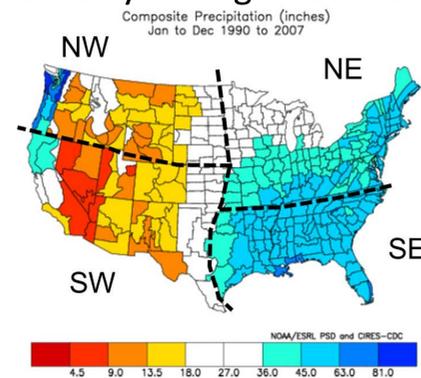
### Rational

- Under its hazardous waste regulations 40CFR 264/265.117, EPA established a post-closure care period for facilities that are used to manage this waste.
- That period begins after completion of closure of the unit and continues for 30 years.
- Some facilities now are approaching the end of the 30-year post-closure period. Questions have arisen about whether post closure care is no longer needed at these sites to be protective of human health and the environment.



### Objectives

- Quantify hazardous waste landfill performance using field data from sites that are nearing the end of their 30 years post-closure care (PCC) period.
- “Ground truth” expected leachate generation rates and chemistry during PCC in relation to current industry norms and expectations.



### Approach

- Gather data from 9 hazardous waste landfill sites with 45 subunits
  - Site Permits, engineering drawings
  - Leachate/collection and removal system data
  - Landfill cover performance and design data
- Analysis of flow and composition data
  - Comparison of observed performance between sites, modeled results and published data
- Implications for understanding long-term landfill performance
  - Analysis of chemical composition data
  - Assessing extent of hydraulic connections
  - Analysis of liner efficiency

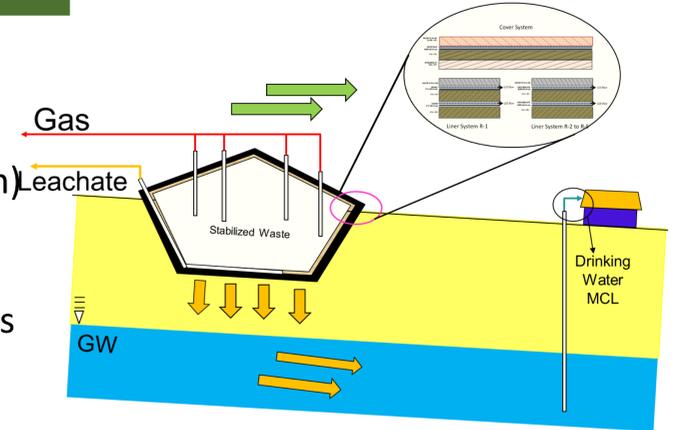
### Intended End users

- Office of Land and Emergency Management
- State Regulators and Engineers

### Lessons Learned

#### Leachate Flow

- Leachate contained relatively high level of hazardous constituents like Arsenic (12 ppm) and Methylene Chloride (230ppm) amongst others.
- Leachate volumes generally decrease over time, though demonstrate higher flow rates than those estimated by the Hydrologic Evaluation of Landfill Performance (HELP)
- No landfill could achieve a flow rate of 0.1 gallons per acre day (gpac) within the 30 years post closure care period (assuming a first order decay)
- The time modeled to reach the 0.1 gpac leachate flow ranged from 33 – 130 years



#### Cover and Liner Systems

- Three of the landfills experienced cap failures during post closure period
- Seven landfills exhibited leachate flow in the leachate leakage detection system
- Apparent liner efficiency ranged from 0 to 100%
- Efficiency correction based on chemical signature was carried out for three sites (small data set). Efficiency ranged from 74 to 100%

#### General Observations

- Data were not readily available and discontinuous
- Containment system maintenance was generally slow (7 to 10 years to repair a cap failure)

### Next Steps

- Long-Term Performance of Subtitle D landfills
- Evaluation of landfill liner performance
- Development of risk based framework for determination of post closure care period
- Update and modernize the HELP model

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