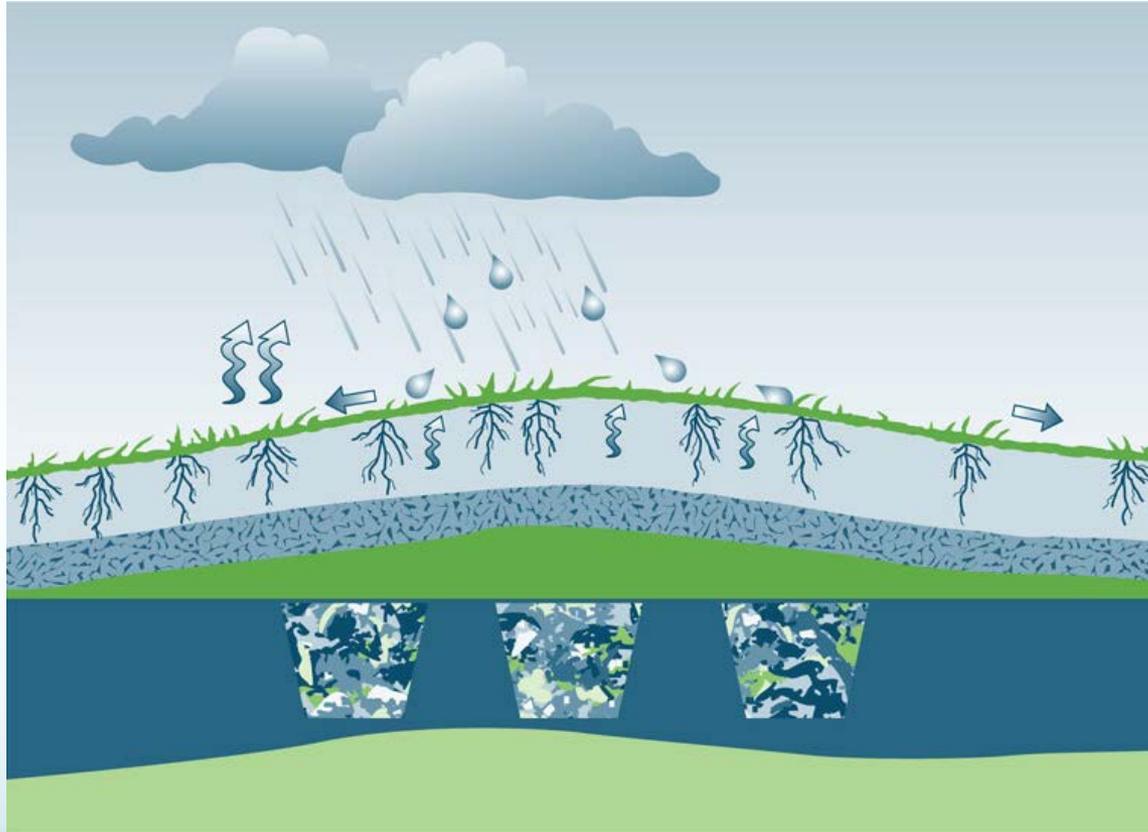


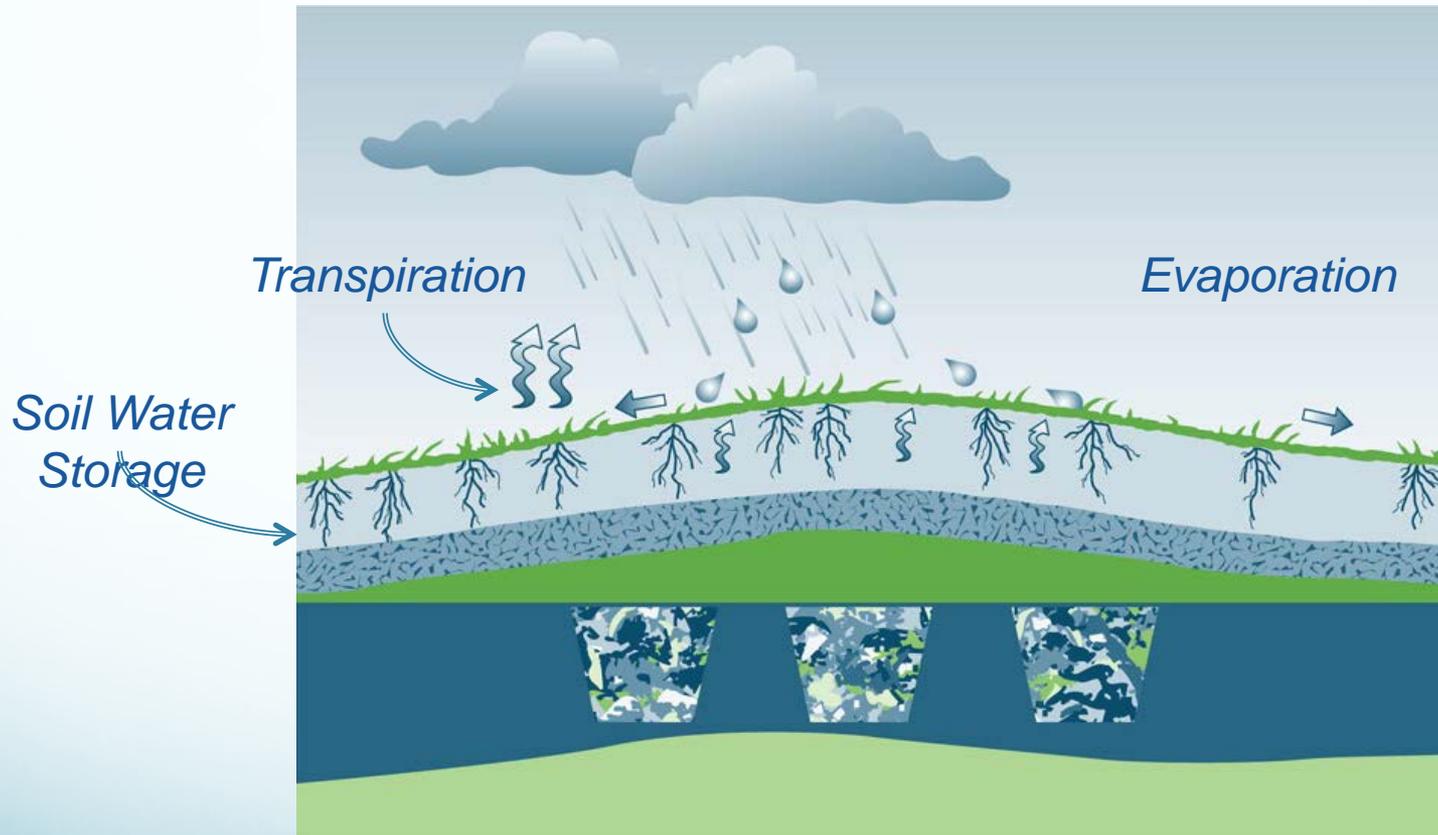
# Teton County Municipal Solid Waste Landfill



# Evaluation: Records Review

- **Task 1:** Is liquid migrating through the Evapotranspiration (ET )cover?
- **Task 2:** Evaluate alternatives to achieve compliance with Idaho Solid Waste Facilities Act

# Evapotranspiration (ET) Cover

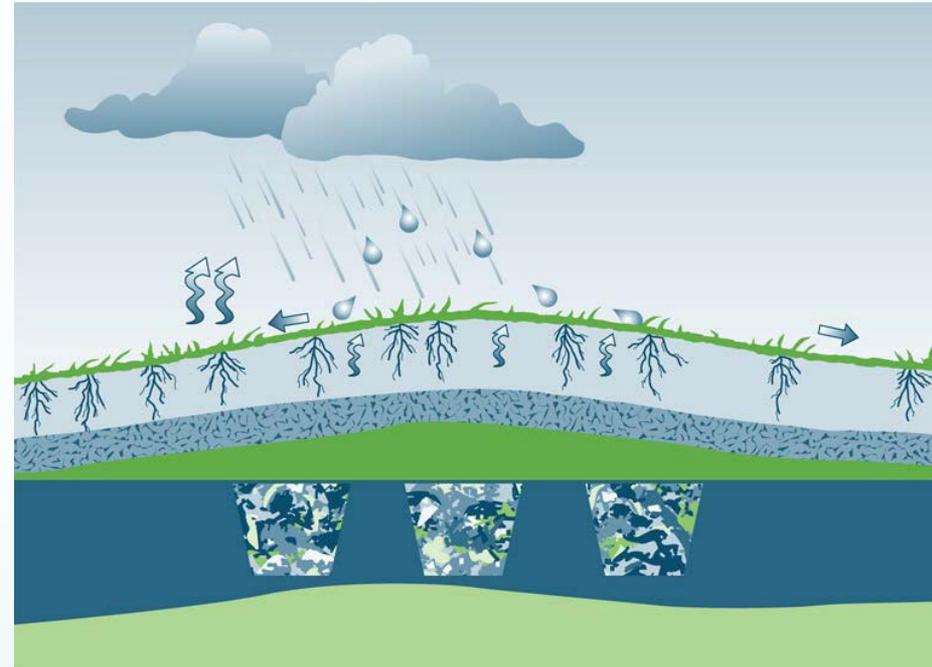


# ET Cover Components

Growth medium for plants  
(agriculture)

Water holding soil properties  
(engineered)

Cover slope



Balance between infiltration from precipitation and the rate of water removal through transpiration and evaporation

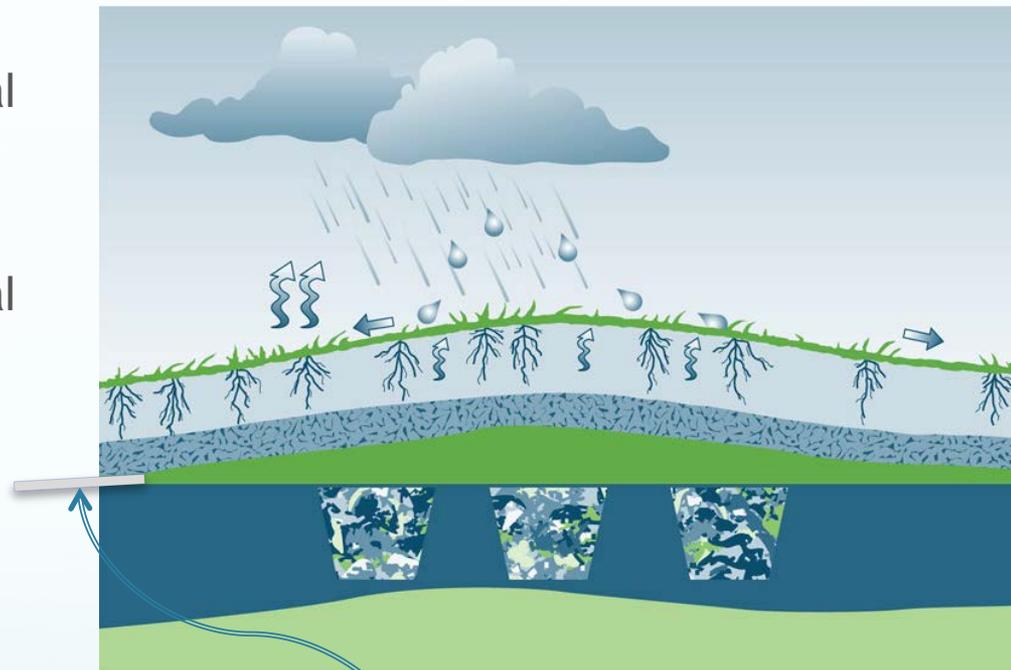
# Task 1: Is liquid migrating through the ET cover?



Where it all began!

# Task 1: Is liquid Migrating through the ET cover?

- County Staff voluntarily notified Idaho Department of Environmental Quality (IDEQ)
- Standing water was sampled by Idaho Department of Environmental Quality 2010
  - Contained Landfill constituents
- Voluntary Consent Order
  - Remediate leachate
  - Investigate ET cover
- Actual location of the pipe relative to the waste is unknown



*Discharge Pipe*

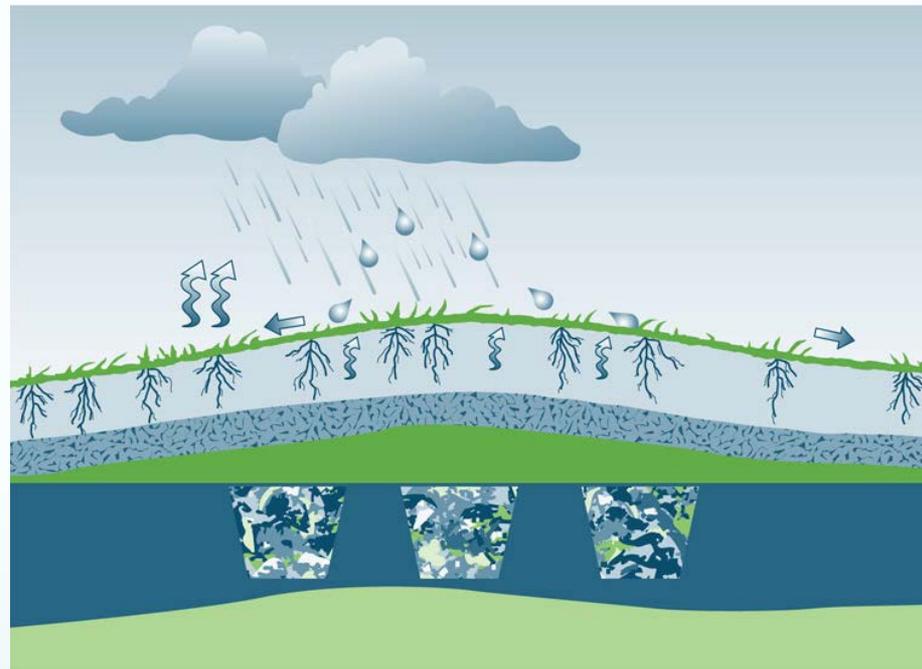
# Task 1: Is liquid Migrating through the ET cover?

**Observation:** Cover not performing as designed

**Recommendation:** Remove the pipe



*Discharge Pipe*





# Task 2: Alternatives to Achieve Compliance

1. Material Testing and Construction
2. Certification of Construction
3. Long-term Inspection and Maintenance
4. Cover Performance Monitoring

# 1. Material Testing and Construction

- ET cover performance is dependent on;
  1. Material properties
  2. Construction
- Material properties are
  - determined by testing prior to design
  - confirmed by testing during construction



# 1A Material Testing

## Observation

- 2007 - 1 sieve analysis every 10,000 yds<sup>3</sup>
- Preliminary Engineering Report (PER) 2014 – 1 sieve analysis every 1,000 yds<sup>3</sup>
- IDEQ – requested 1 sieve analysis every 100 yds<sup>3</sup>

## Recommendation

- 1 sieve analysis every 100 yds<sup>3</sup>



# 1B Construction

## Observation

- 2007 Closure plan lacked documentation of closure techniques, allowable equipment and there were no as-built records
- PER 2014 contains a detailed Construction Quality Assurance Plan
  - Does not clearly define acceptable
    - Equipment
    - Operation of the equipment
    - Limitation to the use of the equipment

## Recommendation:

- Revise or Addend the PER

# Certification of Construction

An ET cover is dependent on proper construction of the material. Construction modifies the material properties to provide the growth medium (transpiration) and material physical structure (water holding capacity)

- Construction specification must be maintained
- Testing must be recorded and confirmed
- Changes during construction must be approved and documented



## 2. Certification of Construction

### Observation

- 2007 closure plan did not formally address Certification of Construction
  - No as-built construction records were available
- PER 2014 contains a detailed Construction Quality Assurance (CQA) plan

### Recommendation:

1. County should retain an Independent Professional Engineer or Scientist for Final Certification and Summary Report.
2. Forms, checklists and change approval forms should be developed for the CQA plan elements

# Long-term Inspection and Maintenance

ET cover performance depends on:

- Thriving vegetative cover
- Lateral and vertical integrity of the cover system



# Long-term Inspection and Maintenance

## Observations

- Locally steep slopes on existing cover
- Surface channeling
- No slope in areas potentially causing pooling
- Burrows
- Locally poor vegetative cover

## Recommendation

- Regular and recorded inspections for vegetative cover, erosion, animal burrow, subsidence (settling) or other cover intrusions

# Cover Performance Monitoring

State and federal regulations require an intrinsic permeability measure of performance, and a minimum thickness.

- Physical parameters of the cover system

IDEQ wants monitoring within the cover

- flux (moisture flow rate)
  - Lysimeters
  - Moisture sensors

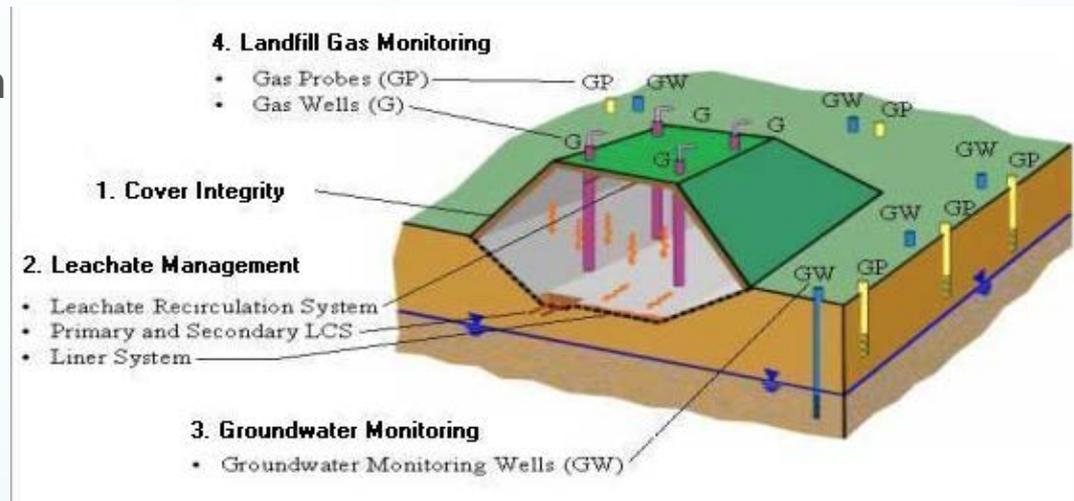


# Interstate Technology and Regulatory Council (ITRC)

- “As regulatory agencies become more confident that Alternative Final Covers (AFC) [Evapotranspiration cover] are capable of providing an acceptable level of protection to the environment, the installation of flux monitoring devices may no longer be required. At this writing (2003) there is not an industry-wide acceptable level for flux through an AFC and no commonly agreed upon method of demonstrating performance.”
- “If EPA promulgates regulations or publishes guidance regarding flux rates, those criteria should be considered in the design decision process.”
- “A complicating factor is that flux-monitoring devices contain uncertainty inherent in their operation. Simple maintenance can cause variability in the quality of data they collect.”

# Interstate Technology and Regulatory Council (ITRC)

- “With Respect to landfills, four basic issues are associated with closure and post-closure care period: Cover integrity, leachate management, groundwater monitoring, and landfill gas monitoring and management.”
- Teton landfill has no liner.



# State Programs

- Charles Johnson, Manager of the Solid Waste Section of the State of Colorado Department of Health and Environment, and Michael Wocknick, P.E, Senior Waste Management Engineer for the California Integrated Waste Management Board, report that their authority (the State of Colorado and the California Regional Water Boards) **do not require** (use) flux monitoring devices (lysimeters or moisture monitoring sensors) to evaluate the performance of an ET cover system. Instead, they rely on material specification tests and documented quality construction techniques to assure performance of the landfill during the Post Closure Care period, including the cover system.
- Construction quality assurance provides them greater confidence and less risk of failure than infiltration monitoring methods.

# Cover Performance Monitoring

- IDEQ is requesting Flux monitors to evaluate the performance of the ET cover.
  - Flux is the flow rate per unit area (a hydraulic parameter)
- State and federal regulations require an intrinsic permeability measure of performance, and a minimum thickness of the cover material.
  - Intrinsic permeability is a function of the material structure only and not the fluid

# Cover Performance Monitoring

## Recommendation

- Reject Flux monitoring of the ET landfill cover
  - Data reliability is poor
  - There is no regulatory metric to compare with flux data
  - Flux data does not distinguish if the vegetative cover or the water holding capacity of the material is failing

# Summary

- Put more emphasis on:
  - Material,
  - Construction,
  - Inspection,
  - Groundwater monitoring, and
  - Documentation