A Motley Crew of Final Covers on TN Landfills

Environmental Show of the South
Factors Affecting Final Cover & Closure

- Regulatory Requirements
- Geography and Geology
- Financial Resources at Time of Closure
- Age of Permit
- Local Friends, Family and Neighbors
# Solid Waste Facility Variability

<table>
<thead>
<tr>
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<th>Open</th>
<th>Closed</th>
<th>Post Closure</th>
<th>Misc</th>
<th>Total</th>
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<tr>
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<td>Class I</td>
<td>35</td>
<td>86</td>
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<tr>
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<td>Class II</td>
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<td>32</td>
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<td>Class III/IV</td>
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Actively tracking 427 facilities
Middle Tennessee

Montgomery

Sullivan Co.
(Overlay)
Montgomery County - Background

- Current Class I permitted over/next to:
  - Class I closed
  - Class IV over Class I

- Acreage:
  - Closed Class I: 48.5 acres
  - Active Class I: 71.68 acres
  - Class IV over Class I: 18.44 acres

- Expansion permitted Fall 2017
  - Total of 23.8 acres with 6 acres of non-piggy back liner
Montgomery County – Cap Variety

- Various capping systems in place:
  - Closure Turf
  - Temporary Cap
  - Soil Cap
  - Piggy Back
Montgomery County – Pre-Expansion

- Closed Class IV
- Temp Cap
- Active Cell
- Closure Turf
Closure Methods

- **Closure Turf**
  - Area can be seen along the highway
  - Had difficulty maintaining vegetation/seeding

- **Temp Cap**
  - Keep out water from landfill = reduce leachate
  - Control gas = reduce odors

- **Soil Cap over Class IV area**
Montgomery County – Piggy Back

- Piggy Back
  - Give additional air space/Major Mod
  - Allow for better cap than prescribed for Class IV

- Expansion areas include areas:
  - No liner system
  - Clay Liner only
  - Composite Liner

- Therefore expansion area liner will serve as cap over piggy back areas
Montgomery Co. – 2017 Expansion

New Liner

Piggy Back over Class IV over Class I

Piggy Back over Class I

New Liner
Montgomery County – Piggy Back

PHASE 3
WEST EXPANSION
WASTE AND COVER

PHASE 4

EXISTING EXPOSED
GEOMEMBRANE
(TO BE REMOVED)

EXISTING CLASS IV
WASTE AND COVER

EXISTING LANDFILL
AND LEACHATE
COLLECTION
SYSTEM IN LANDFILL
CELLS AND COVER

EXISTING LINER AND LEACHATE
COLLECTION SYSTEM IN CELL E

EXISTING LANDFILL WASTE

60 ML TEXTURED WHITE
GEOMEMBRANE

COMPACTED SOIL LINER
(CW PERMEABILITY CLAY
SHANKED TOP 6 INCHES)
FILLED OF ROOM 2"
(SEE NOTE 4)

INTERMEDIATE SOIL
(SEE NOTE 5)

EXISTING WASTE / COVER

PROTECTIVE COVER
ON-SITE CLAY
SAND (SC)

DOUBLE SIDED
DENSIFIED
BAMBOO NET

GEOSYNTHETIC RAIN COVER (GRC)
(OPTIOAL) (SEE NOTE 3)

FINAL COVER
SYSTEM (TYP) 6" TILL

LEACHATE COLLECTION
SYSTEM SUMP

TYPE 1 ANCHOR
TRENCH

TRIAX TRENCH

EXISTING SEGMENT MAP

I-97 DRAINAGE TRENCH

SETTLEMENT PADS

PREPARED
SUBGRADE (TYP)

STRUCTURAL
ILL (TYP)

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Department of
Environment &
Conservation
Middle Tennessee

Humphreys

Sullivan Co. (Overlay)
Humphreys County - Background

- Class II landfill co-located at an industrial facility
- Located in the vicinity of a closed landfill and a newly constructed/active landfill
- Permitted in 1994
- Landfill reached capacity and is due to be closed/capped in Summer 2019
- Original permit had cap of clay
- Minor modification made due to lack of clay close/affordable that is needed for closure
Clay:
- If clay available, can be the cheapest option
- Need to confirm volume at permeability
- Readily approvable

Geosynthetic use:
- Lower infiltration than clay
- Not affected by wetting/drying and freeze/thaw cycles
- Readily obtainable and can be shipped anywhere
- Can be cheaper than clay, if a site is soil poor

Geocomposite use:
- Reduces the space needed for clay cap
- Reduces seepage forces in overlying soil layer to increase factor of safety with regards to slope stability
- Reduce head on top of geomembrane
Hamblen Co. - Background

- Class II, morphed into Class I
- 12 acre foot print
- Operated c. 1993-2006, Subtitle D
- Bankruptcy 2006
- Financial Assurance released to TN for Closure and 30 year PCC
IDEAL & REALITY

1. FINAL COVER
   SCALE: N.T.S.

- 9" PROTECTIVE LAYER
- BASE LAYER
- WASTE

- 12'' PROTECTIVE LAYER
- 18'' LOW PERMEABILITY

- 12 WIDE EARTHEN BERM
- SLOPE = 1%
Hamblen Co. – Leachate Collection Data

Feb. 7 0.99"
Feb. 10 1.07"
Feb. 11 1.33"
Feb. 18 0.8"
Mar. 1 0.85"
Mar. 19 0.17"
Mar. 20 0.57"
Mar. 24 1.2"
Hamblen Co. – Summary

- 2006/2008 Closure Construction
- Closed, non-Subtitle D
- TN retains Orphaned Facility Status and Obligations
- Limited Financial Resources
Benton Co. - Background

- Class II, 2 primary waste streams
- 12-15 acre foot print
- Operated c. 1991-2017
- Bankruptcy 2017
- Financial Assurance released to TN for Closure and 30 year PCC.
Benton Co. - APW

Synthetic (Closure Turf®)

Turf
Sand Infill
Geomembrane
Closure Turf®
Sub-grade
Waste

COLOR MATCH PROPOSED CLOSURE TURF® TO EXISTING CLOSURE TURF®
Benton Co. – Drone View
Second view of industrial waste cell's newly placed grass seed, fertilizer, straw, and matting
TN assumes Orphaned Facility Status and Obligations
2017/2019 Closure Construction
Extensive Community Involvement
The Motley Crue