Avoidance Landfills....

Unleashing the Potential

NC A&T State University
Capstone Seminar
November 2, 2010

Pieter K. Scheer, P.E.
Outline

- Background on Modern MSW Landfills
- Evolution of Landfill Siting Rules
  - “Sanitary” Landfill Rules
  - 40 CFR Part 258
  - State Rules
- Example No. 1 – Johnston County, NC
- Example No. 2 – Newton County, GA
- Questions & Discussion
Background – Modern MSW Landfills
Background – Modern MSW Landfills

- Composite Liner/Leachate Collection System
Background – Modern MSW Landfills

- Groundwater/Surfacewater Monitoring
- Landfill Gas (LFG) Monitoring
- Operating Criteria
  - Waste Exclusions
    - Liquid Wastes
    - Hazardous Wastes
Background – Modern MSW Landfills

- Final Cover System

![Typical Final Cover System Diagram]
Background – Modern MSW Landfills

- Landfill Gas Extraction
Background – Modern MSW Landfills

- Post Closure Care – 30 Years (Minimum)
- Financial Assurance Criteria
- Permitting Process
  - Site Study
  - Construction Plan
  - Other Permits/Approvals
Solid Waste Landfill Permitting Process
New Municipal Solid Waste Landfills
Solid Waste Section - Division of Waste Management

Office of Administrative Hearings (OAH)

* Other Agencies may include:
- 406 Waiver Certification
- 192 Army Corps of Engineers
- Cultural Resources
- Public Health
- Soil Conservation
- Sound (NRECA)

** Other agencies may need to issue:
- EIR
- SHAs
- DSN
- PDAs
- EIR

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PHASE ONE

Applicant: Prepares Site Study Application
- Preliminary Review
  - Yes
  - Prepares Revised Application
  - No
  - Compares Site

Public: Receives Additional Information Request
  - Yes
  - Issued Site Suitability Letter
  - No

Other Agencies: Receives Additional Information Request
- Yes
  - Issued Site Suitability Letter
  - No

PHASE TWO

Applicant: Preliminary Review
- Comprehensive Review
  - Yes
  - Land Quality: Section Division Control Review
  - No

Public: Receives Additional Information Request
- Yes
  - Issued Site Suitability Letter
  - No

Other Agencies: Receives Additional Information Request
- Yes
  - Issued Site Suitability Letter
  - No

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OAH: Review & Comment
- Public Hearing may be required

** OAH: Construction Quality Assurance
This includes testing of fill soil and leachate to ensure compliance with applicable standards.

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EIR: Complete
- Public Hearing may be required

PDAs: Complete
- Public Hearing may be required

OAH: Complete
- Public Hearing may be required

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Finally, OAH Issues Permit
- Public Hearing may be required

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No
- Public Hearing may be required

Yes
- Public Hearing may be required

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Permit to Operate

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http://www.maine.gov/dep/environment/waste/permits/landfills

Rev. 3/2002
RCRA (1976)

- Goals – Protect, Conserve, Reduce
- Subtitle D – Disposal of Non-Hazardous Solid Waste
  - State Solid Waste Plans
  - Sanitary Landfill Criteria
  - Closing or Upgrading of Open Dumps
“Sanitary” Landfill Rules
(Typical State)

Siting Criteria Included:

- 100-Yr Floodplain
- Endangered/Threatened Species
- Archaeological/Historical Site
- State Park/Recreation/Scenic Area/Etc.
- Airports (5,000 ft./10,000 ft.)
- Wetlands
- 50’ to Property Lines
- 500’ to Residences/Wells
- 50’ to Streams/Rivers
Code of Federal Regulations (CFR)
Title 40 Part 258
(40 CFR 258) (NC - 15A NCAC 13B .1600 et seq.)

New Siting Criteria Included:

- Fault Areas
- Seismic Impact Zones
- Unstable Areas
Not In My Back-Yard!!!
Decisions,
avoidance landfill  n  1: a landfill which is designed to stay away from conflicts with siting criteria.
NC – Solid Waste Management Act of 2007
(A.K.A. – Senate Bill 1492)

Siting Criteria Include (for New “Green” Site Landfills:

- Wetlands & Perennial Streams Buffer: 200 feet
- National Wildlife Refuge Buffer: 5 Miles
- State Gameland Buffer: 1 Mile
- State Park Buffer: 2 Miles

Size Restrictions Also Added
Post-Solid Waste Act of 2007
Example No. 1
Johnston County, NC Landfill
Johnston County, NC - Revised Design

Red = Unlined Unit
Green = Lined Unit

Area 1
Phase 4A

Red = Unlined Unit
Green = Lined Unit
Johnston County, NC - Revised Design

Red = Unlined Unit
Green = Lined Unit

Phases 5-10
Johnston County, NC - Revised Design

Future Waste Removal or Piggyback Expansion

Red = Unlined Unit
Green = Lined Unit
### Johnston County, NC

#### Revised Design – Capacity Summary

<table>
<thead>
<tr>
<th>Original Design</th>
<th>Revised Design</th>
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</thead>
<tbody>
<tr>
<td><strong>MSW &amp; C&amp;D:</strong></td>
<td><strong>MSW:</strong></td>
</tr>
<tr>
<td>▪ Phases 5-8: 3.0M Tons</td>
<td>▪ Phase 4A: 1.8M Tons</td>
</tr>
<tr>
<td>(= Total Capacity)</td>
<td>▪ Phases 5-8: 3.0M Tons</td>
</tr>
<tr>
<td></td>
<td>▪ Phases 9-10: 5.7M Tons</td>
</tr>
<tr>
<td><strong>C&amp;D:</strong></td>
<td><strong>C&amp;D:</strong></td>
</tr>
<tr>
<td>▪ Area 1: 0.3M Tons</td>
<td>▪ Area 1: 0.3M Tons</td>
</tr>
<tr>
<td>▪ Area 2: 0.5M Tons</td>
<td>▪ Area 2: 0.5M Tons</td>
</tr>
<tr>
<td><strong>Total = 8.3M Tons</strong></td>
<td><strong>Total = 8.3M Tons</strong></td>
</tr>
<tr>
<td><strong>(177% Increase)</strong></td>
<td><strong>(177% Increase)</strong></td>
</tr>
</tbody>
</table>
Johnston County, NC
Permitting Issues

- Wetlands (1.8 Acres)
- Streams (490 LF)
- Piggyback Landfills
Johnston County, NC
Technical Issues

- **Piggybacking of Unlined Units**
  - Double Liner System
  - Evaluation of Liner System Strain
  - Interface Shear Strength Requirements
  - Landfill Gas (LFG) Concerns
Johnston County, NC
Double Liner System

Leachate Collection Flow: 250 gallons/acre/day
Leak Detection Flow: 2 gallons/acre/day (< 1% of Collection Flow)
Piggyback Landfills: LFG Concerns

Passive LFG Collection Trenches @ 100' Spacing

LFG Collection Trench
Johnston County, NC
Phase 4A MSW Piggyback Unit

Cell 1 - 2002
Cell 2 - 2005
Cell 3 - 2009
Example No. 2
Newton County, GA
Lower River Road Landfill
Newton County, GA – Revised Design

Revised Design: 7.8M Ton Capacity
200% Increase Over Original Design

Expanded Site 2 MSW

Red = Unlined Unit
Green = Lined Unit
Permitting Issues:
- Floodplain Modification
- Wetlands (0.4 Acres) & Streams (1,550 LF)
- Stream Buffer Variance
- Waste Removal & Relocation

Technical Issues:
- Redesign of Site 2 – Phase 3
  - Compatible with Long-Term Plan
- Waste Removal and Relocation
Newton County, GA
Waste Removal & Relocation – Key Aspects

Sequencing:

- In Harmony with Landfill Development
  - Manpower/Equipment Concerns
  - Time to Remove and Verify Cleanup
- Keep Existing Buildings Operational
Newton County, GA
Waste Removal & Relocation Plan

- Health & Safety
- Community Relations
- Environmental Controls & Monitoring
- Site Preparation Activities
- Excavation
- Material Segregation
- Redisposal Procedures
- Quality Assurance
- Testing to Confirm “Clean” Subgrade
Conclusion

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Questions & Discussion
Thank You!

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