Minnesota’s Closed Landfill Program: 20 years of cleanup and long-term care

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What We’ll Discuss

- Background.

- Lessons learned:
  - Construction
  - Post-closure care
  - Land management

- Summary.
Minnesota is famous for:

- Land of 10,000 Lakes
- Fishing
- Paul Bunyan & Babe
- Long & Cold Winters
But all states have:

Closed Landfills
Closed Landfills Addressed
Historically:

- Solid Waste Rules and Permits.
- Superfund.
Minnesota Realized:

- Many closed landfill Permittees ill equipped to pay for necessary cleanup and long-term care.

- 1992 “Alternative to Superfund Report” by MPCA found Superfund:
  - Slow
  - Costly

- Landfill cleanup is a societal problem.
Landfill Cleanup Act (LCA) in 1994

- Currently, 112 Qualified Landfills.
  - Permitted by state to accept MSW
  - Closed by specific date
  - Must meet required closure standard
  - Includes adjacent disposal areas

- Resulted in creation of Closed Landfill Program (CLP).
Closed Landfill Program
Funding Sources

- Solid Waste Management Tax.
- General Obligation Bonding Authority.
- Insurance recovery.
- Financial assurance.
Insurance Recovery

- Adopted risk-based approach in 1996.
  - State placed in policyholder’s shoes

- State hired Special Counsel for recovery actions.

- CLP settled globally with 56 carrier groups at 106 landfill sites for $96.6 million.

- Natural Resource Damage claim settlements for $9.4 million.

- Part of later insurance settlements invested in Closed Landfill Investment Fund.
Entry into Closed Landfill Program

- Landfill Cleanup Agreement (LCA) elements:
  - Easements/restrictive covenants (Institutional Controls)
  - Waiver of claims
  - Hauler records & insurance policies

- Site-specific LCA elements:
  - Transfer of financial assurance if available
  - Transfer of property
  - Reimbursement
Current Status of Landfill Entry into CLP

- 109 Landfill Cleanup agreements completed.
- 8 of 9 closed landfills de-listed from federal superfund per 1995 agreement with EPA.
- 51 of 52 closed landfills de-listed from state superfund.
- Reimbursement payments equal $41.1 million.
CLP Land Ownership

- 8,400 acres in Qualified Facility property.
  - 3,000 acres (38 landfills) owned by state
  - 5,400 acres owned privately or by local government units

- State has purchased 512 acres of buffer property.

- Most private landfill owners have transferred landfill property to CLP.
Landfill Locations
CLP Uses Risk-based Prioritization to Manage Site Risk

- Site risk is ranked each year.
- Scoring model parameters include:
  - Groundwater
  - Landfill gas
  - Surface water
  - Current on-site land use
  - Proposed on- & off-site development
CLP Uses Team Approach

- Supervisor (1)
  - Land Manager (3)
  - Hydrogeologist (4)
  - Engineer (2)
    - Construction & O&M Project Manager (2)
  - Field Staff (3)
- Student Worker (1)
CLP Activities at Landfills
Construction

Active Gas Extraction
CLP Activities at Landfills

Construction

Active Gas Extraction

Cover Upgrades & Repairs
CLP Activities at Landfills

Construction

- Active Gas Extraction
- Cover Upgrades & Repairs
- Groundwater Pump & Treat
Construction Costs by Year
Lessons Learned
Construction

- Investigate.
- Relocate/consolidate waste + minimum 5% slope.
- Continuous oversight.
- Use geonet for sand drainage layer.
- Use erosion blanket liberally.
- Need approved detailed materials handling plan from contractors.
CLP Objectives
Post-closure Care

Maintain cover systems
CLP Objectives
Post-closure Care

Maintain cover systems

Groundwater, surface water & gas monitoring
CLP Objectives

Post-closure Care

- Maintain cover systems
- Groundwater, surface water & gas monitoring
- Operate remediation systems
CLP Remediation Systems

- 101 landfills with cover systems.
- 10 landfills with leachate collection systems.
- 7 landfills with groundwater treatment systems.
- 21 landfills with active gas systems.
- 8 landfills with solar flares.
CLP Contracts

- Design/construction oversight.
- Monitoring & analysis*.
- Operation & maintenance.
- Drilling.
- Surveys.
- Leachate hauling.

* CLP Contract available for use by Cooperative Purchasing Venture members
Post-closure Care Costs by Year

- 1995: $0
- 1996: $1,000,000
- 1997: $2,000,000
- 1998: $3,000,000
- 1999: $4,000,000
- 2000: $5,000,000
- 2001: $6,000,000
- 2002: $7,000,000
- 2003: $5,000,000
- 2004: $6,000,000
- 2005: $7,000,000
- 2006: $8,000,000
- 2007: $9,000,000
- 2008:
- 2009:
- 2010:
- 2011:
- 2012:
- 2013: $7,000,000
Lessons Learned

Post-closure Care

- Expect gas production for 50+ years.
- Use of passive solar flares.
- Expect frequent and expensive GW pump maintenance.
- Staff can perform some O&M work where practicable.
- Financial assurance received usually inadequate.
Lessons Learned
Post-closure Care (continued)

- Emerging contaminants & changing Drinking Water Standards impact program.
- Groundwater Sampling Frequency Guidance reduced sampling/analysis costs by 40%.
- Active gas systems more effective than groundwater pump-and-treat systems in VOC removal.
- Make adjustments for weather.
CLP Activities
Land Management
Affected Property Notice (Notification)

- Provide LGUs with maps depicting:
  - Land Management Area
  - Groundwater contaminant plumes and areas of concern for groundwater and methane gas
  - Narratives explaining what is shown on maps

- Make recommendations & provide technical advice to assist LGUs in adoption of land use controls.

- Maps & narratives updated as necessary.
Land Use Plans

- Statute requires CLP to develop individual site Land Use Plans (LUP).
- LGU’s plan must be consistent with MPCA’s LUP.
- Plan provisions include:
  - Protect on-site remediation systems
  - No development increases risk
Hopkins Landfill
(Case Study)

- Landfill placement preceded apartment development.
- High risk due to edge of waste near residents.
- CLP spent $5 million to consolidate waste.
Land Use Planning
Reducing the Risk
Methane Gas Area of Concern

CLP Methane Area of Concern: HOPKINS SANITARY LANDFILL

Minnesota Pollution Control Agency

Site Contacts
Land Manager: Shawn Ruotsinoja
Engineer: Peter Tiffany
Hydrogeologist: Joe Julik

Site Features
- Gas Probe
- Waste Footprint
- Land Management Area
  Designates the property that is under the responsibility and control of the MPCA.
- Methane Area of Concern
  Area surrounding the landfill that may be impacted by subsurface migration of methane gas.

DISCLAIMER: The State of Minnesota makes no representations or warranties to the user as to the accuracy, currency, suitability or reliability of this data for any purpose. This map depicts a reasonable approximation of impacts from the landfill only and makes no inference about impacts from other potential sources.

Created 11/21/2013 by CLP Engineer Peter Tiffany

1:3,900 Feet
Groundwater Area of Concern
Land Management
Lessons Learned

- Understand property boundaries.
- Pictures are worth 1,000 words.
- Partner early with LGU to adopt local land use controls.
- If you can’t remove the risk from the people, then remove the people from the risk.
- Land use controls are less expensive and more permanent than constructed remedies.
Looking Ahead

- Known construction almost completed, but repairs are on-going.
- Anticipate more cost savings in O&M, however long-term obligations remain.
- Land use planning is key for development.
- Off-set O&M costs with renewable energy such as solar power.
More Information

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www.pca.state.mn.us/cleanup/closedlandfills.html
(closed landfills)