

Chapter Five: Actions to Meet Goal One

Goal One of this Plan states:

By 2013, ensure long-term environmental protection by improving future landfill technology and addressing public health and environmental concerns associated with closed landfills.

This goal seeks to protect human health and the environment by ensuring the safety of old, closed landfills and those currently in operation. The goal recognizes that updated technology, continual monitoring, the reduction of potentially harmful waste, and public education are needed to achieve this goal.

TECHNOLOGY FOR CLOSED AND OPERATIONAL LANDFILLS

North Carolina reached a major solid waste management milestone and became a national model when it closed all unlined MSW landfills. It also drastically improved disposal safety. Although the facilities are closed, they must still be monitored and managed to prevent potentially negative long-term effects on the environment and human health. North Carolina currently has 126 inactive unlined MSW facilities and more than 700 abandoned dumpsites. Studies that examine human risk from exposure to harmful contaminants created by degrading waste in unlined facilities have barely begun. Studies on the other possible effects closed landfills may have on the environment are also just getting underway. Without data, creating assured long-term planning or management strategies is a problem. Regulations must be science-based, but the need for this data has outpaced the scientific community.

Although today's municipal solid waste landfills use superior technology compared to old, unlined landfills, they still need to be monitored for long-term environmental effects. As research and development spur new technology, the level of protection they provide will increase. Just like old landfills, the risk from new landfills lies in the toxicity of the waste they hold. Landfills hold household hazardous wastes, electronics and used motor oil that contain potentially harmful components. Diverting these materials will decrease new landfills' long-term environmental effects.

C&D landfills have different requirements than MSW landfills, and generally operate under less stringent controls. C&D materials are commonly believed to pose less risk than municipal solid waste, but a recent EPA study points out areas of concern. More study on the environmental effects of C&D facilities is needed to protect human health and the environment.

KEY ACTIONS TO MEET GOAL ONE

A number of actions need to be taken to improve landfill safety. Reducing waste disposal, developing recycling programs for particular materials, and increasing public education about neighborhood solid waste facilities are priorities. Solid waste management is complex, so the actions needed to achieve one goal often contribute toward another. The key actions are outlined below.

Objective 1.1. Research bioreactor landfill design and closure requirements and adjust regulations accordingly.

New, lined landfills are designed to shield waste from water and other elements that increase leachate and landfill gases. "Dry tomb" technology uses engineered caps, leachate collection and methane recovery systems to minimize environmental impacts.

Keeping water out reduces leachate, but increases the time before waste reaches full “stabilization,” or completely degrades. Monitoring should continue until waste stabilizes, as this time period may be longer than anticipated.

Current research cannot accurately predict the long-term life of landfill liners, so postponing stabilization creates uncertainty about how long the liners will continue to protect human health and the environment. Accelerated stabilization may offer better, long-term protection.

“Bioreactor” landfills speed waste degradation and reduce the time available for leachate and methane to generate. Research to modify existing liner technology in order to speed stabilization while still protecting groundwater is underway.

The following key actions contribute to this objective:

- Monitor the pilot bioreactor landfill in Buncombe County and similar projects across the United States.
- Explore streamlined permitting or provide other incentives for bioreactor projects.
- Dialogue with other states and the U.S. EPA to stay abreast of state and federal bioreactor research.
- Work with North Carolina chapters of the Solid Waste Association of America and the National Solid Wastes Management Association to conduct seminars and forums that explore research needs and share the results of completed research.
- Draft bioreactor permit guidelines for public review, as it becomes feasible.
- Work to pass funding mechanisms that help finance additional pilot bioreactor projects and continued research.

Objective 1.2. Reduce landfill disposal of material with potentially harmful components.

North Carolina landfills more than 30,000 tons of household hazardous waste and 500,000 gallons of used motor oil each year. The jump in electronic discards, C&D waste and other waste streams may increase landfill toxicity.

Reducing the flow of toxic or potentially toxic materials to MSW landfills would improve the long-term environmental health and safety these facilities offer. Reducing toxics makes bioreactor landfills safer and offers more environmental protection. Local programs successfully divert HHW, but are not widely available statewide. Creating a statewide HHW collection infrastructure with permanent collection facilities (as opposed to designated collection days) would increase the amount of HHW diverted.

The following key actions contribute to this objective:

- Establish permanent HHW collection facilities statewide in cooperation with the Carolina Recycling Association’s Household Hazardous Waste Council.
- Propose disposal bans on materials with hazardous elements; e.g. oil filters and CRTs.
- Propose advance disposal fee legislation for certain products to fund increased diversion efforts.
- Promote waste-screening workshops for landfill employees in partnership with local solid waste organizations.
- Monitor hazard research on specific waste streams (e.g. construction and demolition).

Objective 1.3. Review requirements for construction and demolition landfills.

More than 60 percent of the state's C&D waste goes to C&D landfills. C&D waste contains potentially hazardous elements and may unintentionally include municipal solid waste. Disposed gypsum wallboard encourages hydrogen sulfide generation. Leftover paint, stains, water sealants and other hazardous chemicals may be present in C&D waste, along with lead-painted boards, asbestos or treated lumber. Treated lumber contains copper, chromium and arsenic that can enter leachate and make it hazardous. Objective 1.3 is designed to reduce hazards by examining how effectively current C&D landfill design and operation requirements protect human health and the environment.

The following key actions contribute to this objective:

- Review data on C&D waste streams with an emphasis on components that may pose immediate or long-term hazards.
- Review data documenting groundwater contamination or other environmental impacts caused by C&D landfills.
- Consider requiring liners and leachate collection systems at new C&D facilities as necessary.
- Consider separating and diverting some C&D waste items from C&D landfills.

Objective 1.4. Develop and distribute action plans for closed MSW landfills and abandoned dumpsites.

North Carolina's 126 closed municipal solid waste landfills pose a long-term concern. No data exists on how long the facilities can protect human health and the environment, but the fact that 90 percent of the facilities show some sign of groundwater contamination is cause for concern. Without facility-specific data, it is impossible to determine how long a given facility needs care after closure, what the total monitoring costs will be, and where often costly cleanups need to be performed. Management plans that recognize and address these uncertainties would help the state develop procedures that reduce future problems.

North Carolina has already located more than 700 pre-regulatory abandoned dumpsites, but more exist. To date, there has been no assessment of the environmental impacts these facilities pose to state residents. The state needs to locate the remainder of these sites and assess the environmental impacts they pose. The data can be used to determine if they are hazardous and where cleanups are necessary.

The following key actions contribute to this objective:

- Determine if current MSW landfill requirements for long-term care are adequate (e.g. Appendix 1 and 2 monitoring, financial assurance, etc.)
- Create and propose a long-term action plan.
- Consider adding action plans for closed unlined MSW landfills and abandoned dumpsites to 10-year local solid waste plan requirements.
- Conduct seminars and outreach efforts that encourage action plans for closed unlined MSW facilities and abandoned dumpsites.
- Establish a state-level funding mechanism to support plan development and implementation.
- Require better caps on closed unlined MSW landfills as needed to enhance environmental protection.

- Determine the locations and owners for all abandoned dumpsites. Perform environmental assessments at each dumpsite.
- Support and promote innovative and cost-effective technologies to clean contaminated groundwater at closed unlined MSWs and abandoned dumpsites.
- Propose a state-level funding mechanism to evaluate environmental impacts and clean contaminated groundwater where needed at closed unlined MSWs and abandoned dumpsites.

Objective 1.5. Establish a strategy to fund long-term care and cleanup at closed, lined MSW landfills.

More than 90 percent of North Carolina's 126 unlined MSW landfills have impacted nearby groundwater supplies with leachate. When lined MSW landfills close, they are required to use a synthetic liner in the cap. Using liners at the bottom and top of a landfill is referred to as "dry tomb" technology. Dry tombing slows waste degradation and increases the time it takes waste to stabilize. This time period may exceed the lifetime of the facility's top and bottom liners and its leachate collection system.

Predicting the cost of long-term monitoring and where cleanups are needed is almost impossible without data, but most cleanup estimates total many millions of dollars. Local governments, private landfill owner/operators, and taxpayers will probably provide these funds. However, when private owners cannot be found, are bankrupt or out of business for some reason, cleanup costs typically fall to waste generators and the state. North Carolina currently requires financial assurance mechanisms to ensure 30 years of post-closure care and management, but 30 years may be insufficient. Given this possibility, the state should be prepared to fund long-term care at some facilities.

The following key actions contribute to this objective:

- Review research on the length of time landfills may pose environmental threats.
- Investigate and estimate the cost of 50 years of landfill care, monitoring and cleanups in cooperation with the Institute of Government, the N.C. Association of County Commissioners, and the N. C. Chapter of the Solid Waste Association of North America.
- Review the adequacy of current financial assurance mechanisms.
- Develop a strategy to fund long-term care of closed landfills that includes the cost to create and implement action plans.