



Disposal---Yesterday, Today, and Tomorrow

Introduction

Waste disposal is a critical element of Washington's system of solid waste management. Despite laudable progress toward meeting the state law's priorities for waste prevention and recycling, most wastes generated in Washington are still disposed of instead of recycled. Solid waste is either buried in various types of landfills or burned in incinerators, with the resulting ash buried in landfills. Some of the incinerators produce energy as a by-product. Of the measured portion of disposed wastes in Washington, 94 percent goes into landfills. The other 6 percent is burned in waste-to-energy facilities and incinerators, with production of energy as a by-product. Since 1991, the number of operating municipal solid waste (MSW) landfills in the state has dropped from 45 to 18 (WDOE 2003). The trend is toward more centralized landfills that are better able to meet today's more stringent siting, permitting, and operating standards than the decentralized network of landfills from the past.

Waste generation in Washington has been increasing for some time, and Washington will remain reliant on landfills and incinerators for many years. Waste reduction, reuse, and closed-loop recycling are expanding, which should decrease disposal over time, but population is increasing, which in turn increases the volumes of wastes generated. Given these realities, it is important to ensure that disposal is managed in the most protective ways possible. Disposal of solid wastes should not pose risks to human health and the environment, a specific directive of state law (RCW 70.95.010 and RCW 70.95.165).

Many former landfills have closed or have been abandoned over the years. Federal and state cleanup laws and programs have diligently focused on the former sites considered to pose the largest threats to health and the environment. However, hundreds of former landfill sites have not been addressed at all, for a variety of reasons. No statewide list of these closed landfill sites exists. Many sites have not even been identified and located. Some of the known sites are not hazardous waste sites, or potential contamination is unknown, so they have not been referred into the state cleanup program (managed by Ecology under the Model Toxics Control Act, or MTCA, pursuant to Chapter 70.105D RCW). Many sites are included on the ranked state cleanup "Hazardous Sites List," but are lower priorities than other sites on the list, or lack cleanup funding, or both. This unintended legacy of former landfills needs to be identified and addressed. Moreover, now that we know that waste disposal facilities are not environmentally benign, governments need to ensure that both today's and tomorrow's disposal facilities do not pose current or future threats to health or the environment. We must avoid creating a cleanup or pollution legacy from disposal facilities for future generations to shoulder.

This section includes recommendations for addressing the legacies left over from yesterday's closed and abandoned landfill sites, a necessary step to protect public health and the environment. Also included are recommendations for ensuring that today's disposal facilities minimize human health and environmental risks. Finally, actions for the future are recommended, to make certain that we do not create future legacies of pollution.

History

For a long time we have been burying our wastes. Many people live, work, and play safely near former landfill sites. A century ago, wastes were deposited into unlined "municipal dumps." Most of these are commonly thought to pose little or no threat to human health or the environment. Food wastes decomposed somewhat, many materials were burned, and large items were durable and just stayed where we put them.

Some of the more recent sites pose larger problems. As years went by and as changes in society and technology also changed the waste we generated, a greater volume and variety of hazardous materials began to end up in disposal sites. Placement of these materials into the unlined "municipal dumps" was much more likely to create pollution problems. As environmental releases and their consequences became more evident, the "municipal dumps" were replaced with sanitary landfills. Today, several types of landfills, including inert and limited-purpose landfills, accept a myriad of wastes. Many MSW landfills are lined, covered daily, and ultimately capped to prevent leakage. They are complex, engineered storage vessels for huge quantities of a variety of different materials. The liner systems of today can inhibit waste decomposition, which has both benefits and drawbacks.

Before 1969, no statutes or rules were in place to directly deal with the proper handling of solid waste. In 1969, the state legislature passed the first statute specific to solid waste, Chapter 70.95 RCW, the Solid Waste Management Act. The law has changed through the intervening years to address the evolution in knowledge about the proper handling of solid waste and the proper construction, monitoring, and closure of landfills.

State regulations for municipal and non-municipal solid waste landfill construction, operation, and closure began in 1973 with the adoption of Chapter 173-301 WAC, Regulations Relating to Minimum Functional Standards for Solid Waste Handling. This rule was performance-based, leaving discretion to the operator in meeting rule requirements. In 1985, Chapter 173-304 WAC, Minimum Functional Standards for Solid Waste Handling, was enacted. These rules were more prescriptive, limiting discretionary options for meeting facility requirements. Rule amendments in 1988 incorporated closure, post-closure, and financial assurance requirements. Also, in 1990 a regulation was enacted that established performance standards, emissions standards and design requirements for solid waste incinerator facilities. A regulation addressing ash from incineration of municipal solid waste was adopted in 1990 (Chapter 173-306 WAC). The regulation defines special incinerator ash and prohibits disposal of this ash in MSW landfills, requiring it to be placed in special ash monofills instead, or to be treated through an approved process (such as stabilization or solidification). The regulation also includes stringent handling requirements for special incinerator ash.

In 1991, the federal Environmental Protection Agency (US EPA) adopted federal minimum requirements for the construction, operation, and closure of MSW landfills under the Resource Conservation and Recovery Act (RCRA), subpart D. States were given two years to adopt comparable rules, to request and receive federal delegation, and thereafter to operate a state system to assure minimum national standards for MSW facilities.

In response to the federal requirements, Ecology adopted Chapter 173-351 WAC, Criteria for Municipal Solid Waste Landfills in 1993. This rule further specifies the requirements for municipal solid waste landfills. Subsequently, the state applied for and received partial delegation of the federal RCRA subpart D oversight program for municipal solid waste landfills. Washington did not receive full delegation in three areas: the definition of existing facility, groundwater monitoring requirements, and engineering equivalency. In 1994, Washington received delegation for groundwater monitoring. The definition of existing facility is now moot. The question of engineering equivalency still must be addressed.

In 2003, Chapter 173-350 WAC, Criteria for Solid Waste Landfills, was adopted to address non-municipal landfills. The new regulation provides beneficial use options, and advances the development of modern standards for other solid waste facilities.

Today's Reality

In the past thirty or so years, solid waste disposal facilities have become much safer and far more protective of health, habitat, and natural resources. Many of the modern landfills have liners to protect ground water, gas collection and flare systems to prevent gas migration, gas and groundwater monitoring systems, compaction and daily cover, and buffers from adjoining land uses. For some landfill types, funds to assure proper end-of-life closure and monitoring are required. These are significant improvements from the norm of even fifteen years ago.

Waste-to-energy facilities also accept solid waste for disposal in Washington, including a facility operated by the Spokane Regional Solid Waste System. The Spokane facility is part of an integrated system to manage its solid waste, and it produced more than 15,000 Megawatt hours in 2003, which generated \$12 million in revenues. Disposal of residual ash from the burning requires much less MSW landfill space than the initial amount of solid waste.

The extent to which today's landfills adequately protect human health and the environment is a subject of debate, however. Requirements that govern siting, operation, closure, and post-closure are stringent and extensive. While the newest landfills are state-of-the-art facilities, they are far from benign in their impacts. Landfills may still affect the air, land, and water but to a significantly lesser degree than before today's standards went into effect. As waste decomposes in landfills, methane and other hazardous gases are generated. Methane is a greenhouse gas concern because its impact is twenty-three times that of carbon dioxide (EIA). Leachate from decomposing matter in landfills can contain hazardous constituents. If landfill liners and/or leachate collections systems fail, then groundwater and surface-water pollution can occur. No liners are engineered to be 100 percent impenetrable or to last forever without some sort of failure. In fact, US EPA officials have stated that problems can occur beyond thirty years after closure of a landfill, pointing out that "even the best liner and leachate collection system will ultimately fail due to natural deterioration" (EPA, p. 32).

Landfill closure means completion and cessation of disposal at a site. However, other functions continue after closure, including surface and groundwater monitoring, landfill gas management, erosion control, and leachate collection and monitoring. The types and levels of activities that continue during post-closure are dependent on the landfill's type and size, as well as other factors. The length of time to continue these activities depends on the site itself. The various regulatory requirements place minimum times of monitoring at 20 years (for limited purpose landfills) or 30 years (for MSW landfills). Those sites that closed before 1972 had little to no monitoring of the sites. Between 1973 and 1985, the site owner was required to do "necessary maintenance" for a minimum of five years, or until the site was stabilized (WAC 173-301-309). The solid waste handling standards adopted in 1985 (Chapter 173-304 WAC) required, for the first time, groundwater monitoring during operation, closure, and for at least twenty years during post-closure care for MSW landfills.

Disposal Costs

The price of disposal today should incorporate the costs of meeting the existing broad range of regulatory requirements. For landfills, this should include not only operational costs, but also monies to cover facility closure and post-closure monitoring activities. Charges for disposal are intended to, but do not always, include potential costs for cleanup from environmental degradation that could result from the facility. Even when some of these costs are built into disposal fees, they are not expected to compensate for the human health and environmental impacts caused by the facilities. Cleanup of contamination does not necessarily restore groundwater, soils, and other natural features to their original conditions, but often focuses on containing the pollution and reducing the likelihood of additional pollution. Many costs of landfills, then, are not paid through disposal fees and can not be quantified. Many of these costs are societal costs, such as greenhouse gas emissions.

Financial assurance is required for many landfills operating today. Closure and post-closure accounts are designed to pay only for projected costs for closing and monitoring the sites, unless problems are detected during the period when wastes are accepted and have been incorporated into closure and post-closure cost estimates. For example, if monitoring well samples taken during active operation of a landfill show a level of contamination exceeding groundwater standards, then the financial assurance requirements dictate corrective action costs to be estimated, evaluated annually, and included in the total amount of the financial assurance instrument. However, it is possible that cleanup needs, such as groundwater contamination, might not be detected at a site until much later, perhaps during the post-closure monitoring period. In this instance, it would be unlikely that financial assurance mechanisms would be able to pay for the cleanup.

The strict operation, closure, and monitoring requirements of today significantly reduce the likelihood of a need for future cleanups. However, these requirements are based on a set of assumptions about how long the pollution threats exist in a landfill and on calculations about the waste decomposition rates, the pressure from layers of waste and daily cover materials, the integrity of the liners and caps, and other factors.

Cleanup of Closed Sites

Taxpayers have been paying the costs of cleaning up pollution problems from landfills that have been closed or abandoned. Millions of taxpayer dollars have been committed to these

activities from the federal, state, and local government levels. Theoretically, the property owners, waste generators and transporters are legally liable for these closures and cleanups. In reality, the costs are often borne by the public at large.

Since 1989, over \$75 million in state grant funds has been given to local governments to clean up contaminated landfills. All grants included matching requirements, so the actual cleanup costs were between \$125 million and \$150 million. In addition, from 1992 to 1996, more than \$12 million was given by the state to local governments to close existing permitted landfills. The most problematic of these sites have been cleaned up, but many remain unaddressed. Sometimes, private property owners (or potential developers) pay for cleanup. In some instances, cleanups managed by the federal government involved recovering costs from waste hauling companies that had previously brought wastes to the facilities. The solid waste companies legitimately used those sites for disposal, and the payment of unanticipated cleanup costs from today's revenues can have a huge impact on these companies.

Long-Haul Transport

Today's solid wastes are commodities, often traveling many miles before reaching their final disposal destinations. Out of a total of 4.7 million tons of waste in 2002 (WDOE 2003, p. 107), nine of the state's MSW landfills received 2 million tons from other counties, sometimes from other states and countries (WDOE 2003, p. 110). Because of this, it is also important to consider the impacts of long-distance transportation and associated storage of wastes. In 2002, twenty-five Washington counties that are not adjacent to Klickitat County sent municipal solid wastes to the Roosevelt Regional Landfill located there (WDOE 2003, p. 111). Various locations in Washington sent about 1.4 millions tons of their solid waste to out-of-state landfills in 2002 (WDOE 2003, p. D-4).

Wastes that are long-hauled are typically trucked to transfer facilities for consolidation, sent by rail to the disposal destination transfer point, and then trucked to the disposal site itself. When not sent by rail, they are trucked from transfer points directly to the disposal sites. As an example, Snohomish County sends about 50 shipping containers each weekday by rail from Everett to Roosevelt, which is a 360-mile, twelve-hour journey (Snohomish). Clearly, long-hauling wastes for disposal carries its own set of impacts, in addition to the disposal impacts themselves. In 2002, over 2 million tons of solid waste was transported by rail through rail yards in Seattle. Almost all of this was generated in-state (Friedman).

Goals and Preferred Future

The following long-term goals are envisioned for the next generation, about 30 years from now.

In the future, we should dispose of far fewer materials. We should be able to reuse or recycle most leftover materials. Even so, some materials may not be safely reusable or recyclable, and disposal may be the only viable option for them. Waste disposal facilities in the future should pose minimal to no threats to human health or the environment. It would be better if the landfills and incinerators operating today could be used conservatively and would last forever, eliminating the need to build new disposal facilities. Landfills, by their very nature, are waste storage vessels for future generations to manage.

Working toward this future requires diligence, but also relies on the development of additional information about the risks of disposal facilities, and may rely on development of new technologies. Making the transition to disposing of very few materials and ensuring minimal threats to human health or the environment from disposal facilities will take significant time to achieve.

As Washington moves toward the Beyond Waste future, it is important to not carry forward the pollution and potential pollution legacy of past landfills that have been closed or abandoned. While it will take many years to completely identify and address all of these sites, it is a very important goal.

It is equally imperative that existing waste disposal facilities continue to operate in compliance with all regulatory requirements. These requirements should continue to improve as information is gained about the impacts of these facilities and also about new technologies and methods for safe and protective disposal.

In thirty years,

■ **Closed Sites are Addressed**

Yesterday's landfills no longer pose threats; many are redeveloped and are vital community assets.

■ **Landfills Fully Meet Compliance Requirements**

Landfills and other disposal facilities do not cause problems. The few problems that may come up are contained, addressed, and cleaned up to prevent further degradation and to protect human health. Costs for actions needed are paid by the property owners and waste disposers.

■ **Facilities are State-of-the-Art**

The very small amount of waste that is not recoverable is disposed of at state-of-the-art facilities and collection and disposal have minimal impacts. These facilities are sited and operated to pose no threats to human health or the environment.

■ **Disposed Materials are Recovered**

Disposal facilities have been mined to recover resource materials for recycling. Disposal occurs in such a way that what is being disposed can, where feasible, be recovered later.

Proposed Actions

Short-Term Milestones

To reach the 30-year goals described above, considerable progress must be made in the short term. The following milestones, or shorter-term goals, are proposed as targets to be reached in approximately five years.

Within five years,

- A complete inventory exists for closed/abandoned disposal sites throughout the state.
- Half of the closed sites suspected of having problems have been evaluated to determine needed actions.

- The remaining closed sites are under evaluation.
- At least one closed site has been addressed through a pilot process.
- Financing mechanisms are available to pay for addressing at least the top 25 percent of sites with needs.
- An increased number of sites have been redeveloped or are under redevelopment.
- An evaluation has been completed that details the complete set of costs and impacts of disposal, including long-haul storage and transfer costs, potential revenues from energy recovery facilities or landfill mining, and post-closure remediation cost estimates (to the extent that they are known).
- A landfill closure checklist has been developed and is in use at operational facilities.

Overview of Proposed Strategies

The six recommendations described below are proposed as starting points to work toward the long-term desired future for disposal. The success of these efforts will rely on strong working partnerships between federal government, state government, local government, property owners, and potential developers. Creative thinking is essential, especially for finding ways to finance the cleanup of closed sites that have no revenues associated with them.

The principle of continuously improving disposal methods and facilities will help us find ways to maintain our needed disposal infrastructure while minimizing its impacts for the long term. These recommendations go hand-in-hand with the Beyond Waste key initiatives and the focus on reducing wastes and toxics.

Consistent monitoring and compliance assistance is needed to prevent future pollution problems from disposal facilities. Finally, incorporating the complete costs of the disposal system, including post-closure and monitoring costs, into the prices charged for disposal is needed to level the economic playing field for closed-loop recycling.

Summary List of Recommendations

These recommendations are for the approximately five-year period and are organized into three categories of recommendations. Note that the numbers reflect the numbering system for recommendations in the Summary of the Washington State Hazardous Waste Management Plan and Solid Waste Management Plan document.

■ For Closed and Abandoned Solid Waste Landfills

Recommendation #8SW - Identify closed and abandoned sites statewide.

Recommendation #9SW - Evaluate and prioritize potential problems at closed sites.

Recommendation #10SW - Develop feasible and responsible processes for addressing priority sites.

Recommendation #11SW - Identify funding to address priority sites.

■ For Existing Disposal Facilities

Recommendation #12SW - Ensure that existing disposal facilities comply with requirements.

■ For the Future

Recommendation #13SW - Continually reduce disposal impacts on human health and the environment.

Priority Recommendations

Recommendation #8SW - Identify Closed and Abandoned Sites Statewide

Statement of Action

Inventory and track closed and abandoned landfills. Ensure that property owners with potential or confirmed former sites are notified.

Specific Steps

- ✓ Establish an agreed-upon process to identify closed and abandoned landfills throughout the state.
- ✓ Develop an inventory of all identified sites.
- ✓ Notify property owners of those sites to verify locations.
- ✓ Establish property identification procedures.

Background/Rationale

The location of closed and abandoned landfills provides historical land use information for state and local government that can be used in future land use decisions. It provides information on areas where potential contamination occurred or may occur in the future. It can point the way to further action needed and will institutionalize information that is currently incomplete.

Each county in Washington has a legacy of closed and abandoned landfill sites. Local governments or private individuals and companies own these sites. The majority of these landfills operated prior to full recognition that there were potential health and environmental risks associated with the method and design of disposal sites when each landfill was active.

Ecology's Toxics Cleanup Program database of approximately 9,000 potentially contaminated sites includes about 300 former landfills. Some of these former landfills are also on the smaller list of sites that have been assessed and ranked, the "Hazardous Sites List." A conservative estimate by Ecology indicates that an approximate total of 600 closed and abandoned landfills statewide require identification and evaluation for possible contamination. This estimate is a starting point only. The completed inventory will define the actual number of closed and abandoned landfills statewide.

Ecology and local governments must work together to develop a process to find and evaluate unlocated sites. The best source of information on the location of abandoned or closed landfills resides within local government. The first imperative is to determine what information already exists. An inventory of every county needs to be completed. Local property records can indicate where the majority of the sites are located. Additional work, such as site visits and conversations with local people in the areas will also be necessary.

Property owner notification and official property identification procedures, such as deed notice recording, are important to ensure accurate records of the former sites. Some education of property owners may be needed during this time. Care must be taken to minimize potential

liability concerns when developing the inventory and tracking process, however, as collecting data alone on a site can lead to liability and concerns about cleanup costs.

Recommendation #9SW - Evaluate and Prioritize Problems at Closed Sites

Statement of Action

Establish an approach, schedule, and process for evaluating and prioritizing action needed at identified sites.

Specific Steps

- ✓ Develop an agreed-upon process to informally evaluate and prioritize the sites identified through the inventory.
- ✓ Evaluate the sites and prioritize them for cleanup or other actions.

Background/Rationale

Collaboration is needed between local jurisdictional health departments, local solid waste departments and Ecology. While it is not clear that one statewide priority list is needed to successfully accomplish this, clear criteria, some sort of rating scheme, and close coordination will be imperative.

Consistent methods need to be used across the state to review identified sites. A preliminary screening needs to be performed on identified sites that appear likely to have contamination and the greatest exposure or threat to human health and the environment. Next, sites suspected of having contamination or other problems should be evaluated to gather additional information. Criteria should be applied to the sites that have contamination levels of concern or other problems. The evaluation of sites should include identification of all domestic wells located within 1000 feet of the landfill property boundary.

This process should also determine which sites should be addressed first. Criteria should consider those sites most likely to be contaminated, most likely to present threats to human health and the environment, and sites likely to have economic development potential.

RECOMMENDATION #10SW - Develop Feasible and Responsible Processes for Addressing Priority Sites

Statement of Action

Take steps to encourage needed action on closed and abandoned solid waste landfills. This should include addressing sites through existing cleanup programs, where appropriate. This may also include developing additional options for addressing sites with minimal problems, or that fall outside the scope of existing cleanup programs.

Specific Steps

- ✓ Explore opportunities to develop more flexible approaches to address closed and abandoned landfills.
- ✓ Consider designing and implementing a state/local government pilot project that addresses a category or group of sites to more efficiently and cost-effectively resolve issues at similar sites.

Background/Rationale

The Model Toxics Control Act (MTCA) Chapter 70.105D RCW provides a process for addressing contaminated sites. While this has proven to be an excellent approach to determine potential contamination levels, the idea of using the existing cleanup programs for some former landfill sites (especially those believed to have minimal problems) is sometimes met with reluctance by property owners and local governments. The method to determine the presence and potential level of contamination is complex, time consuming, structured, and expensive. The act of listing the site in the MTCA database triggers further rigid steps to determine whether a cleanup will proceed. Some property owners and local governments have been concerned that when a site is listed in the database, it carries a stigma on the identified property that affects future property use and value.

The most commonly used remedies for landfills are entombment or excavation and disposal at another permitted site. Some site owners wish to explore other approaches, such as treatment technologies or partial cleanups. An evaluation is needed to identify ways to more flexibly address former landfills. This should include proposing ways to simplify the processes to address some older closed landfill sites that pose minor threats. Consideration should be given to promoting interim cleanups on landfill sites, and expanding grant eligibility to cover interim cleanups. Agreed-upon cleanup standards at the beginning of cleanup projects can eliminate uncertainty, thereby allowing for more predictable project costs.

Alternative approaches to existing cleanup processes need to be developed through a collaborative process between Ecology and local government partners. Developing a pilot project to address sites that are not good fits for existing cleanup programs can help to develop more accessible ways to address some former landfill sites.

An existing more flexible cleanup process, the Voluntary Cleanup Program (VCP), allows a property owner to clean up a site independent of the formal MTCA process. Ecology staff reviews all documents and, once site cleanup is complete, has the authority to issue a “no further action” letter on the site. The rule language does not guarantee that no further cleanup actions will be required at a future date. Developers potentially willing to invest in contaminated sites for redevelopment view this as a barrier.

Additional evaluation should be conducted to develop ways to address some of the issues encountered by local governments as they work to address closed landfill sites, including the need for rapid review. Addressing these issues could provide a needed boost for the remediation and reuse of some of these sites.

RECOMMENDATION #11SW - Identify Funding to Address Priority Sites

Statement of Action

Develop cost estimates for the highest priority sites, and identify funding options to pay for the needed corrective action.

Specific Steps

- ✓ Conduct an evaluation of the existing state grant programs to identify potential fund options.
- ✓ Review the potential of other public funding options (for example, new revenue sources,

Brownfields programs, existing grant funds, local revenue options, etc.) and public-private partnerships.

- ✓ Develop mechanisms for government to partner with developers and property owners to clean up old landfill sites and use them for community benefit.

Background/Rationale

The hundreds of closed landfills constitute an unintended legacy that will be expensive to address. Most local jurisdictions do not have funds available to address closed sites for which they are responsible or that have been abandoned. Creative approaches are needed to fund cleanup and other actions needed at these sites.

Site abandonment has occurred when private landfill owners have made economic decisions to abandon sites rather than clean them up. The cost of cleanup is then passed on to the local government and the general public. Local government funding through existing cleanup programs is limited, and not all of these closed sites are appropriate for the cleanup programs. MTCA does include a funding mechanism that generates approximately \$40 million per biennium. While that appears to be a substantial sum, existing demands on the fund from current cleanup actions and legislative appropriations already strain the fund.

An increasing number of sites are located in areas under pressure from population expansion and commercial development. These sites were located in rural areas that over time have changed to urban growth areas. The value of the property is such that pressure for higher uses such as residential development or commercial business is growing. There may be an opportunity to enlist developers in cost-sharing because of the potential value of the newly cleaned up landfill property.

RECOMMENDATION #12SW - Ensure That Existing Disposal Facilities Comply With Requirements

Statement of Action

Evaluate statewide compliance with all regulatory requirements at disposal facilities and establish a plan to ensure regular monitoring and assistance statewide.

Specific Steps

- ✓ Assess statewide compliance of disposal facilities and develop a plan to ensure that facilities receive adequate technical assistance to continue meeting all required conditions in their solid waste permits.
- ✓ Work to close existing landfills or landfill cells that are inadequate and encourage replacement, as needed, with better designed and constructed facilities.
- ✓ Ensure adequate closure and post-closure funds remain in place for the short and long term and regularly monitor closure/post-closure permits.
- ✓ Gather data to begin anticipating trends and needs for future cleanup.

Background/Rationale

Consistent and adequate technical assistance and regulatory oversight is needed across the state. This could be accomplished by:

- Assessing potential of regulatory oversight at the owner level (for example, county public works department) rather than on a site-by-site basis.
- Considering development of a closure checklist and process for filing it with local assessors to provide notification to future developers or owners of the actions taken on that parcel.
- Ensuring local expertise and capacity is developed and maintained to properly oversee regional disposal and other solid waste facilities.
- Adopting state regulations in local jurisdictions to ensure appropriate deed notifications are applied.

To avoid recreating the expensive legacy of closed and abandoned landfills that we face today, it is imperative that these funds are in place, that they are adequate to cover the expected costs, and that they remain available for every landfill in Washington. An important area to address to ensure that landfills do not degrade the environment is the financial assurance requirements. Existing rules provide for levels of financial assurance that many believe are sufficient, provided they are enforced. The financial assurance requirements vary significantly between different types of landfills. The adequacy of financial assurance required for closure and post-closure of a landfill is dependent upon three factors: the completeness of identification of the activities necessary for closure and post-closure, the accuracy of the cost estimates to complete identified closure and post-closure activities, and proper financial assurances instruments structured to ensure funds are available when required.

Additionally, financial assurance requirements are intended to cover only the costs of closure, post-closure monitoring for twenty to thirty years, and pollution prevention measures. If cleanup needs are discovered during a landfill's operation, and if cost of the cleanup is included in the closure and post-closure cost estimates, then it is reasonable to assume that adequate monies would be available to clean up the problems. However, funds are unlikely to be available for cleanup needs not discovered before facility closure. And, some landfills are not required to include monies for corrective action if contamination is found during operation of the landfill. This makes it even more important to effectively monitor operations and closure/post-closure planning.

A number of different financial assurance instruments are now allowed to satisfy the closure/post-closure fund requirements. Surety bonds, insurance, and letters of credit are allowed for MSW landfills, for example. While the surest means of protection is to have actual funds in a special account for this purpose, this is also the most expensive for site owners. So, there is a natural tendency to move toward less expensive means of providing financial assurance. This practice is less secure, however, and again points to the need for regularly and completely updating closure and post-closure cost estimates.

Local permitting agencies have to ensure that the activities and costs associated with them are accurate. The financial assurance instrument used to ensure that assets will be available to complete closure and post-closure activities must be initially reviewed and constantly monitored to make sure funds are available. This will also help keep options open for use of landfill properties for residential and commercial uses, not just typical park and open space uses.

RECOMMENDATION #13SW - Continually Reduce Disposal Impacts on Human Health and the Environment

Statement of Action

Ensure that disposal facilities, including waste-to-energy facilities, do not pose threats to human health and the environment by reducing the toxicity of disposed wastes and by closely monitoring and continually improving operation, closure, and post-closure practices over time.

Specific Steps

- ✓ Begin investigating ways to further decrease potential threats and risks from disposal facilities and practices.
- ✓ Incorporate into local plans the goal of minimizing impacts of waste disposal.
- ✓ Evaluate potential of mining landfills to recover resource materials.
- ✓ Develop a long-term strategy to ensure disposal fees reflect complete costs and that no costs (such as future cleanup) are passed on to future generations.
- ✓ Establish a schedule to regularly assess disposal facility requirements and propose changes, as needed, to ensure adequate public health and environmental protection.
- ✓ Evaluate impacts and costs of out-of-area disposal, including incentives and disincentives for waste reduction and recycling created by long-hauling wastes.

Background/Rationale

We must avoid leaving a pollution legacy from disposal methods. For the long term, we should decrease the need for landfills and other disposal facilities by reducing the amount and toxicity of wastes we generate, and by increasing material reuse. Evaluate the potential human health and environmental impacts of materials disposed of at solid waste facilities. Based on this evaluation, we should develop a proposal for disposal bans and/or processing requirements for problem and recyclable materials, if needed.

Also, a schedule for evaluating the effectiveness of disposal facility requirements should be established and followed, especially given the relatively short length of time that existing requirements have been in place. Landfill operators and owners should be proactive in demonstrating that the beneficial uses of the surrounding environmental media (air, water, and soil) are protected.

While regional disposal facilities are both valued and essential components of Washington's solid waste system, the long-distance transport of wastes to these facilities makes a significant environmental footprint. It is unclear if the existing rail lines, for instance, will have enough future capacity to meet demand. An inventory of the infrastructure that exists and that will be needed for long-haul in the future is needed. An evaluation of the environmental impacts of this transport is also necessary. This will, hopefully, lead to future options for reducing these impacts while still ensuring that sufficient transfer and transport capacity is available.

Local land use regulations can limit the options available for future use of former landfill properties. Barriers to future development of closed landfills need to be identified and addressed. Historically, landfills that have been closed and have completed post-closure care

have become open spaces, parks, golf courses, play fields, etc. These uses tend to be less intrusive on the closed landfill and therefore less likely to cause a failure in the cap.

With tighter controls on landfill design, closure, and post-closure, communities can be more confident of expanding the potential uses of the property beyond the common uses of parks and open space. Potential incentives should also be explored to encourage an owner or private developer's interest in the next use of the landfill site.

Future Recommendations

In five years, an evaluation should be conducted to assess the progress made in a number of areas:

- Addressing closed landfills.
- Strengthening the management of current disposal facilities.
- Closing cells that are not lined or are not as environmentally protective as they need to be.
- Improving the design of future landfills.
- Working to reduce reliance on disposal facilities in the future.

The next phase of implementation for ensuring safe and proper disposal should then be developed. As a part of that assessment, the additional recommended priority actions listed below should be considered and included, as appropriate, to make further progress toward the 30-year goals. Most of these additional recommendations represent continuations of efforts that have already begun or that will be started within the next five years as part of the priority actions proposed above.

- Address the closed and abandoned sites--set a schedule for doing this.
- Track progress toward these goals through performance indicators, including developing a baseline of facility compliance status and using the closed landfill inventory as a baseline.

Conclusions

Identifying all closed and abandoned landfill sites is the first step in reclaiming old landfills for future uses. Once identification is complete, those unaddressed landfills with significant levels of contamination that threaten human health and the environment and/or with high redevelopment potential should be addressed first. Existing landfills and waste-to-energy facilities have mechanisms in place to help reduce the likelihood of future degradation, but that is not enough for the long term. We must reduce the waste we generate to ensure that the number of landfills and other disposal facilities required in the future is minimized. The long-term goal is to ensure that disposal itself poses no threats to human health and the environment.

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