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MEMORANDUM

To: BWP Staff
From: James C. Colman, Assistant Commissioner, BWP
Date: July 6, 2001
Subject: Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites

Note: These revised Guidelines supersede and replace the original "Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites" issued on July 17, 2000.

I. Issue Statement/Background

Many inactive unlined landfills and dumping grounds that ceased operations prior to 1990 were never properly closed and capped in accordance with the solid waste management regulations in effect at that time (310 CMR 19.000, the "Solid Waste Management Facilities Regulations"). These sites have the potential to cause adverse impacts to public health, safety, and the environment by generating leachate and landfill gas.

As part of the revised solid waste regulations in 1990 and subsequent statutory requirements (c. 153 of the Acts of 1992), all active unlined landfills (unlined landfills that accepted waste after 1990) were required to close and cap in accordance with the regulations. During closure of many of those sites, certain hard-to-manage materials not suited for reuse in the general environment were successfully incorporated into the closure design. A variety of materials, such as certain contaminated soils from waste site clean-up activities and residues from construction and demolition waste processing (C&D fines), were used to bring sites to the proper grade for closure, provide an adequate foundation layer for final cover materials, and help defray the cost of closure.

With the closure of active unlined landfills now nearly complete, there are no longer sites available that can use these materials for closure activities. At the same time, disposal of these materials in active landfills, the only other readily available management option, is not only more costly, but these landfills have limited capacity available. However, using these materials to properly close inactive landfills can result in eliminating or reducing public health, safety and environmental concerns of the inactive landfill site, make additional land available for

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productive uses, provide a safe and appropriate location for a number of hard-to-manage materials, and reduce the cost of closure for the owner of the site.

In recognition of the fact that inactive unlined landfill sites should be capped and closed and that some types of materials have proven to be appropriate for use during closure and to defray the cost of closure, thereby expediting such closures, the Department believes it is appropriate and in the interest of environmental protection to issue guidelines to clarify closure issues at inactive unlined landfills.

The purpose of this document is to clarify the closure provisions of 310 CMR 19.000 by providing guidance on the procedures and criteria the Department will use when reviewing requests to close inactive unlined landfills where use of alternative grading and shaping materials is proposed. Specifically, these guidelines address permitting requirements and evaluation procedures for determining the types and quantities of materials used during closure and the length of time for closure activities.

II. Definitions

C&D Fines means the material produced after the processing of construction and demolition (C&D) waste which is: (a) three inches or less (3" minus) in size; (b) consists of dirt (soil), wood, metal, plastic, etc., and (c) is limited to no more than 35% organic content.

C&D Residuals means the construction and demolition (C&D) waste material that remains after recyclable materials (asphalt, brick, concrete, metals, etc.) and C&D fines have been removed during processing of C&D wastes and which consists mostly of wood, textiles (carpet, fabric, etc.), plastic and dirt.

Grading and Shaping Material means materials the Department has determined are not solid waste when used in accordance with an approved plan, or other approval issued by the Department, to provide proper grades for closure and post-closure uses. Grading and Shaping Material is equivalent to the subgrade component of the final cover system.

Inactive Unlined Landfill means, for purposes of these Guidelines, a landfill or dumping ground that was in operation after April 21, 1971, but ceased operations prior to July 1, 1990, that never closed in accordance with a Department approved closure plan.

III. Applicability

Section 19.021 of the Solid Waste Management Facility Regulations (310 CMR 19.000) required owners of inactive unlined landfills to either file proof that the facility was closed in accordance with plans approved by the Department, or to submit a final closure plan in accordance with the regulations (310 CMR 19.030(3)(c)5.). These guidelines are applicable to facilities that never submitted proof of closure and where owners/operators are now seeking approval of closure plans for their facility.

Inactive unlined landfills that ceased operations prior to April 21, 1971, are, by policy, subject to regulation under the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000, and therefore are not specifically subject to these guidelines, unless the Department determines that any such landfill can be adequately regulated under the solid waste management program. Unlined

landfills in operation after July 1, 1990 were required to close pursuant to c.153 of the Acts of 1992 and the 1990 Solid Waste Management Facility Regulations, and are therefore not the focus of these guidelines.

A. General Principles

1. It is the Department's responsibility to determine appropriate closure and post-closure requirements to protect public health, safety and the environment.
2. The Department will only approve closure designs that demonstrate through a landfill assessment that the closure will result in an appropriate level of environmental protection. In reviewing the closure design, the Department will consider whether the closure protects public health, safety and the environment and whether the site is being developed for a post-closure use that is safe and appropriate.
3. The Department will determine the types and quantities of materials that are appropriate for use during closure as well as the length of time for completion of closure.
4. The intent of these guidelines is to facilitate the closure of inactive landfills, not to promote or allow disposal activities.
5. Closure does not trigger any solid waste review thresholds that would make a MEPA filing (ENF, etc.) necessary as long as closure activities do not result in expansion, either vertically or laterally, of the facility for the disposal of solid waste. Changes in the contours of the landfill necessary for proper closure and/or post-closure use are not considered expansions. However, closure activities may trigger other thresholds under other provisions of MEPA, such as for wetlands, which will require compliance with MEPA. Closure does not include combustion, disposal, storage, processing or treatment of solid waste.
6. The owner/applicant will provide the opportunity for timely public review and comment of all closure proposals. The Department will provide the opportunity for public comment on the draft closure plan approval.
7. The Department may require the use of Best Management Practices (BMPs) for all activities at the closure site to minimize the impacts to the surrounding community and environment due to noise, odor, dust, erosion, vehicle exhaust, etc. The Department may require diesel retrofits for all heavy equipment to reduce vehicle emissions as part of the consideration of BMPs for the site.
8. In accordance with the Beyond 2000 Solid Waste Master Plan goal of increasing the source reduction and recycling of non-municipal solid waste, the Department intends to monitor the approved sources of the residuals intended to be used in inactive unlined landfill closures to ensure every reasonable effort is made by facilities to maximize source reduction and recycling of material and minimize the amount of residuals produced. As such, the Department may require documentation of residuals processing activities by facilities and may consider reuse and recycling rates in authorizing use of specific residual materials at inactive unlined landfill closure sites.
9. Use of materials at inactive unlined landfills that are not determined by the Department to be closures in accordance with these guidelines will be considered landfill expansions pursuant to 310 CMR 19.000. Such projects will require permitting in accordance with 310 CMR 16.00 and 19.000 as landfill expansions.
10. All closure activities shall be conducted in accordance with 310 CMR 19.000, the "Solid Waste Management Facility Regulations" and these guidelines.

B. Process

1. Administrative Consent Orders (ACOs) will be used by the Department as the regulatory mechanism for the closure and capping of inactive unlined landfills. The ACO shall include, but not be limited to, the following:
 - a. a schedule establishing when key components of the closure will be completed;
 - b. public comment periods during the planning and design stages of the project;
 - c. a requirement for completing a landfill assessment in accordance with the regulations as part of the closure process;
 - d. a requirement for developing a closure plan and a post-closure maintenance and monitoring plan;
 - e. identification of the proposed post-closure use of the site, if applicable;
 - f. a financial assurance mechanism (FAM), where determined necessary by the Department; and,
 - g. a provision for stipulated penalties or other appropriate mechanisms to ensure compliance.

Most of the items listed above are described in greater detail below.

2. Public comment periods or other public participation mechanisms, which allow at least 21 days for comments, shall include but not be limited to:
 - a. An owner/applicant sponsored public information session to describe the proposal before the ACO is signed (executed) by the Department; and,
 - b. In accordance with the permit review procedures at 19.037, DEP approvals issued for the Corrective Action Design (closure plan approval) will include a public comment period. The Department may, at its discretion, hold a public hearing before issuing a final decision to approve or deny the closure plan.
3. The Department's Solid Waste Section Chiefs shall review all proposals for projects submitted under this policy and the Chiefs shall make recommendations to the Bureau of Waste Prevention (BWP) senior management team for review.
4. The landfill assessment shall be completed before the final cap is installed, but may be done concurrently with grading and shaping activities. The assessment shall be completed in accordance with 310 CMR 19.150 and the May 1997 "Landfill Technical Guidance Manual" (as may be amended), and shall identify the actual and potential threats from the site.
 - a. The assessment shall include an evaluation of the potential impacts resulting from the types and quantities of materials brought to the site for closure activities. Both short term and long-term (after closure) impacts shall be evaluated.
 - b. The Corrective Action Alternative Analysis, completed in accordance with 19.150(6), shall evaluate, at a minimum, the following, unless the Department determines that one or more steps are unnecessary:
 1. the no action scenario;
 2. the consolidation of waste into a smaller footprint;
 3. closure of the site in accordance with the standard regulatory requirement (19.112) (i.e. grading and shaping necessary to establish minimum closure grades (5%));
 4. post-closure use options for the site; and
 5. alternative designs (19.113) using components, materials, technologies or methodologies other than those expressly provided for under 19.112. In particular, the proponent should examine the use of components and materials that result in beneficial use of waste materials (i.e. use of tire chips as drainage material).
5. The site specific closure plan shall include, but not be limited to, identifying all activities that will occur at the site, such as:

- a. the types, amounts and intended function of all materials brought to the site;
 - b. the type and number of trucks brought to the site on a daily basis; and,
 - c. the typical daily activity, including types of equipment and their use, and hours of operation.
6. The site-specific post-closure plan shall identify all maintenance and monitoring requirements necessary to ensure the integrity of the site to prevent any adverse impacts to the public health, safety or the environment.
 7. The Department must approve any proposed post-closure use of the site.
 - a. Post-closure use plans shall be developed and reviewed in accordance with the regulatory requirements at 19.143, Post-Closure Use of Landfills.
 - b. Post-closure use plans (conceptual or final) may be submitted with the closure plan to expedite the review/approval process.
 - c. Post-closure uses of the site that include construction of buildings or active recreation are required to include a risk assessment, which evaluates exposure to landfill gas, for the intended post-closure use unless an active gas collection system is designed, approved and installed.
 8. The financial assurance mechanism (FAM), when required, shall be for an amount sufficient to:
 - a. ensure closure of the site in accordance with the approved plans in the event of failure of the proponent to complete the closure as planned. In the case of sites that are closed in phases, a FAM will be required for the entire project or for each phase; and
 - b. provide for post-closure monitoring and maintenance.
 9. Stipulated penalties or other appropriate mechanisms shall be included in the ACO to address any failure to complete closure activities in accordance with the Department approved plan.

C. Determining Appropriate Closure Activities

1. The actual or potential public health, safety or environmental threats attributable to the site shall be considered in determining the type and extent of closure activities.
2. Closure includes:
 - a. all activities necessary to protect public health, safety or the environment;
 - b. all measures needed to remediate or prevent adverse impacts from past solid waste activity at the site; and,
 - c. all activities necessary for developing the post-closure use of the site.
3. The extent of closure activity is determined by evaluating:
 - a. current conditions at the site through a landfill assessment, which may vary widely from site to site; and,
 - b. alternatives, including the “no action” alternative, and constructing a standard cap.
4. The Department may consider post-closure use of the site when approving final grades for closure.

D. Benefit of Materials Used During Closure

1. Materials brought to the site can be used to provide the necessary contours to achieve the minimum grades required for closure.
2. Materials can be used to improve the integrity and long term performance of the final cover system (cap) by:
 - a. providing a solid foundation layer for the landfill cap construction; and
 - b. minimizing the settlement potential, thereby improving long-term performance of the final cover.

3. Materials can be used to facilitate the post-closure use of the site.

E. Criteria for Materials Used for Closure Activities

1. Use of materials during closure shall not significantly add to the actual or potential public health, safety or environmental concerns of the inactive unlined landfill. Materials used during closure shall:
 - a. be non-putrescible and not contain contaminants that are likely to leach in the landfill environment;
 - b. not significantly increase the concentration of contaminants in leachate or quantities of leachate released at the site;
 - c. not significantly increase the toxicity or quantities of landfill gas released; and,
 - d. not significantly increase nuisance conditions, such as noise, dust or odor, at the site.
2. Closure materials shall have, but not be limited to, the following characteristics:
 - a. be granular and composed predominately of inorganic (mineral) materials to minimize settlement due to decomposition, gas generation, etc.;
 - b. be easy to spread, compact to high density, and not readily decompose over time;
 - c. be well graded; and
 - d. a maximum size where no more than 10% of the material, by weight, exceeds 6 inches (nominal) in size with a maximum size of 12 inches in any dimension. However, the Department may require smaller size materials in its approval based on processor ability to achieve smaller size.
3. To reduce settlement, generation of landfill gas and leachate, the organic content (determined by a loss on ignition test) of materials brought to the site during closure shall either be:
 - a. less than 35% (by weight) on a material specific basis; or
 - b. less than 35% of the combined weight of all materials brought to the site during closure, excluding the weight of final cover materials used for the cap.
4. All materials greater than 35% organic content shall be mixed with other materials to meet 3.b. above, either prior to or during the actual placement of that material. An appropriate method to verify the organic content of materials brought to the site shall be a requirement for use of those materials.

F. Types of Materials Used for Closure Activities

1. The types of materials the Department will consider for grading and shaping materials include, but are not limited to, the following:
 - a. clean soil;
 - b. street sweepings;
 - c. contaminated soil as defined by DEP Policy 97-001;
 - d. approved grading and shaping materials (C&D fines, coal ash, etc. and others as may be approved);
 - e. dewatered catch basin cleanings from separate storm sewers only (not from combined sanitary and storm sewers);
 - f. dewatered dredge spoils (see DEP Policy 94-007); and,
 - g. residuals from solid waste processing facilities or recycling operations including, but not limited to;
 1. residuals from C&D processing facilities;
 2. residuals from Materials Recycling Facilities (recycling facilities, composting facilities, etc.).

2. The type and/or source of all materials used as grading and shaping materials shall be approved by the Department prior to use at the landfill. Testing of materials (chemical, physical, etc.) may be required to determine whether they are suitable as grading and shaping material. Use of grading and shaping materials will be authorized under an ACO and the closure plan approval, or other appropriate approval issued by the Department. This Guideline is considered equivalent to a generic Beneficial Use Determination, pursuant to 310 CMR 19.060, which allows the use of these materials as Grading and Shaping Material. Therefore, a separate Beneficial Use Determination is not required for use of the materials when they are approved as described in this paragraph.
3. Unprocessed MSW, C&D or any other unprocessed wastes will not be considered suitable for use as grading and shaping material in the closure of inactive unlined landfills.

G. Timeframe and Volume Limits for Closure

1. Generally, the maximum time period for completion of closure should be two (2) years - one year for site preparation activities (grading etc.) and one (1) year for installation of the cap.
 - a. The Department may consider a longer time period, generally not to exceed 3 years, based on, but not limited to, the following:
 1. availability of closure materials;
 2. potential adverse impacts to the surrounding community from traffic, dust, noise, odor or other nuisance conditions that would warrant reducing the amount of material coming to the site on a daily basis; and
 3. completion of the closure in phases.
2. Generally, the volume of material used for closure will be the amount necessary to achieve a minimum 5% grade for the entire site.
 - a. Where a minimum 5% grade for the entire site is proposed, closure activities may, if necessary, exceed three (3) years.
3. In determining the volume of material approved to grade and shape a landfill for post-closure use, where the amount would exceed that necessary to achieve a minimum 5% grade, the Department will consider uses that are reasonable, appropriate and consistent with the existing site conditions including, but not be limited to, the following:
 - a. the amount of existing waste at the site;
 - b. the increase in the total volume of material at the site;
 - c. the compatibility of proposed grade and/or elevation changes at the site relative to existing conditions and to the surrounding topography and/or land use;
 - d. the types of materials used during closure; and
 - e. the proposed post-closure use.
4. Achieving proper grades needed to close the landfill, or for post-closure use, is the primary factor in determining the volume of material to be used. Revenue generation to offset closure costs is a secondary factor that may be considered.
5. Except as allowed pursuant to paragraphs 1.a., 2.a. and 3, projects requiring greater than three years to complete or more material than allowed above will be considered landfill expansions and will be required to obtain the appropriate permits that apply to expansions pursuant to 310 CMR 19.000. Non-construction related closure activities, such as assessment work, may occur outside the time periods specified above.



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MEMORANDUM

To: BWP Staff
From: James C. Colman, Assistant Commissioner, BWP
Date: September 4, 2007
Subject: Addendum to "Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites, July 6, 2001" Use of Construction and Demolition Fines and Residuals

MassDEP will continue to review and potentially permit new unlined landfill closure projects pursuant to the "Revised Guidelines for Determining Closure Activities at Inactive Unlined Landfill Sites, July 6, 2001". However, any project proposing to use construction and demolition fines and/or residuals (C&D Fines/Residuals) shall be reviewed based upon the additional criteria specified below, in addition to the criteria established in the Revised Guidelines. These additional criteria are intended to address the potential for generation of hydrogen sulfide gas (H₂S) when C&D Fines/Residuals are used as grading and shaping material in such projects. These criteria do not represent MassDEP's endorsement of C&D Fines/Residuals as grading and shaping material. These criteria do not limit MassDEP from requiring additional measures beyond those listed to protect the public health, safety or the environment. MassDEP may revise this addendum, as needed, to better protect the public health, safety or the environment.

Criteria:

1. **Setbacks** – The proximity of the project to residential, commercial and business areas will be taken into account. In no case will areas using C&D Fines/Residuals for grading and shaping be located closer than the setbacks to residents stated in the Site Assignment Regulations at 310 CMR 16.40 for landfills.
2. **Gypsum/Wallboard Separation** – Each C&D processor that will send C&D Fines/Residuals to the project must have a gypsum/wallboard separation plan approved by MassDEP. The mandatory program must be designed to separate gypsum/wallboard at the job site and/or at the front-end of the C&D processing train prior to crushing or grinding, to greatest extent feasible.

3. **Sulfate Content.** - The project proponent will be required to sample and test, on an ongoing basis, all C&D Fines/Residuals for their sulfate content. MassDEP may establish an upper limit for sulfate content in C&D Fines/Residuals used as grading and shaping material.
4. **Maximize Diversion of Clean Wood** –Clean wood shall be separated from the C&D waste stream to the maximum extent feasible prior to processing and shall be diverted to recycling/reuse activities.
5. **Mix Ratio** – C&D Fines/Residuals must be mixed with soils at a ratio of at least 3 parts soil to 1 part C&D Fines/Residuals, by volume.
6. **Mixing** – Soils and C&D Fines/Residuals must be thoroughly mixed to create a homogeneous mixture of C&D Residuals and soil. Preferably, such mixing shall be done prior to application on the landfill. MassDEP shall approve the mixing method.
7. **Odor Control Plan** – The project proponent shall file an odor control plan with the closure plan for the facility. The Odor Control Plan shall address steps the operator shall take in the event that odor problems develop at the landfill and the triggers for taking these steps.
8. **Capping** – Closure and capping of completed sections of the landfill shall be accomplished as quickly as possible upon reaching final grades.
9. **Financial Assurance** – The Financial Assurance Mechanism (FAM) that is required for the closure and post-closure of the landfill must also address financial assurance for construction and operation of a landfill gas collection system, pre-treatment system and flare. In determining the basis for the FAM the operator will need to determine how long landfill gas might need to be collected, treated and flared and the operation and maintenance required for the collection, treatment and flaring systems.