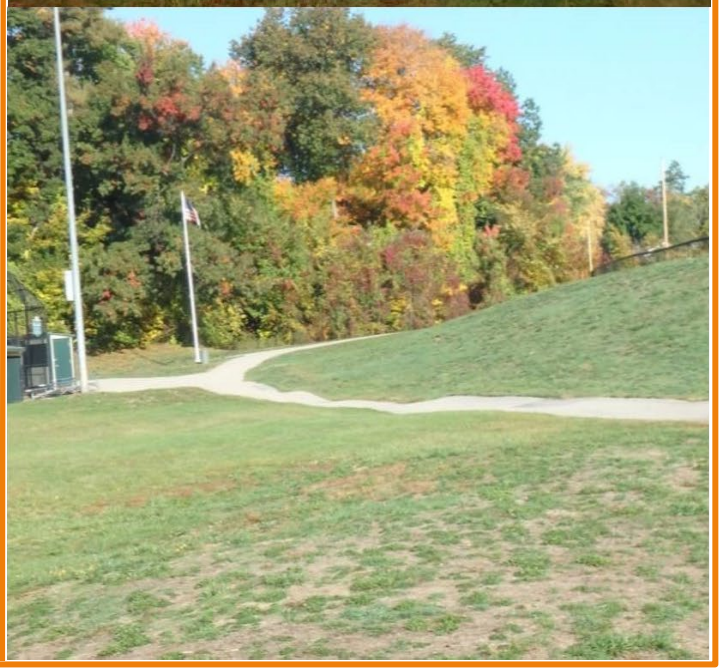
SELF-INSPECTION GUIDANCE MANUAL FOR

Monitoring and Management of a Closed Unlined Landfill







U V L S R P C

Acknowledgements

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UPPER VALLEY LAKE SUNAPEE
REGIONAL PLANNING COMMISSION

MAINTAINING A CLOSED LANDFILL—WHY IS THIS IMPORTANT?

A closed landfill can potentially be a threat to human health and the environment. Even after a landfill is closed, it needs to have constant inspection and maintenance. Every year the manager of an unlined landfill is required to demonstrate to the State that the landfill does not pose a danger to humans or the environment through the annual Post-Closure Report.

Any landfill is an investment. Just like other municipal infrastructure such as a building, a closed landfill needs to be maintained.

HOW TO USE THIS MANUAL

This manual is designed to help managers of closed unlined landfills understand both the NH administrative rules of managing the site, as well as recommended best management practices.

Here's a list of overall requirements. Each of these is explained in more detail in this manual:

- ⇒ FINANCIAL ASSURANCE FOR POST-CLOSURE MONITORING—30 year requirement
- ⇒ INSPECTION—twice a year
- ⇒ ANNUAL POST-CLOSURE REPORT
- ⇒ CONTINUAL MAINTENANCE
- ⇒ SOLID WASTE PERMIT (pre-1981 landfills require different permit)
- ⇒ GROUNDWATER PERMIT

THE BASICS

What's happening underground?

What are the parts of an unlined landfill?

Waste– Waste can include discarded and abandoned materials from households, businesses, agriculture and industry. It can range from plastics to food scraps.

Cap— The containment system or cap over an unlined landfill is to keep precipitation from entering the landfill directly. It is important for the cap to stay intact (no trees growing on it, no erosion, no slumping) to maintain its purpose.

Gas Probe—These are probes used to measure and monitor subsurface gases emitted from decomposing waste.

Gas Vents—Vents allow gases to escape into the atmosphere instead of building up underground. Contained or unvented gases could migrate out of the landfill into basements and cause explosions.

Leachate—The waste in a landfill produces leachate, which is the liquid that drains from the waste mixed with any water infiltrating into the landfill. This leachate can enter groundwater supplies and pose a threat to public health.

REQUIREMENTS

A summary of New Hampshire's legal obligations

SOLID WASTE PERMIT Is the closed landfill permitted? If it is, you should have a copy of the permit or obtain a copy from the NH Department of Environmental Services (DES) for your records. If it is not permitted, it may be an "unauthorized facility" which requires a permit by filing the "Standard Permit for Solid Waste Landfill" form with NH DES. You can access this form and additional information on the NHDES Solid Waste Management Webpage.

GROUNDWATER PERMIT Groundwater management permits prescribe programs for periodic groundwater quality monitoring and reporting, provide for groundwater remediation either through active measures or natural attenuation, specify performance standards for remedies, and describe procedures for performing site investigations and implementing remedial action plans.

FINANCIAL ASSURANCE FOR POST-CLOSURE MONITORING The permittee of a landfill must show proof of financial assurance *annually for the next 30 years* of post-closure maintenance—or until it can be proven that the landfill is no longer a threat to human health or the environment. This requirement is ongoing and does not end 30 years after the landfill closes; it just means the manager must plan out for the next 30 years—every year. The permittee needs to provide proof that the costs that are associated with a closed landfill will be covered, which include monitoring, inspecting, maintaining, and repairing any items that are not properly functioning. It's recommended to Include the landfill inspection, maintenance and permits in the annual municipal budget, where it is treated like any other part of the municipal infrastructure.

INSPECTION Inspect the landfill at least twice a year. Use the Annual Post-Closure report as a guide for your inspection. Any items that need repair or maintenance become action items that need to be addressed. Here's what to check for:

- ⇒ General Site Conditions
- ⇒ Stormwater Management System
- ⇒ Groundwater monitoring wells and surface water monitoring
- ⇒ Cap
- ⇒ Decomposition Gas Control Systems
- ⇒ Leachate Collection and Leak Detection Systems

REQUIREMENTS

A summary of New Hampshire's legal obligations

ANNUAL POST-CLOSURE REPORT An engineer does not have to perform the report, but they must review others' field observations. The following pages have more detailed information on each section of the annual Post-Closure Report requirements. This is due every March 31. It can be submitted electronically or on paper.

CONTINUAL MAINTENANCE Treat the landfill like other infrastructure facilities and protect your investment. Include post-closure costs in the annual municipal budget.

SITE CONDITIONS

Part of the Twice Yearly Inspection and Annual Post-Closure Report

	YES	NO
Is access to the landfill restricted by use of gates, fences or natural barriers?	☐	☐
Are weather-resistant legible signs posted around the perimeter of the landfill in areas where fencing is not used?	☐	☐
Is the access road(s) properly graded and drained?	☐	☐
Is any portion of the site used for activities other than post-closure monitoring and maintenance? If you answered "yes," list these activities in the report's Section 7. for each activity, indicate if it is on or off cap/cover.	☐	☐
Are all groundwater monitoring wells accessible and in good condition?	☐	☐
Is the surface water monitoring system functioning and maintained?	☐	☐



Illegible Perimeter Sign



Unsecured Groundwater Monitoring Well



Unsecured Entry

STORMWATER

Part of the Twice Yearly Inspection and Annual Post-Closure Report

	YES	NO
Are the sedimentation/detention ponds maintained (e.g. sedimentation removed, no overgrown vegetation)?	☐	☐
Are culverts intact and free of obstructions?	☐	☐
Are perimeter drainage swales/ditches well maintained, unobstructed, and free flowing?	☐	☐
Do all drainage swales have positive drainage?	☐	☐
Are the methods used to control surface water well maintained (e.g., berms, benches)?	☐	☐
Are runoff channels protected to prevent scour and erosion that creates sediment?	☐	☐
Is there evidence of erosion (e.g., sedimentation in drainage ditches and	☐	☐



Stormwater Management System—elements: swales, berms, culverts



Stormwater Management — Detention Basin



WOODY VEGETATION IN SWALE: Any woody vegetation in the drainage swale needs to be removed. It will block the proper flow of stormwater, potentially leading to erosion and uncontrolled runoff.



BLOCKED CULVERTS: Remove any debris, such as stones, branches or other vegetative material, that might be blocking culverts from flowing.



EROSION/WASHOUTS: Repair any areas of erosion or washout. It's recommended to check for this after severe weather events.



RUTTED CAP: Look for signs that the cap is intact. Damaged cap.

DECOMPOSITION GAS

Part of the Twice Yearly Inspection and Annual Post-Closure Report

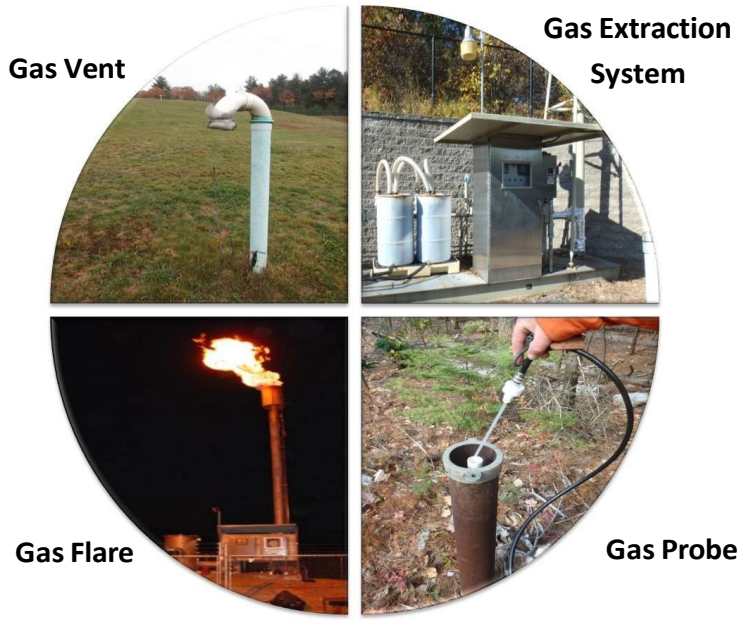
The unlined landfill manager should know if the gas management system is Passive or Active.

	YES	NO
If the facility has an active gas collection/extraction system, are all components of the system in good working order (e.g., blower, flare)?	☐	☐
If the facility has a passive gas system, are all gas vents in good condition and functional (e.g., vent cap, riser pipe)?	☐	☐
Are all soil gas probes in good condition and functional?	☐	☐
Are all indoor air quality monitors in good condition and functional?	☐	☐
Are there any landfill odors?	☐	☐
Is there evidence of stressed (e.g., damaged/weakened) vegetation?	☐	☐

Methane gas can be explosive. If the decomposition gas control system isn't maintained, it can lead to a build up of explosive gases. This buildup and potential explosion can occur at:

- Landfill
- Site structures
- Homes
- Utilities

GAS MANAGEMENT SYSTEM



Decomposition Gas—Methane

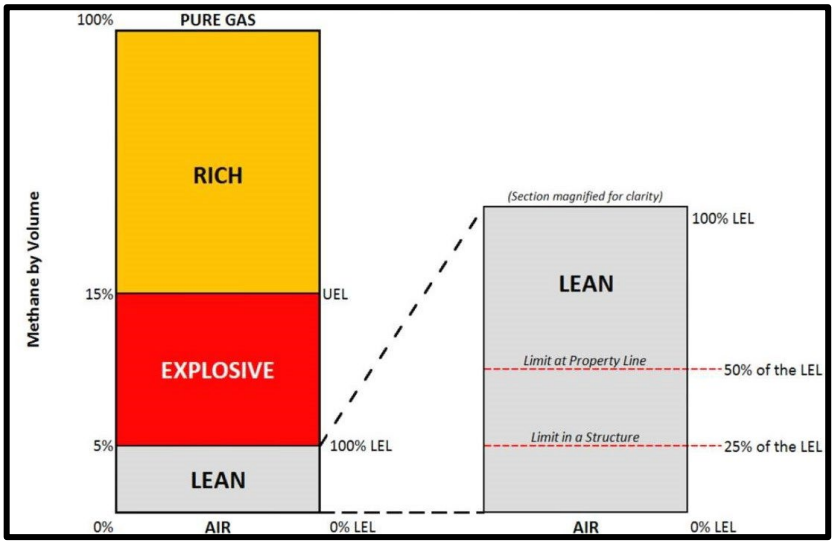
⇒ Take a sample at soil gas probes and gas vents

⇒ In structures on or off site, gas should be >25% of the Lower Explosive Limit (LEL) for methane

⇒ In soil at the property line, gas should be >50% of the LEL for methane

⇒ If in exceedance– implement contingency procedures to protect public health and safety

⇒ Notify NH DES immediately



	YES	NO
Is the permittee required to monitor methane generation from the landfill? If "no," provide an explanation in Section 7 of this form.	☐	☐
If "yes," answer the following questions in this section and attach a summary table of all methane data collected; include indoor air quality data. Provide an evaluation of any trends in methane data and, if applicable, indoor air quality data in Section G.	☐	☐
I. For this calendar reporting year, have methane levels exceeded 25% of the LEL inside any on or off-site structures? Ref Env-Sw 806.07(b)(1)	☐	☐
II. For this calendar reporting year, have methane levels exceeded 50% of the LEL at the property line within the soil? Ref Env-Sw 806.07(b)(2)	☐	☐
III. If you answered "yes" to question I. or II. above, did the permittee implement contingency procedures to ensure protection of public health & safety; and notify NHDES immediately?	☐	☐
For this calendar reporting year, have methane levels exceeded 10% of the LEL in ambient air at the property line?	☐	☐

THE CAP

Part of the Twice Yearly Inspection and Annual Post-Closure Report

Cap - An engineered system or soil cover that protects the waste containment system.

	YES	NO
Is cap settlement uniform? Visual evidence of settling includes depressions, water ponding, cracking, and sloughing.	☐	☐
Is an instrument survey of the cap required? Ref Env-Sw 807.03(b)(10). If you answered "yes," attach a summary table of all survey data collected, and provide an evaluation of any trends in Section G. What was the date(s) of the survey this calendar reporting year:	☐	☐
Does cap slope promote runoff?	☐	☐
Is the cap mowed on a regular basis? NH DES recommends that landfills be mowed twice per year. Date(s) the landfill was mowed for this reporting period?	☐	☐
Is there evidence of erosion (e.g., erosion rills, exposed soil)?	☐	☐
Is the vegetative layer in good condition?	☐	☐
Is there evidence of damage due to unauthorized access?	☐	☐
Is there evidence of damage due to burrowing animals?	☐	☐



CAP MOWING: Keep the cap mowed. Mowing either twice a year or bush hogging once a year will help prevent the establishment of woody vegetation.

Cap Conditions- monitor settlement. How to monitor settlement? Two ways it needs to be done- visual inspection and control points (which requires a surveyor).



EROSION/WASHOUTS: Repair any areas of erosion or washout. It's recommended to check for this after severe weather events. This Is cap settlement.



TREES/SHRUBS GROWING ON CAP: Woody vegetation should not be allowed to grow on the cap. The roots can damage the cap. In case the vegetation falls over, it could expose the cap.



EVIDENCE OF PONDING: Could be sign of uneven settlement within the landfill. Water should not be allowed to pond on the cap.



ANIMAL BURROWING: Animals should not be allowed to disturb the cap.

LEACHATE

Part of the Twice Yearly Inspection and Annual Post-Closure Report

	YES	NO
Are there any leachate breakouts or seeps, either on or off the landfill property?	☐	☐
Does the landfill have a leachate collection and/or leak detection system? If "yes," answer the following:	☐	☐
I. Are leachate collection and leak detection system appurtenances functioning properly?	☐	☐
II. Is leachate stored on-site prior to disposal? If you answered "yes," what quantity of leachate is currently stored on-site?	☐	☐
III. Is leachate properly removed and disposed of on a periodic basis? If you answered "yes," what is the frequency of disposal and the disposal destination?	☐	☐

Not maintaining these systems can lead to:

- Leachate spills/breakouts
- Groundwater contamination

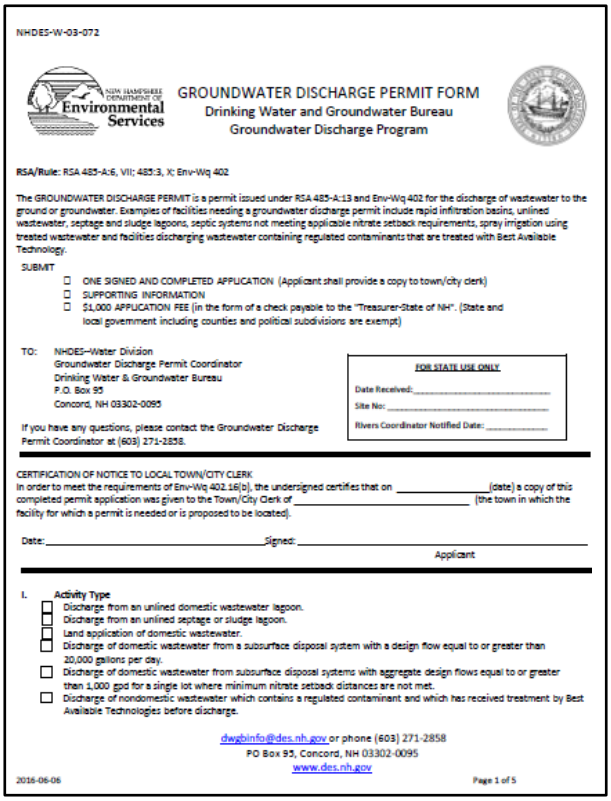


PERMITS

Groundwater management permit
(Required by the State)

Requirements of the permit:

- How often to sample
- How many wells to sample from
- What compounds need to be analyzed
- How often to report these items



NHDES-W-03-072

GROUNDWATER DISCHARGE PERMIT FORM
Drinking Water and Groundwater Bureau
Groundwater Discharge Program

RSA/Rule: RSA 485-A:6, VII; 485:3, X; Env-Wq 402

The GROUNDWATER DISCHARGE PERMIT is a permit issued under RSA 485-A:13 and Env-Wq 402 for the discharge of wastewater to the ground or groundwater. Examples of facilities needing a groundwater discharge permit include rapid infiltration basins, unlined wastewater, septage and sludge lagoons, septic systems not meeting applicable nitrate setback requirements, spray irrigation using treated wastewater and facilities discharging wastewater containing regulated contaminants that are treated with Best Available Technology.

SUBMIT

- ☐ ONE SIGNED AND COMPLETED APPLICATION (Applicant shall provide a copy to town/city clerk)
- ☐ SUPPORTING INFORMATION
- ☐ $1,000 APPLICATION FEE (in the form of a check payable to the "Treasurer-State of NH". (State and local government including counties and political subdivisions are exempt)

TO: NHDES–Water Division
Groundwater Discharge Permit Coordinator
Drinking Water & Groundwater Bureau
P.O. Box 95
Concord, NH 03302-0095

If you have any questions, please contact the Groundwater Discharge Permit Coordinator at (603) 271-2858.

FOR STATE USE ONLY
Date Received: _____
Site No: _____
Rivers Coordinator Notified Date: _____

CERTIFICATION OF NOTICE TO LOCAL TOWN/CITY CLERK
In order to meet the requirements of Env-Wq 402.16(b), the undersigned certifies that on _____(date) a copy of this completed permit application was given to the Town/City Clerk of _____ (the town in which the facility for which a permit is needed or is proposed to be located).

Date: _____ Signed: _____
Applicant

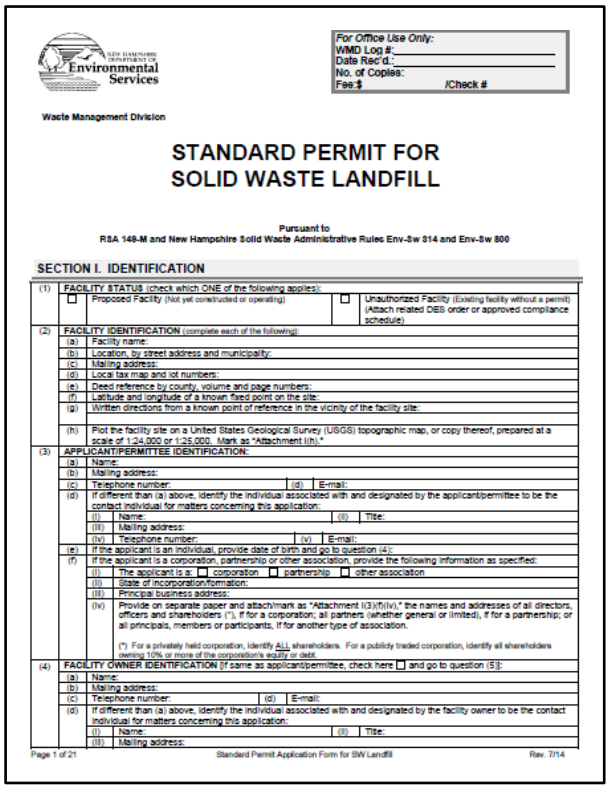
I. Activity Type
- ☐ Discharge from an unlined domestic wastewater lagoon.
- ☐ Discharge from an unlined septage or sludge lagoon.
- ☐ Land application of domestic wastewater.
- ☐ Discharge of domestic wastewater from a subsurface disposal system with a design flow equal to or greater than 20,000 gallons per day.
- ☐ Discharge of domestic wastewater from subsurface disposal systems with aggregate design flows equal to or greater than 1,000 gpd for a single lot where minimum nitrate setback distances are not met.
- ☐ Discharge of nondomestic wastewater which contains a regulated contaminant and which has received treatment by Best Available Technologies before discharge.

dwgbinfo@des.nh.gov or phone (603) 271-2858
PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

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Solid waste permit
(Required by the State)

If your unlined landfill has not been permitted, the owner must contact the State to determine whether they are required to submit a permit application to NH DES for an "unauthorized facility."



For Office Use Only:
WMD Log #: _____
Date Rec'd.: _____
No. of Copies: _____
Fee:$ /Check #

Waste Management Division

STANDARD PERMIT FOR
SOLID WASTE LANDFILL

Pursuant to
RSA 148-M and New Hampshire Solid Waste Administrative Rules Env-Sw 314 and Env-Sw 800

SECTION I. IDENTIFICATION

(1) FACILITY STATUS (check which ONE of the following applies):
- ☐ Proposed Facility (Not yet constructed or operating)
- ☐ Unauthorized Facility (Existing facility without a permit) (Attach related DES order or approved compliance schedule)

(2) FACILITY IDENTIFICATION (complete each of the following):
- (a) Facility name:
- (b) Location, by street address and municipality:
- (c) Mailing address:
- (d) Local tax map and lot numbers:
- (e) Deed reference by county, volume and page numbers:
- (f) Latitude and longitude of a known fixed point on the site:
- (g) Written directions from a known point of reference in the vicinity of the facility site:
- (h) Plot the facility site on a United States Geological Survey (USGS) topographic map, or copy thereof, prepared at a scale of 1:24,000 or 1:25,000. Mark as "Attachment I(h)."

(3) APPLICANT/PERMITTEE IDENTIFICATION:
- (a) Name:
- (b) Mailing address:
- (c) Telephone number: (d) E-mail:
- (d) If different than (a) above, identify the individual associated with and designated by the applicant/permittee to be the contact individual for matters concerning this application:
  - (i) Name: (ii) Title:
  - (iii) Mailing address:
  - (iv) Telephone number: (v) E-mail:
- (e) If the applicant is an individual, provide date of birth and go to question (4):
- (f) If the applicant is a corporation, partnership or other association, provide the following information as specified:
  - (i) The applicant is a: ☐ corporation ☐ partnership ☐ other association
  - (ii) State of incorporation/formation:
  - (iii) Principal business address:
  - (iv) Provide on separate paper and attach/mark as "Attachment I(3)(f)(iv)," the names and addresses of all directors, officers and shareholders (*), if for a corporation; all partners (whether general or limited), if for a partnership; or all principals, members or participants, if for another type of association.

(*) For a privately held corporation, identify ALL shareholders. For a publicly traded corporation, identify all shareholders owning 10% or more of the corporation's equity or debt.

(4) FACILITY OWNER IDENTIFICATION [if same as applicant/permittee, check here ☐ and go to question (5)]:
- (a) Name:
- (b) Mailing address:
- (c) Telephone number: (d) E-mail:
- (d) If different than (a) above, identify the individual associated with and designated by the facility owner to be the contact individual for matters concerning this application:
  - (i) Name: (ii) Title:
  - (iii) Mailing address:

Page 1 of 21 Standard Permit Application Form for SW Landfill Rev. 7/14

ACTION ITEMS

Fix issues as they arise, and include these in the Annual Post-Closure Report

ACTION ITEM – During inspection of the unlined landfill, the landfill permittee or designee may notice items that require repair or maintenance. If something needs a repair, it should be documented with a written description of what issues have been identified. Once repairs are made, describe what was done, and note the actions completed to address the issue and provide documentation. Take photographs of the existing conditions as well as the repairs that are made. Attach a site plan showing the locations of items needing repair. If an issue has not be addressed, submit a general timeframe for completion. Submit this information with the annual Post-Closure Report. The next annual report should show what action items were repaired and how they were done. Photos and documentation will need to be included.



Trees in Drainage Swale

ACTION ITEMS



Broken Gas Vent

PERFORMANCE STANDARDS

The long-term goal

Performance Standards. This is the goal for all closed landfills. The NH Solid Waste Rules have "performance standards":

- ⇒ Stop generating leachate
- ⇒ Stop generating decomposition gases like methane
- ⇒ Achieve maximum settlement
- ⇒ Remove harmful impacts to air and water
- ⇒ Remove threat to human health and the environment

