MINNESOTA POLLUTION CONTROL AGENCY

Environmental Policy

Environmental Policy No.

Policy Title: Alternative Leachate Management

Policy Type: Environmental, Agency Wide

Effective Date: 4-9-01

Background:

Landfill leachate is a liquid that is generated when moisture comes in contact with materials. Land disposal facilities are designed to stop leachate from entering groundwater. The leachate is collected on a liner, and drained off to storage and treatment facilities. Land disposal facility operators are interested in adopting a policy that will allow them some flexibility in how this material is managed. The MPCA has allowed some of the land disposal facilities to reintroduce leachate back into the waste piles under a Phase 1 Pilot Project. The approvals under this pilot project have ended. There is interest by some to continue to allow this management practice. The MPCA is interested in allowing some pilot projects to continue, if the projects are designed to fill information and data gaps to determine the impacts from this practice. This policy is designed to evaluate these projects, establish the parameters as to how they will be selected, and identify expectations as to the outcomes that need to be attained as a condition of approval. The policy is based on recommendations from the MPCA Leachate Treatment Task Group.

Policy Statement:

This policy provides guidance for approval of alternative management of landfill leachate by introducing leachate back into the landfill in order to minimize the need for leachate treatment and disposal to waste water treatment facilities. Stormwater runoff, sludge, and other liquids are not to be added to leachate, or to the waste mass to enhance the biological decomposition of the landfill. Only leachate produced at the site may be reintroduced into the landfill.

An alternative leachate management project will be considered only if the landfill operator agrees to collect and organize pertinent data into information that will help staff at the MPCA determine the efficacy of recirculating leachate back into the landfill and determine the level of treatment that occurs. Approval of an alternative leachate project will be in the form of a major permit modification, requiring public notice and comment before final approval. MPCA staff will consider each of the listed issues when reviewing an alternative leachate management project proposal for approval as a major permit

modification. For the purposes of Minnesota Rules and Statutes, an application to enter a Phase 2 Pilot Study does not constitute a Permit Application.

1. **Alternative Leachate Management pilot project**
   - A land disposal facility will recirculate leachate generated at its facility only, as defined by its solid waste permit. For facilities with more than one type of landfill units covered under the same permit, the proposal must clearly state from which cells/units the recirculated leachate will be generated and to which cells the leachate will be recirculated. Facilities may not accept leachate from landfill units that are not regulated by the same solid waste permit.

2. **Data Needs**

The proposal must address the following:

- How will the project address the fate of metals?
- How will the project address the fate of mercury?
- How will the project measure and evaluate long-term environmental affects?
- How will the project address ambient air monitoring?
- How will the project determine and contrast the emissions from recirculation versus conventional management approaches?
- How will the project measure and contrast cost of recirculation versus conventional management approaches?

3. **Leachate recirculation system design**
   - If leachate spraying on the working face is going to be considered, worker exposure/OSHA, misting/drifting outside of the liner and odor issues need to be addressed.

4. **Leachate volume recirculated**
   - The proposal must include a model of predicted saturation of waste and components of the collection systems at recirculation rates expected at the facility using site-specific historical leachate generation data. The proposal must include the computed hydraulic loading rate.
   - HELP model can be useful for predicting leachate generation rates, though care needs to be taken when interpreting those results. Adjustments will have to be made to account for actual leachate volumes. The HELP model does not account for the drainage layer clogging or liner components aging. The model does not consider the changes in waste field capacity over time. The HELP model must be modified to use site-specific historical leachate generation data rather than the empirical data that is built into the model.

5. **Liner**
   - The minimum acceptable liner system must include at least a single composite lining system comprised of compacted soil and geomembrane, which meets the requirements in *Pollution Control Agency Solid Waste Management Rules Chapter 7035.2815 Subp. 7.*

6. **Leachate collection system**

- Leachate collection and removal systems must be designed to manage flows generated by precipitation during the operating life of the facility and recirculation to prevent the buildup of excess head on the liner. Using historic site-specific leachate generation and precipitation data, the facility operator will compute the anticipated hydraulic loading rate. The proposal must show how this computation relates to the leachate collection system design (spacing and number of the collection pipes, coefficient of permeability of the drainage layer, etc.)
- The leachate collection system must not exceed the one-foot of head on the liner according to *Pollution Control Agency Solid Waste Management Rules Chapter 7035.2815*, Subp. 9. D. Leachate pumps should be automated and the capacity of the pump should be high enough to avoid excess accumulation of the leachate on the liner.
- Depositional blockages in the leachate collection system (drainage layer) should be anticipated, and considerations should be given to enlarging critical components (over-sizing), and contingencies for system cleaning, and component replacement.
- The need for additional leachate storage must be evaluated.

7. **Gas collection system**

- The proposal must evaluate the need for an active gas collection system based on anticipated gas generation rates and odor issues. If a passive system is installed, it must be able to be retrofitted to an active system.
- Due to the anticipated higher gas generation rates, passive gas venting systems must be equipped with solar-powered flares to reduce greenhouse gas emissions.
- The need for ambient air monitoring, either through permanent stations or hand-held equipment, must be evaluated for compliance with air quality standards at the perimeter of the facility.
- A gas collection and venting system must be part of comprehensive landfill cap design. The proposal must also evaluate the need for gas collection and venting during the operational phase if recirculation is to occur prior to placement of the landfill cap.
- The proposal must include a plan to address odors and handle odor complaints. This plan must include who to call, how to investigate complaints, and steps that will be taken to correct the situation. The need for passive solar flares or other methods to prevent odors should be addressed, as well as the need for establishing an odor panel per protocol under ASTM 544 or other applicable standards.
- The proposal must analyze the rate at which greenhouse gases will be produced and evaluate the need for an active gas collection system. If the facility is large enough, consideration should be given to installing an energy recovery system.

8. **Slope**

- Distribution pipes should be set back at least 50 feet from side slopes. The proposal must evaluate whether a greater side slope setback may be warranted based on site-specific design and operational criteria.
- For facility design that include final slopes steeper than 5H:1V, the design must follow the MPCA's Slope Policy. In calculating the slope stability and safety factor, the anticipated saturation condition of the waste due to the proposed pilot study must be included. If the minimum required safety factor cannot be achieved due to waste saturation, the MPCA will not approve the proposal with the steeper side slopes.

9. **Operational plan**

- The MPCA will not approve proposals that do not provide for adequate management and supervision. The facility must employ a dedicated landfill operator who is trained on daily operational requirements of the distribution, recirculation, storage and monitoring systems at the landfill and who will be responsible for the project.
- The proposal should include a description of the training program.

10. **Waste**

- The proposal must specify the anticipated waste density. MSW must be placed at a density (compaction) determined to accommodate recirculation (3-4 passes optimal).
- The proposal should address how waste placement will affect leachate distribution and flow. Waste should be placed in a manner that encourages even distribution and flow.
- MPCA staff encourages waste shredding as a method of achieving the goals mentioned above.

11. **Cover Material**

- Adequate daily cover is still required, however, it must not significantly interfere with the continuous passage of moisture through the landfill from top to bottom.
- If daily cover, such as clay, has been used such that flow of leachate might be impeded, the proposal should discuss plans to breach or remove existing cover material.

12. **Final Cover**

- The proposal should address final cover requirements. Closure or when to apply final cover is a concern due to potential settlement. EPA's Solid Waste Disposal Facilities Technical Manual (EPA Subtitle D document) allows for an extension of the 180 day time frame for completing closure if the facility is recirculating its leachate or to allow for settlement as long as the facility prevents threats to human health and the environment. The proposal must address the design and criteria for use of temporary, alternate and intermediate covers.

- The proposal should address closure. Closure must be in compliance with *Pollution Control Agency Solid Waste Management Rules Chapter 7035*.2815, Subp. 5.B., Subp. 13. E. and Subp. 16.A., or alternative closure requirements. If alternative closure requirements are discussed, the proposal should discuss how these requirements would be incorporated into the facility permit (e.g. variance, compliance agreement, etc.).

13. Inspection, Monitoring and Reporting requirements

- The proposal should discuss how volumes of leachate recirculated will be measured and reported. Volume of liquid recirculated and collected (quarterly). MPCA staff prefers flow meters.
- The proposal should discuss how leachate quality will be measured and reported. Leachate samples should be collected at a point where the leachate from the recirculation cell can be collected separately, as well as when it is co-mingled in the leachate storage tank or ponds.
  - Report quarterly: COD, BOD, total VOCs, pH, specific conductance, total dissolved solids and metals (table 1 from Minn. Rules 7035 and RCRA metals).
  - Report annually: total semi-VOCs

Trends must be tracked over a minimum of a five year period for each cell in which leachate is managed by recirculation. The operator must compare current laboratory test results with historical leachate characteristic data. Graphical representations of past test results will be presented to the MPCA at least annually. Changes in sample collection, testing methodology or testing laboratories must be clearly noted in all text, charts and graphs.

- The proposal will discuss how and where leachate head levels will be measured. Leachate head levels should be checked at least weekly, but reported in a quarterly report, except whenever the leachate is more than one foot over the liner, it must be reported to the MPCA within 24 hours. Any change in leachate head level measurement methodology will be clearly noted in report text, charts and graphs.
- The proposal should discuss how problems will be detected and repaired, and reported to the MPCA. In general, problems encountered should be repaired within two weeks. If a longer time frame is needed, prior approval must be obtained from the MPCA. At a minimum, approved facilities report to MPCA in a quarterly report the following:
  - Odors
  - Monthly walking inspection – looking for seeps and other problems
  - Complaints
- The proposal should discuss how waste settlement will be measured and reported. Annual reporting and comparison to a control cell is preferred.
- The proposal should discuss how landfill gas volumes and quality will be measured and reported. Comparison to a control cell is preferred.
- The proposal should discuss how ambient air monitoring will be measured and reported. The proposal should identify the parameters that will be monitored and

the air quality standards that will be used for compliance. Quarterly reporting is preferred.

- All of the above information should be kept in a log book and copies submitted with quarterly report.

14. Contingency Action Plan

- The facility's Contingency Action Plan must address the potential impacts of the pilot study on items such as leachate in excess of one foot on a liner, side seeps, slope failure, liner leakage, system clogging, odors, nuisance issues, etc. If the existing Contingency Action Plan does adequately address these issues, the proposal should include an amendment or revised plan.
- Pilot projects must stop immediately if the liner show signs of leakage or surface seeps of leachate occur that may be attributed to the recirculation activities. The facility shall follow its Contingency Action Plan to determine the source and quantity of leakage or discharge. MPCA staff may approve the resumption of the pilot study after a site investigation and evaluation has been completed and it is determined that resuming the pilot study will not exacerbate the situation.

15. Financial Assurance

- The proposal must address whether the pilot study will change the probability that the Contingency Action Plan will need to be implemented, or whether the magnitude of a particular contingency may be increased due to pilot study.
- Closure cost estimates are based on the largest area anticipated to be open at any given time during the facility's development. If a landfill is employing a temporary cover, this area has not been officially closed and must be included in the calculation of open area subject to final closure. This may increase the facility's closure cost estimate.
- Leachate recirculation technology has not been proven compared to the traditional "dry tomb" landfill design, so no reduction in the post-closure liability and time period will be allowed.

16. OEA Review

- For certain facilities, a new or amended Certificate of Need (CON) may be required prior to filling in settled areas.
- The proposal should discuss any known CON issues affecting the facility.

Purpose and Rationale

The policy helps staff and the regulated community understand the reasonable limit of the Commissioner's discretion regarding the approval of alternate leachate treatment. It also reinforces state regulations that prohibit the introduction of free liquids into land disposal facilities.

Implementation

Upon approval, the policy will be immediately distributed to the appropriate service delivery staff and cataloged as an approved policy in the Policy and Planning Division records

Statutory Basis

Minnesota Statutes 115A.03 Subd. 21. And 116.06 Subd. 22.

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