

Leachate Recycle Offers Pros, Cons To Groundwater Pollution

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Alternate disposal options is a thriving topic in the 90s and federal regulations have brought one disposal concern into the limelight - leachate.

Recycling leachate in municipal solid waste (MSW) landfills can provide a means of leachate disposal, can enhance the rate of landfill stabilization (fermentation leading to gas formation), and can save money when leachate disposal is not readily available at a publicly owned treatment works. Leachate recycling also has been spurred by problems with dry-tomb landfilling, which postpones, rather than prevents, groundwater pollution from landfill leachate.

Although leachate recycling is gaining recognition, the merits of recycling MSW leachate are controversial. In the mid-1980s, some regulatory agencies encouraged leachate recycling in MSW landfills, while others prohibited it. Critics said that because it increases the hydraulic loading to the landfill, it can increase the rate of groundwater pollution.

While leachate recycling could be conducted in single-composite-lined landfills that conform to US EPA Subtitle D requirements, groundwater monitoring programs for lined landfills under Subtitle D have little chance of detecting pollution of groundwater before it becomes widespread, once leachate leaks through a composite liner. Because the initial leakage from an FML-lined landfill, such as a Subtitle D landfill, comes through holes, rips, tears, and areas of deterioration in the FML, this type of leakage produces finger-plumes of leachate-contaminated groundwater that can go undetected between the wells of the monitoring well array typically used.

A double-composite-lined landfill, in which the lower composite liner is a full-landfill-area pan lysimeter leak detection system for the upper composite liner, can help prevent groundwater pollution. This system allows operators to detect leakage of the upper composite liner before the groundwater is polluted. When leachate is found in the lysimeter system, leachate recycle should be stopped and the waste exhumed if the leakage through the upper composite cannot be stopped.

Plastic bags used for garbage disposal can prevent recycled leachate from interacting with the MSW. Since landfill gas production rates depend on the waste's moisture content, waste that is not exposed to the recycled leachate will produce landfill gas at a slower rate than fully-exposed wastes. Shredding waste before burial can help shorten the duration of landfill gas production and decrease the time for landfill stabilization.

While leachate recycle can reduce the strength of some MSW leachate components, leachate produced in the landfill can still pollute large amounts of groundwater. Leachate recycling is best used during the early stage in a fermentation/leaching wet-cell approach to MSW management. In that approach, the leachate recycle-accelerated stabilization period is followed by a period of washing of the fermented MSW residues with clean water. During that time, residues that would otherwise leak out of the landfill and pollute groundwaters are deliberately leached out of the wastes in a controlled manner. Without the clean-water leaching step and an appropriate leak detection system such as the full-landfill-area pan lysimeter mentioned above, leachate recycle will not significantly contribute to protection of groundwater resources. At this time, however, the US EPA Subtitle D regulations prohibit the addition of "clean water" to leach removable components of wastes, which is an integral part of the fermentation/leaching wet-cell approach. RCRA-Subtitle D needs to be modified to allow this approach with an appropriate leak detection system. Without such a change in regulations, leachate recycle in a Subtitle D landfill will not alleviate the threat of groundwater pollution from MSW landfills. It is recommended that leachate recycle not be practiced in a single-composite-lined landfill where leakage through the liner could pollute groundwater hydraulically connected to the landfill area that could serve as a groundwater resource for this or future generations.

References as: "Lee, G. F. and Jones-Lee, A., 'Leachate Recycle Process Offers Pros and Cons,' World Wastes 37:16,19, August (1994)."

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