



Leachate Sampling for Reduction and/or Termination of Postclosure Care Technical Guidance Document SW-2013-G3

This document addresses leachate sampling at landfills for the purpose of determining when certain postclosure care activities may be reduced and/or terminated.

Background

The owner or operator of any municipal solid waste landfill (MSWLF) is responsible for long-term care of the site for at least 30 years after the facility closes. For MSWLFs that are subject to full Subtitle D regulation, reduction and/or termination of postclosure care (PCC) activities will be based on a PCC Reduction and/or Termination Plan. The plan should be prepared by the facility according to Technical Guidance Document SW-2014-G1 and must be approved by the Kansas Department of Health and Environment (KDHE). If a landfill has a leachate collection system, changes in the composition and flow rate of leachate over time can be used to determine when certain PCC activities may be reduced and/or terminated.

Leachate Parameters

The use of leachate to characterize municipal solid waste (MSW) stabilization is based on the premise that leachate is one of the key end products of the reaction between MSW, indigenous microorganisms, and moisture. To determine the degree of MSW stabilization, the recommended leachate sampling parameters are: quantity/flow rate, temperature, five-day biochemical oxygen demand (BOD₅), chemical oxygen demand (COD), ammonia, pH, and total suspended solids (TSS). Annual leachate monitoring includes all of these parameters except quantity/flow rate and temperature.

Leachate Sample Collection

Once leachate enters a storage facility or contacts air, it is subject to physical, chemical and biological reactions that can change the composition of the leachate. Therefore, the best representative sample must be collected as close to the leachate generation point as possible, ideally as soon as the leachate leaves the waste. The leachate collection location should be selected with this objective in mind. Typically, leachate is collected using grab samples, i.e., single samples taken at specific times.

Leachate is removed from MSWLF units by gravity or by pumping. If leachate is removed by gravity flow, sample collection at the gravity flow outfall allows a representative leachate sample to be collected since the leachate has just left the MSW mass. If the leachate flows into a wet-well, the sample should be collected from leachate flowing into the wet-well; this liquid will provide a representative sample of better quality than either the accumulated liquid in the wet-well or the pumped discharge from the wet-well.

If leachate is removed from the landfill unit by pumping, samples taken at the pump discharge provide the best representative sample, but only when the liquid level in the sump is nearing its lowest set point, since this leachate most recently left the MSW mass. This leachate is relatively unmixed since most of the previously generated leachate stored in the sump was removed prior to reaching the lower set point.

Leachate stored in an evaporation and storage basin is altered by in-situ reactions, evaporation and precipitation. Therefore, leachate basin is an unacceptable location to sample for predicting PCC reduction and/or termination.

Collecting separate leachate samples from each landfill unit is required by KAR 28-29-104(i)(6) and is more representative of the unit's waste stability than a leachate sample taken from several contributing units. However, KDHE suggests that a combined leachate sample representing all units be collected to confirm results from individual units and to define the final leachate quantity and composition.

Frequency of Measurements

The ability to define a trend in leachate composition and quantity/flow rate will depend on the frequency of measurements. More frequent measurements will allow a better determination of leachate composition and quantity/flow rate in each unit of landfill operation. In general, the more data, the greater the confidence in the prediction of PCC reduction and/or termination dates.

Although not required, KDHE recommends initially sampling individual unit and combined leachate streams on a quarterly basis to provide adequate data for trend analysis. This information may be used to determine the kind of data to be collected, the long-term frequency of data collection (at least annually) and the proposed methodology for appraising the data in terms of establishing PCC reduction and/or termination. Appropriate (non-parametric) statistical methods must be used to make long-term comparisons of leachate composition and quantity.

If the landfill has a gas collection and control system, it is best to conduct landfill gas (LFG) sampling at the same time as leachate sampling from the same unit(s) so that more useful correlations can be made between the two sets of data for characterizing MSW stabilization.

Quality Assurance (QA) Procedures

Minimum requirements for the collection and analysis of environmental samples are found in the Quality Management Plan (QMP) for the Division of Environment and the Bureau of Waste Management (BWM). Sample collection and analytical procedures are located in Part III of BWM's QMP. The QMP is available at: www.kdheks.gov/environment/qmp/qmp.htm.

Key concerns for leachate sampling are collection location, adequate sample volumes, and proper sample preservation. A KDHE-certified laboratory should be used to measure leachate composition if certification is available for those analyses.

Although not required, KDHE recommends measuring leachate flow rates quarterly to:

- Perform a liquid balance, which will account for on-site precipitation, and all intentional liquid additions (e.g., leachate recirculation or liquid addition as part of a research, development, and demonstration project); and
- Estimate the total mass flow rate of key leachate parameters.

Additional documents concerning PCC reduction and/or termination are available on the PCC Policies and Guidance web page at: www.kdheks.gov/waste

For additional information regarding the proper management of solid or hazardous waste in Kansas, you may visit the Bureau of Waste Management website at <http://www.kdheks.gov/waste/> or contact the Bureau at: (785) 296-1600, bwm_web@kdheks.gov, or the address at the top of this document.