



SAMPLING ANALYSIS PLAN FOR SMALL ARID LANDFILLS

Technical Guidance Document SW-1997-G3

The Kansas Department of Health and Environment (KDHE), in conjunction with the regulated community of Kansas, has promulgated regulations which allow those landfills which meet criteria detailed in Kansas Administrative Regulation (K.A.R.) 28-29-103 flexibility from some of the requirements placed on other Municipal Solid Waste Landfills (MSWLFs). These landfills are classified as Small Arid Landfills (SALs). In order to demonstrate that naturally occurring geological conditions provide sufficient protection against groundwater contamination at a SAL, most owners or operators must install and operate a groundwater monitoring system. This guidance document was created to assist in the development of an adequate Sampling and Analysis Plan (SAP) which meets the requirements of K.A.R. 28-29-112(b) while maintaining the flexibility allowed for SALs by K.A.R. 28-29-103. An adequate SAP is important to ensure the monitoring results provide consistent data representative of groundwater quality at the facility, since it will be used throughout the active and post-closure life of the facility. The items included in this guidance are considered to be the minimum information required by KDHE. This guidance is based on the Kansas solid waste regulations, EPA's RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD), and standard practices specified by KDHE.

GENERAL FACILITY INFORMATION

An essential part of the SAP is a description of the groundwater monitoring system. The number and identification of monitoring wells and when they were installed should be noted. Monitoring wells should also be identified as upgradient or downgradient in relation to the cell(s). A discussion of the characteristics of the uppermost aquifer is necessary, including the groundwater flow direction. Well construction logs for each monitoring well should be included as an appendix.

The SAP must contain a map identifying property lines; groundwater monitoring well locations; on-site buildings; closed, active, and planned landfill cell boundaries; and all other pertinent facility features. The SAP should identify the months in which sampling will take place.

DOCUMENTATION

Proper field documentation of each sampling event is vital to data interpretation and the success of the groundwater monitoring program. The SAP should

include provisions to properly record all applicable information while performing the field activities. Information can be recorded in a field logbook or on data sheets prepared prior to the sampling event. If data sheets are to be used, the SAP should include an example of the data sheet.

For each monitoring well in the system, it is necessary to record the measurements of static water level and total depth. The well purging method, purge volume, and the purge parameter measurements (if applicable) should also be recorded in the field notes, as should be the sample time and date, and the sample method. Any observations such as unusual monitoring well recharge rates, deficiencies found during the well inspection, equipment malfunction(s), and/or possible sample contamination sources need to be recorded. The SAP needs to include specific procedures for the complete documentation of all field measurements and observations made during the sampling event.

FIELD PROCEDURES

Well Inspection

The sampling team should inspect the well and note the condition of the well pad, casing, protective casing, elevation reference mark, and security locks. The SAP must include provisions to perform this inspection and record any deficiencies in the field logbook.

Depth Measurements

Static water level and total depth measurements must be completed at all wells prior to the purging and sampling of any monitoring well in the groundwater monitoring system. These measurements should be made to the nearest .01 foot from a permanent reference point at the top of the well casing. The SAP must contain specific equipment that will be used and the detailed procedures for collecting these measurements.

Purging Procedure

Stagnant water must be evacuated from a monitoring well prior to sample collection in order to accurately obtain a representative sample from the aquifer. An adequate SAP must include a description of the equipment and procedures used to purge each monitoring well.

The minimum amount of water to be purged may be figured one of two ways. The first option is to purge three borehole volumes. A borehole volume is defined as the water present in the well casing plus the water present in the pore space of the gravel pack surrounding the well casing. If this option is used, the SAP should contain the formula for calculating borehole volume.

The second option for establishing purge volume is to evacuate a minimum of three casing volumes, and also purge until the temperature, pH, and conductivity of the purge water have stabilized. These three purge parameters should be analyzed at a frequency no greater than once per casing volume. Consecutive readings within 10% of each other for each of the three purge parameters are an indication that the water is representative of the aquifer, and sample collection may occur.

The SAP must identify which option will be used to determine purge volume. Circumstances may exist where neither option is practical. Examples are an aquifer with an extremely slow recharge rate, or a monitoring system utilizing a low-flow purging method. The SAP should note any of these site-specific conditions, and describe how purging will be accomplished in these instances.

Sampling Procedures

Samples should be collected from each downgradient monitoring well within 24 hours of measuring the static water level and as soon as possible after purging the well. The SAP needs to identify the equipment and procedures used at each well to obtain a representative groundwater sample. If water is collected from the discharge line of a pump, the maximum flow rate should be 100 ml/min to avoid agitation and loss of volatile organic compounds (VOCs). Due to the potential for sample integrity loss by excessive volatilization, samples to be analyzed for VOCs must be collected before the samples to be analyzed for metals. By Kansas regulations, field filtering is not allowed.

The SAP should include a table listing the sample collection containers, preservation methods, analytical methods, and practical quantitation limits to be used for each constituent listed in Table 1 of K.A.R. 28-29-103.

Field Quality Control Samples

Collection and preparation of several types of quality control samples may be necessary. A blind field duplicate must be prepared and analyzed at every fourth sampling event. Trip blanks and decontamination rinsate blanks are required for any confirmation sampling event described in K.A.R. 28-29-103(f)(6). The SAP should describe the protocol and frequency for preparing each of these quality control samples.

Equipment Decontamination Procedures

Some field equipment may be dedicated to an individual monitoring well. For non-dedicated equipment used at multiple wells, decontamination of the equipment is necessary between use at each

monitoring well. The SAP needs to describe the materials and procedures used for decontamination of equipment. All equipment must be decontaminated by washing with a non-phosphate detergent, followed by a thorough rinse with de-ionized or distilled water. After cleaning, the equipment must be wrapped or bagged to prevent contamination while not in use.

Sample Labels and Chain of Custody Procedures

Proper sample labeling and chain of custody procedures are necessary in order to accurately track each sample from the time of sample collection through laboratory analysis. An explanation of all procedures utilized to label a sample and ship it to the laboratory is required in the SAP.

Every sample container needs a label which notes the facility name, sample identification (monitoring well) number, date and time of sample collection, and any other data required by the laboratory. Once labeled, a sample must be transported to the laboratory for analysis. The SAP should describe how proper chain of custody procedures will be followed.

LABORATORY ANALYSES

The SAP needs to identify what laboratory analyses will be performed on the samples. The analytical methods must be noted, as well as the appropriate

holding times. It is necessary to discuss the practical quantitation limits for the constituents of concern, which must be at or below the Maximum Contaminant Level (MCL) value. The SAP must note that all analyses will be performed by a laboratory certified by KDHE for the analytical methods used.

REPORTING OF RESULTS

The analytical results of each sampling event must be submitted to KDHE as part of a comprehensive report that summarizes the entire sampling event. The SAP should explain what information will be presented in these reports. Reports of sampling events must include, but are not limited to, the following:

- ◆ a copy of field notes and/or field data sheet;
- ◆ a copy of raw laboratory analytical results;
- ◆ compilation of the analytical results (text summary and table);
- ◆ chain of custody records;
- ◆ direction of groundwater flow, including a potentiometric surface map compiled from measurements taken during the sampling event;
- ◆ any deviations from the SAP during the sampling event and reasons for the change; and
- ◆ certification from a qualified groundwater scientist.

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.