



MISSOURI DEPARTMENT OF NATURAL RESOURCES

Procedures for Sampling Landfill Gas Inside Buildings

Technical Bulletin

9/1999

Division of Environmental Quality
Solid Waste Management Program

Overview

This document was prepared by the Missouri Department of Natural Resources' Solid Waste Management Program (SWMP) to provide guidance in how to properly sample for landfill gases in enclosed spaces.

Sampling Equipment

Proper selection of sampling equipment to be used for monitoring buildings is critical to make proper public safety assessments. Explosimeter-type instruments are appropriate for measuring methane in most monitoring in enclosed spaces. You should be aware that in an oxygen free environment some meters are not reliable and can give false readings that are lower than the actual gas concentrations.

It is recommended that detection instruments selected for monitoring buildings have a narrow sensitivity range, from 0-15 percent by volume for methane.

Sampling Procedures

Step 1 - Make sure the instrument has been properly calibrated to methane (Some instruments of this type are calibrated to hexane or propane, which have different combustible limits than methane). Prepare the instrument for sampling by allowing it to properly warm up as directed by the manufacturer.

Step 2 - Attach the hose to the instrument and begin sampling. Some instruments have metal wands that can be attached to the plastic hose to collect air samples. Wands can be made from copper tubing if not made available with the instrument.

Step 3 - To properly assess a building, samples should be collected from:

- A. Around the walls of the building and electrical sockets
- B. Closets or other enclosed wall spaces
- C. Cracks in cement floors
- D. Ceiling areas
- E. Crawl spaces and basements
- F. Areas where below ground utilities enter the building
- G. Any other confined area

Step 4 - If landfill gas is detected by the instrument in any concentration it should be recorded and reported to the department.

Sampling Times

Sampling times are almost as important as the procedure used to collect the sample. Proper monitoring of the site should include those times when landfill gas is most likely to migrate. For these reasons monitoring should be considered when:

- A. Barometric pressure is low and soils are saturated; or
- B. When snow cover is just beginning to melt; or
- C. The ground is frozen or ice covered.

Regulatory Requirements

Sanitary landfills in operation after April 9, 1994, and all demolition landfills that applied for a construction permit after July 30, 1997, are required to conduct the quarterly monitoring of all buildings on site as required by 10 CSR 80-3.010(14) and 10 CSR 80-4.010(14).

These landfills must implement a gas monitoring program to ensure that regulatory limits for methane are not exceeded - 1.25 percent (25 percent lower explosive limit) by volume in buildings on site. Results must be submitted at least quarterly to SWMP in an electronic format.

The Solid Waste Management Regulations require that monitoring reports be submitted to SWMP at least quarterly. The SWMP recommends that gas monitoring be conducted during the months of February, May, August and November and that the results be submitted within 30 days of sampling. The data must be submitted in electronic form. The results submitted should contain:

1. The location of monitoring points.
2. Sample results obtained should include the date the sampling was performed and the barometric pressure, if available. Methane measurements may be given as a percentage of the total air volume or as a percentage of the Lower Explosive Limit (LEL). The following formula can be used to convert a percentage of LEL into a percentage methane by volume:
$$\% \text{ Methane (by volume)} = \text{LEL (\%)} \div 20$$

The form attached to the end of this bulletin may be used to record the information required by the department.

Corrective Action / Emergency Response

If methane gas levels exceed regulatory limits or are an obvious public safety threat, the landfill owner/operator must:

1. Immediately take all necessary steps to ensure protection of public health and safety. For accumulation of gas in buildings, either on-site or off-site, the operator must take appropriate action to mitigate the effects of the gas accumulation in those structures until a permanent remediation is completed.
2. Comply with the Solid Waste Management law and regulations as required by 10 CSR 80-3.010(14) and 10 CSR 80-4.010(14).

Conclusions

Missouri has stringent regulations governing landfill gas migration. Landfill gases that have the ability to migrate in buildings present a threat to public safety. It is the responsibility of the landfill owner/operator to take any and all steps to protect the public from migrating landfill gases both on- and off-site.

References

Farquhar, Grahame, Monitoring and Controlling Methane Gas Migration, course notes presented at April 1993 Sanitary Landfill Design and Management training, offered by the University of Wisconsin, Madison, College of Engineering.

SCS Engineers, Inc., April 1989, Procedural Guidance Manual For Sanitary Landfills, Volume II: Landfill Gas Monitoring and Control Systems, prepared for the California Waste Management Board.

United States Environmental Protection Agency, November 1993, Solid Waste Disposal Facility Criteria, Technical Manual, EPA 530-R-93-017.

For more information call or write:

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