ATMOSPHERIC ANALYSIS AND CONSULTING, INC

# LANDFILL GAS

## Landfill Gas

Municipal Solid Waste contains a large % of organic matter which is decomposed by anaerobic bacteria to produce a variety of gaseous products including primarily Methane and Carbon Dioxide with lesser amounts of $N_2$, $H_2$, NMOCs and $H_2S$. NMOC emissions make up less than 1% by weight of landfill gas but are of concern because they include toxic and/or reactive VOC compounds such as benzene, toluene, chloroform, vinyl chloride, and carbon tetrachloride.

## Emission Factors (AP-42)

Emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an associated activity. These factors are expressed as weight of pollutant divided by a unit of weight, volume, distance or duration of the activity emitting the pollutant.

E = (A) (EF) (1-ER/100)
E=emissions, A=activity rate
EF=emission factor
ER=emission reduction efficiency


**Sucha S. Parmar, Ph. D.**
President/Tech Director
ssparmar@aaclab.com
**Marcus Hueppe**
Laboratory Manager
mhueppe@aaclab.com


Visit us at:: www.aaclab.com

ACCREDITED IN ACCORDANCE WITH nelac Certificate #E87837

TEXAS
FLORIDA
NEW JERSEY

## Landfill Gas Emission Regulations:

According to the EPA, NMOCs are made up of mostly VOCs or HAPs (65 Fed. Reg. 66672, Nov 2000) and 85% of the NMOC content in a landfill gas is VOC. Laws requiring the collection of landfill gas are not based on the global warming impact of CH4 but on the toxicity or reactivity of NMOCs. Federal regulations require that if the landfill has a total permitted capacity greater than or equal to 2.5 million tons of waste, the landfill's annual NMOC emissions must be estimated. If the NMOC emissons are estimated at more than 55 tons per year, the landfill must adhere to the rules that include submitting compliance reports, installing a gas collection system, and "destroying" landfill gas at 98% efficiency. Burning the landfill gas does not "destroy" it but changes it into a different set of pollutants.

## Landfill Gas Sampling and Analysis:

Emissions are measured by the use of various combinations of field sampling techniques and laboratory analytical methods:

A. On-site Measurements:
   - GC/FID
   - FTIR

B. Sample Collection for Laboratory Analysis:
   When measuring emissions from passive vents at landfills, samples are collected over a given time using Tedlar bags or Summa® passivated stainless steel canisters followed by GC/MS, GC/FID, GC/TCA or GC/SCD analysis for various pollutants of interest. EPA 25C is used for NMOC measurements and EPA 3C is used to measure fixed gases from landfills. EPA Method 18 and TO-15 are also used to analyze speciated organic compounds on the AP-42 list.

## AAC's Capabilities:

Atmospheric Analysis and Consulting, Inc. (AAC) is a NELAC accredited full-service air quality analytical laboratory. We offer high quality, responsive and cost-effective analytical services using EPA, ASTM, CARB, NIOSH, NCASI, and SCAQMD methodologies to meet your ambient air, source testing, indoor air, vapor intrusion, Landfill Gas, and pulp and paper industry project needs.

AAC scientists have modified or developed new sampling and analysis methods for several pollutants including acrolein, amines, isocyanates, and sulfur compounds. Our commitment to data quality, ability to handle custom projects and our investment in the latest technology and research makes AAC one of the foremost air labs in the country.

SBA Your Small Business Resource HUBZone