KEYNOTE

MONTHLY

LECTURES



Food *for* **Brain**

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Lecture #7



13:00 CET



ARE LANDFILL EMISSIONS IN THE UNITED STATES UNDERSTATED?

Recent measurements from next generation emission measurement (NGEM) technology indicate that methane emissions from U.S. landfills may be understated. Remote sensing studies in California revealed that landfills were responsible for 41% of the State's methane inventory, with 32 super-emitting landfills identified [Duren et al.; Nature, 2019]. A 2020 USEPA report concluded that air rules are being inconsistently implemented and enforced. First order rate equation (referred to as the Landfill Gas Emission Model or LandGEM) is used to quantify landfills emissions. When comparing LandGEM estimate to landfill header pipe gas flow rates, it has been found that there can be several orders of magnitude difference either higher or lower, causing uncertainty in values in use for policy implementation and inventories. The use of Clean Air Act source emission models and past measurement technology fail to capture the spatiotemporal variability of landfill emissions, leading to uncertainty for decision makers.

This presentation will review NGEM technology for landfill methane measurement (and that of other air pollutants). Through collaborations with California Air Resources Board (CARB), Environment and Climate Change Canada (ECCC) and Carbon Mapper (through philanthropic funding) US EPA is embarking on testing a wider range of landfills to help inform landfill owner/operators of sites where leaks are occurring which are substantial and require near term abatement. Any actions taken would be voluntary and to date most landfill owner/operators were appreciative of the information that they have received which identify where leaks occur. Data are used by EPA enforcement personnel to prioritize landfills to inspect. Over a decade ago, US EPA was advancing the use of ground-based optical remote sensing to quantify fugitive loss from landfills. Although that work has not been continued, findings have informed NGEM measurements leading to better test methods and measurements. Ideally, measurements and not modeling will be used when quantifying emissions from landfills, although some modeling will always be required (e.g., future emission projection for inventories).

Ms. Susan Thorneloe will describe field test measurements being conducted this summer 2022 that use both high- and low-altitude measurements like what was done by CARB to evaluate methane sources in California.



Ms. Susan Thorneloe
Environmental Protection Agency
USA

Ms. Susan Thorneloe is a senior chemical engineer with the US EPA's Center of Environmental Solutions and Emergency Response in RTP, NC. Susan has led many research projects including understanding partitioning of pollutants in the environment from coal ash and other waste materials being considered for beneficial use, land application, and treatment/remediation [i.e. LEAF].

Susan pioneered the use of life-cycle assessment methodology for comparing alternatives for waste and materials management to identify options that compare life-cycle environmental tradeoffs and maximize resource and energy recovery from solid waste management.

Susan was also the initial technical lead for Clean Air Act regulations for municipal solid waste landfills.

Throughout her career, Susan has been an effective networker helping to leverage EPA funding through work across state, local, federal government, industry, NGOs and others in helping find better solutions for more effective environmental management.

Susan is a member of the International Waste Working Group and known internationally for her expertise and technical support.