



Society of Applied Spectroscopy  
New England Section

**September Dinner Meeting Announcement**

When: Tuesday September 15, 2015  
5:30 – 6:30 Social Hour  
6:30 – 7:30 Dinner  
7:30 – 8:30 Presentation & Discussion

Where: **Radisson Hotel & Suites, Chelmsford, MA**  
**10 Independence Drive, Chelmsford, MA 01824 (978-256-0800)**

Speaker: Barbara Marshik  
MKS Instruments  
Andover, MA

Title: **Real-Time Siloxanes Measurements and Biogas Process Control Monitoring using On-Line FTIR at Digester and Landfill Sites**

**Abstract:**

With the rising cost of oil and now the new Green House Gas initiatives, the need to better utilize and control renewable and sustainable energy sources from biogas and biomethane produced by digesters and landfills is becoming more economically feasible. Biogas provides a direct fuel source for powering on-site or regional utilities or as vehicle fuel use. The upgraded biomethane may be used to augment the intra- and inter-state pipelines as well. There are many restrictions on impurities in biogas such as siloxanes and chlorinated hydrocarbons in order to mitigate downstream equipment damage so the ability to monitor the gas content not only for CH<sub>4</sub>, CO<sub>2</sub> and H<sub>2</sub>O but also for siloxanes in order to quickly determine as well as react upon process upsets.

Traditionally siloxane analysis involves collecting biogas samples at the landfill or digester site and then sending them to an off-site laboratory. The laboratories, in theory, provide very low detection limits for siloxanes; however the actual total uncertainty of the measurement is quite high due to the inability to get repeatable samples to the lab. Therefore a novel on site validation methodology was developed for the MKS AIRGARD® Biogas Siloxane Monitor based upon the use of Standard Addition and Analyte Spiking.

The AIRGARD® Biogas Siloxane Monitor collects FTIR spectral information that is instantly correlated to the amount of siloxanes present in the biogas sample as well as simultaneously provides methane, CO<sub>2</sub> and moisture content for product quality monitoring. Data has been collected at numerous landfills and digesters plants which were then used to develop a novel analysis method capable of analysing the presence of low level (<0.2mg Si /m<sup>3</sup>) total siloxanes and other gaseous components that can be used for dynamic process control monitoring. This presentation will focus on how the MKS patented Total Siloxane method was developed and how it can be validated in the field as well as present real field data.

### Speaker Biography:

Barbara Marshik is the Applications Manager for MKS Instruments Process & Environmental Analysis product group. She is responsible for the development of new applications for FTIR gas phase analysis markets that include Specialty Gases, Combustion and Engine emissions, Environmental Air emissions, Biogas and others. Previous experience has taken her from R&D Manager at Whatman (now Parker) creating gas generators to chemometric application development for NIR and FTIR and algorithms for medical devices as well as spectroscopic instrumentation (at InfraReDx and Galactic Industries). She holds a BS in Chemistry from Mankato State University in MN, a Ph.D. in Physical Chemistry from University of Nebraska – Lincoln and a post-doctoral researcher at Northwestern University Ipatieff Catalysis Center. She has published numerous papers as well as book chapters and has given many presentations world-wide on a variety of applications and holds a number of patents in spectroscopic applications. She authored a published ASTM standard for the use of FTIR in detection of impurities in H<sub>2</sub> as well as an SAE publication providing a standard operating procedure for use of FTIR in Engine and Vehicle certification testing and is currently writing an ASTM Standard Method for the use of on line Siloxanes detection using FTIR in Biogas and Biomethane.

**Dinner Details:** A plated meal with a choice of chicken or pasta, salad, bread, and dessert will be provided. Vegetarian Entrée is available on request. Coffee & Tea are included. Please RSVP to Mary Kate Donais at [mdonais@anselm.edu](mailto:mdonais@anselm.edu) with your choice of entrée.

**Cost:** SAS Members \$32; non-members \$37; full time students and unemployed members \$15. (Drinks not included). Please try to have a check or exact change.

**Contact:** We need to know if you are coming ahead of time. Please contact Mary Kate Donais at [mdonais@anselm.edu](mailto:mdonais@anselm.edu) to make a reservation. If you make a reservation and do not show, you must still pay for your meal, or else the chapter ends up paying for you! We will refuse to have you attend in the future if you reserve dinner and then do not attend and pay.

**Directions to the** **Radisson Hotel & Suites, Chelmsford, MA**  
**10 Independence Drive, Chelmsford, MA 01824 (978-256-0800)**

In Chelmsford at Exit 34, Route 110 of I-495. Parking is available in front of both the Independence Bar & Grill Building and the Hotel main entrance.

