

FINAL PROGRAM



40TH INTERNATIONAL CONFERENCE ON THERMAL TREATMENT TECHNOLOGIES & HAZARDOUS WASTE COMBUSTORS

September 13-14, 2023
Le Méridien Charlotte • Charlotte, NC
www.awma.org/IT3



AIR & WASTE MANAGEMENT
ASSOCIATION

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FINAL PROGRAM

General Information

Conference Overview

Now in its 40th year, the International Conference on Thermal Treatment Technologies and Hazardous Waste Combustors provides a forum for the discussion of state-of-the-art technical information, regulations, and public policy on thermal treatment technologies and their relationship to air emissions, greenhouse gases, sustainability, and climate change.

IT3/HWC Conference Committee

Technical Chair: Margarita Murach, *Dürr Systems, Inc.*

Technical Vice Chair: David Ostaszewski, *Alliance Technical Group*

Immediate Past Technical Chair: William Norris, *Ramboll*

Program Advisory Committee:

Pierre Carabin, *PyroGenesis Canada Inc.*

Chih C. Chao, *Cantech Environmental Services*

Cornelia Cretiu, *SOLVAir*

Jurgen Hansen, *Belgoprocess*

Michael Mannuzza, *Ramboll*

Registration

Register online at www.awma.org/IT3. Online registrants will receive a confirmation and receipt, which they can access at any time by logging into their account. Your registration will not be processed without payment.

Conference check-in and badge pickup will be held in the Symphony 5 Foyer at Le Méridien Charlotte during the following hours:

Wednesday, September 13:	7:30 am – 5:00 pm
Thursday, September 14:	7:00 am – 3:00 pm

Refund Policy

If written notice of cancellation is received on or before August 15, 2023 payment will be refunded, less a \$100 cancellation fee. (Cancellation fees apply regardless of payment method). Substitutions may be made at any time; payment for any difference is due at the time of substitution. This refund policy applies to all occurrences, including weather-related events and other natural disasters. In the unlikely occurrence of event cancellation, the Association is not liable for any expenses incurred by the registrant other than the full refund of registration fee(s) paid.

Location

Le Méridien Charlotte

555 South McDowell Street, North Tower
Charlotte, NC 28204
Phone: 704-372-9610

Continuing Education Units

Conference attendees may be eligible for continuing education credits and can apply to receive a Certificate of Participation for the sessions attended. For more information, please contact Gloria Henning at +1-412-904-6021 or glhenning@awma.org.

Presenters' Meeting

Presenters and Session Chairs will meet during breakfast on the day of their session involvement in Symphony 5 to review program details. Presenters should bring their presentations on a memory stick/USB to this meeting, as well as a brief biography.

Conference Proceedings

Conference proceedings will be accessible to all full conference registrants for viewing and download for a limited time following the conference. Attendees will be notified by e-mail when the presentations are available.

Special Accommodations

The Air & Waste Management Association supports the Americans with Disabilities Act (ADA). Those attendees requiring specific equipment, food, or services should contact Cindy Fontanesi at cfontanesi@awma.org to make those needs known in advance. A&WMA will make every reasonable effort to accommodate them.

About the Air & Waste Management Association

A&WMA is a not-for-profit, nonpartisan professional organization that enhances knowledge and expertise by providing a neutral forum for technology exchange, professional development, networking opportunities, public education, and outreach to more than 5,000 environmental professionals in 65 countries. A&WMA also promotes global environmental responsibility and increases the effectiveness of organizations to make critical decisions that benefit society. For more information, please visit www.awma.org.

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Alliance Technical Group

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www.alliancetechnicalgroup.com

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Dürr Systems, Inc. is a global supplier of turnkey, multi-pollutant, clean-air solutions that meet stringent emissions regulations, improve process performance, and protect downstream equipment. We offer a comprehensive suite of Air Pollution Control equipment including RTOs, Wet ESPs, Wet Scrubbers for VOCs, HAPs, PM control, and Solvent Recovery and Distillation Systems. Our aftermarket services include retrofits, rebuilds, spare parts, and inspections, ensuring your system operates at peak efficiency. www.durr.com

Fives Group

Within Fives Group, Fives Solios specializes in the design and supply of emission control equipment and systems for the incineration and energy-from-waste industries. Fives Solios supplies tailor-made dry scrubbing systems for control of particulate, acid gases, dioxin/furans and heavy metals, integrating innovative proprietary technologies: the TGT® and Sonair™ process filters and the All-Dry and Enhanced All-Dry EAD™ scrubbing technologies that provide the highest levels of performance, product quality and energy efficiency. www.fivesgroup.com

United Refractories Company

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Technical Program – Wednesday, September 13

7:30 am – 5:00 pm

Conference Registration
Symphony 5 Foyer

7:30 am – 8:30 am

Continental Breakfast
Symphony 6 & 7

7:30 am – 8:30 am

Presenters' Meeting
Symphony 5

ALL TECHNICAL SESSIONS WILL BE HELD IN SYMPHONY 5

Opening Keynote

8:30 am – 9:15 am

Welcome

Jordan Haywood, A&WMA President; Margarita Murach, Dürr Systems, Inc., Conference Chair

Beneficial Use of Coal Ash

Rick Haverland, Technical Director, ZAG International

9:15 am – 9:30 am

Networking Break and Display Viewing
Symphony 6 & 7



Rick Haverland

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Bright ideas. Sustainable change.

Technical Program – Wednesday, September 13, con't.

Session 1: Incineration: What's New?

Chair: Mel Keener, CRWI

9:30 am – 10:00 am

IT3-15

Revisions to the Hazardous Waste Combustor MACT Regulations

Mel Keener, CRWI, Ashburn, VA

10:00 am – 10:30 am

IT3-33

Pilot-scale Incineration of Fluoropolymers: Evaluation of the Potential Formation of PFAS in Flue Gases

P. H. Taylor, P Taylor & Associates, Lebanon, OH; Deepak Kapoor, GFL; Pyrianga Gunasekar, GFL; H-J Gehrman, KIT; K. Aleksandrov, KIT; S. Herremans, SGS Belgium NV

10:30 am – 11:00 am

IT3-23

Enhanced Thermal Treatment of PFAS-Laden Granular Activated Carbon with Additives

Liliya Chernysheva, Charbel Abou-Khalil, Kyle Doudrick, University of Notre Dame, Notre Dame, IN

11:00 am – 11:30 am

IT3-06

Commercial Organic Chemical Waste Destruction Using Supercritical Water Oxidation

John Follin, General Atomics, San Diego, CA

11:30 am – 12:00 pm

Exhibitor Presentations

Hosted by Cornelia Cretiu, SOLVAir

12:00 pm – 1:00 pm

Lunch

Cardinal Ballroom

Panel: Advancements in PFAS Control Technologies

1:00 pm – 3:15 pm

Chair: William Roberson, U.S. Environmental Protection Agency

IT3-35

Analytical Methods for Quantifying Per- and Polyfluorinated Alkyl Substances in Source Samples: An Overview of Other Test Methods 45 and 50

M. Ariel Geer Wallace, Marci Smeltz, U.S. Environmental Protection Agency, Office of Research and Development, Center for Environmental Measurements and Modeling, Air Methods and Characterization Division, Research Triangle Park, NC

IT3-27

Comparison of the Thermal Destruction of C1 and C2 Fluorine/Chlorine Homologues in a Pilot-scale Research Furnace: Modeling and Experiments

Martin Denison, David Swensen, Marc Cremer, Brydger Van Otten, Reaction Engineering International, Salt Lake City, UT; Jost Wendt, University of Utah, Salt Lake City, UT; Jonathan Krug, Garrett Dildine (Oak Ridge Associated Universities), William Roberson, Erin Shields, James Mattila (Oak Ridge Institute for Science and Education), Paul Lemieux, William Linak, U.S. Environmental Protection Agency, Office of Research and Development, RTP, NC; Preston Burnette, Stella McDonald, Calvin Whitfield, Jacobs Technology Inc., Cary, NC

IT3-32

Use of Fluorinated Refrigerants as Indicators of Thermal Treatment Effectiveness for Per- and Polyfluoroalkyl Substances (PFAS)

Jonathan Krug, William Roberson, Erin Shields, James Mattila (Oak Ridge Institute for Science and Education), Paul Lemieux, William Linak, U.S. Environmental Protection Agency, Office of Research and Development, RTP, NC; Preston Burnette, Stella McDonald, Calvin Whitfield, Jacobs Technology Inc., Cary, NC; William Preston, CSS Inc., Durham, NC

IT3-21

Quantification of GAC-Adsorbed Volatile Organofluorines (VOFs) Using Particle-Induced Gamma Ray Emission Spectroscopy (PIGE)

Liliya Chernysheva, University of Notre Dame, Notre Dame, IN

IT3-22

Tackling the PFAS Challenge Head On with Supercritical Water Oxidation - Never Say Forever

Kobe Nagar, Sudhakar Viswanathan, 374Water, Inc.; Marc Deshusses, Duke University & 374Water, Inc., Durham, NC

3:15 pm – 3:30 pm

Networking Break and Display Viewing

Symphony 6 & 7

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Technical Program – Wednesday, September 13, con't.

Session 2: Carbon Capture, Biomass, Bioenergy

Chair: William Norris, Ramboll

3:30 pm – 4:00 pm

IT3-04

Feasibility Study of Carbon Capture and Storage for World's First Climate Positive Cement Producer

William Norris, Ramboll, Hunt Valley, MD; Burcin Temel McKenna, Christian Riber, Jimmy Andersen, Ramboll, Copenhagen, Denmark

4:00 pm – 4:30 pm

IT3-17

Small Waste-to-Energy Power Generation and the Benefits to Industry and Communities

Dale Haase, SCS Engineers, Charleston, SC

4:30 pm – 5:00 pm

IT3-24

Pilot-Scale Thermochemical Conversion of High Water Content Waste Biomass to Hydrochar: Mass and Energy Balance, Benefits, Challenges, and Scalability

Mukesh Kapila, Richard Bingham, Kieran Kapila, Enoverra, Houston, TX

5:00 pm – 6:00 pm
Networking Reception
Symphony 6 & 7



Technical Program – Thursday, September 14

7:00 am – 3:00 pm

Conference Registration
Symphony 5 Foyer

7:00 am – 8:00 am

Continental Breakfast
Symphony 6 & 7

7:00 am – 8:00 am

Presenters' Meeting
Symphony 5

Session 3: Advancements in Refractory Design

Chair: Ryan McDonald, HarbisonWalker International

8:00 am – 8:30 am

IT3-02

Corrosion (Resistance) in Hazardous Waste Incinerators

Johannes Boersma, Goudkade 2, The Netherlands

8:30 am – 9:00 am

IT3-12

New Considerations for Refractory Lining Design

Ryan McDonald, HarbisonWalker International, Pittsburgh, PA

9:00 am – 9:30 am

IT3-30

Lessons from Failure Analyses in Challenging Refractory Application Environments

Tim Marth, Dana Goski, Dominic Loiacona, Allied Mineral Products, Columbus, OH

9:30 am – 9:45 am

Networking Break and Display Viewing

Symphony 6 & 7

Technical Program – Thursday, September 14, con't.

Session 4: Source Emission Testing Method Updates

Chair: David Ostaszewski, Alliance Technical Group

9:45 am – 10:15 am

IT3-08

PFAS Testing Results at the Clean Harbors, Aragonite Hazardous Waste Incinerator

Bill Troxler, Focus Environmental; Mike Crisenbery, Clean Harbors; Frank Barranco, John Kumm, Steve Yankay, EA EST

10:15 am – 10:45 am

IT3-13

Metal HAP Emissions Continuous Monitoring with Sorbent Traps

Alexandra Sipershteyn, Ohio Lumex Company, Cleveland, OH

10:45 am – 11:15 am

IT3-28

OTM-45 Sampling Lessons Learned

Jesse Rocha, Alliance Technical Group, Carrollton, TX

11:15 am – 11:45 am

IT3-34

A Survey of EPA Sampling and Analysis Strategies for the Characterization of PFAS Off-gas from Thermal Treatment Systems

Courtney Adkins, William C. Anderson, Eurofins US

11:45 am – 12:45 pm

Lunch and Awards Presentation

Cardinal Ballroom



Session 5: Advancements in Air & Water Control Technologies

Chair: Bill Linak, U.S. Environmental Protection Agency

12:45 pm – 1:15 pm

IT3-36

Advanced Gas Cleaning Wet Scrubber Technology for Spodumene Lithium Mineral Processing

Andrew Bartocci, Envitech, Inc., San Diego, CA

1:15 pm – 1:45 pm

IT3-03

Current State of Dry Sorbent Injection (DSI) Solution

Gerald Hunt, Ian Saratovsky, Lhoist North America, Fort Worth, TX

1:45 pm – 2:15 pm

IT3-29

High Efficiency Catalytic Filter Bags for NOx and Particulate Emission Control in Integrated Steel Plants

Tarun Poddar, W. L. Gore & Associates, Elkton, MD

2:15 pm – 2:45 pm

IT3-31

Phosphorus Recovery from Wastewater Treatment Sludges

Cornelia Cretiu, Kai Sartorius, SOLVAir, Houston TX

2:45 pm – 3:15 pm

IT3-11

Clean-Air Technologies & Services - Biogas Industry

Anu Vij, Ship & Shore Environmental, Inc., Signal Hill, CA

3:15 pm – 3:45 pm

IT3-10

Evaluation of Thermal Pre-treatment on Reactivity Reduction of Aluminium Alloy Waste Powders

Roya Biabani, Piero Ferrari, Mentore Vaccari, University of Brescia, Department of Civil Engineering, Architecture, Land and Environment, Brescia, Italy

3:45 pm

Conference Adjourns

3:45 pm – 4:45 pm

Program Advisory Committee (PAC) Meeting



40TH INTERNATIONAL CONFERENCE ON THERMAL TREATMENT TECHNOLOGIES & HAZARDOUS WASTE COMBUSTORS

September 13-14, 2023 • Charlotte, NC

Celebrating 40 Years of the A&WMA IT3/HWC Conference

Over the course of the past 40 years, our conference has been a reliable source of technical, regulatory and policy information exchange amongst thermal treatment facilities, hazardous waste combustors, engineers, solution providers, government agencies, regulatory experts and academia.

We have worked together through key regulatory changes along the way, some of which have reshaped the industry of thermal treatment. We have shared new technologies, research, methods, tools and experience in solving new and challenging problems. We have provided information and technical data from an international perspective, increasing our knowledge base and bringing additional technical expertise to the conversation. In working together, we have created a community of experts with direct experience in all aspects of thermal treatment. Best of all, at each conference we see both a host of familiar faces along with new participants, growing our community, adding new solutions and perspective to meet the challenges we face today and in the future.

Regulations have driven many of the changes we have seen over the years. EPA first proposed regulations for hazardous waste incinerators in 1978 under the Resource Conservation Recovery Act (RCRA). In 1980, EPA promulgated particulate matter (PM), hydrogen chloride (HCl) and destruction removal efficiency (DRE) standards for interim facilities. The predecessor to IT3 started at this time in 1980 to provide a technical and regulatory platform for affected industry.

EPA followed this in 1981 with standards for permitted incinerators and followed with the promulgation of standards for boilers and industrial furnaces (BIF's) that burned hazardous waste, which were later promulgated in 1991. At the same time, EPA proposed additional standards for hazardous waste incinerators.

In 1993, EPA started the process of switching the regulation of air emissions from hazardous waste combustors (HWC) from RCRA to the Clean Air Act by releasing their draft Hazardous Waste Minimization and Combustion Strategy. The initial maximum achievable control technology (MACT) standards were finalized in 1999, overturned in 2001 with interim standards published in 2002. EPA published replacement standards in 2005. These were also challenged and in 2008, the Agency took a voluntary remand of all hazardous waste combustion regulations.

Today, we see new challenges ahead with pending regulatory actions on HW MACT II, PFAS and gasifier regulations, combined with strong drivers and incentives to reduce greenhouse gas emissions and minimize waste.

Building on our long history, this conference has stood the test of time, supported by organizations and individuals with a passion for our industry. With our collective continued support and participation, IT3/HWC will continue to evolve to meet industry challenges for the next 40 years and beyond.

—William Norris, Immediate Past Technical Chair



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