http://divisions.asme.org/mer/

Materials & Energy Recovery Division

Editor: Tom Murphy **Summer 2011**

MESSAGE FROM THE CHAIR

by Thomas White

It is an honor and privilege to be writing the first "Message from the Chair" for the newly named Materials and Energy Recovery (MER) Division of ASME, previously known as the Solid Waste Processing Division (SWPD).

Over years of business and personal travel, I have conversed with many Americans who eventually ask….. "What is your line of work?" My standard reply is that I am in the waste-to-energy (WTE) business. We burn trash which generates heat in boilers. That heat produces steam. The steam drives a generator which produces electricity. Once a boiler is heated up, there is no need for auxiliary fuel as trash burning not only sustains its own combustion, but generates excess heat. Each WTE facility uses 10% to 15% of the electricity produced for internal power.

The majority of the electricity goes through the electrical grid and provides power to homes and businesses. In all cases, the response back to me is…… "That's fantastic! How come we don't have more of those waste-to-energy plants?" I have concluded that most citizens in the USA know little or nothing about waste-to-energy. We need to keep expounding the positive attributes of our business, emphasizing the following points:

1. WTE is a "renewable energy source".
2. Recycling and WTE are compatible partners.
3. Combustion of trash reduces the volume of material going to a landfill by 90%.
4. One ton of combusted trash reduces the need to import one barrel of crude oil.
5. An average-sized WTE facility will provide the electrical needs of 20,000 homes.

Finally, we must remain positive and enthusiastic in our messages to the public. The more they hear of and understand the benefits of WTE, the more they will join in supporting the development of new WTE facilities. ◆

MESSAGE FROM THE OUTGOING CHAIR

by Shawn Worster

What's in a Name?

A rose by any other name- - - - As noted elsewhere in this newsletter, our division has a new name, the Materials and Energy Recovery Division, formerly known as the Solid Waste Processing Division or SWPD. This rebranding is intended to align our division's name more closely with the underlying goal of our membership, supporting sustainable waste management by fostering environmentally and economically sound recovery of materials and energy from what would otherwise go to waste. If one Googles materials and energy recovery, you get 35 million hits. Angelina Jolie only gets 34 million hits, meaning that materials and energy recovery is more popular than Angelina Jolie. We are definitely moving in the right direction.

Benjamin Franklin said there were only two things certain in life: death and taxes. But we in the business know there is a third – trash!!!! Like the tide, bags of trash show up on the curb everyday, rain or shine, winter or summer, recession or boom. In that sea of trash, lies an incredible opportunity. Members of the Materials and Energy Recovery Division have dedicated their professional careers to improving how we manage that valuable asset. I am very proud to have served with such an outstanding group of dedicated professionals, environmentalists focused on recovering the materials and energy left at the curb. I look forward to the next wave.

We are already a decade into the 21st century.

Humankind's imprint on the planet will occur in this century. More than any imprint prior, it will be measured in terms of the steps we take as a society to continue to meet our material needs in a more sustainable manner. The increasing pressure we have placed on our ecosystem is forcing us to reexamine our relationship with the natural world and is requiring greater efforts on the part of our technical experts to better understand and better manage our resources, including air, water, energy, materials and yes, human capital as well.

One place where that reexamination is underway and has been for many years is in the area of how we as a society manage our waste products. As folks who attended NAWTEC 19 heard from Roger Anderson, regional chair of Durham, Ontario, progressive municipalities around the world are planning and implementing state-of-the-art energy-from-waste facilities as key components of integrated solid waste management systems. Across the country and around the world, new and innovative approaches to improve material recovery and energy from our waste streams are under way.

There are over 100 new companies working to develop and implement ways to further divert energy and materials from landfills. Sustainable integrated waste management is now part of the corporate lexicon. Organizations like Walmart and Toyota have adopted aggressive materials and waste management practices up and down their supply chain. Behind these laudable initiatives, there stands the engineering profession, working with management and customers to develop and implement changes to the status quo in a cost-effective and sustainable manner. You, as a practitioner in this exciting and important field, are to be very proud of the contributions that your efforts make in leaving the earth a better place than we were handed. As the old saying goes, "We do not inherit the earth from our ancestors; we borrow it from our children."

To help continue our progress, I call on each and every one of you to adopt a young professional, someone interested in what we do and work with them, help them become active members in the division. It is the best way to ensure that we are building on the experience of the past to help ensure a brighter, more prosperous future.

I want to thank all of the current and former members of the MER Executive Committee and their spouses for all that they do. I wish Tom White, our incoming chair, all the best and now, as my boss always says, get back to work!

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WTE OUTREACH PROGRAM

by Peter A. Napoli

Working through the Philadelphia Section over the past two years we have conducted two plant tours at the Covanta Plymouth facility and made presentations at a monthly section meeting and to the senior mechanical engineering classes at Villanova University.

We will be conducting additional tours in the fall for Villanova students. We will also be offering our presentation & facility tour services to Drexel, Penn, Saint Joseph's and others.

The reaction to these activities has been extremely positive and two students were so interested, that they expressed their desire to enter our field. The four most surprising aspects to these efforts are that:
(1) The vast majority of students and practicing engineers don't even know we exist. (As for those that are aware of WTE, they still think of the old Philadelphia Incinerator and never-ending voyage of the "Cyan-Sea" Ash Barge)
(2) They question why there are not more facilities
(3) Why is this technology not classified as a renewable energy source in all states? and (4) Most engineers and students don't know how a solid fuel boiler works.
As you have affiliation and contact with the ASME section in your area you should offer to make a presentation at one of the section meetings. They are always looking for interesting topics, and as our technology effects energy/climate change/green energy, you will be a most welcomed speaker. You will also be able to make contact with local engineering schools for presentations, promote our division's scholarship program and if you have a facility in your area, you will be able to arrange tours for the section and students.

Since our presentation was prepared in 2006, it is a little dated, but it is available for your use. As it is not password protected you can modify it to suit your personal style. Please contact me at **peter.a.napoli@verizon.net** or 610-566-5983.

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QUALIFIED RESOURCE RECOVERY OPERATOR (QRO) COMMITTEE NEWS

by John W. Norton, PE, BCEE

The Materials and Energy Recovery Division has been working with the QRO Committee to ensure that the QRO testing and certification process serves well both the environment and the solid waste industry. The MER Division funds the author's travel costs to attend the (typically) twice-per-year meetings of the QRO Committee.

The QRO Committee is a "Codes and Standards" function of the ASME. The purpose of such operator certification is to ensure that these highly technical solid waste combustion facilities are able to function as designed. These Certified Operators are key to good plant operation. Ever since the QRO waste combustion operator certification process has been in place (1989), the quality of WTE Plant Operations has been beyond reproach. Other technical fields of operation often pirate away WTE operators with the QRO Certification, because their reputations are so exceptional.

The QRO Committee reviews and revises the QRO Standard from time to time, and it oversees the certification process. QRO added one level of operator certification a few years back for people manning waste combustion operations without energy recovery. One operator has been certified in such a position. The QRO Committee also hears appeals from those attempting to be certified, and from certified operators that have had some sort of difficulty maintaining their licenses. One QRO operator, for example, discovered upon return from active duty in Iraq that his certification had lapsed; he had been called to Active Duty from a National Guard position.

Recently, the QRO Committee was enhanced by the addition of a new USEPA employee, Jesse Miller, who is with their Office of Solid Waste and Emergency Response in Washington DC. It is apparent from the willingness of the USEPA to fund this man's travel to the QRO Meetings, that the EPA considers the future of WTE to be an important consideration, worthy of their staff time. ◆

ASME – MER DIVISION SCHOLARSHIP AWARDS NEWS UPDATE

by Amit Chattopadhyay, PE

Summary of our program: The Scholarship Program continues to be an important part of ASME - MER Division activities. The Division awards annual total of up to $18,000 in scholarships (divided between the student and the university) with a view to stimulate interest in student interests in materials and energy recovery from solid waste and related fields in environmental engineering. Scholarships are awarded to qualified graduate, undergraduate and continuing education students.

Scholarship Awards for the past academic year (2010-2011): One Graduate Scholarship was awarded to Ranjith Kharvel Annepu – scholarship amount: $3,000.

Thanks to Professor Nickolas Themelis of Columbia University, NY, Department of Earth and Environmental Engineering for sponsoring this candidate.

For details of the program follow the link: www.divisions.asme.org/MER/
(Please click MER Division link, followed by Student Activities to access the Scholarship offer.)

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WTERT – COLUMBIA UNIVERSITY

by Dr. Nickolas J. Themelis

WTERT has fully established world-wide sister WTERT sites in Brazil, Canada, China, Greece, Germany, Italy and Japan. All are separately administered within their respective countries but follow the model of WTERT-US. That is to provide free access to high quality accurate information regarding the waste to energy industry. This follows a very successful effort over the past few years to gain better visibility for waste to energy through presentations, seminars and outreach efforts. For example, WTERT associates participated in 5 webinars recently that presented technical and policy information as well as industry perspectives. These webinars totaled an estimated 1000 "attendees" and are archived through American Institute of Chemical Engineers (AIChE) and Electric Utility Consultants, Inc (EUCI). WTERT has also programmed Waste to Energy sessions at the AIChE Spring National Meeting in Chicago, IL and American Chemical Society (ACS) in San Francisco, CA in cooperation with WasteEng International Conference Series on waste valorization. Most recently WTERT cooperated with the US Chamber of Commerce to make connections and provide information for foreign organizations interested in waste to energy promoting US waste to energy vendor equipment and expertise. ◆

INDUSTRY NEWS:

The Waste to Energy industry was encouraged by Maryland Governor Martin O'Malley's signature on a bill recognizing energy generated from waste as a Tier 1 renewable source. His statement is below:

STATEMENT FROM GOVERNOR MARTIN O'MALLEY ON HIS DECISION TO SIGN SENATE BILL 690

ANNAPOLIS, MD (May 17, 2011) – GOVENOR Martin O'Malley issued this statement today regarding Senate Bill 690 - Renewable Energy Portfolio - Waste-to-Energy and Refuse-Derived Fuel:

"After careful deliberation, I have decided to sign Senate Bill 690. Our State has an aggressive goal of generating 20% of our energy from Tier I renewable sources by 2022 and we intend to achieve that goal through as much in-state energy generation as possible. This will require a diverse fuel mix including onshore and offshore wind, solar, biomass including poultry litter, and now waste-to-energy if we are to realize our 20% goal.

"Maryland is not alone in this determination. Over half of the states that have a renewable energy goal classify municipal solid waste as a renewable fuel. European countries that are many decades ahead of the United States in reducing their carbon footprint and their reliance on fossil fuels make broad use of modern waste to energy facilities and employ comprehensive recycling efforts in order to land fill as little waste as possible. In fact, Sweden, a leader in this arena, sends 45% of it's waste to waste-to-energy facilities, recycles 41%, and has reduced the quantity of waste going to landfills by 50% over a 1994 baseline.

"With this decision, I also reaffirm my commitment to bringing offshore wind to Maryland. It is only through a diverse, renewable fuel mix that we will be able to reach our aggressive goals, protect our precious environment, and create the economic engine to move Maryland forward."

NAWTEC 19: FOOD, FRIENDS AND KNOWLEDGE IN LANCASTER, PA

by John S. Austin, PE

A great turnout and program highlighted NAWTEC 19 held this year in Lancaster, Pennsylvania. Attendance was strong with a total of 466 people showing up, including eighteen registered students. Technical information was presented detailing "state of the art" technologies for sustainable green energy and air pollution control. With the help of our WTERT partners two research and technology sessions overviewed the cutting edge research and technology for the energy from waste industry. Presentations concerning WTE contract negotiations and improving plant operations also provided great insight and information. Thirty-six peer reviewed papers were published in the proceedings.

Each year the NAWTEC exhibits get bigger and better. We thank the many exhibitors for sharing food, drink and great technical information with us. As always there was plenty of great food and events including the ASME Material and Energy Recovery Awards Luncheon. As a special treat each attendee was given two free tickets to a Tuesday evening pop folk concert at the nearby Lancaster Arts Center.

We expect and are planning for a special NAWTEC 20 in Portland, Maine, April 23 through 25, 2012. Please join us for the 20th anniversary of the NAWTEC Conference. Technical papers will be submitted and reviewed on-line with the NAWTEC Webtool designed and administered by ASME Technical Publishing. The Proceedings editors, Mark White and Marco Castaldi will need all of your help to bring together a very special technical program. Working an interesting project, identified an industry need, are you involved with new technologies? If so you or your colleagues can showcase your efforts at NAWTEC 20. See the Call for Papers or go to NAWTEC.org to further your career. ◆

MATERIALS & ENERGY RECOVERY DIVISION 2011-2012 EXECUTIVE COMMITTEE @ NAWTEC-19 IN LANCASTER, PA

MER Division Executive Committee, from left to right: John D Clark, Marco Castaldi, Shawn Worster, Thomas White, Robert Faia, and Thomas Murphy.

by Nathiel Egosi, P.E.

Category: Combustion

Winner: Covanta Alexandria/Arlington, Inc.

The Covanta Alexandria/Arlington, Inc. is located in Alexandria, VA and is owned by Covanta Energy Corporation and is operated by Covanta Alexandria/Arlington, Inc. The Alexandria/Arlington Resource Recovery Facility (RRF) is a nominal 975 tons per day (TPD) refuse-fired electric generating facility and it has operated continuously since it began commercial operation in February of 1988. The facility consists of three nominal 325 TPD refuse-fired boilers and two condensing steam turbine generators producing up to 23-megawatts of renewable energy. This is enough electric power to supply all the energy needs of a city of about 20,000 citizens. The facility processes 975 TPD of municipal solid waste for a population of approximately 300,000 residents. The ash that is landfilled is 1/10 of the volume of municipal solid waste processed. This reduces the need for landfill space. The residue which exits the boilers is discharged directly to a vibrating conveyor. At the end of the vibrating conveyor there is a ferrous recovery magnet. All ferrous material collected by the magnet is discharged to a roll off box; the remaining material is discharged to a dump truck. The main ash removal conveyor system is fully redundant. The trucks proceed to the onsite scales for the weighing and then to either the I-95 Landfill for ash removal or a recycling contractor for the ferrous material.

The facility has approximate throughput capacity of 350,000 tons per year and has approximate ferrous metal recovery of 7,000 tons per year. Facility's air pollution control equipment consists of spray dryer absorbers, fabric filter baghouses, a carbon injection system and a selective non-catalytic reduction system. The heat energy produced during the combustion of municipal waste is converted into electricity that is sold to Dominion Virginia Power Company. Facility emissions are strictly regulated by both state and federal agencies, as is the handling and disposal of combustion ash.

Most Recent Accomplishments:

- Over the past decade, the facility has successfully maintained boiler availability of over 96% and has also maintained turbine availability of greater than 98% since the plant started operation.
- Since the ferrous recovery system was installed in 2007, the facility has continuously recovered ferrous metal in excess of 2% of the incoming waste which accounts for over 7000 tons of additional ferrous metals being recycled annually.
- The facility is continuously adding to the list of Job Safety Analysis (JSAs) to ensure all employees understand the job prior to completing it in order to help them be ware of all possible situations that could affect their well being.
- Covanta provides free disposal of up to 500 lbs of waste to any Alexandria city resident, sponsors a mercury collection event to prevent mercury from entering the waste stream and participates in a number of other charitable and local events that demonstrates Covanta's commitment to the community.

MATERIALS & ENERGY RECOVERY DIVISION 2011 AWARDS

by Nathiel Egosi, P.E.

Category: Material Recovery

Winner: City of Ames' Arnold O. Chantland Resource Recovery System

The City of Ames' Arnold O. Chantland Resource Recovery System is owned and operated by City of Ames, Iowa. The facility has been in operation since 1975 when it became the first municipally owned and operated facility of its kind in the country. Situated on one square block in downtown Ames, the facility receives municipal solid waste from surrounding Story County and the town of Ames, and it recycles the waste by using it as an alternative fuel in the City's power plant boilers in place of coal. The system also includes recovery of ferrous and non-ferrous metals. The facility introduced a glass recycling program in 2006. Collection bins provided by Resource Recovery are located at area grocery stores as well as the local redemption center and at the Resource Recovery plant. Benefits of this program include removal of glass from the stream and reduction of glass end up being in landfill. Typically 70% of waste received is processed into RDF for use at the City's power plant; another 5% of waste is ferrous and non-ferrous metals recovered from the process for recycling. Less than 25% of waste received is redirected to a local landfill. Over the 35 years, one million tons of waste have been processed into RDF and combusted at the City's power plant, directly replacing 250,000 tons of coal. Lead acid batteries are collected and sold to a local scrap dealer. CFL's and household chemicals are handled through facility's household hazardous material collection program, introduced in 1998. Tire, propane tanks, and waste oil are separated for proper recycling by private contractors. The majority of material processing occurs during the nighttime hours because heavy equipment operators can ensure a more consistent feed rate and have the opportunity to see and remove undesired material prior to grinding. Another benefit of nighttime operations is the demand of electric power is lower; reducing the chance that the facility would need to shut down due to peak loads on the City's electric system. After the plant shuts down each day, equipment diagnostics and system checks begins. Maintenance activities are tracked through a computerized maintenance management system with work orders.

Most Recent Accomplishments:

- Original cyclone technology was replaced by newer air knife technology in 2006, virtually eliminating fluctuations in recovery rates due to atmospheric conditions.
- A fully automated non-ferrous system was installed in 2009, and is successfully removing non-ferrous metals from rejected materials. Consisting of an eddy current separator followed by an induction sorting machine, the City of Ames RDF plant recovers 92% of non-ferrous from the waste stream prior to introduction to the boilers. The footprint for this equipment occupies a 70% smaller area than the original 1975 non-ferrous equipment. A technical paper was published at NAWTEC-18 documenting the results.
- A new 48" drum electromagnet and multiple magnetic head pulleys throughout the system allow for the recovery of 99.9% of ferrous from the waste stream.
- An air knife was installed to remove stray paper from the ferrous metal before being deposited into a semi trailer, providing a cleaner ferrous and improve metal sales.
- A vacuum was added to a conveyor before the eddy current system to capture paper from disc screen residues.
- The storage bin for the RDF was redesigned from the first–in/last-out single holding facility to a first-in/first-out multiple-sided storage facility, greatly increasing performance, inspection and maintenance can occur on one side while the other side is still in operation.
- The length of the primary disc screen was doubled, improving RDF quality by eliminating more sand, glass and grit.
- The dust collection system was tripled to improve air quality in the processing area for plant employees, as well as improving general housekeeping and safety.

Materials & Energy Recovery Division

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