



## IWWG News & Views

Compiled by Giorgio Bonomi

*In this section of the Journal the reader will find information on the IWWG (International Waste Working Group), reports on activities carried out by Task Groups, a list of future events and relevant notes on the think tank elaboration and activities of the association.*

*In this issue: reports from the 3rd International Scientific Conference on Industrial and Hazardous Waste Management CRETE 2012 and from the 7th InterContinental Landfill Research Symposium ICLRS 2012, update on the activities of the IWWG Task Group on Industrial Waste Management.*

### Report on the 3rd International Scientific Conference on Industrial and Hazardous Waste Management CRETE 2012

The 3rd International Scientific Conference on Industrial and Hazardous Waste Management “CRETE 2012” was held from 12th to 14th September 2012 in Chania, Crete, Greece, under the organization of the IWWG together with the Technical University of Crete (Greece), the University of Padua (Italy) and Nanyang Technological University (Singapore).

The aim of this Conference is establish an international meeting-point for scientists and practitioners working in the field of industrial and hazardous waste management and treatment. A large number of studies and experiences are carried out in this field in different countries, and therefore a regular two-yearly meeting of those involved may result in improved development in this specific field.

More than 350 participants from 45 different countries attended the conference from all over the world. A total of 9 keynote speeches, 31 general sessions, 4 workshops and 3 special sessions was given, focusing on special issues of industrial and hazardous waste management and treatment, as well as the remediation of contaminated sites.

During the opening session, addresses and short speeches were given by the Conference Chairmen, as well as by representatives of the Region of Crete.

The first speaker in the Conference was Prof. Rainer Stegmann from Nanyang Technological University (Singapore), who introduced the Conference participants to the issue of hazardous and special waste management, through his keynote speech on “Future Management of Hazardous and Special Waste- Some Reflections?”. The other speakers who chaired the session were Prof. Evangelos Gidarakos (Technical University of Crete, Greece) and Prof. Raffaello Cossu (University of Padua, Italy).

During the Conference several aspects of industrial and hazardous waste management were approached, including international legislation, waste management and treatment, special waste (e.g. hospital, WEEE, etc.), site characterization and restoration, landfilling, waste-to-energy concepts, waste minimization and recycling and toxicity.



A moment from the Opening Session

Particular attention was focused on the following keynote speeches:

- “The Importance of Waste Characterization for Treatment, Recycling and Reuse of Industrial Waste” (Mariachiara Zanetti, Technical University of Torino, Italy)
- “Emerging Contaminants in the Environment” (Rao Surampalli, U.S. Environmental Protection Agency; USA)
- “Organic Contaminants of Emerging Concern in Agricultural and Urban Groundwaters. Catalonia and Barcelona (Spain) case studies” (Damià Barceló, Institute of Environmental Assessment and Water Research of the Spanish Council for Scientific Research, Spain)
- “Water use cycle in Attica, Greece: following the quality of the water through the cycle” (Themistocles Lekkas, University of the Aegean, Greece)
- “Innovative Remediation Method for Cr(VI)-Contaminated Sites: Application of Fluidized Granulated Iron for Chromate Reduction in Effluents” (Karl E. Lorber, Montan University of Leoben, Austria)
- “Urban Mining and Sustainable Landfilling in Solid Waste Management” (Raffaello Cossu, University of Padua, Italy).

- “Gaseous Emissions from Hazardous Waste Landfills – Occurrence, Investigations, Methods, Results, Impact, Prevention” (Gerhard Rettenberger, Trier University of Applied Sciences, Germany)
- “Hazardous Additives in Products – a Risk or a Perceived Risk?” (Bernd Bilitewski, Technical University of Dresden, Germany)

Two special sessions were held in Greek only and focused on the prevailing situation of hospital and mining waste management in Greece. Several representatives of different relevant governmental and local authorities, as well as the Hellenic scientific community were present, exchanging experiences, pinpointing problems and shortages and suggesting optimum action plans.



Speakers during one of the sessions

A three-member committee, composed of Wolfgang Calmano (Hamburg University of Technology, Germany), Evan Diamantopoulos (Technical University of Crete, Greece) and Karl E. Lorber (Montan University of Leoben, Austria), evaluated all posters displayed in the Conference and an award was given to the best three:

1. “Development of magnetic nanoparticles for Cr (VI) removal from drinking water integrated by a magnetic separation system”, by Simeonidis K., Tziomaki M., Samaras T., Angelakeris M., Mitrakas M., Monty C., Martinez-Bouveta C., Balcells L and Andritsos N. (Greece)
2. “Evaluation of Asbestos Derived Zeolite as an Adsorbent for Pb(II) and Cd(II) Removal From Aqueous Solutions”, by Kapenis V., Pellera F.-M., Anastasiadou K., Pentari D. and Gidarakos E. (Greece)
3. “New Tanning Technologies Based on Valorization of industrial Waste”, by Crudu M., Deselnicu V., Ioannidis I. and Albu R. (Romania)

In addition to the Scientific Program of the conference, conference attendees had the opportunity to participate in the 1st International Hazardous Beach Volley Tournament, which proved to be very successful, relaxing but also competitive! The best three teams received their medals during the official Gala Dinner of CRETE 2012.



Two teams of the 1<sup>st</sup> International Hazardous Beach Volley Tournament

During the Gala Dinner examples of Cretan and Greek Dancing were provided and knowledge on dancing was also exchanged successfully!



Presentation of Cretan dancing during the Gala Dinner

### Report from the 7<sup>th</sup> Intercontinental Landfill Research Symposium – ICLRS 2012

The Seventh ICLRS was held in Sunderby Folkhögskola, near Luleå, Sweden, June 25-27, 2012. The InterContinental Landfill Research Symposium strives to be the primary meeting place for landfill researchers and practitioners world-wide. The conference is held every two years and rotates between Japan, Sweden and the United States of America. It is organized by the IWWG together with Professors Toshihiko Matsuto of Hokkaido University, Japan, Anders Lagerkvist of Luleå University of Technology, Sweden and Morton Barlaz of North Carolina State University, USA. For the current edition, about 70 researchers from 16 countries attended, including graduate students.

The ICLRS is unique in its program format. The meeting is designed as a series of workshops on a wide variety of topics

important for landfills and waste management. Each session is organized around specific research questions, and at least half the time for each session is devoted to focused discussion. Moreover, every participant is requested to bring a poster. Sessions developed in 2012 were as follows:

- Mistakes in landfill research and practice
- Landfill covers – materials and design
- Status quo and future perspectives of landfill aeration
- The myth or control of even gas distribution in methane oxidation systems
- Anaerobic Decomposition of Forest Products in Landfills
- Methane Oxidation Systems – are they still in their infancy?
- Modeling Landfill Gas Generation
- The use of stable isotopes for the quantification of methane oxidation
- Disaster Waste Management
- Landfill aftercare completion from active to passive care and decision making.
- The Fate of Emerging Compounds in Landfills

Many points of interest for future research as well as measures to improve the quality and comparability of data were identified during the sessions. Some of the discussions will be continued in the frame of the corresponding IWWG task groups. Updates on the status of the different Task Groups are available through the website <http://iwwg.eu>.

The opening session was dedicated to a reflection on the pioneering achievements in landfill research of the late Prof. Robert K. Ham, who passed away in February 2012. In his honor a Special Issue of the official IWWG journal *Waste Management on Landfill Processes* was announced for publication in 2013. The issue will include new papers, as well as a few landmark papers written by Prof. Ham during his long career.

All of the discussions during the Symposium were held in two hour slots, but some of the themes had two slots with different but connected issues. A poster session was held each day during the lunch break.

A full calendar of social events was also organized. Participants were invited to a reception buffet in the evening before the Symposium, a barbecue on the first night, on a boat trip in the Luleå Archipelago on the second evening, and after the last session, a visit to a large-scale landfill at a local steel mill was undertaken.

The organizing committee gratefully acknowledges the cordial support provided by the IWWG and individuals who have contributed towards the success of the symposium. A special acknowledgement is due to the session chairs for developing the platforms for constructive discussions. The 8<sup>th</sup> ICLRS will be held in the USA in 2014.

### **Update on the activities of the IWWG Task Group on Industrial Waste Management**

The Industrial Waste Management (IWM) Task Group held a specialized workshop during CRETE 2012, the 3rd International Conference on Industrial and Hazardous Waste Management, which was held in Chania-Crete, Greece, from 12–14 September 2012. The workshop focused on Industrial Wastes-Production and Management and was attended by 25 experts from 12 different countries.

The Production and Management of industrial waste needs particular attention and planning because there are some unique parameters that complicate the whole process, such as:

- Waste characterization analysis
- Variant chemicals
- Fluctuation of hydraulic and pollution load according to the production process
- Different toxic and hazardous substances
- Irregular frequency of discharges over time

The main scope of the workshop was to emphasize in-depth presentations of environmental pollution sources, waste characterization through process knowledge and testing, different policy management strategies and process alternatives, as well as future trends for major hazardous operations.

It was found that a fundamental necessity exists for a general collaboration between industries and government officials in order to proceed with a design which not only meets the discharge limit standards with an end of pipe treatment, but minimizes the risk in the whole step by step process.

This approach will lead to an integrated management system which includes the terms of recycling and reuse, source reduction and energy recovery. In addition, adapting and analyzing all the above parameters is a way of dealing with the complexity of industrial wastes in terms of sustainability.

In the end, there are always wastes to be discharged and the whole treatment process starts with a waste characterization analysis.

The TG Chairman Evangelos Gidaracos from the Technical University of Crete presented the first results on industrial site characterization related to the old industrial site which may contain high levels of contaminants through a long term pollution process. This is a major issue with a significant environmental effect.

Due to technological advances in the environmental sciences it is now more feasible to arrive at a well-defined approach in terms of characterization and remediation.

Hydro-geological surveys and sampling and analysis processes are the basic tools for understanding the problems associated with a large contaminated zone.

In addition, on-site methods have been developed for monitoring the remediation process and for better adjusting the remediation parameters.

There is also the matter of operational industrial sites. In this case, in order to avoid the environmental risk in terms of pollution prevention, a full scale monitoring system needs to be developed. Through this process, the flow diagram of incoming raw materials, the production stream and the waste stream will be closely monitored. Moreover, with soil and groundwater monitoring it will be possible to identify spills or leaks and minimize the environmental effects.

In the second presentation by Hans Van der Sloot from the Hans van der Sloot Consultancy in Langedijk, The Netherlands, the following general characterization testing was proposed to achieve a better understanding of the hazardous and environmental risks associated with the management of mixed materials:

- pH dependence leaching test (TS14429, EPA Method 1313, or equivalent) including (i) acid and base neutralisation capacity, (ii) determination of the pH, electrical conductivity (EC), and redox (Eh) without acid or base addition (“wn pH”), (iii) analysis of eluates for species of potential concern and readily measured major and trace elements, (iv) identification of gas formation at high or low pH, and (v) measurement of dissolved organic carbon (DOC);
- percolation test (TS14405, EPA Method 1314, or equivalent), first fraction only, for pore water simulation, including (i)

determination of the pH, EC and Eh, (ii) analysis of eluates for species of potential concern and readily measured major and trace elements, and (iii) measurement of DOC; and,

- modelling of geochemical speciation and aqueous-solid partitioning based on pH dependence test results.

As part of the above characterization, redox measurement provides an indicator for reducing (sulfidic) or oxidising conditions, DOC provides an indicator for the mobilization of substances and degradability, and EC provides an indicator of total soluble salts (i.e., ionic strength). The full characterisation should include a measurement of elements or species of concern based on potential hazards or risks and also major constituents (e.g. Al, Si, Ca, Fe, S) because the major constituents control the release of minor and trace constituents to a large extent.

In a third presentation by Henning Friege from AWISTA Gesellschaft für Abfallwirtschaft und Stadtreinigung mbH, Germany, the chances and limits of hazardous waste and industrial management with respect to dissipated products were covered.

Looking at hazardous substances in general, three different policy strategies have been developed to clean up the technosphere:

- Complete ban of certain chemicals or the prohibition of use in specific products, and closing of point sources (chemicals policy)
- Regulations for the further fate of used items (waste management policy)
- Barriers against the exposure of people in case of adverse effects (protection of workers and/or consumers)

One or more of these strategies are used depending on the problem which has to be solved. Starting from the experiences collected with CFCs and HCFCs, the tools used for phasing out these chemicals from the technosphere are presented with respect to their influence on the contamination of the environment. Even if a dan-

gerous substance has been banned, it is used further for a number of applications. Therefore, waste management may be very helpful, but there are a lot of obstacles which partially depend on the type of application. Moreover, the question arises as to who has to manage and to pay for the clean up process after use: Should the producers of the hazardous substances, the manufacturers of the products, the last user, or the municipalities pay? The answer to this question varies with the problem. If regulations are adopted for dissipated products including hazardous compounds, manufacturers, communities and consumers share the responsibility for proper management at the end of life of the products in question.

As a case study Friege described CFCs (trade name: Freon) and their substitutes HCFCs (partially hydrogenated CFCs).

Low emissions from production, recycling, and disposal of CFCs and HCFCs from point sources indicate the responsible management of these hazardous substances by industrial producers, recyclers and waste management companies. High emissions emerge:

- with so-called open applications (foaming agents...), which have been severely restricted
- with closed applications which are not properly managed (car air condition systems...)
- or with misuse of items to be disposed.

In conclusion, all participants agreed that the relationship between industry and local authorities should be optimized in the future.

For further information on IWWG activities, please:

- Access the IWWG Website: [www.iwwg.eu](http://www.iwwg.eu)
- Contact: Paola Pizzardini,  
Via Beato Pellegrino 23, 35137 Padova, Italy  
Tel.: 0039 – (0)49 8726986; fax: 0039 – (0)49 8726987  
E-mail address: [info@iwwg.eu](mailto:info@iwwg.eu)