Waste Management 30 (2010) 360–364

Contents lists available at ScienceDirect

Waste Management

journal homepage: www.elsevier.com/locate/wasman

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: report from the Sardinia 2009 Symposium and update on the activities of several IWWG Task Groups.

Report from the Twelfth International Waste Management and Landfill Symposium – Sardinia 2009 *(by Roberto Raga, University of Padova, Italy)*

The twelfth edition of the Sardinia Symposium, organised by the IWWG (International Waste Working Group, www.iwwg.eu), was held in Forte Village, Santa Margherita di Pula, Italy from October 5th to 9th. The event was attended by more than 800 participants (researchers, technicians, administrators and operators) from 65 different nations and saw the presentation of 580 scientific papers in 128 general, specialised and workshop sessions.

New concepts and findings were presented, ranging from waste minimisation and "zero waste" strategies and new support tools for waste management decision-makers, to environmental cost analysis and comparison of greenhouse gas emissions provided by several types of treatment plants.

Specialised sessions and workshops provided for extensive discussion on the optimisation of existing technologies and development of new ideas, placing particular emphasis on controversial issues such as thermal treatment (incineration, pyrolysis, gasification), and the production and use of CDR, including monitoring, environmental impact and health effects of emissions.

The role of landfills, the ultimate destination in any waste management strategy, was widely debated, focusing particularly on their current role as "carbon sink" and the techniques applied to guarantee environmental availability. Several specialised sessions, during which innovative international projects were presented, were devoted to the recovery and reclamation of abandoned sites and the environmental requalification of landfill sites.

Separate collection and recycling

Studies presented on this topic underlined how separate collection and recycling are largely implicated in integrated waste management systems. These strategies however should be carefully organised and not employed for demagogic purposes. Frequently procedures are not transparent and the percentages of wastes collected and widely publicised do not take into account fractions discarded following separate collection and forwarded for disposal in landfills or incinerators. The data presented during discussions clearly underline how a mere 53% of plastics obtained by separate collection is subsequently used in the production of other plastics:

The Opening Session in the main Conference Hall

the rest is disposed of in incinerators. The scarce efficacy of collection systems applied and not gauged to the real potential of treatment and recovery lead to a false perception of the situation and to non-sustainable costs.

If on the one hand lifecycle analysis techniques provide a valid contribution for use in identifying an optimal strategy for waste management organization, shared, transparent procedures should also be established to enhance the comparison of studies carried out using different procedures leading to apparently conflicting results.

Thermal treatment and energy from waste

A particularly intense debate arose during sessions focusing on the thermal treatment of waste and possible effects on the health of the population. Massimo Federico, environmental oncologist at the University of Modena, illustrated the findings of a study performed from 1991 to 2005 with the aim of evaluating the incidence of cancer in a population residing in the vicinity of a thermal treatment plant for municipal waste in Modena. To assess the risk of exposure, three belts at an increasing distance from the plant, up to a maximum of 5 km, were identified; place of residence was taken as an indicator of exposure, variations in incidence rate were analysed using specific spatial and spatial-temporal statistical

0956-053X/$ - see front matter © 2009 Elsevier Ltd. All rights reserved.
doi:10.1016/j.wasman.2009.11.007

models. Data analysis performed on all types of tumour revealed no evidence of increased cancer risk in populations residing in the vicinity of the Modena thermal treatment plant.

Speakers in the sessions "Health and thermal treatment plants": (from left to right) Giulio Angelucci, Stefano Montanari, Raffaello Cossu, Massimo Federico

Stefano Montanari and Antonietta Gatti, experts in nanopathologies, discussed the use of an experimental approach in assessing the impact of emissions from thermal waste treatment plants, based on the characterisation of nanoparticles. During the session papers by Giulio Angelucci, director of the waste management department of the Province of Bolzano, by Roberto Michele Cenci, researcher for the European Commission and by Luca Stabile, University of Cassino, Italy, were also presented.

Landfill disposal

Prof. Jan Gronow (Imperial College, London) underlined how UK regulations oblige all technical options to comply with criteria established by the 1999 European Landfill Directive (reduction of greenhouse gases from landfills, reduction of biodegradable organic substance for landfilling) and emphasize the need to reduce potential methane emissions from landfills by means of aerobic biological treatment of residual wastes. Despite the increment of separate collection, residual wastes deposited in containers for dry non-recyclable wastes still contain a significant percentage of putrescible organic substance, mainly represented by food in its original wrapping.

UK regulations on the aerobic biological treatment of residual wastes are however deemed inadequate due to the following reasons:

- The contribution of landfill emissions to global warming is negligible compared to that of productive activities.
- The costs involved in construction and management of pretreatment plants should be added to the cost of the lack of recovery of energy from biogas caused by pretreatments: fuel is required in pretreatments and the carbon contained in the wastes is oxidized rather than being converted into methane in the landfill and recovered for subsequent energy use.

Therefore, a landfill should be considered an integral part of the waste management system, being constructed and managed in compliance with innovative technologies for environmental protection, likewise being taken into account for the production of bioenergy.

Even though current landfills may provide adequate guarantees during the period of active management, this is not necessarily true for plants in the long-term. Indeed, the European Directive implemented by numerous national laws, dictates the need for financial guarantees to cover the entire post-closure stage of landfill activity for a period of no less than 30 years. The latter implies that emission monitoring and control activities subsequent to landfill closure is guaranteed for a period of 30 years, following which it is not clear who will be responsible for the latter and where funds will be obtained. In previous editions of the Sardinia Symposium it has been demonstrated how the barriers emplaced are capable of containing leachate over a limited period of time: the natural phenomena of material ageing lead to a loss of efficacy with possible uncontrolled emissions even subsequent to the 30-year post-closure stage. This is where the N.I.M.O.T. (Not In My Office Time) Syndrome arises, apparently persuading legislators to leave the problem to their successors. To this regard, activities undertaken by the IWWG Task group on Sustainable Landfilling has been particularly productive. The Task Group is attempting to define optimal management techniques, reference parameters and limit values to be applied in final landfill quality, in order to achieve a landfill capable of providing guarantees in the long-term and facilitating the controlled onset of a so-called "functional stability" over a reasonable time-frame.

Environmental communication and public involvement are moreover of the utmost importance, particularly in avoiding unmotivated resistance to landfills, including the N.I.M.B.Y (Not In My BackYard) Syndrome, that subsequently evolves into the B.A.N.A.N.A (Build Absolutely Nothing Anywhere Near Anything) Syndrome, implying the absolute refusal of any type of technical installation resulting in the inevitable uncontrolled dumping of wastes.

Waste minimisation strategies

An interesting study on this topic was presented by Marion Huber-Humer of the BOKU University in Vienna. She reported how from 1999 to 2007 an increase from 161 to 171 kg of yearly waste quantities per inhabitant not subjected to separate collection was registered in Austria. The latter quantities included between 10 and 20 kg per inhabitant of unconsumed food, still in its original packaging, disposed of in the container for dry non-recyclable waste on exceeding the expiry date.

Food wastage was also the main focus of the round table held during the Symposium closing session, seeing the participation of researchers, governmental representatives and retailers. The following experts took part in the debate:

- Bernd Bilitewski (Technical University of Dresden, Germany).
- Angela Guarino (Last Minute Market Srl, Italy).
- Peter Lechner (BOKU University of Vienna, Austria).
- James Levis (North Carolina State University, USA).
- Alessandro Marangoni (Bocconi University, Milan, Italy).
- Paolo Russo (President of the Agriculture Commission of the Italian Parliament).
- Felicitas Schneider (BOKU University of Vienna, Austria).
- Ian Williams (University of Southampton, UK).

During the discussion Paolo Russo focused attention on the wastage of resources used in the production, transportation and distribution of foods that will never be consumed, focusing on how this affects the agricultural economy and the farmers' (low) income. A proposal has been put forward to construct a model that involves the producers, retailers, receptive administrators and operators of waste treatment plants, with the aim of setting up an ef-

Participants in the Round Table

Rainer Stegmann (right) receives the "A life for waste" Award

fective cooperation between participants, leading to an efficient use of resources. Moreover, several alternative packaging options are currently undergoing investigation to guarantee a longer duration of products and purpose-developed communication strategies. However, the importance of modifying the lifestyle of consumers, who should be oriented increasingly towards a responsible use of resources, should not be under-estimated.

Awards

Four awards were assigned during the Symposium and were delivered to recipients in occasion of the Gala Dinner. The winners were as follows:

- Kriton Curi Award for the best paper on waste management in developing countries: "Separation and composting plant in small cities of Zona da Mata, Minas Gerais, Brazil", by A.A.P. Tinôco, I.C.D. Azevedo, R. Azevedo and E.A.G. Marques, Federal University of Viçosa, Brazil.
- Giovanni Bozzini Award for the best Italian paper: "The influence of the Bolzano waste incineration plant and domestic heating on air quality in the province of Bolzano", by G. Angelucci, K. Bedin, W. Tirler and M. Donegà, Waste Management Department of the Province of Bolzano & Eco-Research, Bolzano, Italy.
- Alberto Rozzi Award for the best poster: "Low cost and simple technologytype leachate treatment system for developing countries", by T. Fukushige, A. Tanaka and Y. Matsufuji, Fukuoka University, Japan.

The recipient of the sixth edition of the "Life for Waste" Award, presented every two years to individuals who have made an outstanding contribution to advances in international waste management, was given to Prof. Rainer Stegmann. The Award (a sculpted Silver statue by the Sardinian artist Antonello Pillittu) was delivered during the Gala Dinner on the evening of Friday October 9th and presented by Loredana Musumeci, Director of the Environmental Unit of the Italian Institute for Health Protection.

From 1982 to 1990 Rainer Stegmann was Professor at the Institute of Environmental Protection and from 1991 to 2008 Head of the Institute of Waste Management at the Technical University of Hamburg, Germany. He retired in March 2008. He is one of the prominent researchers in the field of waste management and provided in particular fundamental scientific contributions on sustainable landfilling, anaerobic digestion, biogas generation and control, treatment of contaminated soil. He co-ordinated several international and national research projects, and was member of the environmental advisory board of Shanks. He co-founded and currently leads the 3RC Research Center at the Nanyang University, Singapore. He is co-organiser of several national and international conferences and has published more than 300 scientific papers and several books. He is the chairman of the International Waste Working Group (IWWG).

Social events

Symposium participants were able to enjoy a detailed social programme throughout the five days of the conference: from the Karaoke evening in the Forte Village disco to the traditional folk music and dances during the Sardinian Dinner in the "Su Talleri" restaurant, and the Gala Dinner that closed the Symposium. For the first time, participants were invited to take part in a talent show "Sardinia's got talent", during which they danced, played music ranging from rock to pop and jazz and otherwise performed. The traditional football match was extremely popular this year, with several teams taking part in a mini-tournament. An opportunity to play sports and have fun even in the highly scientific context of the Sardinia Symposium!

Players in the football match

The next edition of the Sardinia Symposium has been scheduled for October 3rd–7th 2011, once again in the traditional venue of Forte Village Resort.

IWWG Task Groups activities during the Sardinia 2009 Symposium

Specialized workshops and meetings were organized by the IWWG Task Groups during the Sardinia 2009 Symposium. The fol-

lowing are reports of the different activities undertaken by the Task Groups during the Symposium.

L.a.W. (Legislation and Waste) Task Group

The new IWWG Task Group – L.a.W. was launched during the Sardinia 2009 Symposium with three main aims:

- To promote dialogue between regulators, experts, lawyers and judges on environmental issues, taking into account the considerable lack of coordination among the various waste management policymakers.
- To coordinate high standard research on the most recent international trends in waste regulation.
- To produce statements on important regulatory issues and articles to be proposed to the IWWG Journal (Waste Management).

More than 15 delegates attended the first L.a.W. meeting during Sardinia 2009 and enrolled in the Task Group. General agreement was reached on a methodological point: only by defining and establishing clear and realistic priorities will it prove possible to work together effectively and to produce long-lasting results.

Wide consensus was reached on the need to build modern waste disposal and recycling plants throughout the world. From this point of view, a major issue to be addresses, is represented by the numerous ‘‘syndromes” influencing public opinion and frequently succeeding in preventing the planning and implementation of plants, including, for instance, the N.I.M.B.Y. (Not in my Backyard) syndrome and the B.A.N.A.N.A. (Build Absolutely Nothing Anywhere Near Anything) syndrome. In order to overcome these syndromes, it is not sufficient to merely confirm that scientists are right and public opinion is wrong when opposition and concern towards a new plant are conveyed. The scientific community should listen to public concerns, creating an institutional framework in which the latter can be freely expressed and addressed. An ‘‘open society” approach must be followed.

This does not imply that required decisions should be endlessly postponed. Regulators are in charge and should decide what is best for the community. However, any difficult decisions – and decisions on waste management are definitely difficult – should be preceded by an open and fair public debate.

For the above reasons, as its initial aim, the L.a.W. Task Group chose to focus on identification of the best legal procedures internationally adopted to implement – with an informed consensus of the population - the approval of efficient waste management plants, addressing issues posed by the abovementioned syndromes.

The Task Group undertook to concentrate on the above issues over the forthcoming months, and to meet again during one of the next IWWG Conferences to finalize the work carried out and to produce its first official statements.

If interested in joining the L.a.W. Task Group please contact the chairman Luciano Butti (e-mail: luciano.butti@buttiandpartners.com).

pHOENIX – IWWG Task Group on Management of Municipal Solid Waste Incineration Residues

The pHOENIX Task Group held a specialized workshop during Sardinia 2009, focusing on issues related to bottom ash characterization in terms of technical properties for reuse and environmental behaviour, as well as identification of appropriate criteria for bottom ash utilization.

It is well established that waste to energy is an essential part of integrated waste management which can provide a contribution to the multiple targets of maximizing recycling, promoting energy recovery from non-recyclable waste fractions and reducing environmental impacts from final disposal of the residual waste. Over the last decades, significant efforts have been made to identify the best available technologies with respect to waste incineration, for both combustion and flue gas cleaning technologies. Accordingly, progressively stringent air emission criteria have been established for waste incinerators, forcing flue gas treatment to dramatically enhance cleaning performance. Further improvements in gas cleaning technologies in modern waste incineration facilities are expected to maintain the decreasing trend of gaseous emission levels also in the future. A direct consequence is that inorganic pollutants present in the original waste are increasingly transferred to solid residues from incineration, making them account for the major emission route of the process.

As a result, the identification of appropriate management strategies for solid residues from waste incineration appears to be crucial for the overall environmental profile of the process. Among waste incineration residues, bottom ashes are generated in the largest amounts and are at the same time residues featuring the best suited technical properties for utilization, due to similarities in physical characteristics and major composition with natural granular construction materials, as well as typically lower contents of inorganic contaminants compared to other types of residues.

Several issues related to incinerator bottom ash were addressed during the workshop, attended by approximately 40 people from different countries. Following an introductory note concerning the state of the knowledge and research requirements in bottom ash management made by the Task Group chair, Alessandra Polettini (University of Rome ‘‘La Sapienza”, Italy) the following five contributions were provided:

- Identification of leaching processes in MSWI bottom ash.
- Influence of operating conditions and waste input composition on leaching.
- Comparison of different BA processing methods for upgrading the technical and environmental properties of incinerator bottom ash.
- Bottom ash utilization: risk based leaching criteria.
- Use of incinerator bottom ash in landfill cover.

Topics presented stimulated discussion on several aspects related to the environmental implications of incinerator bottom ash utilization. In particular, it was emphasized that the large disparities existing between countries in the approaches applied to bottom ash utilization are mainly a result of different availability of natural construction materials, different traditions/approaches to waste management issues, as well as lack of a unified/harmonized regulatory framework on the specific matter, while they are not related to real differences in bottom ash characteristics from country to country.

The lack of a shared approach to bottom ash utilization reflecting concerns as to the accurate prediction of technical properties and leaching behaviour of bottom ashes on a long-term perspective was also discussed. In this respect, the issue of improving the environmental behaviour of bottom ash with a view to utilization in both the short and long term was also taken into account. The main outcomes included the consideration that measures undertaken with regard to waste input or combustion operations are expected to produce only minor effects (i.e., limited to specific contaminants) on bottom ash quality. As a result, improvement of material behaviour relies on the development of reliable processing methods capable of efficiently stabilizing contaminants within the solid matrix. To evaluate the effect of processes applied to improve bottom ash quality, it was maintained that leaching characterization is mandatory; while considerably consistent leaching

data are available for bottom ashes of different origin, geochemical modelling was recognized as a powerful tool for identification of leaching-governing processes, environmental risk assessment and prediction of long-term leaching behaviour, as well as assessment of quality improvement following processing. In this respect, a link was also identified with the IWWG Task Group on Leaching Assessment Methodology and Tools.

Eco-toxicological assessment of bottom ash utilization was also mentioned as potentially useful information for use in evaluating the environmental effect of utilization, however it was emphasized that the eco-toxicological prediction methods currently available are probably not reliable, requiring significant improvement before becoming more widely applicable.

The discussion on critical aspects related to bottom ash management during the workshop was intended to identify emerging issues and pave the way for an environmentally sustainable management of waste incinerator residues.

Sustainable Landfilling Task Group (SLTG)

During the Sardinia 2009 Symposium an IWWG-SLTG workshop on landfill sustainability was held. More than 70 participants engaged in a lively discussion, trying to define the concept of sustainable landfill. It was discussed whether a 'thermodynamic balance' approach or a more pragmatic approach should be considered. Most of the participants were in favour of the more pragmatic approach. This approach acknowledges that landfills are a reality, will be among us for a long time and we have to do the best we can to reduce their emissions. It was concluded that we should emphasise striving for acceptable risk rather than achieving sustainability. Sustainability is not a clear concept and in relation to landfill it causes opposition among regulators and the general public. It was also suggested that the Task Group work on trying to define a desired 'end-point' for a landfill.

Agreement was reached on the fact that the landfill industry and the regulators essentially need a definition in order to agree on certificates of completion. Completion is the moment at which the responsibility for remaining risk is transferred from the operator to society. For operators, regulators and society this is a very important moment. The key issue is more about risk and risk assessment than about sustainability. It was agreed this should be considered in the definition of a sustainable landfill.

Considering these and other issues the workshop concluded on the following definition (or framework) of acceptable risk for landfills in the context of aftercare completion:

- The landfill reaches functional stability (based on site-specific physical, chemical, and biological characteristics of the waste mass and its location) such that the landfill, taking into account its proposed after-use, is unlikely to pose an unacceptable risk to human health or the environment.
- During the process towards stability no unacceptable risk should occur.
- This situation should be reached as quickly as possible and within the financial provision time.
- The funding for completion of aftercare has been secured and allows for appropriate after-use of the site with minimal (custodial) care.

With this definition the SLTG will continue its work on landfill completion. The next step will be to make an inventory of existing approaches and to evaluate intentions, procedures and criteria of completion.

The workshop ended with a discussion on critical components extending the post-operational phase. Components were added to a proposed list. Also with respect to these components it was concluded they are important in the context of aftercare completion. Aftercare completion is unlikely to occur within 50–60 years after starting operation of the landfill. Certain components (although important impact aspects) may not be such a problem anymore after 60 years. The members of SLTG will be consulted by email once more to provide their opinion on the list of components considering the context of aftercare completion.

For further information on IWWG activities, please:

- Access the IWWG Website: *www.iwwg.eu*
- Contact: Dr. Silvia Zotto – *IWWG Secretariat,*
  Via Beato Pellegrino 23, 35137 Padova, Italy
  Tel.: +39 (0)49 8726986; fax: +39 (0)49 8726987
  E-mail address: info@iwwg.eu