

Ash Recycling: Partnering for Progress

Jan M. Barnes
Duos Engineering (USA), Inc.

ABSTRACT

For several US communities municipal waste combustor (MWC) ash recycling has been a commercial reality for almost a decade with over 1 million tons processed and beneficially used to date. Yet, despite the successes to date a recent report by the Integrated Waste Services Association shows less than 5% of the 7.5 million tons of ash generated in the US is recycled and beneficially used [1]. The technological, scientific and myriad of commercial successes categorically demonstrate the feasibility of ash recycling. The next step is for communities, regulatory agencies, transportation departments, and customers to partner with businesses to recycle their ash stream in an economically and environmentally sound manner. An example of this "*partnering for progress*" is the focus of this paper. The ash recycling partnership described in this paper was presented the Pennsylvania Governor's Award for Environmental Excellence in 1999. Proving that Partnering is a win-win situation for businesses, communities and the environment.

HISTORY

Ash recycling was first investigated in Europe and then in the US more than 25 years ago, with the initial investigations focusing on the physical characteristics of the ash. Universities and departments of transportation performed most of the initial studies with mixed results. The ash itself had great stability and compressive strength and looked promising for construction applications but without removing the metals and other unwanted debris the ash was considered unusable as a "product". For a material to be sold as a construction product it must have uniform characteristics that meet required specifications otherwise it cannot be competitive in the market. As a result, real progress did not occur until a commercial process was developed that removed both the ferrous and non-ferrous metals and the unburned materials from the ash.

During the 25 years of investigation, environmental concerns were raised as to the potential for the ash to leach detrimental constituents into the environment. Thus started a serious evaluation of the chemical characteristics of MWC ash. A plethora of investigations have been conducted by world renowned experts in this particular field of study resulting in eleven international ash conferences and a multitude of other meetings and conferences that focused on ash generation and its proper handling. Studies were conducted by agencies ranging from the US Environmental Protection Agency, (USEPA), Department of Defense (DOD), Department of Energy, NYSERDA, Corp of Engineers, and a multitude of state agencies and universities. The University of New Hampshire and the State University of New York at Stony Brook have contributed greatly to the knowledge base collected to date. The findings of several of these studies are discussed in later sections.

Over the course of the 25 years of investigation commercial ash recycling became a reality with initial operations occurring in Europe, Asia and Bermuda. The Netherlands recycles and beneficially uses more than a million tons per year of the ash it generates. Sweden and Germany beneficially use a major portion of their ash and Bermuda recycles 100% of its MWC ash into monolithic blocks for shore abatement. The National Renewable Energy Laboratory has recently published two papers on ash recycling which can provide additional information on the present and historical perspective on ash recycling in Europe and the United States [2,3].

In 1990, Duos Engineering brought the European technology to the United States where it was enhanced to meet US requirements and initially used in Sumner County, Tennessee as a pilot project. Its success led American Ash Recycling Corp. (AAR) to utilize the Duos technology to develop the first commercial ash recycling facility in the United States. Since 1993 the AAR facility located in Nashville, Tennessee has continually operated processing more than 80,000 tons per year of ash that otherwise would have been placed in the local landfill.

A much larger facility was built in York, Pennsylvania using AAR's advanced design, enabling AAR of Pennsylvania (AARPA) to process up to 240,000 tons of ash per year. The enhancements to the AAR facilities over the years have shown that ash recycling is environmentally and economically viable. The Pennsylvania facility's success was due in large part to the partnership developed between AAR and its community. The partnership was built on the sound foundation of AAR's experience in commercial operations at the Nashville ash recycling facility, and was