

DRY ASH COLLECTION AT COAL FIRED POWER PLANTS AND POTENTIAL FOR WTE FACILITIES

Lead Author: **Vincenzo Cianci**
Research and Development Dep.
Magaldi Ricerche e Brevetti s.r.l., Salerno – ITALY
Via Irno 219 85134 Salerno - Italy

Co-author: **Daniele Coppola**
Magaldi Power s.p.a., Salerno – ITALY
Via Irno 219 85134 Salerno- Italy

Co-author: **Werner Sunk**
Earth Engineering Center,
Columbia University, New York, NY 10027

Summary

Remarkable environmental and economical benefits derive from an innovative technology for dry bottom ash removal from coal-fired power plants that may be applied at WTE facilities combusting unprocessed MSW or RDF. This paper describes the MAC system technology that offers a very reliable and broadly proved solution for dry bottom ash collection and handling. Up to now the MAC system has been installed widely and successfully at coal-fired power stations. However, because of the flexibility of the MAC dry ash collector and the wide experience of MAGALDI GROUP in conveying solid bulk materials, this system is ready to be tested for the collection of bottom ash from WTE boilers.

The MAC system concepts are discussed in detail as follows:

- Description of various system configurations;
- Main differences with traditional wet systems and principal advantages, emphasizing environmental and economical aspects;
- Evaluation of the main criteria for developing a new MAC system that can be applied in WTE facilities.

In addition, an overview on the MAC reference facilities is presented with a closer examination of the Fusina RDF cofired power plant (Venice, Italy).

1. Introduction

In Waste-To-Energy (WTE) power plant, the bottom ash is typically discharged into a water quenching tank. The water level provides a seal and prevents ambient air from entering the combustion chamber. Also quenching the bottom ash with water stops combustion immediately and prevents fugitive emissions. However, one of the disadvantages of quenching are the high concentration of water in the ash (up to 30-40% [3]) leading to unnecessary costs of transporting and landfilling water. Furthermore, the wet ash tends to bind like cement and form accretions

that adhere on metals [4] thus lowering the value of WTE metals and resulting in the loss of small ferrous and non-ferrous metal pieces. Other significant drawbacks of the wet systems consist of lower boiler thermal efficiency due to the high unburned carbon content (UBC) in the bottom ash. Dry ash extraction and processing is state of the art technology at coal-fired power plants. The main equipment is a totally enclosed reinforced stainless steel belt conveyor that conveys the discharged dry ash to the ash processing equipment. Due to the processing of the ash in dry state, the system allows for a more efficient