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A Toxicity Reduction Exercise for Municipal Solid Waste to Energy Fly-Ash Utilising a Separation, Isolation and Treatment Process.

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Abstract
The current situation for fly ash management and policy regulation in the United Kingdom / European Union, has developed the need for new toxicity reduction exercises. New EU wide policies are changing the type of treatment methods that can be legally used for the residues from waste-to-energy plants. In particular the disposal of flue gas treatment residues, which are classified as a hazardous waste, will not be acceptable to landfill according to the Waste Acceptance Criteria without a pre-treatment by 2007. This has raised a number of interesting engineering questions that need to be addressed. The novel TRE of metal matrix encapsulation has been designed based upon the principles of separation, isolation and treatment to meet these new criteria. Metal matrix encapsulation is a treatment program that employs existing industrial infrastructure to improve its usability and legal compliance.

Introduction

The countries of the European Union (EU) have over the past few decades pursued a waste management policy that can be summarised upon the basic principle of separation, isolation and treatment (SIT). The control of municipal solid waste incinerator residues (MSWIR) of combined ash, incinerator bottom ash and FGTR / fly ash has historically followed these principles. The FGTR produced from WTE flue gas treatment systems are classified as a special waste, primarily due to the use of lime to clean the acid from the flue gases. FGTR are listed upon the European Waste Catalogue (EWC), mainly due to category H7, Carcinogenic properties.

This material is currently managed in the UK by an isolation policy in special landfill sites that are highly engineered to meet strict environmental regulations. The sites are rigorously licensed through the Environmental Agency and are governed by the Special Waste Regulations that were established in UK Law 1st September1996. However, the new EU wide WAC has had the effect that by 2007 this will no longer be an option. FGTR must be treated if the waste is to be acceptable for landfill disposal (1) (Appendix, Table 1).

Modern EU Management of fundamental changes across Europe is aided by the use of policy frameworks. The frameworks encompass a number of different directives designed to improve the total technology system operating in an industry. The policy frameworks for waste management that affect MSWIR are the Landfill Directive (2), Waste Incineration Directive (WID) (3) and the EWC. These directives are agreed by common consent within the EU, with the intention of been enacted into national laws. These agreements have been made to address the issues of a growing waste stream, both commercial and domestic. The consequences of the Landfill Directive in the United Kingdom (UK) will be obligated to redirect two million tonnes of biodegradable MSW from landfill by 2010 (4).