INFOTOX (Pty) Ltd

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Retrieval and scientific interpretation of ecotoxicological information

PostNet Suite 112 Private Bag X25723 Monumentpark 0105 SOUTH AFRICA

Tel: 27(12) 346 4668 Fax: 086 513 5478 Cell: 082 416 5864

e-mail: Info@infotox.co.za www.infotox.co.za

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Assessment of Beneficial Use of Waste

Beneficial use refers to the practice where a material used to be regarded and disposed of as a waste is no longer managed as such, but is utilised in stead as a resource or a product. Resources and products are characterised by well defined physical, chemical, or biological characteristics that meet specific quality criteria.

Innovative concepts for the beneficial use of waste are driven by economic, environmental and societal benefits. Regulatory authorities in South Africa advocate beneficial use of waste, but comprehensive scientific information has to be submitted and defended to support applications. In principle, this is not problematic, because this supporting information should in any event be available in the execution of duty of care of the proponent.

In many applications wastes are used as a replacement for naturally occurring materials and therefore offer environmental benefits by avoiding the need to quarry or mine primary resources. This leads to the saving of energy and resource investment, reduction of emissions of pollutants to the atmosphere, reduction of CO_2 emissions and saving of landfill space. Beneficial use of waste has positive impacts on sustainable business and use of resources, the national economy, technology development and socio-economic upliftment.

In addition to assessment of fit-for-purpose, it must be demonstrated that the proposed beneficial use of a waste will not lead to environmental contamination and associated human and ecological risks. Use scenarios may include a wide range of field conditions and applications. Typical scenarios that have to be considered include inhalation of dust during occupational activities such as cutting, grinding and sanding of objects manufactured from waste, human exposure to contaminants as a result of incidental ingestion of dust during occupational scenarios and exposure to leached contaminants into water on contact with rainwater. Following end-of-life disposal, an assessment of hazards to aquatic ecosystems and exposed humans is required, based on potential release of hazardous constituents into water. .

Potential risks associated with these scenarios have to be assessed by characterising leaching behaviour in a framework of tests, which includes bio-elution tests. Bio-elution tests provide information that is biologically relevant in the assessment of exposure to contaminants through inhalation, ingestion and dermal contact. Qualifications and experience in health sciences is essential for interpreting the results of the leach tests in terms of potential risks to human health. Transformation/dissolution tests provide information relevant to aquatic ecosystems and sound scientific knowledge and experience is also necessary to interpret the international aquatic toxicity database.

Safety data sheets (SDSs) are required to assist in the management of hazards associated with the handling and use of resources and products derived from waste. SDSs are based on information generated in the classification of a material or waste according to the Globally Harmonized System of classification and labelling of chemicals (GHS), as represented in the South African National Standard SANS 10234:2008 Ed 1.1. The classification covers physical hazards, hazards to human health and hazards to aquatic ecosystems.

INFOTOX has extensive experience in the skillful classification of a diverse range of organic and inorganic materials, preparations and wastes, and has produced many SDSs in accordance with the GHS requirements. Expertise in health sciences is essential in understanding the critical issues that would affect management of waste in beneficial use applications as reflected in SDSs.