Interim SEPA Technical Guidance Note

Mixing and Stabilisation of Hazardous (Special) Wastes

1.0 Purpose

This document provides guidance to SEPA officers on the use of EWC codes in relation to the mixing, solidification and stabilisation of hazardous waste carried out during waste treatment.

This guidance applies at the stage of classifying waste according to the methodology in Technical Guidance WM2, and not, for example for the purposes of meeting any other requirements for acceptance to landfill.

This document may be made available to operators, consultants and waste producers.

2.0 Introduction

The Special Waste Amendment (Scotland) Regulations 2004 amended the Special Waste Regulations 1996 and standardised the definition of "special waste" with that of "hazardous waste" in the Hazardous Waste Directive (91/689/EC). Hazardous waste contains **dangerous substances** at concentrations that make them dangerous to health or the environment, by virtue of the hazards listed in Annex III to Directive 91/689/EC. The list of hazardous wastes is consolidated in the European Waste Catalogue (EWC).

The document deals only with codes under chapter 19 of the EWC which are considered to have the greatest potential for misunderstanding. Chapter 19 of the EWC contains many other codes that should also be considered when classifying a waste. Entries marked in **red** are **absolute** (**A**) hazardous wastes, i.e. always hazardous and those marked in **blue** are **mirror** (**M**) entries, i.e. hazardous only if dangerous substances are present above threshold concentrations.

3.0 Mixing Wastes

19 02 04* - premixed wastes composed of at least one hazardous waste (A)

This code would apply to wastes which have been mixed, with no other associated form of treatment, for instance to improve handling properties. The mixed waste will remain hazardous. This is because the total amount of dangerous substances has not been reduced. The waste remains an absolute entry. Non-hazardous materials would also be considered to be hazardous waste under this entry when mixed with hazardous wastes.

4.0 Physico-Chemical Treatment

19 02 05* - sludges from physico-chemical treatment containing dangerous substances (M)

19 02 06 - sludges from physico-chemical treatment other than mentioned in 19 02 05

These codes apply where waste has been subjected to any physical and/or chemical treatment which results in the production of a sludge (such as a filter cake). The wastes are mirror entries assessed on the dangerous substances present in the sludge relative to the hazardous waste thresholds[1].

Dilution to below the thresholds is not considered a physico-chemical treatment process, as it would be contrary to the aims of the ban on mixing laid down in Article 2 of Directive 91/689/EEC.

5.0 Stabilised / Solidified Wastes

19 03 04* **wastes marked as hazardous, partly stabilised (A)**

19 03 05 **stabilised wastes other than those mentioned in 19 03 04**

19 03 06* **wastes marked as hazardous, solidified (A)**

19 03 07 **solidified wastes other than those mentioned in 19 03 06**

The EWC provides the following definition of stabilisation and solidification:

"Stabilisation processes change the dangerousness of the constituents in the waste and thus transform hazardous waste into non hazardous waste. Solidification processes only change the physical state of the waste (e.g. liquid into solid) by using additives without changing the chemical properties of the waste."

Accordingly there are three different types of treated waste that could arise from this type of waste treatment facility:

1- Totally stabilised waste
2- Partially stabilised waste
3- Solidified waste

5.1 Totally stabilised waste

19 03 05 **stabilised wastes other than those mentioned in 19 03 04**

This would be a waste that was previously hazardous and after a chemical treatment no longer displays any of the 14 hazardous properties of Annex III of Directive 91/689/EEC. Further information on the testing of hazardous properties is given in WM2.

For hazardous properties **H3** to **H8** and **H10** and **H11** the thresholds of Article 2 of Commission Decision 2000/532/EC as amended, apply (below which no negative effect is observed on living organisms). Hence, for these properties the stabilisation process would have to transform the dangerous substances to an extent that these are brought to concentrations below these thresholds, in a manner that is irreversible.

The hazardous properties **H1**, **H2** and **H12** are different in the sense that there are no thresholds attached and they depend on direct chemical organic and inorganic reactions of certain active compounds. The stabilisation process will be based on a chemical reaction that will transform all molecules of the active agent. The initial concentration of the active compound will determine the amount of reagents to be added to achieve the stabilisation. Stabilisation of H1, H2 and H12 will involve the following:

H1 – *Explosive,* the stabilisation process will be based on a chemical reaction to transform a very unstable (and explosive) compound to render the waste non explosive.

H2 – *Oxidizing,* the stabilisation process will have to reduce the oxidizing compound within the waste under controlled conditions.

H12 – *Substances and preparations which release toxic or very toxic gases in contact with water, air or an acid,* the stabilisation process will be based on a chemical reaction to transform the compound that would otherwise react with water, oxygen or acids.

H9 – *Infectious,* is similar as the stabilisation process will have to destroy, inactivate or render innocuous the infectious agent or pathogen (viruses, bacteria, yeast, fungi, helminths, protozoa, prions, etc) to an extent that these will not be able to reproduce or replicate.

As far as **H13** – *substances and preparations capable by means, after disposal, of yielding another substance, e.g. leachate which possesses any of the H characteristics,* is concerned, the starting assumption is that this property can only be displayed if any of the other hazardous properties is present. The idea being that a waste can not release dangerous substances in concentrations that would render the release dangerous, if they were not present in the waste to begin with. Thus the stabilisation of the other hazardous properties should mean the hazardous property H13 no longer being displayed.

In the case of ***H14*** – *ecotoxicity,* the EWC does not link this to any thresholds, above which waste would display a toxic effect in the different ecosystems. However, there are criteria for H14 established in legislation, consistent with those on which the hazardous properties H4 to H8, H10 and H11 are based. Therefore, the stabilisation process would have to transform the dangerous substances to an extent that permanently reduces them below the thresholds (given in WM2).

In all of the above cases, dilution is not considered a stabilisation process, as it would be contrary to the aims of the ban on mixing laid down in Article 2 of Directive 91/689/EEC. Therefore the total stabilisation of waste can only be demonstrated by calculating the remaining quantity of the dangerous substance in the altered waste and expressing this as a concentration of the mass of the original waste stream.

5.2 Partially Stabilised Waste

19 03 04* wastes marked as hazardous, partly stabilised (A)

Hazardous waste which has been subjected to a stabilisation treatment but which cannot be shown to have been fully stabilised will be considered to be partially stabilised. A hazardous waste that has been partially stabilised will always be hazardous. Furthermore there is a greater risk that the dangerous substances will be released into the environment.

5.3 Solidified Waste

19 03 06* wastes marked as hazardous, solidified (A)

19 03 07 solidified wastes other than those mentioned in 19 03 06

Treatment by solidification binds the hazardous waste into a solid state, relying on the physical properties of an additive/reagent. It does not change or alter the dangerous substances but reduces their mobility and the risk of them being released in the longer term. Thus a hazardous waste that has been solidified will always remain hazardous. Any reactions that take place that otherwise change the hazardousness may result in another code being applied.

A solidified waste that is also completely stabilised should demonstrate the same attributes as above, in section 5.1 (the dangerous substances have to be permanently reduced below the thresholds that make the waste hazardous and show no risk of reforming). Such a waste would be classified as a stabilised waste. The non-hazardous entry for a solidified waste can only be applied to a waste that is non-hazardous prior to being solidified.

6.0 Mechanical treatment (e.g. sorting or crushing)

19 12 11* - other wastes (including mixtures of materials) from mechanical treatment of waste containing dangerous substances (M)

19 12 12 - other wastes (including mixtures of materials) from mechanical treatment of waste other than those mentioned in 19 12 11

These codes only apply to wastes produced by physical treatment, other than those detailed elsewhere in Chapter 19, for instance separation based on differences in physical properties.

7.0 Soil Remediation

19 13 01* - solid wastes from soil remediation containing dangerous substances (M)

19 13 02 - solid wastes from soil remediation other than those mentioned in 19 13 01

There are entries for remediated soils which have been subject to any physical, chemical or biological treatment.

8.0 Stable, Non-reactive Hazardous Waste

This is a generic description to a group of hazardous wastes that meet the requirements for separate disposal in certain non-hazardous landfill sites. It is defined in the Landfill (Scotland) Regulations 2003 and Council Decision 2000/33/EEC (establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC).

There is no relationship between the definition of stable non-reactive hazardous waste and the EWC codes listed in Chapter 19.

Notes

[1] 'Containing dangerous substances' means present above the threshold limits that make the waste hazardous

Reference

COUNCIL DECISION 2000/532/EEC: European Waste Catalogue. http://europa.eu.int/eur-lex/en/consleg/pdf/2000/en_2000D0532_do_001.pdf

Technical Guidance WM2: Interpretation of the definition and classification of hazardous waste. http://www.sepa.org.uk/guidance/waste/hazardous/index.htm