
6.4 Trial Burns Of **Scheduled Wastes** For Co-Processing In Cement Kilns

6.4.1 A trial burn is used to determine the facility's destruction and removal efficiency (DRE) or destruction efficiency (DE), to verify its ability to efficiently destroy POPs in an irreversible and environmentally sound manner. This involves the selection, sampling and analysis of a principal organic hazardous constituent (POHC) in the waste feed to determine its input and emission rates. A trial burn typically consists of a series of tests, one for each set of operating conditions in the facility. Three runs are normally performed for each test. During the trial burn, the operator should establish the operating limits for maximum **scheduled wastes** feed and maximum kiln production rate. The operator shall also schedule a sampling and analysis of emission by competent and accredited party.

6.4.2 The trial burn should be carried out by the cement plant under the following circumstances:

- (a) For existing or new cement plant implementing co-processing of scheduled wastes for the first time; and
- (b) For existing cement plant which already implement co-processing of scheduled wastes in their operation and to make changes in the Raw Meal Acceptance Criteria meant for the blended scheduled wastes and other raw material.

6.5 OTHERS

6.5.1 Other important aspects that should be taken into considerations when the operators of cement plant implement co-processing activity are the requirement for (i) a comprehensive programme on quality assurance (QA) and quality control (QC); (ii) health and safety program; and (iii) the involvement of stakeholders as well as public communication. Further information on three (3) aspects as outlined by UNEP are detailed out in **Annex 2, Annex 3 and Annex 4**.

7.0 ENVIRONMENTALLY SOUND CO-PROCESSING OF **SCHEDULED WASTES** IN CEMENT KILNS

7.1 Waste Acceptance And Pre-Processing

7.1.1 Before a cement plant decide to receive **scheduled wastes** to be used as alternative raw material, the operator should investigate the nature and composition associated with the waste, and all relevant information should be passed by the waste generator to the operator. The waste should also be sampled and sent to accredited laboratories for chemical analysis.

7.1.2 Operators of cement plant should ensure that the **scheduled wastes** received is in compliance to the Waste Acceptance Criteria of alternative raw material **or alternative fuel** that has been established beforehand.

7.1.3 The **scheduled wastes** usually will require a pre-processing to produce a homogeneous waste stream before it is co-processed in the cement kilns.

7.1.4 The operators shall develop a “Standard Operating Procedure” on Waste Acceptance and Pre-Processing that detailed out the management of **scheduled wastes** received to ensure it is manage properly and such activity will not give any adverse effect to the process, environment as well as human health. A general recommendation as outlined by UNEP in **Annex 5**.

7.2 Co-Processing

7.2.1 For optimal performance (co-processing without additional emissions) alternative fuels and raw materials should be fed to the cement kiln through appropriate feed points, in adequate proportions and with proper waste quality and emission control systems.

7.2.2 Co-processing has the following characteristics during the production process (GTZ/Holcim, 2006):

- (a) The alkaline conditions and the intensive mixing favour the absorption of volatile components from the gas phase. This internal gas cleaning results in low emissions of components such as SO₂, HCl, and most of the heavy metals, with the exception of mercury, cadmium and thallium;
- (b) The clinker reactions at 1450°C allow the chemical binding of metals and the incorporation of ashes to the clinker;
- (c) The direct substitution of primary fuel by high calorific waste material causes a higher efficiency on energy recovery in comparison to other ‘waste to energy’ technologies.

7.2.3 A general recommendation as outlined by UNEP in **Annex 6**.

8.0 QUALITY OF CEMENT PRODUCT

- KIV: TO BE DISCUSSED FURTHER WITH CEMENT INDUSTRY-

9.0 GOVERNMENT POLICY AND LEGAL REQUIREMENT

9.1 General Requirements

9.1.1 Below are the general requirements specific to cement kilns co-processing hazardous wastes on a routine basis as outlined by Karstensen (2008a, 2009a):

-
- (a) Compliance with all required national/local licenses, permits, authorisations and emissions and relevant national and local regulations [as outlined under Environmental Quality Act 1974 and all related Regulations, Orders and Rules under the Act.](#)
 - (b) Suitable location, technical infrastructure, storage and processing equipment
 - (c) Reliable and adequate power and water supply
 - (d) Application of BAT for air emissions pollution prevention and control, along with continuous emission monitoring to ensure compliance with regulation and permits (verified through regular baseline monitoring)
 - (e) Exit gas conditioning/cooling and low temperatures (< 200°C) in the air pollution control device to prevent dioxin formation
 - (f) Clear management and organisational structure with unambiguous responsibilities, reporting lines and feedback mechanism
 - (g) Qualified and skilled employees to manage wastes and health, safety and environmental issues
 - (h) Adequate emergency and safety equipment and procedures, and regular training
 - (i) **Authorised and licensed collection, transport and handling of hazardous wastes**
 - (j) Safe and sound receiving, storage and feeding of hazardous wastes
 - (k) Access to an adequate laboratory facilities and equipment for hazardous waste acceptance and feeding control
 - (l) Adequate record keeping of wastes and emissions
 - (m) Adequate product quality control routines
 - (n) Implementation of an environmental management system (EMS) including a continuous improvement programme and ISO 14000 certification
 - (o) Independent audits (government sanctioned or otherwise), emission monitoring and reporting
 - (p) Stakeholder dialogues with local community and authorities, and mechanisms for responding to comments and complaints
 - (q) Open disclosure of performance and compliance verification reports on a regular basis

9.2 Requirements under Environmental Quality Acts 1974 for cement factory

- KIV: TO BE DECIDED BY DOE -

9.3 Emission Limits

- KIV: TO BE DECIDED BY DOE AND DISCUSSED FURTHER WITH CEMENT INDUSTRY -

9.4 Application procedure

- KIV: TO BE DECIDED BY DOE -

9.5 Reporting

- KIV: TO BE DECIDED BY DOE -

DRAFT