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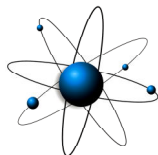
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**NATIONAL POLICY DEVELOPMENT PROCESS  
FOR HIGH TEMPERATURE WASTE  
INCINERATION AND AFR CO-PROCESSING IN  
CEMENT PRODUCTION**

**PROPOSED CONDITIONS OF AUTHORISATION FOR  
THE CO-PROCESSING OF WASTE AS  
ALTERNATIVE FUELS OR RAW MATERIALS (AFR)  
IN CEMENT PRODUCTION**

**DRAFT**

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# 1 INTRODUCTION

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Any cement plant co-processing general or hazardous waste as alternative fuels and/or raw materials (AFRs) must have the relevant approvals from the competent authority in terms of South African environmental legislation. This legislation, regulating the environment and sustainable development in general, and specifically air quality and waste management, require the following approvals for AFR co-processing:

1. Either an 'EIA Authorisation' in terms of Section 22 of the Environment Conservation Act, 1989 (Act 73 of 1989), or 'Environmental Authorisation' in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998, as amended), depending on the time an application was submitted (before or after April 2006).
2. A 'Waste Permit' in terms of Section 20 of the Environment Conservation Act, 1989 (Act 73 of 1989), or in future once the new act is promulgated and relevant provisions are in effect, a 'Waste Management Licence' in terms of Chapter 5 of the National Environmental Management: Waste Management Act (expected 2009).
3. A 'Registration Certificate' for a Scheduled Process in terms of Section 9 of the Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965), or in future once the relevant provisions are in effect, an 'Atmospheric Emission Licence' in terms of Chapter 5 of the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004).

Each of the above approvals must detail the conditions that the approval is subject to, including the requirements and restrictions of operation. The main aim of the conditions proposed in the following sections is to provide a realistic and achievable regulatory framework for the co-processing of waste as AFRs in cement production, which ensures that environmental authorities can efficiently monitor environmental compliance without having to regulate technical and engineering aspects of operation.

## 2 GENERAL CONDITIONS

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- 2.1 This Environmental Authorisation for the receipt, temporary storage, handling and co-processing of Alternative Fuels and Raw Materials (AFR) applies only to Kiln/s No. *[insert specific identification number/s for relevant kiln/s at the site]* at the site of *[insert cement company's name]* at *[insert name of the site]* ('the site'). No AFRs or any other waste may be co-processed in any other existing or new kiln at the site without the necessary approvals being obtained prior to commencement.
- 2.2 This Environmental Authorisation specifically excludes the receipt, temporary storage, handling and co-processing of hazardous wastes containing high levels of Persistent Organic Pollutants (POPs), as defined by the Basel and Stockholm Conventions ('High Level POPs Containing Wastes'), without a Performance Verification Test confirming the kiln's ability to adequately treat these types of waste (Refer to Section 5: Waste Management).
- 2.3 This Environmental Authorisation specifically excludes any and all pre-treatment, pre-processing or blending etc., mechanical or otherwise, of hazardous waste at the site. Only mechanical preparation of general waste to the required physical specification for co-processing as AFR is allowed.
- 2.4 A Registration Certificate in terms of Section 9 of the Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965), and a Waste Permit in terms of Section 20 of the Environment Conservation Act (Act 73 of 1989) *[or its successors in law, i.e. licences in terms of the National Environmental Management Air Quality and Waste Management Acts]* must be obtained, and copies thereof submitted to the Department, prior to the commencement of any waste receipt, temporary storage, handling and co-processing of waste at the site.
- 2.5 Once approved by the Department, relevant provisions of the site-specific Operational and Management Plan (Refer to Section 3: Operational Management) are considered an extension to the conditions of this Environmental Authorisation and must therefore be complied with.
- 2.6 Notwithstanding the specific timeframes prescribed in this Environmental Authorisation for the submission of certain information, all available records, reports and documentation referred to in the conditions of authorisation must be made available to the Department within 14 calendar days after request.
- 2.7 Detailed records of all incidents and complaints must be kept, together with an assessment of the significance thereof, how these were managed, and the measures put in place to prevent the recurrence thereof.
- 2.8 A Site Monitoring Committee must be established prior to the receipt, temporary storage, handling and co-processing of AFR in order to, amongst others, facilitate communication with communities surrounding the plant, ensure transparency, assist with monitoring of operations, and to identify potential and existing problems (For guidance refer to Appendix 11 of the "Minimum Requirements for Waste Disposal by Landfill", DWAF, 2<sup>nd</sup> Edition, 1998). The committee must be constituted in concurrence with all relevant parties, serve as a formal and legitimate structure for community involvement, and include documented agreement on:

- Committee representation (relevant government departments, plant personnel, communities, other interested and affected parties or stakeholders) and mandate of representatives;
  - Frequency of meetings (at least quarterly);
  - Purpose / objectives of meetings;
  - Communication strategy;
  - Minute taking and distribution; and
  - Disclosure of information and associated procedures, including disclosure and review of audit reports and emission monitoring results (Refer to Section 6: Monitoring and Reporting).
- 2.9 The Department must be informed within 24 hours if any condition of this authorisation cannot or have not been complied with, specifically if monitoring shows that air emission limits are being exceeded.

### 3 OPERATIONAL MANAGEMENT

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3.1 Prior to the commencement of the receipt, temporary storage, handling and co-processing of AFRs at the site, *[insert cement company's name]* must develop a detailed, site-specific Operational and Management Plan in accordance with the provisions of and framework set by the Department of Environmental Affairs and Tourism's "Guidelines for the Co-Processing of Alternative Fuels and Raw Materials and Treatment of Organic Hazardous Wastes in Cement Kilns" ('the Guidelines'). This Operational and Management Plan must be peer reviewed by a suitably qualified and experienced independent professional, amended/updated as required/relevant, and then submitted to the Department, together with the peer review report, for the Department's review and approval prior to the commencement of any receipt, temporary storage, handling and co-processing of AFRs at the site. This plan must take due cognisance of international Best Available Techniques and Best Environmental Practice (BAT and BEP), compliance with the conditions of this Environmental Authorisation as well as other approvals, and the prevention of significant negative impacts on the environment, in particular pollution by emissions to air, soil, surface water and groundwater, and the resulting risks to human health, from the receipt, temporary storage, handling and co-processing of AFRs at the site. The plan must accordingly address, amongst others:

- Site management and responsible persons (specific to different phases of receipt, temporary storage, handling and co-processing of AFRs at the site);
- Health, safety, security, risk and emergency management, training and communication;
- Environmental compliance, management obligations and systems, record-keeping, monitoring, auditing and reporting;
- Waste selection and analyses, acceptance procedures and manifests, transport, receipt, handling, and temporary storage;
- Waste co-processing, specifically feed, analysis, kiln stability, quality control, pollution prevention and control;
- Laboratory facilities, monitoring equipment, accreditation and calibration, and maintenance;
- Proposed monitoring equipment and methodologies, monitoring/sampling points etc., and motivation for the proposals and the acceptability and limitations thereof (considering international best practice), as well as maintenance and calibration procedures,
- Procedures and conditions for feeding to the process as well as requirements for interlocks and set points for stopping waste feed;
- Procedures and requirements for collection and analysis of process and environmental samples as well as health checks of employees;
- Record keeping and dissemination of information;

- Detailed discussion of, and the reasons and motivation for, any deviation/s from any specific provisions of the Guideline, as well as alternative measures proposed to achieve the same objective/s of the particular provision/s;
  - Procedures and frequency for the continuous review and update of the Operational and Management Plan if required to ensure it remains up-to-date, relevant and effective; and
  - Independent review and statement on the adequacy and practicality of the plan in terms of its ability to ensure compliance with the conditions of this and other authorisations, specifically air emission standards, and the prevention of significant impacts on the environment.
- 3.2 The cement kiln/s to be used for AFR co-processing must be designed, equipped, built and operated in such a way that emissions from the process is kept in a controlled and homogeneous fashion, even under the most unfavourable conditions, at a temperature of 850 °C for two seconds. If hazardous wastes with a content of more than 1 % of halogenated organic substances, expressed as chlorine, are co-processed or treated, the feed point temperature has to be at least 1 100 °C.
- 3.3 The cement kiln/s to be used for AFR co-processing must have an automatic system to prevent AFR feed during (i) start-up, shut-down or any other situation where the temperature of 850°C or 1100°C (as relevant) is not maintained, or (ii) whenever the continuous emission measurements required as conditions of this Environmental Authorisation show that any emission limit value is being exceeded due to disturbances in or failures of emission control equipment.
- 3.4 Regular maintenance of relevant infrastructure associated with the co-processing of AFRs must be undertaken, specifically in relation to waste storage infrastructure and emission control equipment. A maintenance program must be included in the Operational and Management Plan developed for the site.

## 4 AIR QUALITY MANAGEMENT

- 4.1 The cement kiln/s to be used for AFR co-processing shall be designed, equipped, built and operated in such a way so as to prevent the emissions into the air giving rise to significant ground-level air pollution.
- 4.2 During the co-processing of any AFRs, emissions from each kiln in which waste is being co-processed must at all times comply with the Air Emission Standards for AFR co-processing in cement kilns, subject to the baseline emission measurements for Kiln/s No. *[insert specific kiln identification number if relevant]*, and the provisions and transitional arrangements of the Air Emission Standards as detailed further below.
- 4.3 The following Daily Average emission limits for heavy metals (all forms) and dioxins and furans (International Toxic Equivalent), as determined through periodic emission monitoring (Refer to Section 6: Monitoring and Reporting), may not be exceeded under any circumstance during the co-processing of AFRs:

EMISSIONS	DAILY AVERAGE EMISSION LIMITS (10% O <sub>2</sub> , 101.3 kPa, 273 K / 0 °C, dry gas)
Hg	0.05 mg/Nm <sup>3</sup>
Cd + Tl	0.05 mg/Nm <sup>3</sup>
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V (Sum total)	0.5 mg/Nm <sup>3</sup>
PCDD/PCDF	0.1 ng/Nm <sup>3</sup> I-TEQ

- 4.4 The following Daily Average emission limits for total particulate matter, total organic carbon, hydrogen chloride, hydrogen fluoride, sulphur dioxide and oxides of nitrogen, as determined through continuous emission monitoring (Refer to Section 6: Monitoring and Reporting), may not be exceeded (*subject to the exclusions and/or transitional arrangements detailed in 4.5 to 4.7 below*) *[include if relevant i.e. if transitional arrangements apply to specific kilns]*:

EMISSIONS	DAILY AVERAGE EMISSION LIMITS (mg/Nm <sup>3</sup> , 10% O <sub>2</sub> , 101.3 kPa, 273 K / 0 °C, dry gas)
PM (Total Particulate)	30
TOC	10
HCl	10
HF	1
SO <sub>2</sub>	50
NO <sub>x</sub>	500 (new kilns); 800 (existing kilns)

- 4.5 *[Include transitional arrangements for PM emissions from existing kilns if relevant]*. Until 30 June 2011, the above emission limit for total particulate matter (PM) does not apply to Kiln No. *[insert specific kiln identification number]*, provided that the co-processing of any AFR in this kiln does not increase the current daily average PM emission concentration of *[insert current PM emission concentration for specific kiln/s as relevant]* mg/Nm<sup>3</sup> from Kiln No. *[insert specific kiln identification number]* as measured during baseline emission monitoring without co-processing of any AFR .

From 1 July 2011 until 30 June 2018, a daily average PM emission limit of 80 mg/Nm<sup>3</sup> will apply to Kiln No. *[insert specific kiln identification number]*, and thereafter, as from 1 July 2018, daily average PM emissions from this kiln may not exceed 30 mg/Nm<sup>3</sup> when co-processing AFR .

- 4.6 *[Include transitional arrangements for NOx emissions from existing kilns if relevant]*. Until 30 June 2018, the above emission limit for oxides of nitrogen (NOx) for existing kilns does not apply to Kiln No. *[insert specific kiln identification number]*, provided that the co-processing of any AFR in this kiln does not increase the current daily average NOx emission concentration of *[insert current NOx emission concentration for specific kiln/s as relevant]* mg/Nm<sup>3</sup> from Kiln No. *[insert specific kiln identification number]* as measured during baseline emission monitoring without co-processing of any AFR . As from 1 July 2018 the daily average NOx emission limit of 800 mg/Nm<sup>3</sup> will apply to Kiln No. *[insert specific kiln identification number]* when co-processing AFR .
- 4.7 *[Include exclusions for TOC and SO<sub>2</sub> emissions from existing kilns if relevant]*. Due to the unique characteristics of conventional fuels and/or raw materials used at the site, the emission limits for total organic carbon (TOC) and sulphur dioxide (SO<sub>2</sub>) *[include as relevant]* do not apply to Kiln No. *[insert specific kiln identification number]*, provided that the co-processing of any AFR in this kiln does not increase the current daily average TOC and SO<sub>2</sub> emission concentrations of *[insert current TOC and SO<sub>2</sub> emission concentrations for specific kiln/s as relevant]* mg/Nm<sup>3</sup> from Kiln No. *[insert specific kiln identification number]* as measured during baseline emission monitoring without co-processing of any AFR .
- 4.8 The transitional arrangements and exclusions in 4.5 to 4.7 above do not apply in the event of co-processing hazardous wastes containing high levels of Persistent Organic Pollutants (POPs) as defined by the Basel and Stockholm Conventions ('High Level POPs Containing Wastes'). In this event, the standards in 4.3 and 4.4 must be complied with.
- 4.9 In order to ensure that the required emission limits specified in 4.5 and 4.6 above are achieved within the associated set timeframes, an Air Quality Management Plan must be compiled and submitted to the Department for review at least 1 year prior to the date the particular emission limits have to be complied with. The plan must detail, among others:
- Measures that would be taken to reduce emissions according to requirements;
  - Evaluation of the proposed measures, considering BAT and BEP principles and success of similar measures implemented elsewhere; and
  - Timeframe for implementation and interim milestones expected relating to emission reduction.
- 4.10 Exit gas temperatures must be maintained below 200 °C.
- 4.11 Pollution control devices (exhaust gas cooling and bag filter or ESP) must be available 98% of the time each day (i.e. maximum downtime of 2% or 30 minutes per day). The cumulative annual downtime (total downtime over a one year period) may however not exceed 60 hours.

## 5 WASTE MANAGEMENT

- 5.1 All waste management activities on-site, specifically those relating to transport, temporary storage and handling, must take place in accordance with relevant provisions of the Department of Water Affairs and Forestry's "Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste" (2<sup>nd</sup> Edition, 1998), or any updated versions thereof.
- 5.2 AFR and other waste storage areas on-site must be designed and operated in such a way as to prevent the unauthorised or accidental release of any polluting substances (gaseous, liquid or solid) into the air, soil, surface water and groundwater. The following, among others, must accordingly be considered to form part of waste management procedures on site:
- Possible incompatibility of secondary materials during handling and transport in accordance with SANS 10232-1, Annexure F. Liquid streams shall be stored separately to solid wastes. Flammable liquids (i.e. hydrocarbon sludges) shall be stored separately to substances with a high oxidizing potential. Waste streams with toxic components (such as metals, PCB's) shall be stored separately from other toxic waste streams.
  - Procedures governing the transportation of hazardous waste, including the relevant SANS codes under the National Road Traffic Act (i.e. SANS 10232-1 to 3).
  - Any appointment of a waste transport contractor shall be subject to (i) the contractor complying with the all requirements of the National Road Traffic Act and associated SANS codes for Transportation of Dangerous Goods, (ii) all Emergency Response equipment as stipulated in the Transport Emergency Card (as prescribed by SANS 10232-4) are carried on vehicles, (iii) all drivers carry a Professional Driver's Permit and are trained in HAZMAT response, (iv) all documentation relevant to loads is accurate and complete, (v) adequate emergency response facilities has been contracted along the route from the generator to the plant, (vi) all placarding and emergency information relevant to the load is displayed.
  - Establishing suitable and safe transfer systems from transportation to storage areas to avoid health, safety and environmental risks from spillage, such as fugitive emissions or vapour displacement. Suitable vapour filtration and capture equipment must be in place to minimize impact to the reception point and surrounding areas from unloading activities.
  - Assuring that storage facilities fit their purpose. Appropriate storage for liquids must meet relevant safety and design codes for storage pressures and temperatures.
  - Adequate dust control systems for solid materials handling systems.
  - Storage design must be appropriate to maintain the quality of the materials, e.g. for solids, preventing build-up of old, solid materials, and mixing or agitation for liquids to prevent settlement.

- Transfer and storage areas must be adequately designed to manage and contain accidental spills into rainwater or firewater, which may be contaminated by the materials. This requires appropriate design for isolation, containment and treatment. Storage for liquids must have adequate secondary containment.
  - Written procedures and instructions for the unloading, handling, and storage of solid and liquid fuels and raw materials used on site.
  - Identification of designated routes for vehicles carrying specified fuels and raw materials within the site.
  - Appropriate signs indicating the nature of materials at storage, stockpiling, and tank locations. Storage halls must be fitted with water sprinkler systems and be vented to control accumulation or destruction of solvent vapours.
  - Tanks containing hydrocarbons must be fitted with an explosion safety device. Additional devices may be required such as atmosphere control (e.g. 'nitrogen blankets') and temperature control (e.g. shell cooling).
  - Equipment must be grounded and appropriate anti-static devices and adequate electrical devices selected (e.g. motors, instruments, etc.) where relevant.
  - All dry material must be stored in protected warehouses and liquid material in engineered and banded storage facilities. In particular, transfer of wastes from the transporter must occur within an enclosed or banded area.
  - Emergency Response Plans must cater for any accidents and incidents, and spill kits must be maintained on-site.
  - Storage areas for hazardous waste must be as close to the point of application to the kiln as possible, but far enough away to prevent being heated by the radiant heat and to allow truck delivery access.
  - Pumps and piping systems for liquid and sludge transfers must be able to tolerate varying viscosities and solid particles (or filters should be installed to remove such). Adequate maintenance of these pumping systems has to be performed to prevent pipe bursts.
  - Transfer of dry materials (e.g. paper, sewage pellets and plastic) must be enclosed to prevent wind-blown litter.
- 5.3 Adequate storage capacity must be provided for contaminated stormwater run-off from the site, or for contaminated water arising from spillage or fire-fighting operations, to ensure that such effluents can be tested and treated before discharge where necessary.
- 5.4 The following types of waste are not allowed to be received, stored, handled or co-processed at the site and are explicitly excluded from this Environmental Authorisation:
- Anatomical, infectious or biologically active medical/health care waste;
  - Asbestos containing waste;
  - Unsorted electronic waste;
  - Bio-hazardous waste;
  - Entire batteries;

- Explosives;
  - Mineral acids and corrosives;
  - Radioactive waste;
  - Unsorted municipal waste; and
  - Unknown or unidentified wastes.
- 5.5 The co-processing of High Level POPs Containing Waste (as defined by the Stockholm and Basel Conventions) in a certain kiln must be preceded by an independently monitored Performance Verification Test on the kiln to determine the Destruction Efficiency (DE) and Destruction and Removal Efficiency (DRE) of principal organic hazardous compounds (POHC) in the specific kiln. During the test, all relevant conditions of this Environmental Authorisation would apply, specifically those related to air quality management, monitoring and reporting.
- 5.6 A detailed, independent report documenting and interpreting the results of the Performance Verification Test must be submitted to the Department for approval prior to the continued treatment of High Level POPs Containing Waste. Note that as a minimum, a DE/DRE of 99.9999% would be required, as well as compliance with Air Emission Standards prescribed in this Environmental Authorisation in Section 4: Air Quality Management (transitional arrangements and exclusions do not apply).
- 5.7 A plan for conducting a Performance Verification Test must be submitted to the Department at least 3 months prior to the commencement of such a test, and must include, amongst others, the following:
- Motivation for why the plant should be used for treatment of POPs;
  - A feasibility study showing that the plant is technically qualified;
  - Planned date for commencement of the test and expected duration;
  - Details on the waste to be co-processed during the test, including source, volume, composition etc. (see 5.8 below);
  - Motivation for the particular choice of waste and its suitability in providing an accurate and representative indication of the kilns DE and DRE, and therefore suitability to treat High Level POPs Containing Waste;
  - Extension of monitoring regime to include Chlorobenzenes, HCB, PCB, Benzene, Toulene, Xylene, PAH, and NH<sub>3</sub>;
  - Monitoring and analysis to be conducted, the associated methodologies and independent parties responsible for monitoring.
- 5.8 Detailed records must at all times be kept of all waste accepted and co-processed at the site. These records must include, amongst others, the following information for all individual waste streams:
- Source / origin (company, locality and process that generated the waste);
  - Volume and mass of waste;
  - Chemical composition and physical characteristics;
  - Waste classification;

- Risks associated with hazardous waste in terms of its MSDS and the management thereof;
  - Specific raw material or energy replacement value and characteristic/s;
  - Waste storage method and time of storage prior to treatment;
  - Specific transport and handling requirements;
  - Any pre-processing or preparation of waste prior to co-processing;
  - Compatibility tests (if relevant);
  - Record of co-processing as individual waste stream or in combination with other wastes;
  - Volume, mass and percentage feed into the kiln;
  - Feed point into the kiln;
  - Time of co-processing and period required for co-processing the total volume of waste;
  - If POPs have been treated, the Certificate of Destruction.
- 5.9 Detailed records must be kept of waste not accepted and turned away from the site, as well reasons for non-acceptance.
- 5.10 Any residues or waste resulting from the receipt, temporary storage, handling and co-processing AFRs must be minimised in quantity and hazard. Residues must be adequately destroyed in the kiln and stored in such a way that dispersal into the environment is prevented (e.g. in closed containers).

## 6 MONITORING AND REPORTING

- 6.1 Measurement equipment shall be installed and acceptable techniques used in order to accurately monitor the parameters, conditions and mass concentrations relevant to the co-processing of AFR in the kiln/s.
- 6.2 All emission monitoring results must be reported as a Daily Average concentration expressed as mg/Nm<sup>3</sup>, or ng/Nm<sup>3</sup> I-TEQ for PCDD/PCDF, and at 'normalised' conditions of 10% O<sub>2</sub>, 101.3 kPa, 273 K / 0 °C, dry gas. This must be communicated to any external specialists performing measurements, and it must be ensured on-line emission monitors will be able to accommodate this requirement.
- 6.3 Continuous, on-line measurement of the following emissions must take place for each kiln co-processing AFRs:
- Particulate matter (total particulate);
  - O<sub>2</sub>;
  - CO;
  - NO<sub>x</sub>;
  - SO<sub>2</sub>;
  - HCl;
  - HF; and
  - VOC/TOC.
- 6.4 Continuous, on-line measurement of the following operating parameters must take place for each kiln co-processing AFRs:
- Emission exhaust volume (e.g. Nm<sup>3</sup>/hr) and flow rate (e.g. m/s);
  - Water vapour content of exhaust gas (humidity);
  - Exhaust gas temperature;
  - Kiln temperature;
  - Pressure; and
  - Availability of air pollution control equipment (exit gas cooling and ESP/bag filter).
- 6.5 The appropriate installation and the functioning of automated, continuous monitoring equipment for emissions to air are subject to quality control and to an annual surveillance test. Independent calibration has to be done by means of parallel measurements with the reference methods at least every three years.
- 6.6 Periodic measurements of heavy metals and dioxin and furan emissions must be conducted bi-annually (i.e. every 6 months) by independent/external, accredited specialists during the first 12 months of AFR co-processing, and annually thereafter. If possible/applicable, the measurements must coincide with the co-processing of substantially different AFRs, e.g. waste tyres vs. hydrocarbon waste (oils and solvents) vs. spent pot lining vs. sewage sludge vs. blended waste etc.

- 6.7 Average emission values for heavy metals must be measured over a minimum sample period of 30 minutes and maximum of 8 hours, and average values for dioxins and furans (expressed as I-TEQ) over a sample period of a minimum of 6 hours and maximum of 8 hours.
- 6.8 Periodic measurements of air emissions have to be carried out representatively to provide accurate and scientifically correct emission data and results, and sampling and analysis must be carried out by independent, accredited laboratories.
- 6.9 To ensure valid monitoring results are obtained, no more than five half-hourly average values in any day, and no more than ten daily average values per year, may be discarded due to malfunction or maintenance of the continuous measurement system.
- 6.10 All measurement results shall be recorded, processed and presented in an appropriate manner in order to enable the Department to verify compliance with the permitted operating conditions and air emission standards. Quarterly Emission Monitoring Reports must be compiled and include, amongst other:
- Daily average results of all continuous, on-line emission monitoring parameters (identified in 6.3 above), reported on line graphs that include individual, daily average data points, and indicating the relevant air emission limit if applicable;
  - Results of all continuous, on-line operational monitoring parameters (identified in 6.4 above), reported on line graphs that correspond in scale with the emission monitoring results;
  - Results of periodic emission measurements of heavy metals, and dioxins and furans;
  - Confirmation of residence times and temperatures of specific wastes co-processed as determined by the specific feed points, kiln dimensions and material and gas flow rates;
  - Discussion on availability or air pollution control equipment, together with reasons for and management of downtime;
  - All relevant results must be compared with baseline measurements taken prior to the co-processing of AFR; and
  - Detailed evaluation and discussion of any non-compliance during the reporting period.
- 6.11 Internal Quarterly Environmental Audits, and an Independent Annual Environmental Audit must be conducted on the functioning and monitoring of the plant. The audits must give a detailed account of the general running of the process and the emissions into air compared with the set air emission standards, and must cover all operations and supporting paperwork of the sourcing, sampling and analysis, acceptance, transportation, storage and preparation of waste on site, operation, monitoring, reporting, staff training, emergency preparedness and response procedures and processes. The audit reports must, where relevant, present information in such a way so that a clear view of AFR co-processing and its influence on air emissions and operations are obtained. The audits must include, but not be limited to, the following:
- Detailed assessment and evaluation of compliance, or progress in compliance, with the conditions of this Environmental Authorisation;

- Detailed discussions on any non-compliances and the significance thereof, how these were addressed, and the recurrence thereof prevented;
- Summarised information/results required as conditions of this Environmental Authorisation;
- Incorporation of air emission and operational monitoring results from Quarterly Emission Monitoring Reports (see 6.10);
- Records of the AFR types and volumes co-processed during the reporting period;
- Reporting of on each waste stream's feed volume over time, reported on line graphs that correspond in time and scale with emission and operational monitoring results;
- Description and evaluation of all infrastructure development (e.g. waste storage areas) and kiln modifications (e.g. feed mechanisms) during the period of reporting;
- Review of the site Operational and Management Plan in terms of its adequacy to ensure compliance with the conditions of this and other approvals, specifically air emission standards, and the prevention of significant impacts on the environment;
- Summary of findings of any audits of the company's Environmental Management System (e.g. ISO14001);
- The annual audit must include independent verification of the data, results and conclusion included in the Quarterly Emission Monitoring Reports and Independent Quarterly Environmental Audits; and
- Review of progress with implementation of the site Air Quality Management Plan if applicable (Refer to 4.9).