A GUIDANCE NOTE ON THE BEST PRACTICABLE MEANS

FOR

CEMENT WORKS

(MANUFACTURE OF CEMENT AND ASSOCIATED PROCESSES)

BPM 3/4

Environmental Protection Department
Air Management Group

1997

1.0 INTRODUCTION

1.1 This note is issued by the Environmental Protection Department as one of a series to provide guidance for processes specified under Part IV of the Air Pollution Control Ordinance (the Ordinance). It is a guide to the Department's officers in the assessment of an application for a licence under the Ordinance.

1.2 It should be understood that this note sets out the basic requirement for the applicant to provide and maintain the best practicable means for the prevention of the emission of air pollutants. The applicant should recognize that whether a licence is granted or refused, and on what conditions, may depend on all the circumstances of an individual application besides this note.

1.3 This note covers specified processes and associated processes for the manufacture of cement, described as "Cement Works" in Schedule 1 to the Ordinance. Cement Works are works in which the total silo capacity exceeds 50 tonnes and in which cement is handled or in which argillaceous and calcareous materials are used in the production of cement clinker, and works in which cement clinker is ground.

2.0 EMISSION LIMITS

2.1 All emissions to air, other than steam or water vapour, should be colourless, free from persistent mist or fume, and free from droplets.

2.2 Smoke emission from a combustion process should not, when compared in the appropriate manner with the Ringelmann Chart or an approved device, appear to be as dark as or darker than Shade 1 on the Ringelmann Chart.

2.3 The concentration limits specified below should apply to the emissions from the manufacture of cement and associated processes. All pollutant concentrations are expressed at reference conditions of 0°C, 101.325 kPa and dry conditions without correction for oxygen content, and compensated for any effect of dilution air to the concentration.

(a) <u>The kiln system for clinker production</u>

Particulates	50 mg/m^3
Sulphur dioxide	400 mg/m^3
Oxides of nitrogen (expressed as nitrogen dioxide)	800 mg/m^3

(b) <u>Other processes</u>

Particulates	50 mg/m^3

3.0 FUEL RESTRICTION

3.1 Unless otherwise agreed by the Authority, fuels to be used should be conventional fuels that comply with the provisions of the Air Pollution Control (Fuel Restriction) Regulations.

4.0 CONTROL OF EMISSIONS

4.1 Emission of air pollutants should be minimised to prevent:

(a) harm to the environment, adverse effects to human health, or creation of any nuisance situation;

(b) threatening the attainment or maintenance of the relevant air quality objectives;

(c) giving rise to an objectionable odour noticeable outside the premises where the process is carried on; and

(d) imposing undue constraint on the existing and future development or land use.

4.2 To satisfy the emission limits set out in section 2.0 of this note, prevention or reduction of emissions at source is the choice. Where the emission is not able to be prevented or reduced at sources to sufficient extends to meet these requirements, air pollution control equipment should be provided.

- *Dispersion*

4.3 Chimneys include vents, structures and openings of any kind from or through which air pollutants may be emitted. The applicant will need to demonstrate that the proposed chimney will provide sufficient dispersion of air pollutants.

4.4 A chimney should be at least 3 metres above the roof of any building to which it attaches and above the roof of any adjacent buildings.

4.5 Emissions from chimneys should be directed vertically upwards and not restricted or deflected by the use of, for example, plates or rain caps.

4.6 The efflux velocity of the exhaust gas stream emitted from a chimney should not be less than 15 m/s at full load condition.

4.7 For a combustion process, the temperature of the exhaust gas stream emitted from the chimney should not be less than the acid dew point.

- *Clinker and Cement Production*

4.8 Exhaust gases from the main processing equipment (kilns, clinker coolers, mills, driers, etc.) should be vented to a suitable gas cleaning equipment to meet the emission limits set out in section 2.0 of this note.

4.9 Dust emissions from ancillary processing equipment (crushing, screening, blending, packing, loading, etc.) should be properly contained and vented to suitable arrestment plant to meet the emission limit set out in section 2.0 of this note.

- *Materials Handling*

4.10 Handling and storage of fuel, raw materials, products, wastes or by-products should be carried out in such a manner to prevent the release of:

(a) visible dust emissions;

(b) emissions of organic vapours; and/or

(c) other noxious or offensive emissions.

4.11 The receipt, handling, storage of all materials should be carried out in such a way to minimise the emission of dust to the air.

4.12 Stock of clinker, bulk cement, other cementitious materials, dry pulverised fuel ash, pulverised coal and other pulverised materials should be stored in silos. Stock of other dusty materials should be stored in silos or covered storage. Dust laden air from silos and covered storage should be vented to suitable equipment to meet the emission limit set out in section 2.0 of this note.

4.13 Conveyance of cement, other cementitious materials, dry pulverised fuel ash, pulverised coal and other pulverised materials should be by ducts or pneumatic pipelines. Dust laden air from the conveying system should be vented to suitable arrestment plant to meet the emission limit set out in section 2.0 of this note.

4.14 Conveyance of clinker and other dusty materials inside buildings should be carried out so as to prevent or minimise airborne dust emissions. Where conveyors are used, they should be provided with protection against wind-whipping, for example by fitting side broads. Conveyor discharges should be arranged to minimise free fall at all times.

4.15 Conveyance of clinker and other dusty materials outside buildings should be by fully covered or totally enclosed systems. Transfer points should be totally enclosed.

4.16 Other materials which may generate airborne dust emissions, for example crush rock, coarse aggregate, or coal should be delivered, stored and handled so as to prevent or minimise dust emissions.

4.17 The packing of cement into bags and loading of cement into bulk tankers and barges should be carried out using purpose-designed plant fitted with extraction for displaced air ducted to suitable arrestment plant, for example bag filters, to meet the emission limits set out in section 2.0 of this note.

- *Miscellaneous*

4.18 Traffic areas, including roads and areas with regular vehicle movements, should be paved with a suitable roadway covering and be kept clean constantly by means of sweeping machines or other facilities.

4.19 All spillages should be cleaned up promptly using, for example, a vacuum cleaner or vacuum system. Particular attention should be paid to preventing and cleaning up deposits of dust on support structures and roofs in order to minimise wind entrainment of deposited dust.

4.20 Silos should be fitted with high level alarm to prevent overfilling. Seating of pressure relief valves to all silos should be checked periodically.

5.0 MONITORING REQUIREMENTS

5.1 The applicant should satisfy the Authority that–

(a) he will provide the necessary instrumentation, process controls and monitors to demonstrate that the process is being properly controlled;

(b) the scope, manner and monitoring frequency will be sufficient to demonstrate compliance with the terms and conditions imposed to the licence at all times; and

(c) he will have sufficient staff to service these requirements.

Results of all monitoring and inspections should be recorded in such a manner specified by the Authority. This record should be retained at the premises for a minimum of two years, or other period specified by the Authority, after the date of last entry and be made available for examination as and when required by the Authority.

5.2 Indication of the satisfactory of air pollution control equipment should be provided. For example, the pressure drop across filters should be displayed.

5.3 Continuous monitoring of the exhaust gas emissions from the kiln system for clinker production should be made for:

(a) particulates;

(b) sulphur dioxide; and

(c) oxides of nitrogen.

The continuous monitoring instruments to be provided should meet the specifications required by the Authority. They should be maintained and calibrated according to the manufacturer's recommendations. Unless otherwise agreed by the Authority, zero and span checks should be carried out every 24 hours.

5.4 Ambient monitoring should be made for total suspended particulates, and respirable suspended particulates if required by the Authority, in such a manner and at such locations

and frequency specified by the Authority.

6.0 COMMISSIONING

6.1 Commissioning trials, to be witnessed by the Authority whenever appropriate, should be conducted to demonstrate the performance and capability of the air pollution control measures. Unless otherwise agreed by the Authority, the report of the commissioning trial should be submitted to the Authority within 1 month after completion of the trial.

7.0 OPERATION AND MAINTENANCE

7.1 Best practicable means requirements include not only the provision of the appliances, but the proper operation and maintenance of equipment, its supervision when in use, and the training and supervision of properly qualified staff.

7.2 Equipment should be repaired as soon as practicable. Specific operation and maintenance requirements should be specified for individual pieces of equipment used in the specified processes.

7.3 Malfunction, breakdown or failure of any process or air pollution control equipment that may result in abnormal emission of air pollutants should be reported to the Authority by telephone or facsimile as soon as possible, followed by a written report within 3 working days after the incident.