

**ENVIRONMENT AND HERITAGE SERVICE**

**GUIDANCE FOR PROCESSES PRESCRIBED FOR  
AIR POLLUTION CONTROL  
BY THE CHIEF INDUSTRIAL POLLUTION INSPECTOR**

**CHIEF INSPECTOR'S GUIDANCE  
TO INSPECTORS  
(PART B PROCESSES)**

**MINERAL PROCESSES**

**B PROCESS GUIDANCE NOTE - GNB 3/3 VERSION 4**

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## 1. INTRODUCTION

This Note is issued by the Chief Industrial Pollution Inspector as one of a series providing guidance for processes prescribed for Air Pollution Control (APC) by the Chief Inspector in Regulations made under the Industrial Pollution Control (Northern Ireland) Order 1997.

A further series of Notes is produced by the Department of the Environment (NI) for those processes prescribed for air pollution control and subject to regulation by the District Councils.

This Note provides a guide on standards and techniques to Inspectors in their assessment of an application for, or variation of, an APC authorisation under the Order.

This Note will also be of interest to operators of such processes, however it should be understood that whether an authorisation is granted, and on what conditions, will depend on the particular circumstances of each application. Parameters such as individual process characteristics and site location may influence the nature of the conditions that are included in an authorisation.

A key objective of the legislation is to ensure that, in carrying on a prescribed process, the best available techniques not entailing excessive cost (BATNEEC) will be used -

- (i) for preventing the release of prescribed substances into the air or, where that is not practicable by such means, for reducing the release of such substances to a minimum and for rendering harmless any such substances which are so released; and
- (ii) for rendering harmless any other substances which might cause harm if released into the air.

This Note comprises guidance in relation to new and existing processes and is based on an assessment of best available techniques as qualified by the requirement not to entail excessive cost. (The definition and meaning of BATNEEC is contained in the Industrial Pollution Control Part A and B processes “A Practical Guide”.)

The guidance contained in this Note is based on the current state of knowledge and understanding of these processes, their potential impact on the environment, and the available control techniques at the time of publication. The guidance will be updated regularly, (as a minimum the Note will be reviewed at not more than four yearly intervals from the date of publication), to reflect changes in knowledge and understanding. It will not always be possible to revise the Notes quickly enough to keep in absolute step with rapid changes. It is therefore recommended that operators and their advisors check with the Inspectorate as to whether there have been any changes before relying on this Note for the purpose of making an application or taking other significant action under the Order.

## 2. **PROCESS DEFINITION**

2.1 This Note applies to processes as described in Schedule 1 - Section 3.4, Part B\* of the Industrial Pollution Control Order (Prescribed Processes and Substances)

Regulations (Northern Ireland) 1998 in which:

- (a) the grading, screening, crushing, grinding or other size reduction (other than the cutting of stone) of any designated mineral or mineral product other than sand;
- (b) any designated mineral or mineral product is heated.

Where “designated mineral or mineral product” means -

- (i) clay, sand, lignite and any other naturally occurring mineral other than coal;
- (ii) metallurgical slag;
- (iii) boiler or furnace ash produced from the burning of coal, lignite, coke or other coal product; and

(iv) gypsum which is a by-product of any process.

2.2 In the context of this Note “process” comprises the whole process including the treating, handling and storage of any materials used in the process as well as products and wastes produced by the process.

### 3. **GENERAL REQUIREMENTS**

3.1 New processes should be subject to the standards contained in this Note immediately. For substantially changed processes, the part of the process that is affected by the change should normally be subject to the standards contained in this Note prior to operation.

3.2 It should be the aim to bring existing processes up to current standards whenever the opportunity arises. Account should be taken of the plant’s technical characteristics; its rate of utilisation and the length of its remaining life; the nature and amount of polluting emissions from it and the desirability of not entailing excessive costs for the plant concerned.

3.3 “Mobile Plant” authorised under the order, irrespective of the period of use, should meet the full requirements of this note. “Mobile Plant” means “plant which is capable or designed to move or be moved whether on roads or otherwise”.

### 4. **RELEASES INTO AIR**

#### 4.1 **Reference Conditions**

All pollutant concentrations from contained releases should be expressed at reference conditions of temperature 273K (0°C) and pressure 101.3 kPa (1 atmosphere)

without correction for water vapour content.

These units and reference conditions may not be suitable for continuous monitoring methods and may, by agreement with the Inspectorate, be converted for day to day control purposes, into values more suitable for the available instrumentation.

## 4.2 **Emission Targets**

4.2.1 For new processes a particulate emission standard of **50** mg/m<sup>3</sup> will apply to all contained releases. This standard has been set taking account of the reference test method in par. 7.2.4 which is used to verify compliance.

4.2.2 All releases, other than steam or water vapour, should be colourless, free from persistent mist or fume and free from droplets.

4.2.3 The aim should be that all releases are free from offensive odour outside the process site boundary, as perceived by the Inspectorate.

4.2.4 Uncontained emissions, (for example from stockpiles), should be substantially free from visible emissions of dust.

## 5. **RELEASE ROUTES**

Principal release routes to air are shown in Table 1.

## 6. **TECHNIQUES FOR RELEASE MINIMISATION**

### 6.1 **Introduction**

The techniques selected need to include releases from raw materials

reception/storage, internal transportation, and from processing.

The process should be designed and operated in such a way that the substances released have the minimum impact on the environment. As a general principle the Inspectorate should be looking for evidence of the prevention, minimisation and rendering harmless of all releases of prescribed substances, and the rendering harmless of all other releases in the application, and requiring this in the authorisation.

Releases from the process may require a combination of several abatement techniques and the careful control of the process route taken in order to deal with the releases. The applicant should review all the options that are available and demonstrate that the combination of primary process and selected abatement equipment represents BATNEEC.

## 6.2 **Techniques**

- 6.2.1 Wet suppression methods should be used to control fugitive dust emissions from primary crushing and screening operations. Wet suppression methods should also be used to control fugitive dust emissions from transfer points.
- 6.2.2 Wet suppression equipment must have an adequate supply of water. The system must operate automatically, incorporate the use of a wetting agent and have adequate frost protection.
- 6.2.3 The preferred option for dust control from the secondary crushing/screening stage and all subsequent stages is by extraction and collection. Wet suppression techniques may also be used to complement the extraction and collection plant in these areas. Where wet suppression methods are used to control fugitive dust emissions, good design, maintenance and operation are essential. If the standard of dust control thus achieved is not to the satisfaction of the Inspectorate, or where there is a justifiable

complaint situation, extraction and collection should be used to meet the requirements of par. 4.2.1.

- 6.2.4 The best available techniques for removing suspended particulate matter from contained emission is by fabric filters or high efficiency wet collectors.
- 6.2.5 Where extraction and collection is used, the preferred method of disposing or discharging the accumulated fine dry material is by a wet system. Where a dry system is used, (for example lime dust), the material should be transferred into closed vessels, (for example a silo or bin), fitted with an effective dust collection system, (for example a silo vent filter), with consideration being given to its final mode of transfer or disposal.
- 6.2.6 **Enclosure**
- 6.2.6.1 All conveyor belts carrying material should be enclosed on two sides and above. Transfer points between such conveyors should be effectively enclosed. Where dried material is handled, transfer points should be ducted to an arrestment plant.
- 6.2.6.2 Conveyors should be fitted with an effective means of cleaning which does not cause a secondary dust problem.
- 6.2.6.3 Enclosure/encapsulation of screens should be reasonably dust tight. Screen houses should have self-closing doors with close-fitting entries/exits of appropriate size. Where containment of dust within the screen house building is not successful then extraction and collection should be provided to meet the requirements of Par. 4.2.1.
- 6.2.6.4 Crushing plant should be adequately enclosed and fitted with efficient means for the control of dust emission. Crushers should be designed to minimise the flow of air through the crusher and also to minimise the free fall of stone, particularly on discharge.

## 6.2.7 Storage of Material

6.2.7.1 It is acceptable to stock pile the following materials in the open -

- (a) material that has been screened to remove fine material, (typically less than 6mm);
- (b) crusher run material, blended material or grizzly that has been conditioned prior to stockpiling; and
- (c) long term storage of fine material, but not working stock of fine material, provided that it has been conditioned prior to stockpiling in a sheltered area, well away from the site boundary and as far away as possible from residential or commercial property.

6.2.7.2 The potential for airborne emissions from stock piles should be minimised by using the following techniques -

- (a) drops from stock pile conveyor head drums should be kept to a minimum;
- (b) all stock pile conveyor head drums should be provided with effective wind break protection;
- (c) falling material should be conditioned with effective water spray suppression;
- (d) chutes or socks made from rubber strip curtains should be provided immediately after stock pile conveyor head drums of dusty material, in particular blinding; and
- (e) dusty material should be conditioned with a water spray system during dry and/or windy conditions.

6.2.7.3 Post Screen Storage

6.2.7.3.1 Coarse Screens

For new processes or upgrades to existing plant, product from coarse screens must either pass to bin storage or onto covered conveyors prior to conditioning and stockpiling.

For existing processes, where it is not practicable to achieve the new processes standard, the area beneath the screen should be effectively enclosed on three sides and sealed to the screen with curtain strips hanging over the access.

#### 6.2.7.3.2 Fine Screens

For new processes or upgrades to existing plant, product from fine screens should be stored in bins or silos. Under suitable site-specific circumstances, it may be acceptable for fine material, (typically less than 6mm), to be stock piled in a three-sided enclosure with roof. The enclosure should have sufficient capacity to hold the working stock of fine material.

For existing processes, where storage of the fine material in bins or silos is not practicable, the area beneath the screen should be effectively enclosed on three sides and sealed to the screen with curtain strips over the access as a minimum. If this arrangement gives rise to justifiable complaints, upgrading to the new process standard should be required.

For mobile plant, the preferred method for the storage of fine material is in mobile bins or silos. Under suitable site-specific circumstances, it may be acceptable for fine material to be stock piled in a three-sided enclosure with roof provided that:

- (i) it is well conditioned with water;
- (ii) there is effective wind protection for the head drum of the stockpile conveyor, (i.e. cover and chute),
- (iii) the material is always below and within the sides of the three-sided enclosure.

#### 6.2.8 **Loading, Tipping and Transport**

6.2.8.1 Dusty material, (i.e. typically all material that has not been screened to remove the less than 6mm fraction), being transported internally should be conditioned.

6.2.8.2 Loads of dusty material leaving the site to the public road should be covered.

- 6.2.8.3 Dust control by wet suppression or extraction and collection should be employed at vehicle loading points. An automatic system is preferable.
- 6.2.8.4 Measures taken must address shelter from wind and disturbance during loading/tipping. This may be achieved by provision of covered storage for working stock or by other means agreed with the Inspectorate.
- 6.2.8.5 Dusty material should be tipped at the bottom of stockpiles and pushed up into place. Material should not be tipped over the quarry face at any time and should not be tipped on stockpiles during windy conditions. Stockpiles should be conditioned to ensure that wind whipping of dust is minimised during dry and windy weather conditions.
- 6.2.8.6 Stockpiling fine material should only be used for long term storage. Fine material should primarily be loaded onto lorries directly from the bins, storage bay or store rather than from the long term storage stockpile.
- 6.2.9 **Dispersion from Chimneys and Vents**
- 6.2.9.1 The applicant will need to satisfy the Inspectorate that an appropriate assessment of vent and chimney heights has been made to provide adequate dispersion of prescribed substances, and other substances that might cause harm, which cannot be prevented and may be released. Some guidance is given in Technical Guidance Note D1 (ISBN 0-11-752794-7).
- 6.2.9.2 The Operator should have procedures in place to reduce load or shut-down plant in the event of inadequate dispersion conditions.
- 6.2.9.3 Chimneys or process vents should be designed to provide efflux velocities that meet the requirements for stack aerodynamic downwash as described in Technical Guidance Note D1. Care should be taken to avoid generating positive pressure zones within the chimney unless the chimney wall is impervious or lined. Where a wet

method of arrestment is used, the linear velocity within the arrestment equipment should not exceed 9 m/sec, to avoid entrainment of droplets.

6.2.9.4 Chimney flues, process vents and all ductwork should be leakproof. Chimney flues and ductwork leading to the chimney should be adequately insulated to minimise the cooling of waste gases and prevent liquid condensation on internal surfaces. Chimney flues and ductwork should be regularly cleaned to prevent accumulation of material.

6.2.9.5 Chimney or process vents should not be fitted with any restriction at the final opening, (for example, a plate, cap or cowl), where it is necessary to achieve a dispersion of the residual pollutants except for a cone to meet the efflux velocity requirements of par. 6.2.9.3. The discharge should be vertically upwards.

#### 6.2.10 **General Operations**

6.2.10.1 Roadways normally used by road going vehicles including loading bays should be hard surfaced and kept clean or wet to avoid dissemination of dust but should be adequately drained to avoid ponding of water. Vehicles exhausts should not, wherever practicable, be directed below the horizontal. Wheel and chassis cleaning facilities should, where necessary, be installed for vehicles leaving the works. Quarry dump trucks where possible should be modified to minimise dust arisings from radiator cooling fans.

6.2.10.2 All buildings which have accumulations of dust on external surfaces likely to become dusty should be cleaned by a wet cleaning system. Internal cleaning should be undertaken regularly where accumulated dust is likely to drop down externally or be subject to wind whipping, and the preferred system is by in-built cleaning with sufficient plug-in points.

6.2.10.3 Effective control of emissions requires the maintenance and proper use of equipment as well as proper supervision of process operations. Effective preventive

maintenance should be employed on all plant and the equipment concerned with the control of emissions to the air. Essential spares and consumables should be held or be available at short notice.

- 6.2.10.4 Staff at all levels should receive the necessary training and instruction in their duties relating to control of the process and emissions to air. Particular emphasis should be given to training for start-up, shut down and abnormal conditions.
- 6.2.10.5 A high standard of housekeeping should be maintained.
- 6.2.10.6 Vehicles destined for the public road should not be overloaded, but should be loaded well within the sides/tailgate of the lorry to prevent spillage of material onto the public road. Vehicles without tailgate should not be loaded if they are destined for the public road.
- 6.2.10.7 All spillages that may give rise to dust emissions should be cleaned up promptly, normally by wet handling. Dry handling of dusty spillages should not be permitted other than in fully enclosed buildings.
- 6.2.10.8 The preferred method for dealing with excess quantities of grizzly, blinding and dust is to wet process them to recover any useful by-products, such as smaller aggregate fractions, grit, sand and silt, provided that the silt and waste water do not cause other environmental problems.

## 7. COMPLIANCE MONITORING PROGRAMME

### 7.1 General

Conditions in the authorisation should require the results of all monitoring to be recorded. It should further distinguish between:

- compliance records;
- measurement or records for which regular formal returns to the Inspectorate are not normally required; and
- operational records made by the operator during the normal course of operating the process.

### 7.2 Monitoring Requirements

7.2.1 Monitoring of the final release of pollutants from all contained releases should be made for particulate emissions.

7.2.2 For new plants, upgrades to existing plant or where there is a justifiable complaint situation, the emissions from any arrestment plant handling dry material with a nominal capacity in excess of 100 m<sup>3</sup>/min, (other than that serving storage silos), should be continuously indicatively monitored and continuously recorded for particulate emissions, bearing in mind the limitations and accuracy of continuous monitors. Audible and visible alarms which activate at a reference level agreed with the Inspectorate should be fitted. Emission events which result in the alarms being activated should be recorded. Arrestment plant handling below 100 m<sup>3</sup>/min should be designed and maintained to minimise visible particulate emissions.

When continuous monitoring is not appropriate, non-continuous monitoring should be undertaken. The averaging period for all continuous monitors should be calculated by taking into account only the hours which the process is operating. Where fabric filters are to be used an indication of pressure drop across the filter

may be useful. Continuous emission charts and records should be retained by the operator for a minimum of 4 years and available for examination by the Inspectorate.

- 7.2.3 The sampling positions for all monitoring instruments should be agreed with the Inspectorate. Care is needed in the design and location of sampling systems to obtain representative samples.
- 7.2.4 The reference test method for particulate emissions is BS 3405: 1983. An alternative test method is acceptable by agreement with the Inspectorate, provided that it can be shown that results comparable with this method are obtained. The onus is on the operator, that the appropriate equipment, laboratory facilities, expertise and quality control procedures are provided to ensure accurate results.
- 7.2.5 The frequency of periodic testing should be at least once per year and it should be carried out at “worst case” representative conditions, (i.e. a high load condition). If a justifiable compliant situation arises, the frequency may need to be increased. The Inspectorate should be advised at least 7 days in advance of any periodic monitoring exercise to determine compliance with the emission standard as well as the provisional time and date of monitoring, pollutants to be tested and the methods to be used. The Inspectorate reserves the right to observe or audit any periodic compliance testing.
- 7.2.6 The results of all non-compliance monitoring and inspections should be recorded in a log book, retained by the operator for a minimum of 4 years and made available for examination by the Inspectorate.
- 7.2.7 Visual assessments of emissions should be made frequently, and at least once a day. Remedial action should be taken immediately in the case of abnormal emissions. Visual assessments and action taken should be recorded in the log book. Where in the opinion of the Inspectorate there is repeated evidence of airborne dust being deposited off-site, the operator should undertake monitoring to identify the source.

The monitoring should be by a British Standard test method where appropriate or by a method agreed with the Inspectorate.

### 7.3 **Environmental Monitoring**

Depending on the local circumstances the Inspectorate may require the owner of a works to monitor the effects of their operation on the surrounding neighbourhood by means of atmospheric sampling or other measurements. Such monitoring would be of a scope and frequency sufficient only to establish the level of any local environmental impact.

**TABLE 1**

**TABLE OF PRINCIPAL RELEASE ROUTES  
FOR PARTICULATE EMISSIONS**

<u><b>SOURCE</b></u>	<u><b>CAUSE</b></u>
Crushing Plant	Product size reduction.
Screening Plant	Grading product.
Material Handling	Wind whipping from conveyors ; conveyor discharge to stockpile; bin discharge to lorries; and handling with mechanical plant.
Material Storage	Wind whipping of stockpiles; and silo vents.
Surface Dust	Works vehicle disturbance; and wind whipping.

### **Additional Information**

This Note applies to mineral processes as described in Schedule 1 - Section 3.4, Part B of the Industrial Pollution Control Order (Prescribed Processes and Substances) Regulations (Northern Ireland) 1998 but does not apply if the operation of the process is unlikely to result in the release into the air of particulate matter.<sup>1</sup>

This note also applies to “*The crushing, grinding or other size reduction with machinery designed for that purpose of bricks, tiles and concrete*” when an operator is also authorised to carry on “*The grading, screening, crushing, grinding or other size reduction (other than the cutting of stone) of any designated mineral or mineral product*” in accordance with Schedule 2 paragraph 7 of the Industrial Pollution Control Order (Prescribed Processes and Substances) Regulations (Northern Ireland) 1998<sup>1</sup>.

This Note refers to general quarry operations associated with the processing of stone, but excludes:-<sup>2</sup>

- (a) *The drilling/blasting/extraction of minerals, the removal of overburden and the cutting and dressing of stone* - these are not prescribed processes.
- (b) *Sand and gravel* – the extraction of sand and gravel is not a prescribed process. Crushing, grinding, screening and grading of wet material is not normally likely to result into air of particulate matter except in a quantity that is trivial.

#### References

1. The Industrial Pollution Control Order (Prescribed Processes and Substances) Regulations (Northern Ireland) 1998, Schedule 1, Section 3.4, Part B. [ISBN 0-337-92893-2](#)
2. Department of the Environment/The Scottish Office/Welsh Office, Secretary of State’s Guidance – Quarry Processes, PG3/8 (96). [ISBN 0-11-753279-7](#)