Process Guidance Note 3/14 (04)

Secretary of State's Guidance for Lime Processes

Defra would like to acknowledge the work of the Environment Agency's Local Authority Unit in the drafting of this guidance note.

Environment Agency

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1 Introduction

1.1 This note is issued by the Secretary of State, the Welsh Assembly Government (WAG) and the Scottish Ministers ("the Government") to give guidance on the conditions appropriate for the control of emissions into the air from lime processes/ installations[1] . It supersedes guidance note PG3/14(95) published in August 1995.

1.2 This is one of a series of notes giving guidance on Best Available Techniques (BAT) and Best Available Techniques Not Entailing Excessive Cost (BATNEEC)[2]. The notes are all aimed at providing a strong framework for consistent and transparent regulation of installations.

1.3 This note is for use under both Local Air Pollution Control (LAPC) established by Part I of the Environmental Protection Act 1990, and Local Air Pollution Prevention and Control (LAPPC) established by the Pollution Prevention and Control Act 1999[3]. It constitutes statutory guidance to regulators under regulation 37 of The Pollution Prevention and Control (England and Wales) Regulations 2000, SI 1973[4]. To the extent it provides guidance on techniques, it also constitutes statutory guidance to regulators under section 7(11) of the 1990 Act, and in any event regulators are expected to have regard to it. The note will be treated as one of the material considerations when determining any appeals made against a decision under either the 1990 or 1999 Acts.

1.4 The note also (where appropriate) gives details of any mandatory requirements affecting air emissions which are in force at the time of publication, such as those contained in Directions from the Government.

Site specific BAT/ BATNEEC

1.5 All processes are subject to BAT/ BATNEEC. In general terms, what is BAT/ BATNEEC for one process in a sector is likely to be BAT/ BATNEEC for a comparable process; but in each case it is, in practice, for regulators (subject to appeal) to decide what is BAT/ BATNEEC for the individual process and the regulator should take into account variable factors (such as configuration, size and other individual characteristics of the process) and the locality (such as proximity of particularly sensitive receptors[5]). Ultimately, therefore, what constitutes BAT/ BATNEEC is site specific but this guidance note comprises guidance for the generality of processes in the sector and careful regard should be had to it, in order to maximise consistency of permits as appropriate.

Who is affected

1.6 This guidance is for:

- regulators: who must have regard to the guidance when determining applications and reviewing extant authorisations and permits
- operators: who are best advised also to have regard to it when making applications, and in the subsequent operation of their process
- members of the public: who may be interested to know what the Government considers (in accordance with the legislation) amounts to appropriate conditions for controlling air emissions for the generality of processes in this particular industry sector

1. The term “process(es)” is used in the remainder of the note to mean both “processes” under the Environmental Protection Act 1990 and “installations” under the Pollution Prevention and Control Act 1999.
2. BATNEEC is the formulation used in the Environmental Protection Act 1990 and BAT is used in the Pollution Prevention and Control Act 1999. For the purpose of this guidance note, the two concepts are regarded as having essentially the same effect.
3. In accordance with the Pollution Prevention & Control (England and Wales) (Amendment) Regulations 2002, SI 2002/275, lime processes transfer from regulation under the 1990 Act to the 1999 Act from 1 April 2003. The relevant date in Scotland under Part 2 of schedule 3 to SSI 2000/323 is 31 December 2002.
4. In Scotland, section 24 of the Pollution Prevention and Control (Scotland) Regulations 2000.
5. Guidance on the relationship between BAT/BATNEEC and air quality objectives is contained in the General Guidance Manual on policy and procedures for A2 and B installations.

1.7 The guidance is based on the state of knowledge and understanding at the time of writing of:

- lime processes
- their potential impact on the environment and
- what constitutes BAT/ BATNEEC for preventing and reducing air emissions

1.8 The note may be amended from time to time in order to keep abreast with developments in BAT including improvements in techniques and new understanding of environmental impacts and risks. Such changes may be issued in a complete revision of this document, or in separate additional guidance notes which address specific issues. (It may not always be possible to issue amending guidance quickly enough to keep in absolute step with rapid changes, which is another circumstance where paragraph **1.5** above might apply.)

1.9 Steps will be taken to ensure that those who need to know about changes are informed. Operators (and their advisers) are, however, strongly advised to check with the regulator whether there have been any changes before relying on this note for the purposes of making an application under the 1990 or 1999 Acts or making any other decisions where BAT/ BATNEEC may be a consideration.

Consultation

1.10 This note has been produced in consultation with relevant trade bodies, representatives of regulators including members of the Industrial Pollution Liaison Committee, and other interested organisations.

Publication

1.11 This and the other published guidance in this series is available, free of charge, via Defra at **www.defra.gov.uk**. There are links to this site from the following web sites:

- Scottish Executive at **www.scotland.gov.uk**.
- Environment Agency at **www.environment-agency.gov.uk**.
- Scottish Environment Protection Agency at **www.sepa.org.uk**.

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1.12 General guidance explaining LAPPC and setting out the policy and procedures, is contained in the “General Guidance Manual on Policy and Procedures for A2 and B Installations” available from **www.defra.gov.uk/environment/ppc/index.htm**, referred to in this document as the "General Guidance Manual.” This is designed for operators and members of the public, as well as for local authority regulators. In Scotland there is the SEPA Practical Guide for Part B activities available from **www.sepa.org.uk/ppc/guidance/practicalguidepartbactivities.pdf**

1.13 In addition to the General Guidance Manual referred to above, explanation or clarification of certain terms used in this guidance note may be found in a general guidance note issued under Part I of the Environmental Protection Act 1991: 'Interpretation of terms used in process guidance notes', known as General Guidance Note 4 - GG4 - published by HMSO in 1991. Where there is any conflict between GG4 and the guidance issued in this note or in the General Guidance Manual, the latter two documents should prevail, as should any subsequent guidance issued in relation to LAPPC.

2 Timetable for compliance and reviews

Existing processes or activities

2.1 The previous guidance advised that upgrading to that standard should usually have been completed by 1 April 1996. Requirements still outstanding from any existing upgrading programme should be completed.

Upgrading for this note

2.2 The new provisions of this note and the dates by which compliance with these provisions is expected are listed in the table below, together with the paragraph number where the provision is to be found. Compliance with the new provisions should normally be achieved by the dates shown. Authorisations/permits should be varied as necessary, having regard to the changes and the timetable.

Table 1: Compliance timetable

Provisions	Relevant Paragraph / Row in Table 2	Compliance Date
Slaking process has a new emission limit for particulate matter depending upon the consistency of current performance of arrestment systems.	**Table 2** Row 1	From the date of the publication of this note.
Arrestment equipment with exhaust flow >300 m^3/min (other than that serving slaking plant or silos) has an emission limit for particulate matter of 50 mg/m^3.	**Table 2** Row 4	10 years from the date of the publication of this note.
Arrestment plant handling dry dust which discharges externally, with exhaust flow greater than 100 m^3/min other than that serving silos or slaking plant, has a **design specification** to achieve an emission limit for particulate matter of 50 mg/m^3 .	**5.15**	Where 50 mg/m^3 design criteria can be designed into existing plant, by the use of higher grade replacement filters or different scrubber liquor flow rates or packing media for example, then this should be complied with as soon as practicable, which in most cases should be within 12 months of the publication of this note. New or replacement plant should be designed to this specification prior to installation. Where 50 mg/m^3 design criteria cannot be designed into existing plant then replacement plant is required and this should be commissioned by 2010.
New arrestment plant handling dry dust which discharges externally, with exhaust flow greater than 100 m^3/min other than that serving silos or slaking plant, there is a **design specification** to achieve emission limit for particulate matter of 50 mg/m^3.	**5.15**	Prior to installation.
New silo filtration plant has a **design specification** to operate to an emission standard of less than 10 mg/m^3.	**5.17**	Prior to installation.
New silos to be fitted with automatic protection systems unless silos are protected during deliveries to an equivalent degree by an alternative automatic system.	**6.7**	On installation.
All other provisions.	-	To be complied with as soon as practicable, which in most cases should be within 12 months of the publication of this note.

2.3 Replacement plant should normally be designed to meet the appropriate standards specified for new installations or activities.

Relaxation of conditions

2.4 Where provisions in the preceding guidance note have been deleted or relaxed, authorisations should be varied as necessary as soon as reasonably practicable. **Section 7** provides a summary of all changes.

New processes or activities

2.5 For new processes or activities, the authorisation/permit should have regard to the full standards of this guidance from the first day of operation.

Substantially changed processes or activities

2.6 For substantially changed processes or activities, the authorisation/permit should normally have regard to the full standards of this guidance with respect to the parts of the process that have been substantially changed and any part of the process affected by the change, from the first day of operation.

Permit reviews

Reviewing permits

2.7 Under LAPC the requirement is to review conditions in authorisations at least every four years. (Section 6(6) Environmental Protection Act 1990).

2.8 Under LAPPC the legislation requires permits to be reviewed periodically but does not specify a frequency. It is considered for this sector that a frequency of once every six years ought normally to be sufficient for the purposes of Regulation 15(1) Pollution Prevention and Control Regulations 2000.

More frequent review may be necessary in individual cases for the reasons given in Regulation 15(2). Further guidance on permit reviews is contained in chapter 26 of the General Guidance Manual. Regulators should use any opportunities to determine the variations to authorisations/permits necessitated by paragraph **2.2** above in conjunction with these reviews.

2.9 Under both LAPC and LAPPC, conditions should be reviewed where complaint is attributable to the operation of the process and is, in the opinion of the regulator, justified.

3 Process description

Regulations

3.1 Lime slaking and the manufacture of dry hydrated lime (under a certain size) are prescribed for:

- **LAPC**, under section 3.1 Part B (c) of Schedule 1 to the Environmental Protection (Prescribed Processes and Substances) Regulations 1991, SI 472 (as amended).
- **LAPPC**, under section 3.1 Part B of Schedule 1 of the Pollution Prevention and Control (England and Wales) Regulations 2000 SI 1973.[6]

3.2 This note refers to processes for the slaking of lime and processes for the production of lime where the activity is not likely to involve the heating in any 12 month period of 5,000 tonnes or more of calcium carbonate or calcium magnesium carbonate or, in aggregate, of both.

3.3 It does not cover the addition of water to hydrated lime or the use of quicklime in a process which does not involve its mixing with water, neither does it cover the mixing of quicklime with materials other than water, such as sand or clay, even where the quicklime reacts with any water which may be present in those materials. The slaking of lime is a process for national inspectorate control under Part A1 of Section 3.1 when carried out by the same person and at the same location as a Part A1 manufacture of lime activity.

Slaking process

3.4 Lime in its natural form calcium carbonate, known as chalk or limestone, is fired to form calcium oxide, known as quicklime, (this is a Part A 1 activity). Quicklime is then slaked by the addition of water. The slaking process produces calcium hydroxide, also known as hydrated lime. Feedstock lime from different sources will have different compositions (particle size and reactivity) which can affect emissions.

3.5 The principal difficulty in slaking is getting effective contact between the water and all the lime particles. The chemical reaction of slaking is exothermic but it can be necessary to provide a heated water supply and to agitate the mixture to enhance the slaking process.

3.6 Quicklime and water are fed continuously into the slaking chamber. The mixture is thoroughly mixed by counter rotating intermeshing paddles. Hydrated lime is discharged by gravity. A classifier is provided for the separation of any grit from the hydrated lime.

Bulk powered material transfer

3.7 Powdered materials are delivered by road or rail in bulk tankers, or by water in barges or ships. The powder materials are transferred through a closed system of heavy duty hoses to storage silos, using compressed air as a carrier medium. Silos are vented to allow air to escape through filters, so controlling dust emission.

3.8 The delivery of powder from **road tankers** relies on a compressor (blower) mounted on the tanker lorry providing a supply of air which is used in three ways:

- to pressurise the tank vessel with air so that inside the vessel there is significant pressure which helps feed the powder out of the tankers. The tank is pressurised at the start of the blow, and can be repressurised as necessary during the course of discharging.
- a separate feed from the air supply passes to the distributor system which fluidises the powder around the distributor plate.
- a third feed of air receives fluidised powder and flows from the tanker, along the connecting pipework and into the silo. The powder fed from the distributor system is thus transferred to the silo in the air stream.

6. In Scotland, section 6.3 Part B of Schedule 1 of the Pollution Prevention and Control, (Scotland) Regulations 2000 (SSI 2000/323)

3.9 The flow of air/material through the pipe depends on the pressure in the blowing line and hence the pressure in the tankers. The pressure required to successfully convey the powders is determined by the resistance to flow and gravity that is to be overcome which varies depending upon the height to which the powders are to be pumped (i.e. the height of the silo) and the pipe length, diameter and configuration.

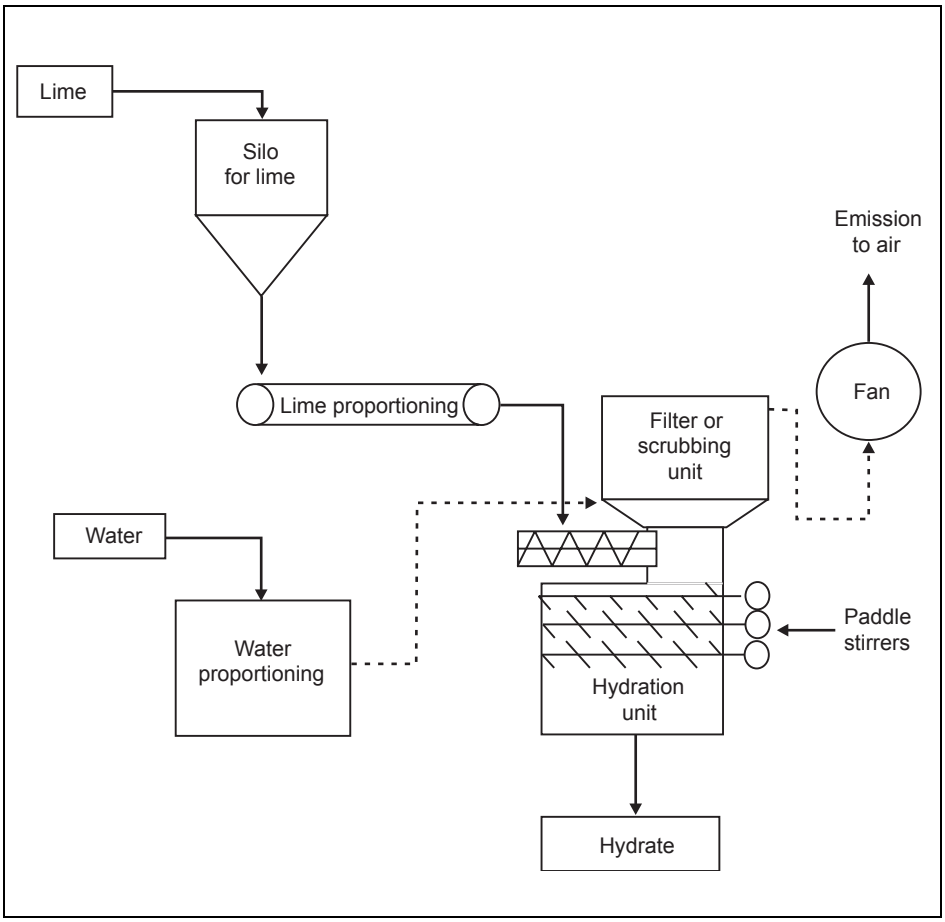
3.10 The tanker discharge is controlled by the tanker driver. The driver controls the flow of air to the tank, the distributor and the silo to maintain a constant flow of material into the silo without exceeding the flow capacity of the filter system or exerting excessive pressure in the silo (which is not a pressure vessel).

3.11 In the event that the silo becomes pressurised the pressure relief valve should lift for safety reasons. If the pressure relief valve is not designed to relieve the pressure quickly enough, the silo may rupture or the filter unit may be ejected from the top of the silo. Such incidents give rise to an unacceptable emission to atmosphere. Such incidents have been caused by excessive pressure being blown from the delivery tanker into the silo at the end of the delivery cycle. Venting the residual air from a tanker should be via a flow restrictor, which limits the rate at which the air is discharged, if it has to be discharged through the silo. Rather than venting through the silo, it is preferable that residual air should be vented to atmosphere using a filtered vent on the tanker.

3.12 All new silos should be installed with automatic protection systems to control the delivery of material from the tanker such that it is not possible to over-fill or over-pressurise the silo. An alternative automatic system fitted to the tanker may be acceptable, provided that it is demonstrated to protect the silo to an equivalent degree.

3.13 If the filter system on the silo is not capable of handling the large flow of air that is generated during the delivery process, this may cause an increase in pressure within the silo. Filter manufacturers supply information on the pressure drop across filters and the filtration rate. It is important that the filter size is calculated to match the flow rates of air through the silo. The filter systems must be cleaned to prevent blockages and accumulation of powder in the filter system.

Figure 3.1: Simplified flow diagram of a lime hydration process



4 Potential releases

Pollutants and sources

4.1 The key emissions from these processes that constitute pollution for the purposes of Part I of the Environmental Protection Act 1990 or the Pollution Prevention and Control Regulations 2000 and therefore warrant control are those consisting of **particulate matter**.

4.2 The following parts of the process may give rise to **particulate matter** in the form of **dust**:

- drying, handling, bagging, loading and unloading processes
- transfer of potentially dusty materials including discharge into hoppers and onto conveyors, and delivery to storage silos and sheds
- roadways including haulage roads, if dry

4.3 The following parts of the process may give rise to other pollutants:

- slaking may give rise to **steam** emissions

5 Emission limits, monitoring and other provisions

5.1 The emission limit values and provisions described in this section are achievable using the best available techniques described in **Section 6**. Monitoring of emissions should be carried out according to the method specified in this section or by an equivalent method agreed by the regulator. (See Ref. **(e)** (M1) and Ref. **(f)** (M2))

5.2 The reference conditions for limits in **Table 2** are:

- 273K, 101.3 kPa, without correction for water vapour content

Table 2: Emission limits, monitoring and other provisions

Row	Total Particulate matter	Emission limits/ provisions	Type of monitoring	Monitoring frequency (subject to paragraphs 5.11 - 5.13)
1	Slaking process*	Where currently achieved: 50 mg/m^3.	Isokinetic testing.	Twice per year.
		Where 50 mg/m^3 currently achieved, but only inconsistently: 100 mg/m^3 PLUS efforts should be made to improve consistency.		
		Where 50 mg/m^3 currently not achieved: 100 mg/m^3.		
2	All authorised emission points.	No abnormal emission.	Operator observations.	At least daily.
3	Silo inlet and outlets.	No visible emission.	Operator/driver observations.	During every delivery.
			Also	
			Record start and finish times.	
4	Arrestment equipment** with exhaust flow >300 m^3/min.	50 mg/m^3.	Indicative monitoring, using equipment which is referenced annually and continuously recorded.	
5	Arrestment equipment** with exhaust flow >100 m^3/min.	No visible emission.	Monitoring to demonstrate that the arrestment equipment is functioning correctly.	Continuous.
6	Arrestment equipment** with exhaust flow <100 m^3/min.	No visible emission.	Operator observations at least daily.	At least daily,
			OR	OR
			Indicative monitoring to show that the equipment is functioning correctly.	Continuous.

* The position will be revisited in 2 years having regard to the Bref guidance and in light of practical experience.

* * Other than that serving slaking plant or silos, and only if it is discharging externally.

Monitoring, investigations and recording

5.3 The need for and scope of testing, and the frequency and time of sampling depend on local circumstances, operational practice and the scale of operation. Because of the potential impact of feedstock quality on achievement of emission limits, where 50mg/m^3 is not being met, it is likely to be useful to compare feedstock usage with the emission results. As part of proper supervision the operator will monitor emissions, make tests and inspections of the process and keep records, in particular:

- The operator should keep records of inspections, tests and monitoring, including all non-continuous monitoring, inspections and visual assessments. The records should be:
  - kept on site
  - kept by the operator for at least two years; and
  - made available for the regulator to examine
- Any historical records kept off-site should be made available for inspection within one working week of any request by the regulator.

Information required by the regulator

5.4 The regulator needs to be informed of monitoring to be carried out and the results; the results should include process conditions at the time of monitoring.

- The operator should provide a list of key arrestment plant and should have a written procedure for dealing with its failure, in order to minimise any adverse effects.
- The operator should notify the regulator at least 7 days before any periodic monitoring exercise to determine compliance with emission limit values. The operator should state the provisional time and date of monitoring, pollutants to be tested and the methods to be used.
- The results of non-continuous emission testing should be forwarded to the regulator within 8 weeks of the completion of the sampling.
- Adverse results from any monitoring activity (both continuous and non-continuous) should be investigated by the operator as soon as the monitoring data has been obtained/received. The operator should:
  - identify the cause and take corrective action
  - record as much detail as possible regarding the cause and extent of the problem, and the action taken by the operator to rectify the situation
  - re-test to demonstrate compliance as soon as possible; and
  - notify the regulator

Visible emissions

5.5 Visible emissions should be limited and monitored as follows. Abnormal emissions require action as described in paragraph **5.6**.

- Emissions from combustion processes should in normal operation be free from visible smoke and in any case should not exceed the equivalent of Ringelmann Shade 1 as described in British Standard BS 2742:1969.
- All reasonably practicable steps should be taken to minimise the duration and visibility of visible emissions during start-up and shut down, and changes of fuel or combustion load.
- All releases to air, other than condensed water vapour, should be free from persistent visible emissions.
- All emissions to air should be free from droplets.
- Visual assessments of emissions should be made frequently, and at least once a day during operations. The time, location and result of these assessments should be recorded.

- Where, in the opinion of the regulator, there is evidence of airborne dust from the process off the site, the operator should make their own inspection and assessment, and where necessary undertake ambient monitoring with the aim of identifying those process operations giving rise to the dust. The monitoring may either be by a British Standard method or by a method agreed with the regulator. In these situations, determination of wind direction may be required. Once the source of the emission is known, corrective action should be taken without delay.

Abnormal events

5.6 The regulator needs to be notified about certain events, whether or not there is related monitoring showing an adverse result, and the operator should respond to problems which may have an adverse effect on emissions to air.

- The operator should provide a list of key arrestment plant and should have a written procedure for dealing with its failure, in order to minimise any adverse effects.
- In the case of abnormal emissions, malfunction or breakdown leading to abnormal emissions the operator should:
  - investigate and undertake remedial action immediately
  - adjust the process or activity to minimise those emissions; and
  - promptly record the events and actions taken
- The regulator should be informed without delay:
  - if there is an emission that is likely to have an effect on the local community; or
  - in the event of the failure of key arrestment plant, for example, bag filtration plant or scrubber units.

Continuous monitoring

5.7 Continuous **indicative** monitoring can be used as a management tool. In conjunction with continuous recording it identifies any trends in emissions; for example, that emissions are gradually increasing, which may indicate a need for maintenance. It can also be used with or without continuous recording to trigger an alarm when there is a sudden increase in emissions; for example if arrestment plant fails. For a given concentration of particulate, the output level varies with the instrument. It should be noted that not all monitors provide a linear response to an increase in particulate matter. The monitor should be set up to provide a baseline output when the plant is known to be operating under the best possible conditions; i.e. such that emissions are fully compliant with the authorisation/permit. The instrument manufacturer should be able to set an output level which corresponds to around 75% of the emission limit, to trigger alarms. Thus the alarms are activated in response to this significant increase in particulate loading above the baseline, so that warning of the changed state is given before an unacceptable emission occurs. The regulator may wish to agree the alarm trigger level.

5.8 All new continuous monitoring equipment should be designed for less than 5% downtime over any 3-month period. Where continuous monitoring is required, it should be carried out as follows:

- All continuous monitoring readings should be on display to appropriately trained operating staff.
- Instruments should be fitted with audible and visual alarms, situated appropriately to warn the operator of arrestment plant failure or malfunction.
- The activation of alarms should be automatically recorded.
- All continuous monitors should be operated, maintained and calibrated (or referenced, in the case of indicative monitors) in accordance with the manufacturers' instructions, which should be made available for inspection by the regulator. The relevant maintenance and calibration (or referencing, in the case of indicative monitors) should be recorded.
- Purchasers of new or replacement monitoring equipment should specify the requirement for less than 5% downtime over any 3-month period, on ordering.

Calibration and compliance monitoring

5.9 Calibration of quantitative instruments and compliance monitoring should meet the following provisions as appropriate:

- No result should exceed the emission concentration limits specified, except where either:
  (a) data is obtained over at least 5 sampling hours in increments of 15 minutes or less; or
  (b) at least 20 results are obtained where sampling time increments of more than 15 minute are involved; AND in the case of (a) or (b)
  (c) no daily mean of all 15-minute mean emission concentrations should exceed the specified emission concentration limits during normal operation (excluding start-up and shut-down); and
  (d) no 15-minute mean emission concentration should exceed twice the specified emission concentration limits during normal operation (excluding start-up and shut-down).
- Non-continuous emissions monitoring of particulate matter should be carried out according to the main procedural requirements of BS ISO 9096: 2003, with averages taken over operating periods, excluding start-up and shutdown.

5.10 Exhaust flow rates should be consistent with efficient capture of emissions, good operating practice and meeting the requirements of the legislation relating to the workplace environment.

- The introduction of dilution air to achieve emission concentration limits should not be permitted.

Varying monitoring frequency

5.11 Where non-continuous quantitative monitoring is required, the frequency may be varied. Where there is consistent compliance with emission limits, regulators may consider reducing the frequency. When determining "consistent compliance", results from three or more monitoring exercises, carried out over a period of at least two years, or results from two or more monitoring exercises in one year supported by continuous monitoring should be used, and factors to consider include:

- any significant process changes in that time which might affect the monitored emission;
- the variability of monitoring results. For example, results which range from 15 - 45 mg/m^3, against an emission limit of 50 mg/m^3, might not qualify for a reduction in monitoring as they vary widely and are not consistent with each other.
- the margin between the results and the emission limit. For example, results which range from 45 - 50 mg/m^3 when the limit is 50 mg/m^3 might not qualify for a reduction in monitoring as they are very close to the limit.

5.12 The frequency of testing should be increased, for example, as part of the commissioning of new or substantially changed processes, or where emission levels are near to or approach the emission concentration limits.

5.13 It is not appropriate to reduce monitoring where it is required to demonstrate correct functioning of arrestment plant.

Sampling provisions

5.14 Care is needed in the design and location of sampling systems in order to obtain representative samples for all release points.

- Sampling points on new plant should be designed to comply with the British or equivalent standards. e.g. BS ISO 9096: 2003, BS EN 13284-1or BS ISO 12141:2002 for sampling particulate matter in stacks.
- The operator should ensure that adequate facilities for sampling are provided on stacks or ducts.
- Where monitoring is not in accordance with the main procedural requirements of the relevant standard, deviations should be reported as well as an estimation of any error invoked.

Emissions from arrestment plant

5.15 There are specific design requirements that apply to arrestment plant. Where 50 mg/m^3 design criteria can be designed into existing plant, by the use of higher grade replacement filters or different scrubber liquor flow rates or packing media for example, then this should be complied with as soon as practicable, which in most cases should be within 12 months of the publication of this note. New or replacement plant should be designed to this specification prior to installation. Where 50 mg/m^3 design criteria cannot be designed into existing plant then replacement plant is required and this should be commissioned by 2010. There are also monitoring and recording requirements for emissions from arrestment plant handling dry dust which discharges **externally**, other than that serving slaking plant or silos (these are addressed in **Table 2** of this note). Purchasers of new or replacement plant should specify the design criteria on ordering, and ensure that the plant is capable of meeting the limit. The design criteria should be made available to the regulator for inspection. The plant should be operated and maintained in such a way that it works within the design parameters at all times.

- Arrestment plant with an exhaust flow of over 300 m^3 / min should be continuously indicatively monitored and recorded for particulate matter. It should be designed to achieve the limit of 50 mg/m^3 for particulate matter when functioning correctly.
- Arrestment plant with an exhaust flow of over 100 m^3/min but less than 300m^3/ min, should be continuously indicatively monitored for particulate matter. It should be designed to meet a particulate matter emission limit of 50 mg/m^3 when functioning correctly.
- Where 50 mg/m^3 design criteria can be designed into existing plant, by the use of higher grade replacement filters or different scrubber liquor flow rates or packing media for example, then this should be complied with in accordance with **Table 1**.
- Where 50 mg/m^3 can not be designed into existing plant, then it is expected that the design should achieve 100 mg/m^3.
- Arrestment plant with an exhaust flow of 100 m^3 / min or less should be designed and maintained to prevent visible emission of dust. Checks should be made and recorded on a daily basis to ensure the correct functioning of the plant.
- Where emissions do not exceed 50 mg/m^3 without arrestment plant being needed, and this is demonstrated by a single isokinetic sampling exercise undertaken in accordance with paragraph **5.9**, continuous monitoring should not be required.
- Where arrestment plant is designed to meet a specific emission limit, the specification should be available for inspection by the regulator. The plant thereafter should be maintained to meet this specification.
- All replacement arrestment plant, including that serving silos, should meet the standards required of new plant.
- Where particulate matter emissions are abated using a wet scrubber, the scrubber should be regularly inspected and maintained. Action should be taken to deal with any blockages that occur due to accumulation of solids, for example adding flocculating agents to the liquor to settle the solids out.
- Where wet arrestment plant is used, the liquor circulation should be monitored by suitable instrumentation such as a variable orifice meter, to provide continuous indication of liquor flow.
- Where a bypass of arrestment plant is installed for safety reasons, the bypass should be kept closed during normal operation. The regulator should be advised of the frequency of opening for safety checks. Every opening of the bypass should be automatically recorded and all reasons for, and the duration of, opening of the bypass should be recorded.

Emissions from silos

5.16 During silo filling it is most likely that any emissions would be released during the first and last five minutes of the delivery. The first few minutes is when emissions due to leaks or split hoses would first be noticed. The last few minutes is when excess pressure from the tanker/ blowing system may cause an emission through the pressure relief valve if the delivery is not controlled correctly. During silo filling procedures isokinetic monitoring of emissions from the arrestment plant is not likely to be possible as the delivery period is so short. For this reason there is no numerical emission limit for such plant. It is important however that the plant is designed to cope with the delivery flow rate that is used for the silo.

5.17 Silo systems require appropriate inspections and assessments to minimise potential for emissions during the filling process. The following measures relating to arrestment plant on silos and other silo management techniques are only applicable where the silo vents to the external environment or where silo emissions may escape from inside a building into the external environment.

- All new or replacement silo filtration plant should be designed to operate to an emission standard of less than 10 mg/m^3 for particulate matter.
- Operators should have a procedure in place to ensure that visual assessment of emissions from silo inlet connections and the silo arrestment plant are undertaken throughout the duration of all bulk deliveries. The start and finish times of all deliveries should be recorded.

Inspection of filtration plant

- Silo arrestment plant and arrestment plant serving other process operations should be inspected at the frequency specified below:

Table 3: Filtration plant inspection frequency

Filter cleaning method	Frequency of visual inspection
Fitted with reverse jets	at least once a month
Fitted with mechanical shakers	at least once a week
Requiring manual shaking	it is not expected that these are being used but if they are then daily inspection or prior to any delivery being made if deliveries are not daily

- The outlet should be checked for signs that emissions have occurred. The equipment should also be checked for defects in the air flow or the cam shakers. If emissions or defects are detected then corrective action should be taken promptly and before another delivery takes place. Any failure of the silo management system (e.g. high level alarms, filter, pressure relief valve) should lead to full investigation of the operation of the plant and equipment.
- Reduced inspection frequency of bag filter (or cartridge) arrestment plant may be appropriate, as follows:
  (a) where pressure drop sensors or other continuous monitors are used to monitor the arrestment plant; such monitors should be inspected according to manufacturers' recommendations to ensure their proper operation.
  (b) where continuous camera operation enables observation of all emission points from the arrestment plant and pressure relief valves.
  (c) for filters fitted with reverse jets or with mechanical shakers where operating experience has demonstrated satisfactory operation of the arrestment plant.
  (d) where the process operation is infrequent.

6 Control techniques

Summary of best available techniques

6.1 The following table provides a summary of the best available techniques that can be used to control the process in order to meet the emission limits and provisions in **Section 5**. Provided that it is demonstrated to the satisfaction of the regulator that an equivalent level of control will be achieved, then other techniques may be used.

Table 4: Summary of control techniques

Sources of particulate matter	Control technique
Loading and unloading processes **Conveyor transfer points**	**Within buildings** **Suppression** **Reduced drop heights** • use of variable height conveyors • use of chutes **Dust arrestment** (loading area) • bag filters • cartridge filters
Double handling transfer points	**Site and process design**
Delivery from road tanker to silo • it is common for overcharging of silos to cause the pressure relief valve to lift, thereby causing an unacceptable emission.	**Process control**
Silos	**Dust arrestment** • bag filters • cartridge filters
Raw material storage	Storage silos Bags Within buildings Stockpiles
Conveyors, conveyor transfer points	**Containment** • wind boards **Appropriate siting** • away from site boundary especially if near residential or other sensitive receptors
Drying, grinding and milling processes	**Within process buildings** **Dust arrestment** • bag filters / cartridge filters **Wet arrestment** • venturi scrubbers
Blending, packing processes etc.	**Containment** **Reduced drop heights** **Dust arrestment** • bag filters / cartridge filters
Roadways including haulage roads	**Suppression** • site and process design

Table 4: Summary of control techniques

Sources of particulate matter	Control technique
External operations Conveyors Roadways	**Appropriate siting** • away from site boundary especially if near residential or other sensitive receptors **Wind dynamics management** • use of fencing, bunding, profiling etc
Vehicles - bodies and wheels	**Wheel-wash** and under-body vehicle wash
Lorries, trains	**Covering** • dust covers

Techniques to control emissions from contained sources

6.2 The processes should be designed and operated in such a way that any substances released to air have the minimum impact on the environment. As a general principle, there should be evidence that the releases of prescribed substances will be prevented. If emissions of prescribed substances cannot be prevented then they should be minimised and rendered harmless. An operator should review the available techniques, and be able to demonstrate that the selection of process controls and arrestment equipment represents BAT/BATNEEC.

6.3 Best available techniques are required to control dust emissions, for example from reception and storage of potentially dusty materials, internal transportation (whether in vehicles, front loaders or on conveyors), processing, loading and unloading. Potential fugitive emissions, which are those from sources such as buildings, roads and other surfaces also need to be controlled. The main principles for preventing dust emissions are **containment** of dusty processes, **collection** of dust in arrestment plant and **suppression** of dust using water. Arrestment and suppression techniques need to be properly designed, used and maintained, in order to be effective. **Protection** of external sources, such as stockpiles, from wind whipping is necessary. There are various methods that may be used to this end.

6.4 **The control techniques described below address the sources of particulate matter listed in Table 4 .**

Silos

6.5 The silo management system includes the high level alarms, arrestment plant and pressure relief device. If best practice is being applied then any failure of the silo management system leads to full investigation of the operation of the plant and equipment. Continuous high level monitoring systems are currently available for use in storage silos. They may be used telemetrically to monitor stock within the silo. They may also be used to automatically stop delivery of material to the silo. It is expected that such systems will become more widely used in the future.

6.6 Careful delivery by trained personnel will avoid materials being blown into silos at a rate which is likely to result in pressurisation of the silo, especially towards the end of the delivery when the quantity of material entering the ducting is reduced. If deliveries are accepted from tankers without on board relief valve and filtration systems, particular care to avoid pressurisation of silos when venting air through the silo at the end of the delivery is needed.

6.7 The following measures relating to arrestment plant on silos and other silo management techniques are only applicable where the silo vents to the external environment or where silo emissions may escape from inside a building into the external environment.

- All dusty or potentially dusty materials should be stored in silos, in confined storage areas within buildings, or in fully enclosed containers / packaging. Where the storage is open within a building, then suitable precautions should be taken to prevent wind whipping.
- When delivery to a silo or bulk storage tank takes place, displaced air should either be vented to suitable arrestment plant (for example cartridge/bag filters) or backvented to the delivery tanker, in order to minimise emissions. Arrestment plant fitted to silos should be of sufficient size (and kept clean) to avoid pressurisation during delivery.
- In order that fugitive emissions are minimised during the charging of silos, transfer lines should be securely connected to the silo delivery inlet point and the tanker discharge point, in that order. Tanker drivers should be informed of the correct procedures to be followed.
- Bulk storage tanks and silos containing dry materials should be equipped with audible and/ or visual high level alarms, or volume indicators, to warn of overfilling. The correct operation of such alarms should be checked in accordance with manufacturers' instructions. If manufacturers instructions do not specify, then the check should be weekly or before a delivery takes place, whichever is the longer interval.
- If emissions of particulate matter are visible from ducting, pipework, the pressure relief device or dust arrestment plant during silo filling, the operation should cease; the cause of the problem should be rectified prior to further deliveries taking place. Tanker drivers should be informed of the correct procedure to be followed.
- Seating of pressure relief devices on silos should be checked at least once a week, or before a delivery takes place, whichever is the longer interval.
- Immediately it appears that the device has become unseated during silo filling, no further delivery should take place until corrective action has been taken. The pressure relief device should be examined to check for defects before being re-set and a replacement fitted if necessary. Tanker drivers should be informed of the correct procedure to follow.
- Deliveries to silos from road vehicles should only be made using tankers with an on-board (truck mounted) relief valve and filtration system. This means that venting air from the tanker at the end of a delivery will not take place through the silo. Use of alternative techniques may be acceptable provided that they achieve an equivalent level of control with regard to potential for emissions to air.
- Care should be taken to avoid delivering materials to silos at a rate which is likely to result in pressurisation of the silo. If compressed air is being used to blow powder into a silo then particular care is required towards the end of the delivery when the quantity of material entering the ducting is reduced and hence the air flow is increased.
- All new silos should be fitted with an automatic system to cut off delivery in the event of pressurisation or overfilling. Use of alternative techniques may be acceptable provided that they achieve an equivalent level of control with regard to potential for emissions to air.
- Wherever practicable, quicklime should be stored in bulk silos which are vented to suitable arrestment plant, for example bag filters. Otherwise, storage should be in a suitably confined storage area to prevent airborne emissions of particulate matter.
- Where quicklime is received in lump or granular form, and is delivered by tipping from a road vehicle, the receiving area should be enclosed in such a way as to minimise the escape of particulate matter to the air.

- Where the storage of raw materials in bags is unavoidable the transfer of lime from bags into slaking equipment should be effected in such a way as to minimise escape of particulate matter. Where necessary to minimise the escape of lime to the air, the opened bag handling area should be provided with local exhaust ventilation, and ducted to suitable arrestment plant.
- Silo filling pipes should be equipped with an isolating valve, which should be closed prior to disconnection of the delivery vehicle discharge pipe.

Conveying

6.8 There are various ways of keeping conveyor belts and the surrounding areas clean. For example, where chevron belts are used, catch plates may be fitted to contain dust falling from the underside of the belt at the turning point. From a health and safety perspective this is not always possible and hoses and sprinklers is a possible alternative, except where cleaning lime as this may cause a dangerous reaction. New conveyors can be designed to minimise free fall at discharge points. A chute, or similar equipment, at the point of discharge from a conveyor reduces dust arising. Arrestment plant might be a suitable control option if dusty emissions arise from conveyor transfer points. The conditions relating to conveyors should not be applied where material has been screened to remove particles under 3 mm in size, unless visible dust emissions have been observed from the conveyors. The following conditions should only be applied where emissions to the external environment are likely to arise:

- Where dusty materials are conveyed, the conveyor (which might be a bucket elevator) and any transfer points should be enclosed to such an extent as to minimise the generation of airborne dust.
- Conveyors should be fitted with effective means for keeping the return belt clean and for collecting materials removed by this cleaning operation.
- Where chevron belts are used, catch plates should be fitted to contain dust falling from the underside of the belt at the turning point.
- Conveyor belts should not be overloaded.
- Where the design of the conveyor allows free fall of material to occur, techniques should be used at the point of discharge to minimise this, for example the use of a chute or similar equipment.

Process operations

6.9 Emissions from the process operations covered by this note comprise very fine particulate matter, in the form of dust. The control of dust emissions from these processes is mainly by the use of enclosures and wet scrubbers. Internal transport of dusty materials should be carried out so as to prevent or minimise airborne dust emissions, as this then reduces the potential for fugitive emissions.

- Transfer systems for moving quicklime from storage into slaking equipment should be totally enclosed, with the exception of inspection grilles which are only provided to enable the satisfactory transport of material to be visually ascertained.
- The packing of dried powdery material into bags should be carried out using purpose designed plant fitted with extraction for displaced air ducted to arrestment plant (for example bag filters).
- Equipment for crushing, grinding or other size reduction processes should be fitted with dust extraction.

Techniques to control fugitive emissions

6.10 Fugitive dust emissions should be prevented whenever practicable. When this is not practicable emissions should be controlled at source by measures agreed between the regulator and the operator. Examples include correct storage of raw materials, organising the process in such a way that spillage is avoided, and maintaining high standards of internal and external housekeeping. To make buildings as dust tight as necessary to prevent visible emissions, self-closing doors and close-fitting entries and exits for conveyors are among the options that may be used. Attention should be paid to preventing and cleaning up deposits of dust on external support structures and roofs, in order to minimise wind entrainment of deposited dust. If necessary, emissions should be controlled and abated using suitable arrestment equipment.

- All process buildings should be made as dust tight as is necessary to prevent visible emissions.
- All process buildings should be cleaned regularly, according to a written maintenance programme, to minimise fugitive emissions.
- All new buildings housing processing machinery should be externally clad with materials that can be readily cleaned.
- Where local exhaust ventilation is used, emissions should be ducted to suitable arrestment plant.
- Dusty wastes should be stored in closed containers.
- The method of collection of product or waste from dry arrestment plant should be such that dust emissions are minimised.
- A high standard of housekeeping should be maintained.
- All spillages which may give rise to dust emissions should be cleaned up promptly, normally by wet handling methods except where cleaning lime, because this may cause a dangerous reaction. In the event of a major spillage it should be dealt with on the same day that it occurs, and measures to minimise emissions should be taken immediately.

Loading and unloading

6.11 In loading areas appropriate dust control measures may include the following:

- enclosures fitted with extract ventilation to arrestment plant
- enclosure fitted with water sprinklers (except in areas where lime is being handled as a reaction between lime and water can be dangerous)

6.12 It is good practice to ensure that potentially dusty materials being delivered to the site are sheeted or held in closed containers before being admitted to the site. Best practice ensures that loading and unloading of road vehicles and rail wagons is carried out so as to minimise the generation of airborne dust.

- Where dusty materials, including wastes, are loaded to or from lorries, vessels or rail wagons, means should be provided to minimise the generation of airborne dust (e.g. by minimising drop heights).
- Tankers carrying dusty materials should discharge only into silos fitted with an effective dust collecting system.
- After loading, vehicles should be sheeted or the load otherwise totally enclosed as soon as possible and before leaving the site, where the load is potentially dusty.

Roadways and vehicles

6.13 In designing a new process, minimising vehicle movement in the site layout will enable better control of roadways with the potential for fugitive emissions.

6.14 Vehicle exhausts directed above the horizontal are preferred as these avoid the impact of the exhaust raising dust when travelling on internal roadways.

6.15 On some sites wheel-cleaning facilities may be useful to prevent dust being carried off the site. Where the plant is co-located with a quarry which has wheel wash and underbody wash facilities available, these might be used where necessary. If a plant is co-located with a quarry which does not have wheel-wash facilities, it may not be appropriate to install them. Vehicles may also be effectively cleaned, prior to leaving site, with a brush and hose. Sometimes the presence of a long access road ensures that any dust falls off the vehicles and does not reach the public highway. Hard surfacing for roadways should normally comprise compacted stone chippings between the loading points and the wheel wash (where present), and macadam or concrete for the final section of road leading to the public highway. Sweeping, wetting or sealing are all techniques that may be used to reduce dust emissions from roads. The technique that should be used depends upon the type of road under consideration.

- Roadways in normal use and any other area where there is regular movement of vehicles should have a hard surface capable of being cleaned or kept wet. They should be kept clean or wet, in order to prevent or minimise dust emissions. They should be adequately drained to avoid ponding of water. They should be kept in good repair. This provision only applies to roads inside a working quarry to the extent that they form part of the Part B installation. (Guidance on the meaning of "installation " can be found in Annex III of the "General Guidance Manual")
- Where necessary to prevent visible dust being carried off site, wheel-cleaning facilities should be provided and used by vehicles before leaving the site.

Air quality

Ambient air quality management

6.16 In areas where air quality standards or objectives are being breached or are in serious risk of breach and it is clear from the detailed review and assessment work under Local Air Quality Management that the Part B process itself is a significant contributor to the problem, it may be necessary to impose tighter emission limits. If the standard that is in danger of being exceeded is not an EC Directive requirement, then industry is not expected to go beyond BAT to meet it. Decisions should be taken in the context of a local authority's Local Air Quality Management action plan. For example, where a Part B process is only responsible to a very small extent for an air quality problem, the authority should not unduly penalise the operator of the process by requiring disproportionate emissions reductions. More guidance on this is provided in paragraph 360 of the Air Quality Strategy which gives the following advice:

"*The approach from local authorities to tackling air quality should be an integrated one, involving all strands of local authority activity which impact on air quality and underpinned by a series of principles in which local authorities should aim to secure improvements in the most cost-effective manner, with regard to local environmental needs while avoiding unnecessary regulation. Their approach should seek an appropriate balance between controls on emissions from domestic, industrial and transport sources and draw on a combination and interaction of public, private and voluntary effort.*"

Dispersion and dilution

6.17 Pollutants that are emitted via a stack require sufficient dispersion and dilution in the atmosphere to ensure that they ground at concentrations that are harmless. This is the basis upon which stack heights are calculated using HMIP Technical Guidance Note D1 (D1). The stack height so obtained is adjusted to take into account local meteorological data, local topography, nearby emissions and the influence of plant structure. It is necessary that the assessment also take into account the relevant air quality standards that apply for the emitted pollutants.

Revised stack height calculations should not be required unless it is considered necessary because of a breach or serious risk of breach of an EC Directive limit value and because it is clear from the detailed review and assessment work that the Part B process itself is a significant contributor to the problem.

The calculation procedure of D1 is usually used to calculate the required stack height but alternative dispersion models may be used in agreement with the regulator. D1 relies upon the unimpeded vertical emission of the pollutant. A cap or other restriction over the stack impedes the vertical emission and hinders dispersion. For this reason where dispersion is required such flow impeders should not be used. A cone may sometimes be useful to increase the exit velocity and achieve greater dispersion.

An operator may choose to meet tighter emission limits in order to reduce the required stack height.

Where an emission consists purely of air and particulate matter, (i.e. no products of combustion or any other gaseous pollutants are emitted) the above provisions relating to stack height calculation for the purpose of dispersion and dilution should not normally be applied. However, if the emission point is within a designated air quality management area with respect to PM10, then this may have to be reviewed.

Stacks, vents and process exhausts

6.18 Liquid condensation on internal surfaces of stacks and exhaust ducts might lead to corrosion and ductwork failure or to droplet emission. Adequate insulation will minimise the cooling of waste gases and prevent liquid condensation by keeping the temperature of the exhaust gases above the dewpoint. Stacks and ductwork should be leakproof.

6.19 The dispersion from all stacks and vents can be impaired by low exit velocity at the point of discharge, or deflection of the discharge. Unacceptable emissions of droplets could possibly occur from wet arrestment plant where the linear velocity within the associated ductwork exceeds 9 m/sec. The use of mist eliminators reduces the potential for droplet emissions.

- Where a linear velocity of 9 m/sec is exceeded in the ductwork of existing wet arrestment plant, it should be reduced to the extent that is practicable to ensure that droplet fallout does not occur.
- Flues and ductwork should be cleaned to prevent accumulation of materials, as part of the routine maintenance programme.
- Exhaust gases discharged through a stack or vent should achieve an exit velocity which is normally greater than 15 m/sec during normal operating conditions to achieve adequate dispersion. A lower velocity may be acceptable provided it achieves adequate dispersion and dilution in accordance with paragraph **6.17** above.
- A minimum discharge velocity should be required in order to prevent the discharged plume being affected by aerodynamic downwash.
- Stacks or vents should not be fitted with any restriction at the final opening such as a plate, cap or cowl, with the exception of a cone which may be necessary to increase the exit velocity of the emissions.

Management

Management techniques

6.20 Important elements for effective control of emissions include:

- proper management, supervision and training for process operations;
- proper use of equipment;
- effective preventative maintenance on all plant and equipment concerned with the control of emissions to the air; and
- it is good practice to ensure that spares and consumables are available at short notice in order to rectify breakdowns rapidly. This is important with respect to arrestment plant and other necessary environmental controls. It is useful to have an audited list of essential items.

- Spares and consumables - in particular, those subject to continual wear - should be held on site, or should be available at short notice from guaranteed local suppliers, so that plant breakdowns can be rectified rapidly.

Appropriate management systems

6.21 Effective management is central to environmental performance; It is an important component of BAT and of achieving compliance with permit conditions. It requires a commitment to establishing objectives, setting targets, measuring progress and revising the objectives according to results. This includes managing risks under normal operating conditions and in accidents and emergencies. It is therefore desirable that processes put in place some form of structured environmental management approach, whether by adopting published standards (ISO 14001 or the EU Eco Management and Audit Scheme [EMAS]) or by setting up an environmental management system (EMS) tailored to the nature and size of the particular process. Operators may also find that an EMS will help identify business savings.

Regulators should use their discretion, in consultation with individual operators, in agreeing the appropriate level of environmental management. Simple systems which ensure that LAPC considerations are taken account of in the day-to-day running of a process may well suffice, especially for small and medium-sized enterprises. While authorities may wish to encourage wider adoption of EMS, it is outside the legal scope of an LAPC authorisation/LA-PPC permit to require an EMS for purposes other than LAPC/LA-PPC compliance. For further information/advice on EMS refer to EMS Additional Information in **Section 8**.

Training

6.22 Staff at all levels need the necessary training and instruction in their duties relating to control of the process and emissions to air. In order to minimise risk of emissions, particular emphasis should be given to control procedures during start-up, shut down and abnormal conditions.

Training may often sensibly be addressed in the EMS referred to above.

- Training of all staff with responsibility for operating the process should include:
  - awareness of their responsibilities under the permit;
  - minimising emissions on start up and shut down
  - action to minimise emissions during abnormal conditions
- The operator should maintain a statement of training requirements for each operational post and keep a record of the training received by each person whose actions may have an impact on the environment. These documents should be made available to the regulator on request.

Maintenance

6.23 Effective preventative maintenance should be employed on all aspects of the process including all plant, buildings and the equipment concerned with the control of emissions to air. In particular:

- A written maintenance programme should be provided to the regulator with respect to pollution control equipment; and
- A record of such maintenance should be made available for inspection.

7 Summary of changes

Reasons for the main changes are summarised below.

Table 5: Summary of changes

Section/ Paragraph/ Row	Change	Reason	Comment
Emission limits, monitoring and other provisions			
Table 2 Row 1	For slaking processes a new emission limit for particulate matter as follows: Where currently achieved: 50 mg/m^3 Where 50 mg/m^3 currently achieved, but only inconsistently: 100 mg/m^3 PLUS efforts should be made to improve consistency. Where 50 mg/m^3 currently not achieved: 100 mg/m^3	Achievement of this standard appears to be inconsistent within the industry but the Bref note implies it should be achievable. It is hoped that efforts will be made to better understand site specific circumstances that affect the emission from slakers.	The position will be revisited in 2 years having regard to the Bref guidance and in light of practical experience.
Table 2 Row 4	For arrestment plant handling dry dust (other than on slaking plant and silos) with an exhaust flow >300 m^3/min there is a new **emission limit** for particulate matter of 50mg/m^3. A new provision to record the continuous monitoring is in place.	Plant should already be designed to meet this limit	Isokinetic sampling of the emissions should be carried out at least once to demonstrate compliance with this limit. Continuous monitoring **and recording** of the emissions from such plant is required to ensure continued compliance with the limit. Records of the emissions provide a very useful management tool with respect to the maintenance requirements to keep the plant operating within its design specification.
5.15	For arrestment plant (other than on slaking plant and silos) with an exhaust flow >100 m^3/min there is a new **design criteria** to meet a particulate matter limit of 50mg/m^3.	Such equipment should be designed to meet this limit.	There is no change to the monitoring required for such plant. (Continuous indicative monitoring to demonstrate that the plant is functioning correctly to its design specification is required.)
5.9 and **5.14**	Use of BS 3405 for monitoring particulate matter emissions replaced by BS ISO 9096:2003. Sampling points on **new** plant should be designed to comply with BS6069 requirements.	BS ISO 9096:2003 designed to measure concentrations below those for which BS 3405 was written.	The main procedures of BS ISO 9096:2003 should be followed and any points of diversion from the standard noted. The effect on the results of any deviation from the standard should be estimated and reported.
5.17	All **new** silo filtration plant should be designed to operate to an emission standard of less than 10 mg/m^3 for particulate matter.	Such equipment should be designed to meet this limit. It is easily achievable.	Design criteria include specified flow rates and required surface area of specific filtration medium in order to meet the standard.

Table 5: Summary of changes

Section/ Paragraph/ Row	Change	Reason	Comment
Control techniques			
6.7	All **new** silos should be installed with automatic protection systems to control the delivery of material from the tanker to the silo such that it is not possible to overfill or over-pressurise the silo.	To reduce emission incidents due to overfilling of silos.	
6.22	The operator should maintain a statement of training requirements for each operational post and keep a record of the training received by each person whose actions may have an impact on the environment. These documents should be made available to the regulator on request.	Good management practice.	
6.23	A written maintenance programme should be provided to the regulator with respect to pollution control equipment.	Good management practice which should ensure preventative maintenance is properly considered and planned. Preventative maintenance protects against incidents due to plant failure.	

8 Definitions and further information

This guidance	Process Guidance Note 3/14 (04)
Previous guidance	Process Guidance Note 3/14(95) which in turn replaced PG 3/14 (91)
LAPC	explained in the Introduction of this guidance
LAPPC	explained in the Introduction of this guidance
Permit	the written permission to operate an installation prescribed for LAPPC – (the replacement for authorisation under LAPC)
Authorisation	the written authority to operate a process prescribed for LAPC - (will be replaced by permit under LAPPC)
Local enforcing authority	is replaced by the word 'regulator' in LAPPC
Regulator	replaces the phrase 'local enforcing authority' from LAPC
Existing process	should be taken to have the following meaning (which is based on paragraph 14 of Schedule 3 to SI 1991 /472): • a process which was being carried on at some time in the 12 months immediately preceding the first day of the month following publication of this guidance note; • a process which is to be carried on at a works, plant or factory or by means of mobile plant which was under construction or in the course of manufacture or in the course of commission on the first day of the month following publication of this guidance note, or the construction or supply of which was the subject of a contract entered into before that date.
New process	not an existing process.
Authorised person	under section 108 of the Environment Act 1995, "authorised person" has replaced the term "inspector".
Installation	should be interpreted in accordance with the guidance contained in the the General Guidance Manual on Policy and Procedures for A2 and B Installations. www.defra.gov.uk/environment/ppc/manual/index.htm
Process	the term "process has been used in this guidance note to refer to both "processes" under the Environmental Protection Act 1990 and "installations" under the Pollution Prevention and Control Act 1999.

Health and safety

Operators of processes and installations must protect people at work as well as the environment:

- requirements of a permit or authorisation should not put at risk the health, safety or welfare of people at work
- equally, the permit or authorisation must not contain conditions whose only purpose is to secure the health of people at work. That is the job of the health and safety enforcing authorities

Where emission limits quoted in this guidance conflict with health and safety limits, the tighter limit should prevail because:

- emission limits under the Environment Protection Act 1990 or Pollution Prevention and Control Act 1999 relate to the concentration of pollutant released into the air from prescribed activities
- exposure limits under health and safety legislation relate to the concentration of pollutant in the air breathed by workers
- these limits may differ since they are set according to different criteria. It will normally be quite appropriate to have different standards for the same pollutant, but in some cases they may be in conflict (for example, where air discharged from a process is breathed by workers). In such cases, the tighter limit should be applied to prevent a relaxation of control

EMS additional information

Further information/advice on EMS may be found from the following:

- Envirowise at **www.envirowise.gov.uk** and **www.energy-efficiency.gov.uk** and Environment and Energy Helpline freephone 0800 585794
- ISO 14001 **www.bsi.org.uk** or telephone BSI information centre (020 8966 7022)
- EU Eco Management and Audit Scheme (EMAS) **www.emas.co.uk** or telephone the Institute of Environmental Management and Assessment (01522 540069)

Regulators and process operators may also like to be aware of:

BS 8555: a new standard to help SMEs implement an EMS, by offering a five-phase approach, is contained in BS 8555 which was published in 2003 following on from work undertaken by the Acorn Trust. The Institute of Environmental Management and Assessment, which has taken over the Trust's activities, is developing a scheme of accredited recognition for companies achieving different phases of BS 8555. BS 8555 can be used to achieve ISO 14001 and registration to the higher standard, EMAS.

Some of the **High Street banks**, such as NatWest and the Coop, now offer preferential loan rates to organisations that can demonstrate they are committed to improving their environmental performance. The NatWest also produce a self help guide for SMEs, 'The Better Business Pack', focusing on waste, utilities, transport and supply chain issues. It gives tools, guidance and examples. Contact: WWF-UK on 01483 426444.

References

(a) Secretary of State's Guidance (England and Wales): General Guidance Manual on Policy and Procedures for A2 and B Installations , March 2003 - available from the Defra web-site and, in hard copy, from the Defra Publications line 08459 556000 **www.defra.gov.uk/environment/ppc/index.htm**

(b) DOE/WO Additional Guidance AQ17(94), issued to local authorities by the Air and Environment Quality Division of DEFRA and by the Welsh Office, provides further advice on the assessment of odour. The Scottish equivalent of AQ17(94) is SN 11(94).

(c) Current air quality objectives are specified in:
- The Air Quality (England) Regulations 2000 SI 928
- The Air Quality (Wales) Regulations 2000 SI 1940
- The Air Quality (Scotland) Regulations 2000 SI 97

(d) HMIP Technical Guidance Note D1: "Guidelines on Discharge Stack Heights for Polluting Emissions", published by The Stationery Office, ISBN 0-11-752794-7.

(e) M1 Sampling requirements for monitoring stack emissions to air from industrial installations, Environment Agency July 2002 **(EA website)**

(f) M2 Monitoring of stack emissions to air. Environment Agency May 2003 **(EA website)**

(g) BS 2742:1969: "Notes on the use of Ringelmann and miniature smoke charts".

(h) BS 3405:1983: "Method for measurement of particulate emission including grit and dust (simplified method)".

(i) BS ISO 9096:2003: Stationary source emissions. Manual determination of mass concentration of particulate matter.

Web addresses

The final consultation drafts and final published versions of all guidance notes in this series can be found on **www.defra.gov.uk/environment/index.htm**.

Welsh Assembly Government web-site **www.wales.gov.uk**.

Local Authority Unit of the Environment Agency for England and Wales. **www.environment-agency.gov.uk**.

Scottish Environment Protection Agency (SEPA) **www.sepa.org.uk**.

Energy saving and environmental management measures can increase industry profits. Envirowise (formerly ETBPP) show how at **www.envirowise.gov.uk** (or freephone 0800 585794).

Appendix 1: Extract from Pollution Prevention and Control (England and Wales)[7] Regulations 2000 SI 1973[8]

(The processes for local air pollution prevention and control are listed under "Part B". The "Part A1" processes are for national regulatory control. The "Part A2" processes are subject to local authority integrated pollution prevention and control.)

Section 3.1 - Production of Cement and Lime

Part A1

(a) Producing or grinding cement clinker

(b) Producing lime -

(i) in kilns or other furnaces with a production capacity of more than 50 tonnes per day; or

(ii) where the activity is likely to involve the heating in any period of 12 months of 5,000 tonnes or more of calcium carbonate or calcium magnesium carbonate or, in aggregate, or both.

Part A(2)

Nil.

Part B

(a) Storing, loading or unloading cement or cement clinker in bulk prior to further transportation in bulk.

(b) Blending cement in bulk or using cement in bulk other than at a construction site, including the bagging of cement and cement mixtures, the batching of ready-mixed concrete and the manufacture of concrete blocks and other cement products.

(c) Slaking lime for the purpose of making calcium hydroxide or calcium magnesium hydroxide.

(d) Producing lime where the activity is not likely to involve the heating in any period of 12 months of 5,000 tonnes or more of calcium carbonate or calcium magnesium carbonate or, in aggregate, of both.

7. For activities carried out in Scotland the PPC (Scotland) Regulations should be referred to. For activities carried out in Ireland the PPC (Ireland) Regulations should be referred to.
8. Every effort has been taken to ensure that this Appendix is correct at the date of publication, but readers should note that the Regulations are likely to be subject to periodic amendment, and this Appendix should not therefore be relied upon as representing the up-to-date position after the publication date.