Attachment Nº D.1

INFRASTRUCTURE & OPERATION

Environmental Protection Agency
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Lagan Cement Ltd.
IPPC Licence Application

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Contents

I.P.C. Licence Application

1.0 Introduction and Scope

This Application to the Environmental Protection Agency for an Integrated Pollution, Prevention and Control (IPPC) Licence deals with a proposal to burn Meat and Bone Meal (MBM) as a fuel source at the Lagan Cement Ltd facility in Kinnegad, Co Meath.

Lagan Cement Ltd propose to burn Meat and Bone Meal (MBM) as a fuel source at their cement manufacturing facility in Kinnegad, Co Meath. It is planned to replace up to 45% of coal currently burned at the plant with MBM. The cement plant is currently powered by the burning of coal, oil or pet coke which are fossil fuels and as such contribute significantly to the CO_2 emissions from the facility. In an effort to reduce the level of CO_2 emissions from the plant, Lagan Cement Ltd plan on burning MBM in place of a significant percentage of the coal it currently burns. In doing this Lagan Cement will be replacing fossil fuels with a renewable, carbon-neutral fuel, MBM. This will result in a significant decrease of mass emissions of greenhouse gases, particularly CO;! from the facility which in turn will contribute significantly to the objectives of the National Climate Change Strategy and assist the country in meeting its greenhouse gas emission targets under the Kyoto Protocol.

This Section of the IPPC Licence application describes the history of the site and gives detailed information on the operational systems and procedures for both the existing and proposed activities.

2.0 Development and Operational History

Lagan Cement Ltd is part of the Lagan Group. Headquartered in Belfast, the Lagan name has been synonymous with the quarrying and construction industries for over 30 years in Northern Ireland. In addition to the Killaskillen Cement Plant, the Lagan Group's other holdings in the Republic include an integrated quarrying, asphalt and bitumen emulsion plant at Ballycoolin, Blanchardstown, Co. Dublin; Kingscourt Brick in Co. Cavan; and Fleming's Fireclays in Athy, Co. Kildare. In addition, the Lagan Group also has four asphalt plants at Bennettsbridge, Co. Kilkenny; Tulla, Co. Clare; Rossmore, Co. Cork and at Kinnegad, Co. Meath (immediately adjacent to the eastern boundary of this site).

On 14th April 1999, Lagan Cement Ltd. sought planning permission, which was granted in June 2000, to erect and operate a new cement works and to quarry limestone and shale at Killaskillen, Kinnegad, Co. Meath. Following a 2-year construction programme, the facility commenced production in 2002 and was licenced to produce approximately 150,000t of white cement and approximately 300,000tpa of Ordinary Portland Cement (OPC) per annum. It is the only cement works in Ireland or Great Britain capable of producing white cement.

Lagan Asphalt Ltd, a sister company of Lagan Cement Ltd, were granted permission for the development of an asphalt plant in 2001. This is located to the west of the cement plant but is a separate facility and a fully independent operation. The facility does use common entrance roadways to the Lagan Cement Ltd facility in the interest of optimising the use of roadways in the area.

In 2002, Lagan Cement Ltd applied for and received planning permission for an extension to the rate and extent of extraction of raw materials from the shale quarry at the site. This permission was sought in anticipation of a need to fulfil contractual requirements in respect of the M6 motorway project which runs past the site. Although planning permission was granted, the development was not progressed since the company did not win the Motorway contract and hence the materials were not needed at that time.

In July of 2004 Lagan Cement Ltd were granted planning permission for an increase in production in order to maximise the efficiency of the plant. The rate of production of cement was increased from 450,000 tonnes per annum to 600,000 tonnes per annum. Retention permission was also granted for the following:

- a redistribution of buildings and structures within the processing area and a reorganised material handling area,
- an extension of the south eastern face of the quarry,
- 2 no. settlement lagoons as constructed,
- a revised layout for the site access.

The current proposal to burn meat and bone meal will not involve any changes to the rate or extent of raw material extraction at the site and there will be no change to the cement manufacturing process. Planning permission is required solely because a new fuel will be burned at the site.

3.0 Existing Activities

3.1 Site Layout

The site on which the plant is located covers over 200 hectares and contains a shale quarry, a limestone quarry, both of which supply raw materials for the cement manufacturing process, and lands in agricultural use. It lies between 2.5 and 4.5 km southwest of Kinnegad and 1.2 to 3.5 km north of Ballinabrackey in County Meath. It is approximately 60km by road from Dublin and Athlone, and Mullingar is located approximately 17km to the northwest. The Site Location Map is presented as Figure 1 of Appendix I of Attachment A. The layout of the site is detailed in Figure 2 of Appendix I of Attachment A. The cement works is located on the western side of the site towards the southern boundary, the limestone quarry lies south east of the works area and the shale quarry is located in the north west part of the site.

3.2 Process Description

3.2.1 Introduction to the cement manufacturing process

Lagan Cement Ltd manufacture both grey Portland Cement and white cement using the same overall process. Cement is produced in a kiln at very high temperatures from a mixture of raw materials. Limestone is the primary raw material required for the production of cement. Shale is an important additive for the manufacture of grey cement and kaolin is the necessary additive for producing white cement. All of the limestone required is excavated on site from the limestone quarry. The shale quarry provides the necessary shale for the plant and has an estimated life of up to 30 years, after which time an alternative source will be located and the shale will then be imported onto the site. Kaolin and other raw materials are currently imported to the site.

There are eight stages in the cement manufacturing process:

- Raw material preparation
- Raw material analysis and blending
- Raw meal milling and mixing
- Raw meal kilning
- Clinker cooling and handling
- Clinker grinding
- Storage and handling of cement,
- Coal preparation

Each of these stages is described in detail in the IPC Licence application for the original development (Attachment 9, IPC Licence Reg. No. 487) and a summary is presented in the following sections. For each of the main stages in the manufacturing process, a description of the process is provided together with details of material throughput, process control systems and sources and treatment of emissions generated as a result of each activity.

A schematic representation of the overall production process is presented in Figure 1 in Appendix I of this attachment

3.2.2 Raw materials preparation

3.2.2.1 Process Description

The limestone is quarried at the on-site limestone quarry and transported from there to the Raw Materials handling area and from here into the crusher building where the Primary and Secondary crushing takes place. Crushed material is conveyed under cover to the Blending Bed.

Two qualities of shale are quarried and these materials are fed to the shale crusher which is housed in a separate building in the Raw Materials handling area. A third quality of shale is bought in and added to the mix. The three qualities of shale are proportioned to attain a correct balance of the chemical composition in the Blending House.

The raw materials preparation takes place during normal quarry working hours ie five and a half days per week with no night time working.

3.2.2.2 Process Control

Samples are taken for laboratory analyses from the boreholes drilled for blasting. Laboratory results influence the face exploitation quantitatively. As excavation advances the quantities from the different quarry faces are adjusted for an optimised proportion to attain the required mixes and simultaneously advance in such a way that all the available material can be used.

3.2.2.3 Emissions

Air Emissions & abatement measures

The main emissions associated with the raw materials recovery and preparation are particulate emissions. The main sources of dust from the quarrying operation are associated with the raw material extraction, transport of raw material to the crusher and the crusher itself. The crushing and material conveying operations are enclosed, and local extraction systems vent to Bag Filters which control dust emissions from these sources. The shale stockpiles are partially enclosed by sheeting, and the gypsum, kaolin and imported shale is also stored under cover further minimising dust emissions.

The raw material extraction and stockpiling operations are the most significant sources of dust emissions at the site and the following mitigating measures are carried out:

- Effective design and management of the blasts to prevent fly rock and significant particulate emissions
- Fixed and mobile water sprays are used to control dust emissions from internal haul roads, material stockpiles and storage and plant yard surfaces.

- Loose loads of materials entering the site are covered and a dedicated wheel wash is located at the entrance to the shale quarry.
- A full vehicle wash spray and wheel wash is sited near the cement works entrance.

Noise Emissions and abatement measures

Noise from the Raw Materials preparation stage of the process is associated with the excavation, recovery, transportation and crushing of raw material. Noise from the quarry workings is minimised by ensuring that all plant and equipment meets stringent specifications for noise emissions.

Acoustic screening bunds are provided between the nearest noise sensitive receptor and the quarry and plant operations resulting in a barrier attenuation of at least 15 &(A).

Vibration and abatement measures

The most significant potential impact associated with the quarrying operation is the potential noise and vibration impacts associated with blasting for the purpose of recovery of raw materials in the limestone quarry. Blasting is not generally required for ground preparation in the shale quarry although one or two blasts per year may be required to remove Reef Limestone; some ripping of shaley limestone at depth may also be required. The blasts in the limestone quarry occur once every 1 – 2 weeks on average.

By careful design of the blasts following trial blasts to establish the local site characteristics, it is possible to ensure that the vibration associated with the blast do not exceed the limits imposed at nearby sensitive receptors. A comprehensive description of the control measures planned for minimising vibration impacts associated with blasting is presented in Section F.

Water and abatement measures

The proposed excavations will extend to a maximum depth of about 70m below groundwater level in the limestone area and approximately 50m below groundwater level in the shale area. Consequently, pumping of in-flowing groundwater is required to facilitate quarrying operations. It is proposed to work both shale and limestone quarries by dewatering using sump pumping arrangements.

Run-off from the roads near the quarries are drained in to the quarries. Surface water run-off from the undisturbed landscaped screening banks is also drained through the nearest quarry.

Water run off and ground water pumped out does not contain harmful substances. However since some soil and fine matter may be in suspension a Settlement Lagoons will allow this to be settled before discharge to the Kinnegad River

The drainage arrangements for the site ensure that no uncontrolled discharge of drainage from the site can occur at any time. Water pumped from the quarries is directed to the Settlement Lagoons where a residence time of 28 hours ensures adequate settling capacity. Most of the pumped water is groundwater which is free from any contamination.

3.2.2.4 Waste

No process waste is generated at this stage of the process. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.2.5 Malfunction

There are no specific malfunctions which could result in accidental or unplanned emissions or discharges. In the unlikely event of a power failure, the Bag Filters would cease to function temporarily but so would the crushing machines, so the emissions potential is eliminated. Details of control measures for preventing unplanned discharges to the Kinnegad River are outlined in Attachment F.

3.2.3 Raw Material analysis and blending

3.2.3.1 Process Description

A schematic representation of the processes involved in raw material analysis and blending is presented in Figure 2 of Appendix of this Attachment.

The conveyor between the raw materials handling area and the Blending House is fully enclosed and transports crushed limestone from the crushed material store or the crusher to the Blending House. The conveyor is fitted with neutron type analysers for continuous measurement of calcium, silica, iron and alumina in the raw feed. Kaolin is also stored separately in the Blending House and will be blended as required with the other raw materials when white cement is being manufactured.

The mix of shales and limestone is blended in the Blending House reducing fluctuations by laying a large number of layers on a stockpile. Material is reclaimed off the heap at approximately the rate at which the raw mill (see below) needs the blended raw material mixture for the final composition of the raw meal i.e. an average of about 37t/h.

3.2.3.2 Process Control

The conveyor is fitted with neutron type analysers for continuous measurement of calcium, silica, iron and alumina in the raw feed, and this allows effective control over the rate at which raw materials are conveyed to the Blending Bed. Weighing equipment operating with a closed loop feedback, controls- the proportions of the three qualities of shale fed into the pre-blending stockpile. The quantity of each shale quality is tracked and totals must be in predefined proportions. Thus a heap of shale has a consistent composition for an optimum silica to alumina ratio in the raw mix.

3.2.3.3 Emissions

Air emissions and abatement measures

All of the conveying and blending operations are enclosed so there is minimal potential for emissions to atmosphere associated with this operation. The crushing operation is enclosed and so too is the crushed raw material store so that emissions are contained at source and are also treated in a Bag Filter. The conveyor of blended material from the Blending House is vented to a Bag Filter – any dust collected is fed back in to the process. There are no other significant sources of emissions to atmosphere associated with this activity.

Noise emissions and abatement measures

There are no significant process-related noise sources associated with this process. The fans collecting dust for the bag filters are all fitted with silencers.

Vibration and abatement measures

There are no significant process sources of vibration associated with this process.

Water and abatenient measures

There are no water discharges generated as a result of this process.

3.2.3.4 Waste

There is no process waste generated as a result of this process. Any materials not used in the initial flow through are fed back into the process at a later stage. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.3.5 Malfunction

In the event of power loss, activities in this area would cease temporarily until power is restored from the auxiliary diesel generator or from the plant mains electricity supply. There are no specific malfunctions which could lead to unplanned release to the environment associated with this operation.

3.2.4 Raw mix milling and mixing

3.2.4.1 Process Description

A, schematic representation of this stage of the manufacturing process is presented in Figure 3 of Appendix I of this Attachment. The Raw Mill crushes the sub-100mm blended Raw Mix to a fine powder and also dries it.

A belt conveyor, onto which limestone and iron oxide are also dosed, feeds material reclaimed from the Blending Bed by the reclaimer to a raw mix feed bin. From the feed bin the material is fed to a Raw Mill for grinding to a fine dust called raw meal.

3.2.4.2 Process Control

Material fed to the raw mill is proportioned and controlled. A feed bin on load cells feeds the mill and acts as a buffer. The level of the material in this bin controls the rate at which the total mix is prepared. Three components, limestone, shale mix and iron sinters are weighed and fed in the correct proportion onto the belt conveyor feeding the bins. Controlling the raw mix is important for the quality of the clinker produced and for maintaining the process in a more steady operating condition.

Steady and constant conditions in the kiln very significantly help maintain good combustion control and reduce emissions of CO and NO,.

The raw mill being a roller mill is fed with the raw mix. The rate of feed is controlled by the pressure drop of the gases flowing through. Gas temperature is controlled by air-cooling or by spraying water either in the conditioning tower or directly into the material being milled. The fineness of the material is controlled by adjustments to both the mill itself and the separator.

The composition of the raw meal is checked during transport to the homogenisation silo. If necessary, adjusting materials are added in the feed to the raw mill.

3.2.4.3 Emissions

Air emissions and abatement measures

Emissions to atmosphere associated with this process arise from the handling and conveying of raw materials and the milling operation. Dust emissions are vented to bag filters for abatement.

Noise emissions and abatement measures

The operation of the Raw Mill and the fans on the bag filters may result in noise emissions. The design of the buildings is chosen to ensure attenuation of noise from within the buildings and all fans are fitted with silencers.

Vibration and abatement measures

Vibrations may occur as a result of the operation of the Raw Mill. The design of the Mill buildings has taken this into account and suitable construction techniques have been employed to ensure that the impacts at nearby receptors are just at or beyond the level of human perception.

Water and abatement measures

There are no water discharges generated as a result of this process. The cooling water used in the process is recirculated and no water discharge occurs as a result of the process,

3.2.4.4 Waste

There is no waste generated as a result of this process. Any dust collected in the emissions control systems and off-spec product is fed back in to the raw mill for re-use. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.4.5 Malfunction

In the event of power loss, activities in this area would cease temporarily until power is restored from the auxiliary diesel generator or from the plant mains electricity supply. There are no specific malfunctions which could lead to unplanned release to the environment associated with this operation. If the Bag Filters were shut down for maintenance or due to power loss, the process would also be stopped.

3.2.5 Raw meal milling and mixing

3.2.5.1 Process Description

A schematic representation of this most important processing stage in the cement manufacturing process is presented in Figure 4 in Appendix I of this Attachment. The installation consists of three major sections, the preheater, the kiln and the clinker cooler – the latter operation is discussed in the following section. A variety of equipment serves this unit at start-up, shut down and during normal operation.

Raw material is drawn from the raw meal feed silos through discharge hoppers to a weighing bin and is introduced close to the top of the column in the kiln pre-heater. As it is guided down through the cyclones in the system, it picks up the heat of the gases from the kiln. Milled coal or oil is added to the hot meal and the temperature rises, driving off carbon dioxide in the calcining process. At the bottom of the pre-heater the hot material is introduced into the kiln where its temperature is gradually brought up to 1420°C (grey cement) or ca 1500°C (white cement). As the kiln rotates the material inside tumbles following a spiral path on the inside of the kiln shell, finally reaching the outlet where it drops into the cooler. Here the intermediate product, clinker, is abruptly cooled to 600°C and then down to 100°C at a slower pace. The heat of the material is recovered heating the air needed for combustion.

3.2.5.2 Process Control

Raw meal fed to the kiln is weighed and dosed precisely to maintain constant conditions. It is equally important that the chemical and physical qualities of the raw meal are constant and accurate (this having been assured in the preceding steps, i.e. preblending, dosing, grinding and homogenising. Assuring constant conditions makes combustion control of the kiln and the calciner much better and is important for both energy savings and cleaner combustion gases.

Combustion gases from the kiln are monitored. There is a gas analyser for O_2 and CO content at the kiln outlet, which indicates the quality of the combustion in the kiln. At the exit of the calciner the O_2 and CO content of the gases is also measured. Gases entering the kiln ESP are also sampled and CO is measured. Gas volumes through the whole kiln system are controlled and kept at the minimum required level for energy efficiency. Maintaining volumes low helps reduce emissions. These measurements are recorded on strip chart recorders, the values are used to control combustion and to protect the installation. If safety limits are exceeded alarms are triggered and the ESP high voltage is controlled or even shut down.

3.2.5.3 Emissions

Air emissions and abatement measures

The main emissions associated with this process are combustion gases and particulate matter. Emissions to atmosphere are vented via cyclones into an electrostatic precipitator (ESP). Bag filters are used to control emissions from other sources. The detailed discussion of emissions from this process is presented in Attachment No E.

Noise emissions and abatement measures

Noise emissions result from the operation of the kiln and the associated plant. Fans used throughout the process in abatement plant also result in noise emissions. The details are discussed in Attachment No E and F.

Vibration and abatement measures

There are vibrations associated with the operation of the kiln. This is discussed in greater detail in Attachment No E and F.

Water and abatement measures

The only water used in the process is that used for cooling when the raw mill is not operating. There is no water discharged as a result of the process since this water is evaporated or recirculated.

3.2.5.4 Waste

Used refractory linings from the kiln and cyclones in the pre-heater are generated. These are disposed off by approved means. This is further discussed in Attachment H. Any dust collected in the emissions control systems is fed back in to the raw meal silos for re-use. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.5.5 Malfunction

The only significant malfunction which could result in an unplanned release to the environment is malfunction of the ESP or deliberate shut-down of the ESP if CO safety threshold concentrations are exceeded. The CO is monitored continuously and, in the event of safety thresholds being exceeded, the system will be shut down and the plant will also be shut down. The cyclones will continue to operate and will be effective in minimising dust emissions if this malfunction occurs. The emphasis is placed on prevention of CO-induced ESP trip-outs.

3.2.6 Clinker cooling and handling

3.2.6.1 Process Description

A schematic representation of the unit operations involved in this process is presented in Figure 5. From the end of the kiln, clinker drops out into the clinker cooler. This is a cross flow heat exchanger: ambient air is blown through a moving grate and through the clinker to cool it at a forced high rate from 1350°C down to 600°C and then on to lower temperatures at a slower pace. All the material collected is clinker and is fed back into the process.

The clinker is crushed by a roller-breaker to remove large lumps and is transported with special heat resistant conveyors to clinker silos for storage. From the clinker silos, clinker is fed to the cement mill for grinding to cement as and when required.

3.2.6.2 Process Control

There are no unique Process Control steps in the clinker cooling stage of the process -- the overall process control relating to the production of clinker is the effective process control for this stage.

3.2.6.3 Emissions

Air emissions and abatement measures

Air from the clinker grate is fed back to the kiln to assist in combustion and drying. Air emissions from the clinker cooler stage and storage silos are vented to a bag filter.

Noise emissions and abatement measures

Noise emissions will be associated with the operation of the air handling units which will be fitted with silencers and housed, and also with the operation of the clinker crusher.

Vibration and abatement measures

Vibration will be associated with the operation of the clinker crusher.

Water and abatement measures

There is no water used in this operation and hence no waste water will be generated.

3.2.6.4 Waste

There is no process waste generated during this operation. Particulate emissions from the clinker cooler and clinker silos bag filters are all fed back in to the process. Clinker produced during start-ups is stored in a separate silo for reintroduction in to an early stage of the process for re-processing. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.6.5 Malfunction

In the event of power loss, activities in this area would cease temporarily until power is restored from the auxiliary diesel generator or from the plant mains electricity supply. There are no specific malfunctions which could lead to unplanned release to the environment associated with this operation. If the Bag Filters were shut down for maintenance or due to power loss, the process would also be stopped.

3.2.7 Clinker grinding

3.2.7.1 Process Description

A schematic representation of the unit operations involved in this process is presented in Figure 5 of Appendix I of this Attachment. Cement is produced by grinding the intermediate product, clinker, with gypsum in an approximate proportion of 95% clinker and 5% gypsum.

Cement grinding is done in a ball mill, a metal tube lined with special cast steel liner plates designed to help lift the grinding media (steel balls) in the mill as it is turned. The mill is internally divided into two chambers with a diaphragm separating the unequally sized compartments. The first compartment pre-grinds the coarse material while the second compartment finish grinds cement. To improve efficiency, air flowing through the mill cools the material being ground and moves material faster through the system. With the help of an air separator the fine ground material is removed as finished product while coarse material is returned to the mill at the feed end, Material continues circulating in a closed circuit until it reaches the required fineness.

3.2.7.2 Process Control

The feed into the cement mill is controlled by belt weighers. Additives, proportioned by weight, are added depending on the composition of the feed and the grade of cement being manufactured.

3.2.7.3 Emissions

Air emissions and abatement measures

Dust emissions are generated in various operations. All emissions are vented to bag filters, and the dust collected is fed back in to the process as indicated in Figure 5.

Noise emissions and abatement measures

Noise is a significant emission associated with the operation of the cement mill, which is the most significant noise source associated with the manufacturing operations. The design of the building has been specially selected to minimise the impact of this noise source on nearby noise sensitive receptors. Noise emissions are also associated with the air handling units associated with the unit operations and with the bag filters.

Vibration and abatement measures

Vibration is associated with the operation of the cement mill and the gypsum crusher.

Water and abatement measures

There is no water used in this process and no water discharges associated with this operation.

3.2.7.4 Waste

There are no process wastes associated with this operation. Any dusts collected in the abatement plant are returned to the process. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.7.5 Malfunction

In the event of power loss, activities in this area would cease 'temporarily until power is restored from the auxiliary diesel generator or from the plant mains electricity supply. There are no specific malfunctions which could lead to unplanned release to the environment associated with this operation. If the Bag Filters were shut down for maintenance or due to power loss, the process would also be stopped.

3.2.8 Storage and handling of cement

3.2.8.1 Process Description

A schematic representation of the unit operations involved in these processes is presented in Figure 5 of Appendix I of this Attachment. From the cement silos, cement is drawn pneumatically and conveyed by air slides in to bucket elevators for bagging and pallet loading in the packing plant or for direct loading in to container trucks.

The packing machine fills bags of 25kg bags at a rate of up to 2400 bags/hour, these are either directly loaded on trucks or conveyed to a palletising machine. Pallets are either loaded immediately or stocked.

3.2.8.2 Process Control

The process is controlled by weighing.

3.2.8.3 Emissions

Air emissions and abatement measures

Dust emissions generated during the operations associated with this process are vented to bag filters, recovered and reused.

Noise emissions and abatement measures

Noise is associated with the operation of the air handling units and the fans on the bag filters.

Vibration and abatement measures

There are no significant vibration sources associated with this process.

Water and abatement measures

Water is not used in or generated in this process.

3.2.8.4 Waste

There are no process wastes associated with this operation. Any dusts collected in the abatement plant are returned to the process. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.8.5 Malfunction

In the event of power loss, activities 'in this area would cease temporarily until power is restored from the auxiliary diesel generator or from the plant mains electricity supply. There are no specific malfunctions which could lead to unplanned release to the environment associated with this operation. If the Bag Filters were shut down for maintenance or due to power loss, the-process would also be stopped.

3.2.9 Coal preparation

3.2.9.1 Process Description

Coal for the cement kiln is stored in one of two coal silos. The coal is conveyed as needed to a feed bin, which in turn feeds the coal to the coal mill. Coal needs to be ground to a fine powder to facilitate combustion in the kiln. The high temperatures required in a cement kiln and the way heat needs to be transferred to the material in process in the kiln requires a flame with a high temperature, and this can only be achieved with coal dust blown in through a burner pipe. The flame reaches temperatures of about 2,000°C. The coal mill operation is similar to the raw meal mill, only significantly smaller in capacity and specially designed to grind coal safely.

Powdered coal is stored in two specially designed silos, of a limited size for safety. The coal is weighed before being fed pneumatically to the kiln burner.

In the kiln, coal is burned only when temperatures are high enough for safe combustion. To start-up the installation fuel oil or natural gas is used to preheat the areas where coal combustion takes place. This is a matter of safety. For this purpose special arrangements are made for the fuel supply,

3.2.9.2 Process Control

The heat required to dry the coal while being ground is derived from exit gases from the preheater. These gases are low in oxygen content and are used for safety reasons. Nevertheless CO is measured at the mill outlet and the bag filter outlet. The coal installation is also equipped with a number of thermometers. Measurement of the gas analysers are recorded on strip chart recorders and the signals are used to trigger alarms and safety devices. If safety limits are exceeded alarms are triggered and the installation can be flooded with CO_2 to avert fire.

The silo storing pulverised coal in addition to its special construction is equipped with thermometers and a CO analyser. If limits are exceeded, alarms are triggered and CO_2 flooding of the coal takes place to render the installation safe.

3.2.9.3 Emissions

Air emissions and abatement measures

The coal mill bag filter cleans air drawn through the coal mill. The product collected in this filter is pulverised coal ready for use in the burners. The air used, which originates in the preheater, dries and entrains the coal. These gases carry dust escaping from the preheater, which is mixed into the coal and returned to the kiln through the burners. Explosion relief vents are fitted in the Mill and Coal Store which, if activated, will result in emissions of coal dust.

Noise emissions and abatement measures

Noise will be associated with the operation of the coal mill and the air handling systems.

Vibration and abatement measures

Vibration will be associated with the coal mill operation.

Water and abatement measures

Water is not used in or generated in the process.

3.2.9.4 Waste

There is no process waste generated in this process. All dusts collected in the abatement plant are used in the process. Some waste oils and lubricating and degreasing fluids associated with maintenance and operation of the plant, machinery and transport vehicles may be generated.

3.2.9.5 Malfunction

In the event of an explosion in the coal mill or in the coal store, explosion relief vents would be activated and a release of coal dust could occur. The controls in operation are sensitive so that at first warning of a potentially dangerous situation, the carbon dioxide extinguishing system would be operated thus eliminating the risk of fire and associated explosions.

In the event of power loss, activities in this area would cease temporarily until power is restored from the auxiliary diesel generator or from the plant mains electricity supply. There are no specific malfunctions which could lead to unplanned release to the environment associated with this operation. If the Bag Filters were shut down for maintenance or due to power loss, the process would also be stopped.

4.0 Proposed Activity

4.1 Process Description

Lagan Cement Ltd propose to burn Meat and Bone Meal (MBM) as a renewable fuel source at their cement manufacturing facility in Kinnegad, Co Meath. It is planned to burn up to 50,000 tonnes of MBM annually in the plant and this will result in replacing up to 45% of coal currently being burned at the plant.

MBM will be transported to the site in a dedicated sealed, leak-proof tanker which will be transported from the rendering plants where it is produced to the cement plant, The MBM will be pneumatically blown from the tanker into one of two 100m^3 silos via an enclosed system which will not be exposed to the open air at any point and the material will be blown through a 4mm screen before entering the silo. This will prevent the possibility of any spillages of MBM and ensure only material of the correct particle size will enter into the process. The MBM will be stored in flat-bottom silos with a rotating screw extracting mechanism and this action will prevent the MBM material from coagulating during its short storage time in the silos. The MBM will then be fed pneumatically from the silo to the two burners through a closed pneumatic system.

The first burner or pre-heater burner is used in the calcination process where the raw meal calcium carbonate is converted into calcium oxide before being conveyed to the kiln. The temperature in this process is significantly greater than 850°C at all times during the calcination procedure. The kiln burner heats the raw meal constituents to temperatures in excess of 1400°C after which the reaction products leave the kiln as 'clinker'. The residence time for the materials in the kiln is approximately 20 minutes.

MBM will be burned only when temperatures are high enough for safe combustion, To start-up the installation fuel oil or natural gas is used to preheat the areas where MBM combustion takes place.

The MBM that will be used at the Lagan Cement plant will conform to specific quality standards. Any material that does not conform to these standards will be refused entry to the site and will be returned to the rendering plant where it originated,

4.2 Process Control

The MBM delivery system is such that it is never exposed to the atmosphere. The MBM is pneumatically pumped from the tanker to the silo and from the silo to the kiln and it is pumped at all times under cover.

The MBM installation is also equipped with a number of thermometers. Measurement of the gas analysers are recorded on strip chart recorders and the signals are used to trigger alarms and safety devices. If safety limits are exceeded alarms are triggered and the installation can be flooded with CO_2 to avert fire.

4.3 Emissions

4.3.1 Air emissions and abatement measures

The operation of the plant using the proposed alternative fuel will lead to the discharge of some emissions into the atmosphere. The main emissions to air are the flue gases from the main stack at the cement kiln. Some substances which are not currently regulated in the emissions streams will be regulated under the terms of the new IPPC licence. These include HCl, HF, Heavy Metals and Dioxins and Furans. As part of the baseline studies carried out for this application, HCl, HF, Heavy Metals and Dioxins and Furans were also measured in the emission stream from the main stack as a result of the existing fuel use. Very low or trace levels of these compounds were found in the emission stream and the emission levels would be expected to be the same as or lower than these emission levels when MBM is used to co-fuel the cement plant, These additional substances will be required to be monitored at regular intervals as set out in the requirements of the Waste Incineration Directive 2000/76/EC. It has been shown in the accompanying EIS that these emission concentrations from the Lagan facility are significantly lower than the standards as set out in the Directive.

4.3.2 Noise emissions and abatement measures

Noise will be associated with the operation of the engine transferring the MBM from the tanker to the silo and also from the silo to the kiln. The engine will be acoustically housed.

4.3.3 Vibration and abatement measures

There will be no vibration associated with the burning of MBM at the facility.

4.3.4 Water and abatement measures

Water is not used in or generated in the process.

4.4 Waste

There is no process waste generated in this process. Any residue resulting from the burning of MBM will be incorporated into the final product. This means that the manufacturing process is completely efficient in terms of waste management as the volume of waste generated from production is zero with all process material ending up in the final product.

4.5 Malfunction

There are no specific malfunctions that could lead to unplanned release to the environment associated with this operation.

5.0 Reported Incidents

The following incidents have been recorded and reported to the Environmental Protection Agency since operations commenced on the site in 2002.

- On December 26th, 2004 one of the clinker silos collapsed. There were no emissions of any type to the atmosphere as a result of this incident. The incident occurred as a result of a design flaw in the clinker silo structure. This flaw has been replicated world-wide and is a universal design flaw which is currently being assessed and rectified. The plant designers and additional international consultants were invited back to the facility to complete a comprehensive review of all design elements and structural stability and integrity at the facility in Spring 2005. The Audit and Review showed that all other structures were free of design flaws and no repeats of this type of incident are predicted.

- In January 2005, there was a blockage in the pre-heater tower which resulted in a build-up of pressure internally in the structure. For safety reasons it was required that a door in one of the cyclones was opened in order to release the pressure build-up, As a result there was a significant release of dust to the environment which escaped through the open door.

This incident had resulted in a corrective action being developed and remedial measures have been implemented to ensure that a repeat of this incident does not occur again. In particular, access windows have been introduced which will allow any blockages to be manually freed without the need to open doors; new work instructions have also been prepared for employees working in the area.

There have been no other recorded incidents at the Lagan Cement Ltd facility. Lagan Cement Ltd have not been convicted or prosecuted under the Environmental Protection Act, 1992 or the Protection of the Environment Act, 2003. Lagan Cement Ltd have not been convicted or prosecuted under the Waste Management Act 1996, or the Local Government (Water Pollution) Acts 1977 and 1990. Lagan Cement Ltd have had no other prosecutions brought against them.

Appendix I

Figure 1 Process Flow Schematic

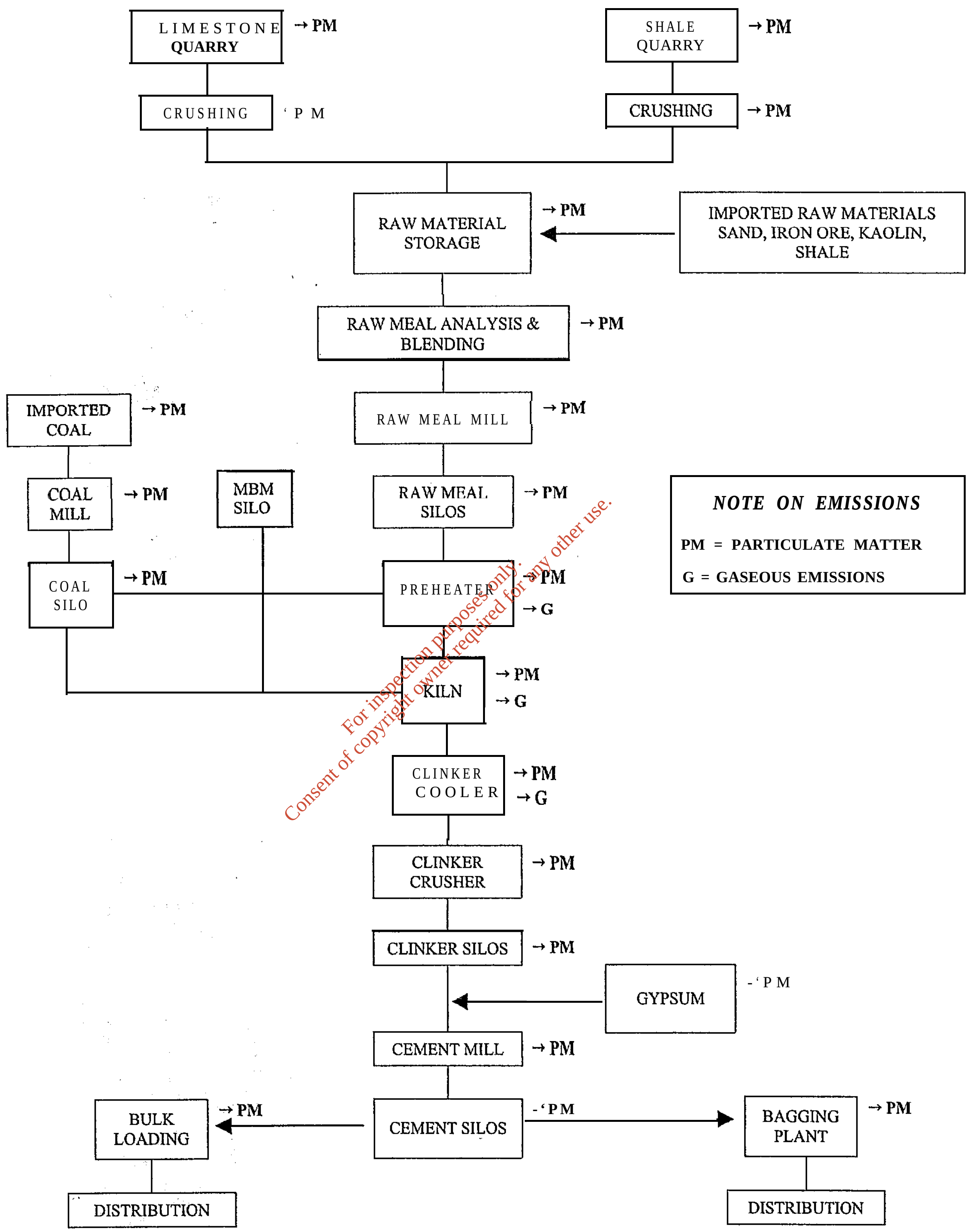

Figure 2 Process Flow Schematic: Raw Material Analysis and Blending

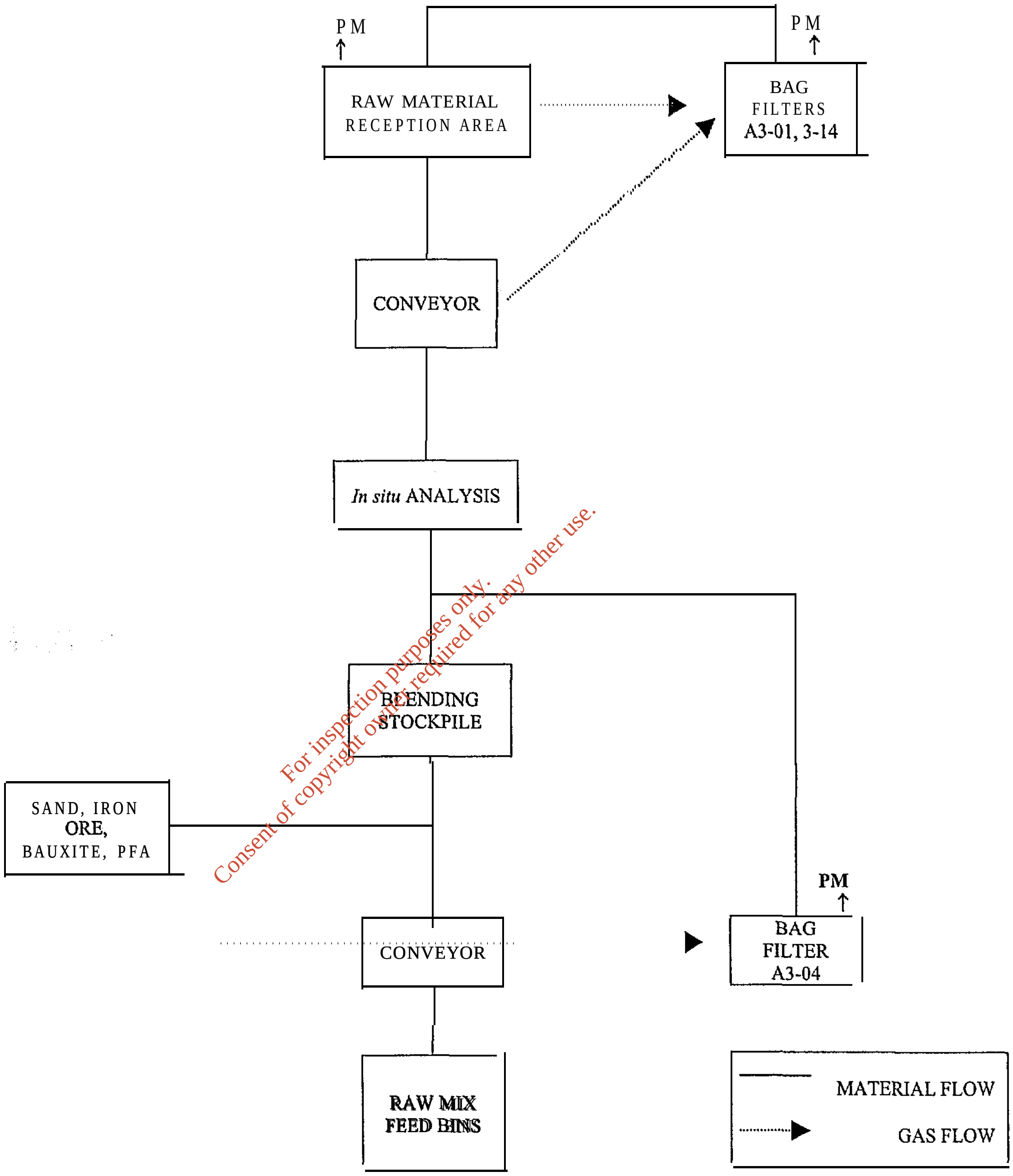

Figure 3 Process Flow Schematic: Raw Mix Milling & Mixing

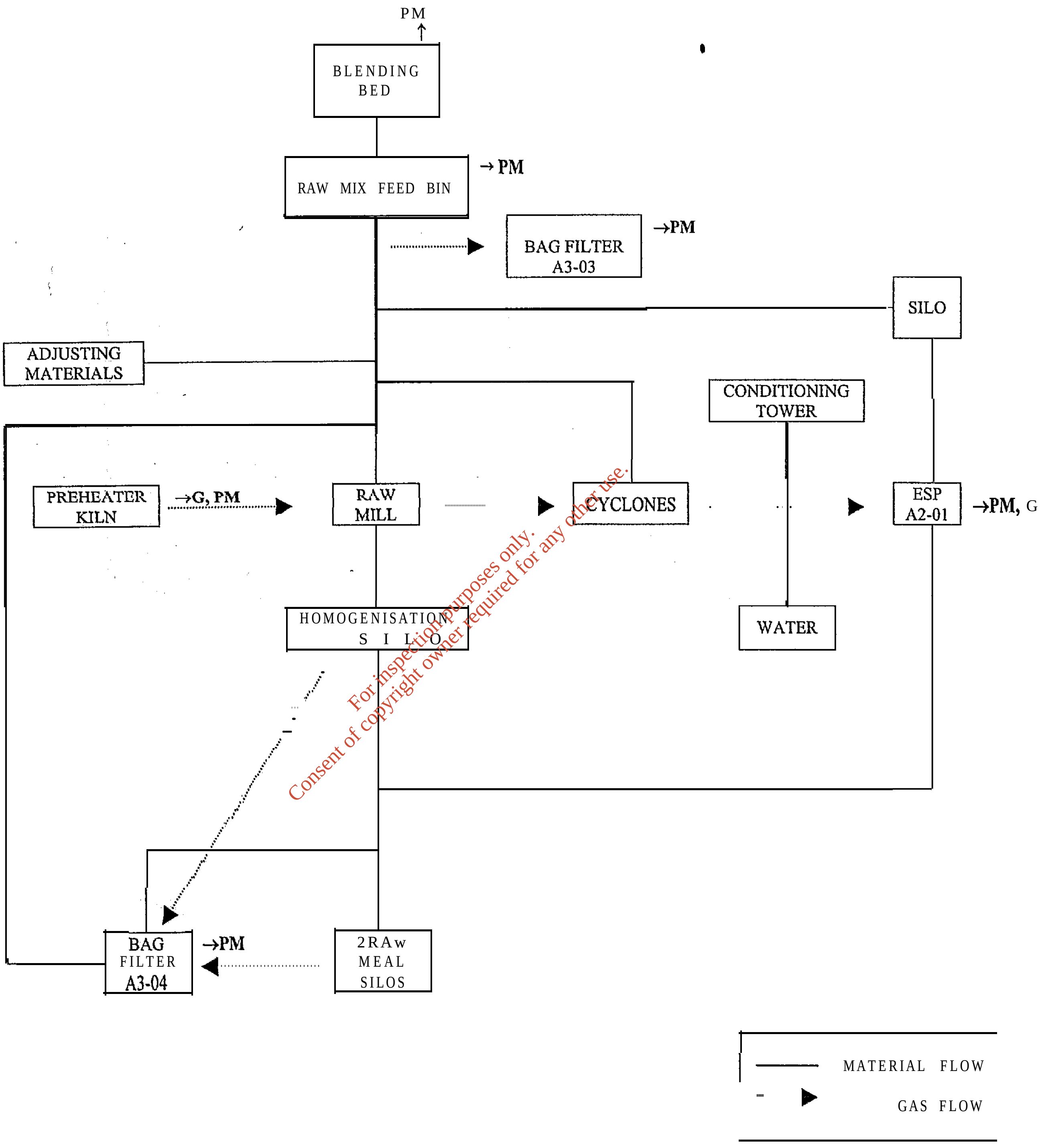

Figure 4 Process Flow Schematic: Raw Meal Kiln & Clinker Cooling & Handling

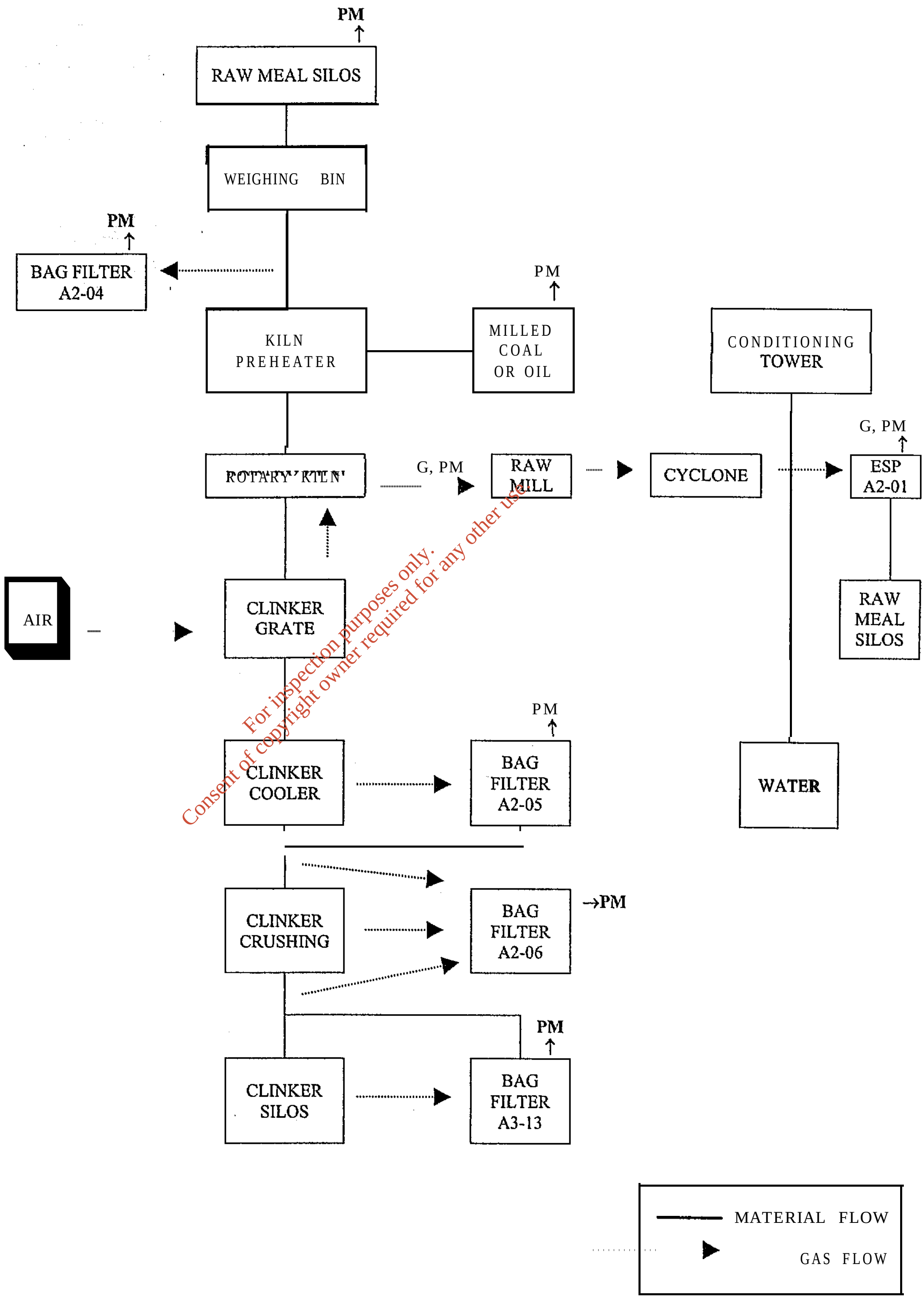

Figure 5 Process Flow Schematic: Clinker grinding, storage & handling of cement