



ENVIRONMENT  
AGENCY

## Variation Notice with introductory note

Pollution Prevention and Control Regulations 2000

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**Blue Circle Industries plc  
Lafarge Cement UK  
Aberthaw Business Unit  
East Aberthaw  
Barry  
CF62 3ZR**

**Variation Notice number  
NP3437PH**

**Permit number  
BL3986**

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## Introductory note

### **This introductory note does not form a part of the Variation Notice.**

The following Notice is issued under Regulation 17 of The Pollution Prevention and Control (England and Wales) Regulations 2000 (S.I.2000 No. 1973 (as amended) (the Regulations) to vary the conditions of a Permit issued under the Regulations to operate [part of] an installation.

The Notice comprises Schedule 1 containing conditions to be deleted, Schedule 2 conditions to be amended and Schedule 3 conditions to be added. The Notice is subject to the express conditions set out in Schedules 1 to 3.

The Permit, as amended by this Variation Notice, contains conditions which have to be complied with. It should be noted that aspects of the operation of the installation which are not regulated by those conditions are subject to the condition implied by Regulation 12(10) of the PPC Regulations, that the Operator shall use the best available techniques for preventing or, where that is not practicable, reducing emissions from the installation. Techniques include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

### **Brief description of the changes introduced by this variation notice.**

The principle purpose of the activities at the installation is to manufacture cement.

This variation is to permit the use of Meat and Bone Meal (MBM) as a partial substitute fuel at the East Aberthaw Works, subject to the satisfactory completion of a trial. The trial will follow the requirements set out in the Environment Agency's Substitute Fuels Protocol For Use On Cement And Lime Kilns, (version 4, issued June 2003).

MBM is produced at animal rendering plants during the high temperature processing of waste arising in the course of preparing meat for consumption. It is a granular solid residue that is left after extracting fat (tallow). Until recent years it was used as a fertiliser and animal feed, but is now mainly disposed of to landfill. It is a non-hazardous waste with a significant energy value that can be released when the material is burned.

The variation allows MBM to be burned in the cement kiln to provide up to 30% of the total thermal energy needed to produce cement clinker. It will be used with the coal/petroleum coke as the only partial substitute fuel.

The opportunity has been taken in this variation to make a small number of minor changes that have become necessary following the issue of the original permit.

**Other PPC Permits relating to this installation**

Permit holder	Permit Number	Date of Issue
None	-	-

**Superseded Licenses/Consents/Authorisations relating to this installation**

Holder	Reference Number	Date of Issue
Blue Circle Industries PLC	AI0713	27/08/93
Variation to IPC Authorisation	AP6826	18/01/1995
Variation to IPC Authorisation	BA2679	28/04/1998
Variation to IPC Authorisation	BE2379	30/11/1998
Variation to IPC Authorisation	BF2013	31/01/1999
Variation to IPC Authorisation	BF9131	23/07/1999
Variation to IPC Authorisation	BH7911	28/01/2000
Variation to IPC Authorisation	BK4545	14/02/2001
Variation to IPC Authorisation	BK7439	01/04/2001

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## Talking to us

If you contact the Agency about this Permit please quote the Permit Number.

The Operator should use the Emergency Hotline telephone number (0800 80 70 60) or any other number notified to it to give a notification under condition 5.1.1 of the Permit.

## Confidentiality

The Permit/Variation requires the Operator to provide information to the Agency. The Agency will place the information onto the public registers in accordance with the requirements of the PPC Regulations. If the Operator considers that any information provided is commercially confidential, it may apply to the Agency to have such information withheld from the register as provided in the PPC Regulations. To enable the Agency to determine whether the information is commercially confidential, the Operator should clearly identify the information in question and should specify clear and precise reasons.

## Variations to the permit

This Permit may be varied in the future. The Status Log within the Introductory Note to any such variation will include summary details of the Permit, variations issued up to that point in time and state whether a consolidated version of the Permit has been issued.

## Surrender of the permit

Before this Permit can be wholly or partially surrendered, an application to surrender the Permit has to be made. For the applicant to be successful, they would have to be able to demonstrate to the Agency, in accordance with Regulation 19 of the PPC Regulations, that there is no pollution risk and that no further steps are required to return the site to a satisfactory state.

## Transfer of the permit or part of the permit

Before the Permit can be wholly or partially transferred to another person, a joint application to transfer the Permit has to be made by both the existing and proposed holders, in accordance with Regulation 18 of the PPC Regulations. A transfer will be allowed unless the Agency considers that the proposed holder will not be the person who will have control over the operation of the installation or will not ensure compliance with the conditions of the transferred Permit. If the Permit authorises the carrying out of a specified waste management activity, then there is a further requirement that the transferee is considered to be a "fit and proper person" to carry out that activity.

## Status Log

Detail	Date	Comment
Application BL7272	Received 29/08/01	
Application BL3986	Received 28/08/01	
Commercial Confidentiality Claim	Received 28/08/01	Company withdrew claim by letter dated 12/09/01
Response to request for information	Request dated 12/10/01	Response dated 02/01/02 Final submission of revised application on CD format
Response to request for information	Request dated 10/01/02	Response dated 31/07/02 Response dated 15/08/02 Response dated 06/12/02
Operator's first request to extend deadline of response to request for information	Request dated 05/04/02	Request accepted and confirmed on 08/07/02
Operator's second request to extend deadline of response to request for information	Request dated 02/08/02	Request accepted and confirmed on 07/08/02
Operator's third request to extend deadline of response to request for information	Request dated 08/08/02	Request accepted and confirmed on 08/08/02. Information received on 15/08/02
Response to request for information	Request dated 03/10/02	Response dated 21/10/02
Permit BL3986	Determined 21/01/03	
Application to use MBM as a substitute fuel	Received 13/07/04	Duly made 27/07/04
Schedule 7 notice for Additional information	Issued 30/07/04	Response 27/08/04
Variation determined	Determined 10/12/04	

*End of introductory Note*

**.Variation Notice**

Pollution Prevention and Control  
(England and Wales) Regulations 2000



**ENVIRONMENT  
AGENCY**

## Variation Notice

Permit number (**The Permit**)

**BL3986**

Variation Notice number

**NP3437PH**

The Environment Agency in exercise of its powers under Regulation 17 of the Pollution Prevention and Control (England and Wales) Regulations 2000 (S.I. 2000 No. 1973) (as amended), hereby varies the Permit issued on 21/01/2003 and held by you.

**Blue Circle Industries PLC**("the Operator"),

Whose Registered Office is

**The Old Rectory**

**Misterton**

**Lutterworth**

**Leicestershire**

**LE17 4JP**

**Company registration number 00066558**

which relates to the operation of an Installation at

**Lafarge Cement UK**

**Aberthaw Business Unit**

**East Aberthaw**

**Barry**

**CF62 3ZR**

to the extent set out in Schedules 1 to 3 of this Variation Notice.

**This Notice shall take effect from 10/12/2004.**

Signed

**Andrew Johnson, PIR/RSR Team Leader**

Authorised to sign on behalf of the Environment Agency

Date

**10/12/2004**

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Effective from: **10/12/2004**

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## **SCHEDULE 1 - CONDITIONS TO BE DELETED**

1. No conditions are deleted

## **SCHEDULE 2 - CONDITIONS TO BE AMENDED**

### **2. Condition 1.1.1 is amended to:**

- 1.1.1 The Operator is authorised to carry out the activities and/or the associated activities specified in Table 1.1.1.

**Table 1.1.1**

<b>Activity under Schedule 1 of the Regulations/ Associated Activity</b>	<b>Description of specified activity</b>	<b>Limits of specified activity</b>
Producing or grinding cement clinker [Schedule 1 Activity – Chapter 3, Section 3.1, Part A(1)(a)]	The operation of a dry cement making process.	Area defined in the site layout plan, resubmitted in response to the request for further information Notice.
Raw material storage, handling and preparation [directly associated activity]	Receipt of raw materials or recovery of raw materials from quarry. Preparation and storage of raw materials or process feedstocks. The raw meal is pneumatically transported to a system of blending silos before discharge to storage silos prior to being fed to the kiln for clinker manufacture.	Recovery of raw materials from the quarry floor or receipt on site through crushing, blending, other processing and feeding materials to the kiln system. Area defined in the site layout plan, resubmitted in response to the request for further information Notice.
Conventional solid fuel storage and preparation [directly associated activity]	The raw fuel mix is stored on open stockpiles prior to grinding into pulverised fuel, which is stored in hoppers and then fired to the kiln.	Area defined in the site layout plan, resubmitted in response to the request for further information Notice.
Product handling, storage and despatch [directly associated activity]	Product handling, storage, packing and despatch.	The cement is pneumatically transported from the mill house to storage silos. Cement held in these silos is loaded into road tankers or bagged. Area defined in the site layout plan, resubmitted in response to the request for further information Notice.
Substitute fuel storage [directly associated activity]	Substitute fuel storage and handling systems, specifically MBM.	Receipt on site, storage and feeding to kiln burner.

### **3. Condition 2.1.1 is amended to:**

- 2.1.1 The Permitted Installation shall, subject to the conditions of this Permit, be managed and controlled as described in the documentation specified in Table 2.1.1, or as otherwise agreed in writing by the Agency.



<b>Table 2.1.1 : Management and control</b>		
<b>Description</b>	<b>Parts</b>	<b>Date Received</b>
Application	The response to question 2.1 given in section 2.1 of the application	Final Resubmitted Application (CD format) on 04/01/02
Response to Second Schedule 4 Part1 Notice	Response to questions B2.1 (1 to 5)	15/08/02
Application to use MBM as a substitute fuel	Application details related to MBM as a fuel	13/07/04
Response to Schedule 7 request for information dated 27/08/04	All parts	27/08/04

**4. Condition 2.2.1 is amended to:**

- 2.2.1 The Operator shall, subject to the conditions of this Permit, use raw materials (including water) as described in the documentation specified in Table 2.2.1, or as otherwise agreed in writing by the Agency.

<b>Table 2.2.1 : Raw materials (including water)</b>		
<b>Description</b>	<b>Parts</b>	<b>Date Received</b>
Application	The response to question 2.2 given in section 2.2 of the application	Final Resubmitted Application (CD format) on 04/01/02
Application to use MBM as a substitute fuel	Application details related to MBM as a fuel	13/07/04
Response to Schedule 7 request for information dated 27/08/04	All parts	27/08/04

**5. Condition 2.2.2 is amended to:**

- 2.2.2 Gas oil shall contain less than 0.2% sulphur content by weight. The Operator shall report sulphur in oil content to the Agency annually.

**6. Condition 2.3.1 is amended to:**

- 2.3.1 The Permitted Installation shall, subject to the conditions of this Permit, be operated using the techniques and in the manner described in the documentation specified in Table 2.3.1, or as otherwise agreed in writing by the Agency.

**Table 2.3.1: Operating techniques**

Description	Parts	Date Received
Application	The response to questions 2.3 given in section 2.3 of the application	Final Resubmitted Application (CD format) on 04/01/02
Response to Second Schedule 4 Part1 Notice	Response to questions B2.3 (1 to 8) and B2.3.8	15/08/02
Application to use MBM as a substitute fuel	Application details related to MBM as a fuel	13/07/04
Response to Schedule 7 request for information dated 27/08/04	All parts	27/08/04

**7. Condition 2.10.1 is amended to:**

2.10.1 The Operator shall, subject to the conditions of this Permit, carry out, evaluate and assess monitoring as described in the documentation specified in Table 2.10.1, or as otherwise agreed in writing by the Agency.

**Table 2.10.1 : Monitoring**

Description	Parts	Date Received
Application	The response to question 2.10 given in section 2.10 of the application	Final Resubmitted Application (CD format) on 04/01/02
Response to Second Schedule 4 Part1 Notice	Response to questions B2.10 (1 to 18)	15/08/02
Response to Third Schedule 4 Part1 Notice	Response to Second Schedule 4 Part1 Notice	21/10/02
Application to use MBM as a substitute fuel	Application details related to MBM as a fuel	13/07/04
Response to Schedule 7 request for information dated 27/08/04	All parts	27/08/04

**8. Condition 6.1.1 is amended to:**

6.1.1 Emissions to air from the emission point(s) specified in Table 6.1.1 shall only arise from the source(s) specified in that Table.

**Table 6.1.1: Emission points into air**

<b>Emission point reference/description</b>	<b>Source</b>	<b>Location of emission point</b>
A1	Chimney to No.6 cement kiln	Point A1 on the site layout plan, resubmitted in response to the request for further information Notice.
A2	3000 HP cement mill dust plant	Point A2 on the site layout plan, resubmitted in response to the request for further information Notice.
A3	3000 HP cement mill separator	Point A3 on the site layout plan, resubmitted in response to the request for further information Notice.
A4	3000 HP cement mill- conveyor to cement mill clinker hopper	Point A4 on the site layout plan, resubmitted in response to the request for further information Notice.
A5	Combined discharge from closed circuit venting system on coal milling plant	Point A5 on the site layout plan, resubmitted in response to the request for further information Notice.
A6	OPC bag loading facility	Point A6 on the site layout plan, resubmitted in response to the request for further information Notice.
A7	OPC bag loading facility	Point A7 on the site layout plan, resubmitted in response to the request for further information Notice.
A8	Silo reserved for bulk cement	Point A8 on the site layout plan, resubmitted in response to the request for further information Notice.
A9	Silo reserved for bagged cement	Point A9 on the site layout plan, resubmitted in response to the request for further information Notice.
A10	Raw meal blending, storage, handling and kiln feed facility	Point A11 on the site layout plan, resubmitted in response to the request for further information Notice.
A11	Clinker handling system from kiln to storage	Point A12 on the site layout plan, resubmitted in response to the request for further information Notice.
A12	Primary stone crusher at Aberthaw Quarry	Point A13 on the site layout plan, resubmitted in response to the request for further information Notice.
A13	Secondary stone crusher within the cement works	Point A14 on the site layout plan, resubmitted in response to the request for further information Notice.
A14	Coal mill vacuum plant	Point A15 on the site layout

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		plan, resubmitted in response to the request for further information Notice.
A15	Rapid hardening cement bulk loading facility	Point A17 on the site layout plan, resubmitted in response to the request for further information Notice.
A16	Clinker conveyors to main clinker store	Point A18 on the site layout plan, resubmitted in response to the request for further information Notice.
A17	PLC bulk cement loading dust plant	Point A20 on the site layout plan, resubmitted in response to the request for further information Notice.
A18	Carbon filter vent on MBM storage silo	Top of MBM storage silo

**9. Condition 6.1.2 is amended to:**

6.1.2 The limits for emissions into air for the parameter(s) and emission point(s) set out in Table 6.1.2 and Table 6.1.4 shall not be exceeded

**10. Condition 6.1.4 is amended to:**

6.1.4 The Operator shall carry out monitoring of the parameters listed in Table 6.1.4, from the emission points and at least at the frequencies specified in that Table.

**Table 6.1.4: Emission limits into air**

Parameters	Total Particulates (mg/m <sup>3</sup> )				Frequency and duration
	Hourly Average	Daily Average	Annual Average	Periodic	
Emission Point A2	40	30	None	30	Continuous and annual periodic monitoring
Emission Point A3	40	30	None	30	Continuous and annual periodic monitoring
Emission Point A4 to A18	No evidence of deposition in the vicinity of the release point				

**11. Condition 9.1.1 is amended to:**

After Improvement Condition No. 9.16 in Table 9.1.1, there shall be added:-

**Table 9.1.1: Improvement programme requirements**

Reference	Requirement	Date
9.16	The Operator shall demonstrate that the CEM's operate to a confidence limit of 95%. A written report shall be submitted to the Agency to confirm this. Following Agency approval, the measurement uncertainty values as defined in 6.1.15, can be adopted.	1/07/05

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**12. Condition 10.1.1 is amended to include the interpretation of the term MBM as used in this Variation.**

**"MBM"**

means Meat and Bone Meal (MBM). It is produced at animal rendering plants during the high temperature processing of animal remains comprising mainly abattoir waste arising in the course of preparing meat for consumption. It is a granular solid residue that is left after extracting fat (tallow) during the rendering process.

MBM used at this Installation cannot be produced from the rendering of any animal waste from the Over Thirty Month Scheme (OTMS) designed to eliminate Bovine Spongiform Encephalopathy (BSE), as long as the scheme remains in force. The waste for rendering may contain Specified Risk Material (SRM) such as brain and spinal cords from other animals.

MBM is classified as a non-hazardous waste by the European Waste Code (EWC Code) 02 02 02, defined under the heading "Wastes from the preparation and processing of meat, fish and other foods of animal origin" and the sub-clause "Animal tissue waste".

MBM does not contain raw or unprocessed meat, bones or animal parts, or any other waste of agricultural, horticultural or industrial origin.

### SCHEDULE 3 - CONDITIONS TO BE ADDED

#### 13. Condition 2.2.3 is added:

2.2.3 MBM burned at the Permitted Installation shall be as described by the EWC Code 02 02 02 and shall comply with the limits specified in Table 2.2.3.

**Table 2.2.3 : MBM Specification**

Parameter	Maximum Value
Calorific Value	14 – 24 MJ/kg
Moisture content	<10 %
Sulphur	1.5 % w/w
Chloride	0.75 % w/w
Fluorine	0.11 % w/w
Bromine	0.1 % w/w
Phosphorus	15.0 % w/w
Zinc	0.2 % w/w
Ash	30 % w/w
Group I metals <sup>(1)</sup>	5 mg/kg
Group II metals <sup>(2)</sup>	20 mg/kg
Group III metals <sup>(3)</sup>	1500 mg/kg
Manganese	1500 mg/kg
Lead	200 mg/kg

(1) Mercury and its compounds

(2) Cadmium and thallium

(3) Antimony, arsenic, cobalt, chromium, copper, lead, nickel, vanadium.

#### 14. Condition 2.2.4 is added:

2.2.4 The materials detailed in Table 2.2.4 shall be stored in the location and manner specified in that table.

**Table 2.2.4 : Raw materials (including water)**

Material	Location of Storage on site	Storage Conditions
Coal/petcoke blend	Dedicated fuel stockyard	Open stockpile
Ferrous sulphate	Dedicated storage silo	Silo
MBM	Dedicated storage silo	Silo equipped with dust filter and carbon filter

**15. Condition 2.3.2 is added:**

- 2.3.2 The Operator shall, subject to the conditions of the permit, be permitted to trial the use of MBM as described in the documentation specified in Table 2.3.1, or as otherwise agreed in writing by the Agency, and in accordance with the Environment Agency's Substitute Fuels Protocol For Use On Cement and Lime Kilns (Version 4 issued June 2003).

**16. Condition 2.3.3 is added:**

- 2.3.3 The Operator may only continue to burn MBM after the completion of the trial described in condition 2.3.2, with the written approval of the Environment Agency and in accordance with the other conditions of this permit.

**17. Condition 2.3.4 is added:**

- 2.3.4 Only the substitute fuel and quantities specified in Table 2.3.4 shall be used at the Permitted Installation.

<b>Table 2.3.4: Permitted substitute fuels</b>			
Description	European Waste Catalogue Number (where available) or other specification	Thermal input at any time	
		Minimum	Maximum
MBM	EWC 02 02 02	0% thermal substitution	30% thermal substitution

**18. Condition 2.3.5 is added:**

- 2.3.5 The operator shall cease the burning of MBM as soon as practicable during periods –
- a** of plant operation not classified as 'normal operation', plant malfunction, or,
  - b** any continuous emission limit value specified in table 6.1.2 is being exceeded, or,
  - c** any of the Continuous Emissions Monitors for particulate, SO<sub>2</sub>, NO<sub>x</sub>, CO, VOC's, HCl, temperature, oxygen or moisture are not operational other than for periods of less than two hours where an analyser is off-line for routine planned maintenance or calibration.

**19. Condition 6.1.14 is added:**

- 6.1.14 The Operator shall carry out monthly dust deposition monitoring at two locations and using methods agreed with the Agency. The results shall be reported quarterly using an agreed format and within 28 days of the end of each quarter.

**20. Condition 6.1.15 is added:**

- 6.1.15 With regard to the calibration of continuous emission monitors, at the daily and hourly emission limit value, the values of the 95% confidence intervals of a single measured result shall not exceed the following percentages of the emission limit values:

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Carbon monoxide	10%
Sulphur dioxide	20%
Oxides of nitrogen	20%
Particulate matter	30%
Total organic carbon	30%
Hydrogen chloride	40%

**21.** Conditions 21 - 32 shall cease to have effect in the following circumstances:

- If the Environment Agency permits the use of MBM as a substitute fuel after the completion of the trials, as in Condition 2.3.3, or
- If the MBM trials are permanently ceased before completing the Trials Programme and Monitoring requirements in Conditions 31 and 32 of this Variation.

If the trials are permanently ceased before completing the Trials Programme and Monitoring requirements, the Operator shall immediately cease burning MBM and notify the Environment Agency.

**22.** The trial burning of MBM shall be completed within 18 months from the effective date of this Variation, unless otherwise agreed in writing by the Environment Agency.

**23.** The Operator shall give the Environment Agency 14 days notice, in writing, before loading any MBM into the storage silo.

**24.** The Operator shall give the Environment Agency 7 days notice, in writing, of the intention to commence burning MBM. The commencement date indicated in this notification shall be taken as the start of the MBM trial period.

**25.** The Operator shall cease burning MBM on the completion of the trials or 9 months after notifying the Environment Agency of the start of the trial period, whichever is earlier, unless otherwise agreed in writing by the Environment Agency.

**26.** The Operator shall notify the Environment Agency in writing within 7 days of the completion of the trial burning of MBM.

**27.** Within 4 calendar months following notification that the MBM trials have been completed, the Operator shall submit a report on the outcome of the trials to the Environment Agency. The report shall include an assessment of the environmental performance measured against the Critical Success Factors shown in Table 28 and a comparison of emissions with and without using MBM. The report shall be in the format described in Section 4.3 "Reporting of Substitute Fuel(s) Trials" in the Agency's Substitute Fuels Protocol.



28. The Critical Success Factors for defining the outcome of the MBM trials are shown in Table 28 of NP3437PH.

**NP3437PH Table 28: Critical Success Factors for the MBM Trials**

Critical Success Factors	DESCRIPTION
<b>Effects on the Overall Environmental Impact</b>	
The Overall Environmental Impact (and particularly the impact of emissions) will be calculated when MBM is used and compared with the baseline case when MBM is not used.	
CSF 1	There will be no net environmental detriment to the local environment resulting from a change in emissions caused by burning MBM. The assessment will be based on the Environment Agency's H1 methodology (Integrated Pollution Prevention and Control (IPPC) Environmental Assessment and Appraisal of BAT) and will take account of other benchmark criteria established to protect the environment.
CSF 2	Reduction in releases of Carbon Dioxide as calculated using the WBCSD Working Group Cement Protocol version 1.6.
CSF 3	No discernible odours from the burning or storage of MBM detectable outside the site boundary as perceived by an Authorised Officer of the Environment Agency.
<b>Compliance with Existing Emission Limits</b>	
Stack emissions will be monitored continuously for particulates, SO <sub>2</sub> , NO <sub>x</sub> , HCl, TOC and CO and there will be additional non-continuous monitoring carried out during the trials. The data from all monitoring will be used to confirm compliance with current emission limits defined in the Permit.	
CSF4	The current specified emission limit values will not be exceeded for any reason directly attributable to the use of MBM.
CSF5	No notifiable unauthorised releases of MBM to air, land or water.
<b>Management Procedures In Place for the Use of MBM</b>	
Management systems relevant to the operation and handling of MBM will be included within the site Environmental Management System (EMS) and demonstrated to be effective. These procedures and management systems shall be audited during the trials.	
CSF 6	The management systems and relevant procedures specific to the use, storage and handling of MBM will be demonstrated as being effective.

29. MBM must cease to be burned as soon as practicable if it becomes apparent that there is a non-compliance with any of the CSFs. Any such non-compliance shall be treated as a Notifiable Incident in Condition 5.1.1 of this permit. The use of MBM may only resume after written approval of the Environment Agency.

30. The Operator shall advise the Agency and Vale of Glamorgan Local Health Board of any complaints, within 24 hours of their receipt, that are attributed directly to the use of MBM.

31. The Operator shall carry out the trials programme shown in Table 31 of NP3437PH to allow comparative monitoring to take place during the MBM trials.

**NP3437PH Table 31: MBM Trials Programme**

Fuel Combination	Baseline Testing Coal/Petcoke	Main Trials Programme <sup>(2)</sup> Coal/Petcoke & MBM
Trial weeks <sup>(1)</sup>	6	6

- (1) Minimum length of time required to obtain stable Kiln operation and enable monitoring programme to take place.
- (2) MBM used at or as near as possible to the 30% thermal substitution rate.

32. The Operator shall carry out monitoring at the stated frequency from the sources indicated in Table 32 of NP3437PH, for the substances or criteria shown in that table.

NP3437PH Table 32: Monitoring & Sampling					
Substance or Criteria to be measured	Minimum Number of Samples Required (A)				
	Feeds	Coal & Petcoke	MBM	Kiln Stack A1	Clinker
Total Particulates				C+6	
PM <sub>10</sub>				6	
NO <sub>x</sub> (as NO <sub>2</sub> )				C+6	
SO <sub>2</sub>				C+6	
CO				C+6	
HCl				C+6	
HF				6	
VOC (as TOC)				C+6	
Group I, II and III metals. (B)	2	2	6	6 (F)	2
Total of each S, F, Cl, Br, I	2	2	6		2
Dioxins and furans.				6	2
PCBs				6	
PAHs				6	
Moisture, temp., and O <sub>2</sub>				C+6	
Flow	C	C	C	S	C
Calorific value (gross and net)		6	6		
Moisture			6		
Solids and ash content			6		
Total Organic Carbon, Nitrogen & Amino Acids				E	E

### Notes For Table 32

A	<p>During testing, when MBM is used it shall be as near as possible to the maximum 30% thermal substitution rate.</p> <p>The minimum number of samples required is set in order to provide the same minimum number of valid results.</p> <p>Multiple sampling applies to the baseline and MBM trial. Where multiple sampling is specified no more than one sample shall be taken in each week.</p>
B	<p>Group I metal means Mercury; Group II metals means Cadmium &amp; Thallium; Group III metals means Sb, Sn, As, Pb, Cr, Co, Cu, Mn, Ni, and V and their compounds;</p> <p>Group II &amp; III metals reported in total for each group and by species.</p>
C	Continuous Monitoring
E	<p>For Kiln Stack sampling this will be taken from the duct prior to the Baghouse or other suitable agreed location.</p> <p>Sampling Frequency: Daily sampling for 7 days. If total aqueous extracted amino acids is less than 5mg/100g for all daily samples, sampling may be reduced to weekly for the next month.</p> <p>If total aqueous extracted amino acids is less than 5mg/100g for all weekly samples, sampling may be reduced to monthly for the next quarter or until end of the trial.</p> <p>Sampling frequency reverts to the immediately previous frequency if any amino acid sample exceeds 5mg/100gm.</p> <p>(Reference: Environment Agency Monitoring Protocol – Ash and particulate testing methods and frequency for animal remains incineration, including MBM (for analysis of carbon and total protein content).</p>
F	All metals to be sampled simultaneously in the gaseous and particulate phases and reported separately.
S	Simultaneously during periods of periodic stack monitoring.

