Environment Agency

Review of an Environmental Permit for an Installation subject to Chapter II of the Industrial Emissions Directive under the Environmental Permitting (England & Wales) Regulations 2010 (as amended)

Consultation on our decision document recording our decision-making process following review of a permit

The Permit number is: EPR/BL7248IH
The Operator is: Cemex UK Cement limited
The Installation is: Rugby Cement Plant
This Variation Notice number is: EPR/BL7248IH/V016

Consultation commences/commenced on: 03/03/2017
Consultation ends/ended on: 31/03/2017

What this document is about

Article 21(3) of the Industrial Emissions Directive (IED) requires the Environment Agency to review conditions in permits that it has issued and to ensure that the permit delivers compliance with relevant standards, within four years of the publication by the European Commission of updated decisions on BAT conclusions.

We have reviewed the permit for this installation against the revised BAT Conclusions for the production of Cement, Lime and Magnesium Oxide industry sector published on 9th April 2013 in the Official Journal of the European Union . Where appropriate, we also considered other relevant BAT Conclusions published prior to this date but not previously included in a permit review for the Installation. In this decision document, we set out the reasoning for the draft consolidated variation notice that we are minded to issue.

It explains how we have reviewed and considered the techniques used by the Operator in the operation and control of the plant and activities of the installation. This review has been undertaken with reference to the decision made by the European Commission establishing best available techniques (BAT) conclusions (BATc) for production of Cement, Lime and Magnesium oxide as detailed in document reference 2013/163/EU. It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

As well as considering the review of the operating techniques used by the Operator for the operation of the plant and activities of the installation, the draft consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issue. Where this has not already been done, it also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and with other permits issued to installations in this sector. Although the wording of some conditions has changed, while others have been deleted because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document we therefore address only our determination of substantive issues relating to the new BAT Conclusions and any changes to the operation of the installation.

The document is in draft at this stage, because we have yet to make a final decision. Because the operator has requested a relaxation of certain otherwise mandatory standards, before we make this decision the IED requires us to explain our thinking to the public and other interested parties, to give them a chance to understand that thinking and, if they wish, to make relevant representations to us. We will make our final decision only after carefully taking into account any relevant matter raised in the responses we receive. Our mind remains open at this stage: although we believe we have covered all the relevant issues and reached a reasonable conclusion, our ultimate decision could yet be affected by any information that is relevant to the issues we have to consider. However, unless we receive information that leads us to alter the conditions in the draft Consolidated Variation Notice, or to reject it altogether, we will issue the Notice in its current form with an explanation of how we have addressed consultation responses..

In this document we frequently say “we have decided”. That gives the impression that our mind is already made up; but as we have explained above, we have not yet done so. The language we use enables this document to become the final decision document in due course with no more re-drafting than is absolutely necessary.

We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future.

How this document is structured

1. Our proposed decision
2. How we reached our decision
3. The legal framework
4. Annex 1– Review of operating techniques within the Installation against BAT Conclusions.
5. Annex 2 – Review and assessment of derogation request(s) made by the operator in relation to BAT Conclusions which include an Associated Emission Level (AEL) value.
6. Annex 3 – Improvement Conditions
7. Annex 4 – Consultation responses
8. Annex 5 – Review and assessment of changes that are not part of the BAT Conclusions derived permit review.

1 Our proposed decision

We are minded to issue the Variation Notice to the Operator. This will allow it to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice that updates the whole permit.

As part of our proposed decision we have decided to grant the Operator's request for a derogation from the requirements of BAT Conclusion 18 as identified in the production of cement, lime and magnesium oxide BAT Conclusions document. The way we assessed the Operator's requests for derogation and how we subsequently arrived at our conclusion is recorded in Annex 2 to this document.

We consider that, in reaching our decision, we have taken into account all relevant considerations and legal requirements and that the varied permit will ensure that a high level of protection is provided for the environment and human health.

The draft Consolidated Variation Notice contains many conditions taken from our standard Environmental Permit template including the relevant annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the Notice, we have considered the techniques identified by the operator for the operation of their installation, and have accepted that the details are sufficient and satisfactory to make those standard conditions appropriate. This document does, however, provide an explanation of our use of "tailor-made" or installation-specific conditions, or where our Permit template provides two or more options.

2 How we reached our draft decision

2.1 Requesting information to demonstrate compliance with BAT Conclusion techniques

We issued a Notice under regulation 60(1) of the Environmental Permitting (England and Wales) Regulations 2010 (a Regulation 60 Notice) on 1 May 2014 requiring the Operator to provide information to demonstrate where the operation of their installation currently meets, or how it will subsequently meet, the revised standards described in the relevant BAT Conclusions document.
The Notice required that where the revised standards are not currently met, the operator should provide information that

- Describes the techniques that will be implemented before 9 April 2017, which will then ensure that operations meet the revised standard, or
- justifies why standards will not be met by 9 April 2017, and confirmation of the date when the operation of those processes will cease within the installation or an explanation of why the revised BAT standard is not applicable to those processes, or
- justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised standard described in the BAT Conclusions.

Where the Operator proposed that they were not intending to meet a BAT standard that also included a BAT Associated Emission Level (BAT AEL) described in the BAT Conclusions Document, the Regulation 60 Notice required that the Operator make a formal request for derogation from compliance with that AEL (as provisioned by Article 15(4) of IED). In this circumstance, the Notice identified that any such request for derogation must be supported and justified by sufficient technical and commercial information that would enable us to determine acceptability of the derogation request.

The Regulation 60 Notice response from the Operator was received on 8 January 2105.

We considered that the response did not contain sufficient information for us to commence determination of the permit review. We therefore issued a further information request to the Operator on the 22 May 2015. Suitable further information was provided by the Operator on 6 July 2015.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review but not that it necessarily contained all the information we would need to complete that determination.

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 60 Notice response that appears to be confidential in relation to any party.

2.2 Review of our own information in respect to the capability of the installation to meet revised standards included in the BAT Conclusions document

Based on our records and previous experience in the regulation of the installation we have no reason to consider that the operator will not be able to comply with the techniques and standards described in the BAT Conclusions.

2.3 Requests for Further Information during determination

Although we were able to consider the Regulation 60 Notice response generally satisfactory at receipt, we did in fact need more information in order to complete our permit review assessment, and issued a further information request on 22 May 2015. A copy of the further information requests was placed on our public register.

In addition to the responses to our further information requests, we received additional information during the determination from Cemex UK Limited regarding the derogation request on the 6 July 2015, 23 June 2016 and 16 December 2016. made a copy of this information available to the public in the same way as the responses to our information requests.

We are now providing the public with an opportunity to comment on our proposed decision and conclusion to the Permit Review which includes our draft Consolidated Variation Notice and this decision document. We will consider all relevant representations we receive in response to this consultation and will amend this explanatory document as appropriate to explain how we have done this, when we publish our final decision.

3 The legal framework

The Consolidated Variation Notice will be issued, if appropriate, under Regulations 18 and 20 of the EPR The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an *installation* as described by the IED;
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, if we issue the Consolidated Variation Notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

Annex 1: decision checklist regarding relevant BAT Conclusions

BAT Conclusions for the production of cement, lime and magnesium oxide, were published by the European Commission on 9 April 2013. There are 69 BAT Conclusions; 1 and 2 are generally applicable, 3 – 29 apply to the cement industry, 30 – 54 apply to the lime industry, and 55 – 69 apply to the production of magnesium oxide. This annex provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation. This annex should be read in conjunction with the Consolidated Variation Notice

The overall status of compliance with the BAT conclusion is indicated in the table as

NA Not Applicable

CC Currently Compliant – We have reviewed the information available to us and considered that it provides sufficient evidence show the operator is currently complaint with the BAT conclusion and have no reason this will change before the implementation date.

FC Compliant in the future (within 4 years of publication of BAT conclusions) - We have reviewed the information available to us and considered that it provides sufficient evidence show the operator has suitable plans in place to ensure they will be complaint with the BAT conclusion by the implementation date.

NC Not Compliant

BAT C No	Summary of BAT Conclusion requirement for production of cement, Lime and magnesium oxide	Status NA/ C / FC / NC	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
1	In order to improve the overall environmental performance of the plants/installations producing cement, lime and magnesium oxide, production BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the listed features.	**CC**	All activities and operations at Rugby are covered within the scope of an environmental management system, which has been certified by an accredited external body as conforming to ISO 14001 since 2000. The EMS incorporates the features described in BATC 1.
2	In order to reduce/minimise noise emissions during the manufacturing processes for cement, lime and magnesium oxide, BAT is to use a combination of the listed techniques.	**CC**	Rugby works carries out both occupational and environmental noise monitoring surveys annually. Data collected in these surveys is used to identify potential noise sources and an improvement programme is in place to minimise noise from these sources. Rugby works has been operating since 2000, therefore as equipment such as compressors are replaced over time more energy efficient and less noisy equipment is installed. More recently a noise and vibration management plan has been established and agreed with the Environment Agency for Rugby works to address particular issues from the local community. As part of this initiative, the latest technology in the form of an acoustic camera has been utilised.
3	In order to reduce all kiln emissions and use energy efficiently, BAT is to achieve a smooth and stable kiln process, operating close to the process parameter set points by using the listed techniques.	**CC**	The kiln is operated using a modern computer based control system and solid fuel feed systems all use modern gravimetric techniques to ensure the process is optimised, emissions are reduced and energy is used efficiently. Kiln operations are covered by site management systems and various parameters will be taken into consideration, such as temperature and pressure, to monitor and maintain smooth and stable operations.
4	In order to prevent and/or reduce emissions, BAT is to carry out a careful selection and control of all substances entering the kiln.	**CC**	The use of natural raw materials are dependent on the local sources available. Alternative raw materials, their selection and the way they are fed to the kiln are covered by the procedures explained in BAT Conclusion 11.

	Particulate matter (PM), Oxides of Nitrogen (NOx), Sulphur Dioxide (SO2), Carbon Monoxide (CO), Dioxins and Furans (PCDD/F), Hydrogen Chloride (HCl), Total organic carbon (TOC), Hydrogen Fluoride (HF), Ammonia (NH_3)		A risk assessment process that includes a mass balance approach is available for any new material to ensure emissions are reduced and managed, including those mentioned in BAT 24 to 28, i.e. TOC, HCl, HF, dioxins and metals. In addition quality management and management of change systems are implemented at Rugby works to manage kiln inputs to minimise and prevent emissions
5	BAT is to carry out monitoring and measurement of process parameters and emissions on a regular basis and to monitor emissions in accordance with the relevant EN standards or, if EN standards are not available, ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality, including the following: a. Continuous measurements of process parameters demonstrating the process stability, such as temperature, O_2 content, pressure and flowrate. b. Monitoring and stabilising critical process parameters, i.e. homogenous raw material mix and fuel feed, regular dosage and excess oxygen c. Continuous measurements of NH_3 emissions when SNCR is applied d. Continuous measurements of dust, NOx , SOx , and CO emissions e. Periodic measurements of PCDD/F and metal emissions	**FC**	a) Rugby Cement plant utilises, monitors and controls the process via numerous process monitoring techniques including temperature, pressure, oxygen and flow rate. These are linked and provide continuous signals to the plant SCADA control system. b) Consistent quality control procedures are applied to ensure homogenous raw material mix by the use of performance monitoring against targets for each process stage. In turn raw material feed and fuels are controlled and delivered via calibrated feed devices. Excess oxygen is monitored as described in (a) above c) SNCR is not utilised at Rugby Cement Plant. d) Continuous measurements of NOx, SOx and CO are measured utilizing certified analysers (MCERTs), these in turn are calibrated to the CEN standard BS EN14181 (1), calibrations performed by an accredited testing organisation, employing certified Engineers in accordance with ISO17025, after calibration ongoing CEM quality control is provided by the plants trained and competent personnel following the QAL 3 requirements of BS EN 14181. Continuous measurement or periodic measurements of dust are undertaken as defined by the permit. e). Testing for PCDD/F and metals are performed by an accredited testing organisation, employing certified Engineers in accordance with ISO17025. f) Continuous measurements of HCl and TOC are measured utilizing certified analysers (MCERTs), these in turn are calibrated to the CEN standard BS EN14181(1), calibrations performed by an accredited testing

	f. Continuous or periodic measurements of HCl, HF and TOC emissions. Continuous or periodic measurements of dust		organisation, employing certified Engineers in accordance with ISO17025, after calibration ongoing CEM quality control is provided by the plants trained and competent personnel following the QAL 3 requirements of BS EN 14181. Rugby works has agreement to monitor HF periodically with testing being performed by an accredited testing organisation, employing certified Engineers in accordance with ISO17025. g) Rugby Cement Plant has agreement to monitor dust from non-kiln sources periodically with testing being performed by an accredited testing organisation, employing certified Engineers in accordance with ISO17025. Scheduled periodic monitoring is undertaken on channelled dust flow points if below 10,000Nm^3/hr. A list of all channelled dust emission points was provided which identified 3 points greater than 10,000 Nm^3/hr.
6	In order to reduce energy consumption, BAT is to use a dry process kiln with multistage preheating and precalcination.	**NA**	This BAT conclusion is only applicable to new plants and major upgrades. Nevertheless, cement production is energy intensive and Rugby works make every effort to minimise energy consumption. The kiln at Rugby works was commissioned in 2000 and is a precalciner with multistage cyclone preheater therefore BAT has been achieved for process selection. Should CEMEX carry out a major upgrade of the kiln any cost effective opportunities to reduce energy consumption towards the BAT associated energy level would be assessed as part of an upgrade project
7	In order to reduce/minimise thermal energy consumption, BAT is to use a combination of the listed techniques.	**CC**	The operator listed the approach they take against the techniques a-f in BATC7. The responses indicate compliance with the requirement to reduce/minimise thermal energy consumption. The Rugby works utilises an alkali bypass system.
8	In order to reduce primary energy consumption, BAT is to consider the reduction of the clinker content of cement and cement products.	**CC**	In the UK clinker substitution is largely achieved through the use of additions such as GGBS and PFA at the concrete plant in combination with CEM I cement in the production of ready mixed concrete. Rugby does produce some CEM II products although the proportion is dictated by commercial demands.

9	In order to reduce primary energy consumption, BAT is to consider cogeneration/combined heat and power plants.	**CC**	Cogeneration - Published data (Nobis Cement international 5/2009 vol 7 p) indicates that waste heat recovery, in countries such as China, with high electricity costs and poor grid reliability but with low investment and capital cost, can be cost effective but only in cement plants with greater than 5,000 tonne per day clinker capacity and with raw material moisture lower than 3%. The Rugby kiln typically produces 4000 tonnes per day and the raw material moisture is high as Rugby works is a semi- wet process and therefore this technique is not considered applicable. CEMEX does not believe that CHP is currently viable at Rugby works. Furthermore there is no demand infrastructure for the waste heat generated by the plant in the immediate vicinity of the plant and capital investment is not currently justified as paybacks are unattractive. However, this technology is constantly under review. Implementation of Article 14 of the Energy Efficient Directive requires (under certain circumstances) an operator to undertake additional assessment if substantial refurbishments take place.
10	In order to reduce/minimise electrical energy consumption, BAT is to use one or a combination of the listed techniques.	**CC**	The operator listed the approach they take against the techniques a-e in BATC7. a) Power management systems are used, such as load management, and power factor correction systems to minimise loss. b) Variable speed drives are utilised in numerous parts of the process such as cooler fans, alternative fuels conveying systems and other conveying systems. All new plant is assessed to identify if variable speed drives are appropriate. There is a significant investment programme already in place for variable speed drives. c) Continuous monitoring of electrical energy use is undertaken with improved sub metering, the majority of which is automated in key high usage areas. This ensures ancillary equipment is not left running unnecessarily. All plant areas have KPI"s and reporting requirements to aid identification of potential areas for improvement and these are reviewed monthly and reported internally for benchmarking.

			Management of change systems are implemented at Rugby cement plant to manage kiln inputs to minimise electrical energy use. Project planning systems also address energy efficiency measures during design. d) Rugby works has a service contract with a compressed air specialist who manages the system. This service includes biannual audits to ensure the compressed air system is operating at maximum efficiency. The service includes remote monitoring to minimise leaks and improve efficiency. e) Process optimisation assessments are undertaken at least annually and inspections are routinely undertaken during mill maintenance stops. These have identified initiatives such as mill charge optimisation, grinding performance, media levels and use of grinding aids to maximise grinding with minimal power and to reduce kWh per tonne of production.
11	In order to guarantee the characteristics of the wastes to be used as fuels and/or raw materials in a cement kiln and reduce emissions, BAT is to apply the listed techniques: - Apply QA systems to guarantee the characteristics of wastes and to analyse any waste that is to be used as a raw material or fuel for constant quality, physical criteria, chemical criteria - Control the amount of relevant parameters for any waste that is to be used as raw material or fuel - Apply QA systems for each waste load.	**CC**	The use of waste materials as fuels and/or raw materials within the cement manufacturing process is managed and controlled by procedures within the environmental management system. Procedures for the introduction of waste materials ensure that the characteristics of the materials are analysed prior to use and are appropriate for the specific process. This initial investigation will examine the chemistry of the material and predict its potential behaviour and impact; physical properties will be assessed to identify the most appropriate feed & substitution rates, input locations, and feed methods. The initial assessment will also consider the suppliers" abilities for consistency of quality, supply and performance. The specification of the waste material will be agreed prior to acceptance and monitored regularly during use. Procedures for the use of waste materials are implemented to control use as fuel or raw materials. Compliance with the requirements of the Environmental Permit and the MPA Code of Practice for

			the use of waste materials will ensure that regulatory obligations are met and communicated appropriately. Rugby works has agreements in place with the EA for the frequency of waste fuel analysis. Rugby works implement an Environmental management system that includes quality assurance systems for the characteristics of wastes to be used as fuels and/or raw materials. No waste stream specific details have been provided as part of the Reg60 response but this area has been subject of inspector review in the past and is considered acceptable.
12	In order to ensure appropriate treatment of the wastes used as fuel and/or raw materials in the kiln, BAT is to use the listed techniques.	**CC**	The operator listed the approach they take against the techniques a-f in BATC12. The responses indicate compliance with the requirement ensure appropriate treatment of the wastes. Rugby works does not co-incinerate hazardous wastes as fuels.
13	BAT is to apply safety management for the storage, handling and feeding of hazardous waste materials, such as using a risk-based approach according to the source and type of waste, for the labelling, checking, sampling and testing of waste to be handled.	**CC**	The operator states "the implementation of the MPA code of practice for the use of waste materials ensures a through, detailed risk assessment approach is applied to all wastes, both fuels and raw materials." This covers all new materials or changes in waste supplier. Prior to the MPA fuel or raw material changes were covered by EA permitting processes and included a risk assessment undertaken by the operators. Where hazardous waste materials are used as fuel or raw materials, appropriate consideration of the characteristics, source, type, chemical and physical properties of the material will be applied to ensure all appropriate controls are identified and implemented.
14	In order to minimise/prevent diffuse dust emissions from dusty operations, BAT is to use one or a combination of the listed techniques.	**CC**	The operator listed the approach they take against the techniques b-j in BATC14. The responses indicate compliance with the requirement to minimise/prevent diffuse dust emissions from dusty operations.

15	In order to minimise/prevent diffuse dust emissions from bulk storage areas, BAT is to use one or a combination of the listed techniques.	**N/A**	Bulk materials are stored in buildings or covered bays. There are no open stockpiles at the Rugby works. Water sprays are not considered necessary but all roads used by lorries are concreted and routinely cleaned. As there are no external stockpiles this BATC can be considered as not applicable.
16	In order to reduce channelled dust emissions, BAT is to apply a maintenance management system which especially addresses the performance of filters applied to dusty operations, other than those from kiln firing, cooling and main milling processes. Taking this management system into account, BAT is to use dry flue-gas cleaning with a filter. BAT-AEL <10 mg/Nm^3	**CC**	Fabric filters are used on conveying systems, building dedusting and storage silos and these are subject to both inspection and maintenance systems. Small sources are fitted with indicative monitoring to provide an indication of any issues with abatement equipment. Replacement filters are designed to emit less than 10mg/Nm^3.
17	In order to reduce dust emissions from flue-gases of kiln firing processes, BAT is to use dry flue-gas cleaning with a filter. BAT-AEL <10-20 mg/Nm^3 (daily average)	**FC**	The kiln at Rugby utilise a fabric filter. The operator initially requested a derogation as part of the regulation 60 notice reply. This request was subsequently withdrawn on the 17 March 2016 as the operator now considers that they can achieve the limit of 20mg/Nm^3 based on the impacts of multiple sources feeding one main stack. The technical aspects linked to the plant layout and previous compliance data was considered and a view taken that no derogation was required. The aspects considered included: • five feed points into one stack • the difficulty in measuring the flow rate and particulate levels in any of the separate five feeds prior to them combining in the main stack; • three sources utilising bag plant abatement and two using ESP; • the history of compliance monitoring on the main stack for the combined releases; • the dispersion benefits of a combined flow and

			• a revision of a start up condition in the permit to make it more representative of 24 hour average. Our interpretation of the BATC is that no derogation would be required if the ELV is set at 20mg/Nm^3 for particulate matter on the main stack as a daily average value. Refer to key issues Annex 5
18	In order to reduce dust emissions from the flue-gases of cooling and milling processes, BAT is to use dry flue-gas cleaning with a filter. BAT-AEL <10-20 mg/Nm^3 (daily average or periodic)	**FC**	The clinker cooler, raw mill and fuel mill are not considered further in this BAT Conclusion as they are technically linked to the main stack emissions discussed in BAT Conclusion 17. Various control options have been reviewed for minimising emissions from the significant non-kiln sources, namely cement mill 4, 5 and 6 and their predicted benefit on local air quality. Emissions of particulates from the cement mills vary depending on products made but generally meet the upper end of the <10-20 mg/Nm^3 range as a daily average. Control options have been considered and implemented to improve emission abatement from other significant non-kiln sources namely cement mill 4, 5 and 6. Upon reassessment of the capabilities of the existing plant a derogation request was submitted on 23 June 2016 for Cement mill 6 and Mill separators on 5 and 6 to retain existing ELV of 30 mg/Nm^3 until the equipment can be replaced in line with a phased programme. After replacement the ELV will be tighter to meet the BAT-AEL of 10mg/Nm^3. The derogation was approved with details contained in annex 2.
19	In order to reduce the emissions of NOx from the flue-gases of kiln firing and/or preheating/ precalcining processes, BAT is to use one or a combination of the listed techniques. BAT-AEL (Calciner) 200-450 mg/Nm^3 (daily average)	**CC**	The operator uses a low primary air, low NOx burner which utilises swirl air to reduce the intensity of flame temperature which in turn reduces thermal NOx contributions from the process. Kiln process variables are also closely monitored. The pre-calciner process involves around 70% of the fuel being burnt at the calciner at a relatively low temperature. This reduces thermal NOx contributions from the process. The design of the kiln system incorporates low NOx technology. The staged tertiary air supply enables strong reducing conditions to be established in the lower part of the calciner. This inhibits the

			formation of NOx and also causes some NOx from the kiln gas to be reduced to nitrogen by the carbon and carbon monoxide present at this point. The CO produced from the reducing conditions in the calciner is oxidised in the upper section of the calciner with the tertiary air from the clinker cooler. Secondary abatement including SNCR has reviewed will potentially be installed. An improvement condition has been drafted to allow evaluation of SNCR operations and it impact on reducing NOX emissions and potential for ammonia slip associated with SNCR usage. The operator requested that the use of wastes should be considered as normal operation as it has been demonstrated to reduced NOx emissions. No such option is described within the BATC and as such normal operation is considered to be linked to the manufacture of clinker as opposed to the fuel type being used.
20	When SNCR is used, BAT is to achieve efficient NOx reduction, while keeping the ammonia slip as low as possible, by using the listed technique. Ammonia slip BAT-AEL <30-50 mg/Nm^3 (daily average)	**FC**	The installation has recently been gained approval to install SNCR at the Rugby works. An improvement condition has been drafted to allow evaluation of SNCR operations and it impact on reducing NOx emissions and potential for ammonia slip associated with SNCR usage.
21	In order to reduce/minimise the emissions of SOx from the flue-gases of kiln firing and/or preheating/precalcining processes, BAT is to use one of the listed techniques. BAT-AEL <50-400 mg/Nm^3	**CC**	The Rugby kiln process uses a novel technique for minimising the SO_2 released from the sulphur in the raw materials, based upon the fact that nearly all the sulphur from the raw materials is contained in the clay / stone component which is dried and ground in the raw mill. The novel feature is the point at which this material is added to the kiln system. The raw meal is added to the process at the calciner whereas the conventional point for adding the raw materials is at the inlet to the crusher drier. There is some possibility using the conventional feed point that SO_2 would be evolved and that much of this may not react with CaO carried over in the hot gas or with the $CaCO_3$ injected at the same point.

			By employing this technique at Rugby the sulphur rich materials are fed into the process at a point where they will come into immediate contact with a huge mass of very hot chalk and calcium oxide. The sulphur will then be fixed as calcium sulphate, a very stable chemical in solid form which will flow along with the rest of the raw materials into the kiln for turning into cement clinker. Kiln process variables are closely monitored to reduce SO_2 formation and minimise peaks in SO_2 emission levels. The kiln system is operated by trained and experienced process controllers who monitor kiln operating conditions and make adjustments as necessary based on the information given. Every effort is made to ensure a smooth and stable kiln process is maintained. This is achieved by the use of computerised control systems and solid fuel/ raw material feed systems.
22	In order to reduce SO_2 emissions from the kiln, BAT is to optimise the raw milling processes. (no BAT-AEL)	**CC**	SO_2 emissions are low as due to the kiln feed design and as the raw meal is added directly to the calciner, the technical design of the process provides a scrubbing effect for SO_2
23	In order to minimise the frequency of CO trips and keep their total duration to below 30 minutes annually, when using electrostatic precipitators (ESPs) or hybrid filters, BAT is to use the listed techniques in combination. (no BAT-AEL)	**CC**	CO is continuously monitored as the kilns use ESP as abatement. Monitors have a rapid response time to ensure CO does not build up to dangerous levels within the ESP. Computer control systems monitor the combustion process to reduce peaks. Existing maintenance techniques such as water jetting are employed to reduce the possibility of surges of material in the kilns which can lead to CO peaks.
24	In order to keep the emissions of TOC from the flue-gases of the kiln firing processes low, BAT is to avoid feeding raw materials with a high content of volatile organic compounds (VOC) into the kiln system via the raw material feeding route.	**CC**	The operator employs a risk assessment process to establish and asses the impacts of raw materials with a high content of volatile organic compounds into the kiln system. Previous permit conditions also limit the organic component in raw materials to 5000 mg/kg as organic hydrocarbon as well as restraining the CV value to less than 10Mj/kg. As the installation is a co-incinerator the special provisions in the Annex vi apply. Chapter iv (IED) allows cement co-incinerators to request derogations away from the TOC value of 10mg/Nm^3 where TOC and SO_2 do not result from

	no BAT-AEL		the co-incineration of waste. Proof was not provided as part of the Reg60 response but has been previously supplied as part of the WID implementation. A previous variation agreed a TOC emission limit value via a permit variation of 50 mg/Nm^3 dry 10%O_2. This emission limit allows for the higher usage of British coal and accounts for the higher level of TOC emissions observed compared to other sources during milling of the British coal. The variation demonstrated how the use of British coal is BAT and that a TOC emission limit of 50 mg/Nm^3dry 10% O_2 is insignificant to the environment and human health
25	In order to prevent/reduce the emissions of HCl from flue-gases of the kiln firing processes, BAT is to use one or a combination of the listed primary techniques. BAT-AEL <10 mg/Nm^3	**CC**	A combination of raw material and fuel input control combined with the addition of lime as part of the SO_2 reduction programme combine to minimise HCl releases. Typical releases are below the 10mg/Nm^3 limit
26	In order to prevent/reduce the emissions of HF from the flue-gases of the kiln firing processes, BAT is to use one or a combination of the listed primary techniques. BAT-AEL <1mg/Nm^3	**CC**	HF emissions are inherently low in the manufacture of cement. Cemex UK limited employ primary abatement techniques such as raw material and fuels input controls.
27	In order to prevent emissions of PCDD/F or to keep the emissions of PCDD/F from the flue-gases of the kiln firing processes low, BAT is to use one or a combination of the listed techniques.	**CC**	The operator described the techniques employed to prevent emissions of PCDD/F and these are considered in line with the techniques listed in the BAT conclusions. Emissions of PCCD/F are considered to be BAT in there prevention via the following approaches: a). Inputs to the kiln system are monitored for inputs for quality and environmental reasons, internal limitations to the process balance are set. b). Chlorine cycles are monitored within the process as these can cause significant production issues and as such chlorine input is internally regulated to prevent high levels.

			c). As above. d). fuels containing halogenated chlorine above 1% are not utilised at the Rugby installation . e). Quick cooling of kiln gases occurs as part of the inherent process of the kiln type. f). No waste is burnt on start up or shut down of the kiln system. Historic results show that the ELV has a good level of compliance.
28	In order to minimise the emissions of metals from the flue-gases of the kiln firing processes, BAT is to use one or a combination of the listed techniques.	**CC**	The operator listed the approach they take to minimise the emissions of metals against the techniques a-c in BATC28. The responses indicate compliance with the requirement to minimise emissions of metals. There is a good compliance with previous ELV's which are unchanged as a result of the BATC.
29	In order to reduce solid waste from the cement manufacturing process along with raw material savings, BAT is to: - reuse collected dusts within the process, wherever practicable utilise these dusts in other commercial products, when possible	**CC**	Rugby works uses the BAT techniques detailed above as follows. Wherever possible and within quality control restraints, BPD is recovered at Rugby works by intergrinding with cement as quality control parameters allow. Any excess BPD is handled by several routes. CEMEX utilises BPD internally at its grinding mill and building product sites as a bound material to replace raw materials. In addition, external recovery companies are utilised for beneficial recovery purposes such as, in soil stabilisation projects and as fertilisers. The use of landfill for disposal of BPD is a "last resort" in accordance with the waste hierarchy. Rugby works last landfilled BPD in 2011. As an indication, the MPA Cement Sector Plan average data has shown that 22.87 kg CKD/BPD per tonne of cement was disposed to landfill in 1998 and this has been reduced to zero by 2012.

Key Issues

Where relevant and appropriate, we have incorporated the techniques described by the Operator in their Regulation 60 Notice response as specific operating techniques required by the permit, through their inclusion in Table S1.2 of the Consolidated Variation Notice.

We have reviewed the limits and monitoring requirements for all emissions at the installation to ensure that they are in accordance with the requirements of the BATCs. We considered all emission points, many fairly small and not listed in the permit.

The Operator provided a list of all channelled dust emissions, with an indication of volumetric flow rate. The general approach is that dust emissions >10,000 Nm^3/h are listed individually, have a dust limit applied (in accordance with the BAT-AEL for the type of abatement) with a monitoring requirement to demonstrate compliance. Dust emissions <10,000 Nm^3/h, which are deemed "small sources" by the BATCs, are included as group.

Section 1 covers emission limits and section 2 covers monitoring.

1. Emission limit changes: BATc 16 - 28

Changes to some emission limits and the introduction of new ones are required to ensure compliance with the BAT Conclusions. All the new and revised limits apply from 9 April 2017, the compliance date.

The following table provides an overview of emission limits within permit tables S3.1 and S3.2, with changes highlighted in bold text:

Overview of changes to emission limit values

Parameter	**ELVs (mg/Nm^3)**		
Kiln emissions K1 (permit table S3.1):	**Previously: (Variation V015)**	**New Limit: (Variation V016)**	**BAT-AEL mg/Nm^3**
Dust (ESP)	30	**20**	<10-20
NOx	500	450	<200-450
CO	500	Removed	-
SOx	200	200	<50 - 400
TOC	50	50	-
HCl, HF	10, 1	10, 1	<10, <1
Metals – Gp I, II	0.05	0.05	<0.05
Metals – Gp III	0.5	0.5	<0.5
Dioxin & furans PCDD/F	0.1	0.1ng/Nm^3	<0.05-0.1 ng/Nm^3
Benzene and Butadiene	No limit	Removed	Not applicable
BATC 16, 17 Non-kiln dust emissions (permit table S3.2):			
A2, A4, Cement mills	30	**20**	
A5, A6, A7 cement mill	30	**30 (1)**	<10-20
A8, A9, A10, A11, A12, A13, A14	-	**10**	<10

All other channelled dust emissions abated by fabric filters (<10,000Nm^3/hr)	No previous limit	**10**	<10

(1) subject to derogation – phased replacement of fabric filters after which the ELV will become 10mg/Nm^3

a. Dust limits (BATCs 16, 17, 18):
Cemex UK Limited supplied a list of 23 channelled dust emissions of which 12 are >10,000Nm^3/hr, most already listed in the permit. There are 7 new dust emission sources to be listed in the permit as a result of the permit review A8 - A14.

BATC16: Emission points <10,000Nm^3/hr, and therefore deemed "small source" emissions by the BAT Conclusions; with BAT identified as utilising fabric filters. The abated emissions are now included in the permit as a new emission group "*all other channelled dust emissions abated by fabric filters*" and the BAT-AEL is applied as a dust limit of 10 mg/Nm^3 (in accordance with BATC 16).

BATCs 17 and 18 contain a composite BAT-AEL: <10 – 20 mg/Nm^3, with a footnote "*when applying fabric filters or new or upgraded ESPs, the lower level is achieved"*. In line with this, we have applied a limit of 10mg/Nm^3 to emissions from mills and packers which are abated by bag filters.

BATC17: kiln emissions, are abated by fabric filters and the BAT-AEL of 10mg/Nm^3 would be applicable. However, the operator provided evidence to show that it is not possible to accurately measure releases from the bag filter prior to joining with another 4 sources blending within the main stack. As three of these releases utilise ESP (with a BAT-AEL of 20mg/Nm^3) it has been concluded that the combined emission should have an ELV of 20mg/Nm^3 to cover all operating conditions. This allows the exhaust gases to benefit with increased buoyancy and better dispersion.

Benzene and Butadiene have been removed from the permit as a requirement to sample. There is no BAT-AEL associated with these parameters and no specific governmental policy to sample for these parameters. Collected data will be assessed as part of a review of organic material emissions including PAH.

BATC18 clinker cooler emissions. There is no independent exhaust vent for the clinker cooler (abated by ESP) so the BAT-AEL would be 20mg/Nm^3. This allows the exhaust gases to benefit with increased buoyancy and better dispersion.

All other emission points greater than 10,000 Nm^3/hr including cement mills, clinker import and packing are abated by bag filters so the dust limits are reduced from 30mg/Nm^3 to 10 mg/Nm^3. The operator has stated that an improved maintenance programme should be sufficient to meet the new standard. Three emission points were subject to a derogation request to retain the 30mg/Nm^3 until such time as the filter is replaced with an upgraded bag filter after which it will be limited to 10mg/Nm^3.

All emission limits apply for the specified monitoring reference period – **see section 2 below,** regarding detail of monitoring of these emissions.

b. Oxides of Sulphur SOx (BATC 21)
Cemex UK Limited have retained the existing ELV of 200mg/Nm^3.

c. CO (BATC 23)

BATC 23 does not set a BAT-AEL for emissions of carbon monoxide. Due to the previous low ELV of 500mg/Nm^3 and the low TOC levels emitted with this process carbon monoxide has been removed as it is no longer considered to be emitted in quantities significant enough to require an ELV.

d. TOC (BATC 24):
There is no BAT-AEL for TOC; instead IED Annex VI applies. We have retained the existing ELV.

All other kiln parameters (HCl, HF, Gp I, II & III metals and dioxins/furans PCDD/F) have existing limits which are in line with the BAT-AEL, so these limits are retained unchanged.

2. Monitoring: BATC 5

The basis for choosing a frequency and method (continuous or periodic) of monitoring of emissions included reference to the BATC, an assessment of the mass of release, potential impacts, previous compliance history and process variability. The results are summarised here and reflect the permit conditions.

The length of sampling period can vary from ½ hour to 6-8 hours depending on the sampling strategy and standard used. For compliance purposes the selection of sampling period reflects the likelihood of variance, potential impacts, the frequency of sampling and the expected concentration. In general terms smaller releases with limited potential for impact have sampling frequencies as low as ½ hour. Larger releases, or where compliance is based on infrequent sampling, have a longer sampling period to allow it to be more representative.

Referring to BATC 5c-g, there are some specific regulatory requirements defined for monitoring of kiln processes, which also fall under IED ch IV and Annex VI as waste is co-incinerated. For non-kiln activities, there are no specific monitoring requirements other than the statement “continuous or periodic” for dust emissions. Each emission point has been assessed to decide if it should be monitored continuously or periodically, and if the latter, the frequency of sampling has been decided based upon risks posed. We have taken into account the history of compliance as well as the scale and impact of a potential release in setting the monitoring requirements.

a. Kiln parameters - all (BATC 5c, d, e and f):
The type of monitoring (continuous/periodic), the reference period and frequency of monitoring of the kiln emissions are all unchanged from the previous variation for all parameters. As waste fuels are burned, the permit implements the requirements of IED Annex VI and these are in line with the requirements of BATC 5. No changes to kiln monitoring are required in order to comply with the BATCs.

b. Non-kiln dust (BATC 5g):
We are retaining the requirement for periodic monitoring on the clinker cooler (A8, A9) which is abated with ESP. Although this is considered a significant releases monitoring returns have shown compliance with a 20mg/Nm^3 limit. However, there will be an added requirement to maintain indicative monitoring.

BATC 5 allows for continuous or periodic monitoring of dust from non-kiln activities. Existing periodic monitoring has been retained. Other emission points are all fitted with bag filters and the volumetric releases are relatively small (and smaller in size than the regulated lime kilns on which dust is monitored periodically) and

consequently pose a lower risk. We are setting a frequency of 6 monthly for the mills and annually for the other release points. Where continuous monitors have been previously available these will be used for indicative performance of the abatement plant, and establish any performance problems. Environmental protection will be maintained as this variation reduces the ELV for releases from all mills to 10mg/m^3. Historic monitoring data indicates that emissions can meet the 10mg/Nm^3 limit. A review of the data indicated that there has not been 100% compliance with the new tighter ELV. The increase in frequency of bag maintenance identified by the operator will be required to ensure ongoing compliance with the new limit.

The periodic dust monitoring has a reference period of 30 minutes (minimum). This is considered to be an appropriate minimum period for these emissions.

For the "small sources" emission group "all other channelled dust emissions abated by fabric filters", we are requiring a performance check based on a maintenance management system, as allowed by BAT 5g. Periodic monitoring is not required to demonstrate compliance with the new 10mg/Nm^3.

Emission point	Parameter	Type of monitoring	Frequency	Reference period
A1 (Main stack venting Kiln, cooler, bypass and two mills)	Dust, NOx, SO_2, TOC, HCl,	continuous	-	Daily average
	HF	periodic	6 monthly	Min 1 hour
	metals	periodic	6 monthly	Min 30 min
	PCDD/F	periodic	6 monthly	6 – 8 hour
A2, A5 Cement mills	particulates	**periodic**	**6 monthly**	**Min 30min**
A4, A6, A7 cement mill	particulates	**periodic**	**6 monthly**	**Min 30min**
A8, A9, A10, A11, A12, A13, A14	particulates	**periodic**	**Annually**	**Min 30min**
All other channelled dust emissions abated by fabric filters (<10,000Nm^3/hr)	particulates	**periodic**	**6 monthly**	**Min 30min**

We have set monitoring methods according to our monitoring guidance note, M2

c. Table S3.5 Process Monitoring requirements

This table has been updated from previous variations to remove parameters which we no longer require to be reported (electricity and water usage) and add in Raw meal and Fuels feed rate (both in t/hr) which is required in line with BATC 5b. The table now includes the indicative dust monitoring on mills, and continuous monitoring of the kilns' emissions for temperature, pressure, oxygen and water vapour to demonstrate process stability and to allow monitoring correction to reference conditions, in line with BATC 5a.

Other Monitoring aspects

Reference conditions:
The reference conditions for reporting measured emissions from non-combustion sources has been changed by the BATCs from no correction required for temperature, pressure, oxygen or water vapour content, to reporting dry at Standard Temperature and Pressure (STP) with no correction for oxygen. The Schedule 6 interpretation has been updated for this change.

Annex 2: Assessment, determination and decision where an application(s) for Derogation from BAT Conclusions with associated emission levels (AEL) has been requested.

The IED enables a competent authority to allow derogations from BAT AELs stated in BAT Conclusions under specific circumstances as detailed under Article 15(4):

'By way of derogation from paragraph 3, and without prejudice to Article 18, the competent authority may, in specific cases, set less strict emission limit values. Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits due to:

(a) the geographical location or the local environmental conditions of the installation concerned; or

(b) the technical characteristics of the installation concerned.

The competent authority shall document in an annex to the permit conditions the reasons for the application of the first subparagraph including the result of the assessment and the justification for the conditions imposed.

A summary of any derogations granted is also recorded in Annex 1 of the Consolidated Variation Notice in accordance with the requirement of IED Article 15(4) as described above.

As part of their Regulation 60 Notice response, the operator has requested a derogation from compliance with the AEL values included in the following BAT Conclusion as detailed below.

Cemex UK Limited requested a derogation from BATC18.

- BATC 18 Dust emission from milling processes specifically Cement mill 5 separator, Cement mill 6 main vent and Cement mill 6 separator. The BAT-AEL for mills abated with fabric filters is <10mg/Nm^3 with the operator requesting to maintain the existing limits of 30mg/Nm^3. The request was to allow a phased replacement of the fabric filters with new units capable of meeting the new <10mg/Nm^3 limit. The justification for the request was on technical grounds linked to the general investment cycle of the industry and specifically to align with the kiln down times.

Although information was provided in their response to allow us to commence assessment of the derogation request it was insufficient to enable us to complete the determination and further information was requested and subsequently supplied on 14 July 2016 (detailed arguments and CBA) and 16 December 2016 (relative capacities of mills).

On review and assessment of this information we have decided to grant the derogation requested by the operator in respect to the AEL values described in BAT Conclusion 18 but have included other Emission Limit Values in the Consolidated Variation Notice that will ensure suitable protection of the environment.

The Operator requested a time limited derogation from BAT 18, associated with dust emissions from the flue-gases of cooling and milling processes as described in the BAT Conclusions for the Production of Cement, lime and magnesium oxide, implementation date 9th April 2017. The derogation request was on the on the basis of the technical characteristics of the plants specifically the general investment cycle and the timing of installation of abatement plant linked to the kiln run times.

The derogations for three emission points have been considered together as they form part of a phased replacement of fabric filters on two separators and one main cement mill which we have considered together because the technical criteria for allowing the derogation are linked.

The Operator's application considered 4 options for meeting the BAT-AEL. They have proposed to retain existing ELV for particulate matter (PM) on three release points; Cement mill 5 and 6 separators and the main cement mill 6 until new bag filter abatement plant are fitted after which the BAT AEL of 10mg/Nm^3 will be achieved. The operator rejected all the other options. The phased approach to replacing existing bag filters is outlined below:

Emission point	Current limit	Emission point BATAEL Compliance date
Cement Mill 5 separator	30mg/Nm^3	10 mg/Nm^3 limit from 30 June 2019
Cement Mill 6 main	30mg/Nm^3	10 mg/Nm^3 limit from 30 April 2020
Cement Mill 6 separator	30mg/Nm^3	10 mg/Nm^3 limit from 30 April 2021

The Environment Agency has reviewed the application and concluded

The operator has supplied a valid derogation request against the BAT conclusions 18. The derogation request is based on technical characteristics specifically the investment cycle and the practicality of replacing 3 bag filtration systems. The operator has described three relevant techniques for achieving the BAT-AEL and justified the screening out two of them. Two options were taken forward to conduct a cost benefit analysis, compliance by April 2017 and compliance by phased replacement of existing mill filters. The derogation request included a proposal to retain the existing ELV of 30mg/Nm^3, for 2 separators and one cement mill until a range of dates commencing June 2019 to April 2021 according to a supplied schedule of works. After this date the operator has proposed that the fitting of new bag filtration systems to all three points will be completed and the BAT-AEL levels of 10mg/Nm^3 would be met.

- The derogation request is based on technical characteristics of the installation. The operator considered a number of technical criteria that are considered in turn below.
- Investment cycle – CEMEX undertakes major biennial shutdown cycle on the cement mills, typically in winter or early spring periods tying in with kiln shut downs. Major mill shutdowns will be required due to building construction for abatement plant upgrades. Where lack of space requires building redesign for larger filters, local planning will also need to be sought and the time implications involved taken into consideration. By reviewing the three mill derogation requests together the investment cycle impacts become very relevant as only one major refit can take place at a time.

- Practicability – a major abatement plant upgrade will entail compliance with various legal obligations such as local planning conditions and health and safety. The health and safety requirements will be significant, possibly involving a full CDM project. Therefore, and along with availability of people resources, it is only practicable to undertake one large filter upgrade per shutdown within CEMEX UK. The availability of key staff is considered relevant to this derogation request as it a limiting factor in the timing of fitting the new plant.
- Recent investment – CEMEX has made significant investment to minimise particulates from the installation, in particular approximately 7 million pounds in 2007 to upgrade the main kiln exhaust system abatement. Whilst not directly linked to the three emission points for which derogation is sought, the investment accounts for a major source of particulate emissions from site. Other investments in relation to minimising particulate emissions include silo top improvements and enclosure and clinker storage and transfer upgrades. On its own this was not considered a strong derogation criteria argument but as the investment addresses particulate matter release from the site it is considered as a supportive argument to meet the technical criteria requirements.
- Plant configuration - Space is very limited in the cement mill area, surrounded by the main inbound traffic route and brook. The plant configuration is not considered a strong enough argument when compared to other cement installation layouts.
- The derogation request included a proposal to retain the existing ELV of 30mg/Nm^3, for 2 separators and a cement mill until a range of dates commencing June 2019 to April 2021 according to a supplied schedule of works. After this date the operator has proposed that the fitting of new bag filtration systems to all four points will be completed and the BAT-AEL levels of 10mg/Nm^3 would be met. The operator has justified this request on the technical grounds specifically the link to major plant refit in line with kiln production cycles, availability of staff and the practical restrictions of installing four new bag filters at the installation.

The operator has provided a credible argument that the increased costs linked to the technical characteristics are disproportionate for achieving the BAT AEL. The operator supplied 3 valid CBA analysis, one for each of the fabric filters subject to the derogation. Taken individually they show the costs are disproportionate to the environmental benefits. The data was combined into a single CBA which also confirmed that the costs were disproportionate.

The operator has demonstrated that the costs of achieving the BAT-AEL by April 2017 are disproportionate to the environmental benefits. The environmental impacts of the current releases are not considered significant and the phased introduction of new abatement equipment will result in significant reductions from over 37.5 tonnes per year to 12 tonnes by 2021.

- The predicted impact of derogating from the BAT-AEL on any long term or short Environmental Quality Standards / Environmental Assessment Levels was considered. The operator provided the following information on the background levels of particulates in the area. Rugby works will contribute to the existing background air quality (i.e. that arising from other sources). Based on information provided by the Department of Food and Rural Affairs (Defra) background maps, annual mean background concentrations of PM10 are around 16.0 µg/m3. These are well within the annual mean air quality objective for PM10 of 40µg/m3 (40% of the air quality objective). For PM2.5, annual mean concentrations are around 10.3 µg/m3 (42% of the air quality objective). Data indicates that air quality in Rugby is considered to be good and it should be noted that emissions from the cement works

will have been included in the modelling carried out to assess background concentrations.

- The operator provided detailed air dispersion modelling to demonstrate current impacts of particulate releases and the impact of the proposed changes.
- Other potential environmental impacts. The operator highlighted ongoing work to reduce particulate emissions from the installation as a whole. CEMEX has made significant investment to minimise particulates from the installation, in particular approximately 7 million pounds in 2007 to upgrade the main kiln exhaust system abatement. Whilst not directly linked to the three emission points for which derogation is sought, the investment accounts for a major source of particulate emissions from site. Other investments in relation to minimising particulate emissions include silo top improvements and enclosure and clinker storage and transfer upgrades costing approximately 4 million pounds. Other near planned investment includes upgrades to cement mills 4 and 5 by April 2017

The operator has provided a credible argument that the increased costs linked to the technical characteristics are disproportionate for achieving the BAT AEL. The operator supplied 3 valid CBA analysis, one for each of the fabric filters subject to the derogation. Taken individually they show the costs are disproportionate to the environmental benefits. The data was combined into a single CBA which also confirmed that the costs were disproportionate. The CBA shows that the option of achieving BAT on time has significantly higher costs than environmental benefits in comparison to the proposed derogation option

- There is no requirement for an additional improvement condition as the operator has provided a timeline and commitment for the introduction of new abatement plant as part of the derogation request.

The Environment Agency is therefore minded to allow this derogation request.

Annex 3: Improvement Conditions

Based on the information in the Operator's Regulation 60 Notice response and our own records of the capability and performance of the installation at this site, we consider that we need to set improvement conditions so that the outcome of the techniques detailed in the BAT Conclusions are achieved by the installation. These improvement conditions are set out below - justifications for them is provided at the relevant section of the decision document (Annex 1 or Annex 2).

We also consider that we need to set improvement conditions relating to changes in the permit not arising from the review of compliance with BAT conclusions. The justifications for these are provided in Annex 5 of this decision document.

Previously completed improvement conditions are recorded below but removed from the permit to improve clarity. The numbering format has been retained to ensure consistency in record keeping.

Reference	Requirement	Date
IC1	On completion of the further Climafuel trials (variation EPR/BL7248IH/V010), the operator shall review all actual emissions to air from the main stack (emission point 1) against the relevant emission limit values as set by the permit. Where an actual emission is significantly lower than the relevant emission limit value, the operator shall consider the potential for reducing the emission limit value to a more appropriate level. The operator shall submit a written report of its assessment, its conclusions and proposed measures to address any issues raised to the Environment Agency.	Completed
IC2	The operator shall conduct VOC speciation emissions monitoring from the main stack to standard BSEN 13649 whilst grinding 100% British coal. This shall be done on two separate occasions, at least two months apart. A report of the results shall be submitted to the Environment Agency.	Completed
IC3	Before the new dedicated silo for the storage and transfer of clinker, applied for in the application for variation MP3435UH, can be used, a post commissioning report shall be submitted to the Environment Agency. The report should include evidence that a review of the "as built" arrangements has been carried out which include a demonstration that interlocks for stopping clinker transfer in the event of abnormal operation are in place.	Completed
IC4	The operator shall complete a comprehensive audit of all particulate emissions from the revised clinker transfer system including the new dedicated clinker silo. The audit should include point source and fugitive emissions. The audit will then be used to assess the combined impact of the emissions on the air quality for both short term and long term scenarios. The operator shall develop BAT proposals for any remedial work required. A report outlining the assessment its conclusions and measures to address any issues raised is to be forwarded to the Environment Agency	Completed
IC5	The operator shall review the impact of noise on the surrounding environment following the new dedicated clinker silo becoming fully operational	Completed
IC6	The Operator shall carry out a technical evaluation of the burning of tyre chips at a higher feed rate of up to 10 tonnes per hour as waste derived fuel in kiln 7. The technical evaluation programme shall comply with the requirements of the "10 Tonnes Per Hour Tyre Chip Technical Evaluation Programme " document produced by the Environment Agency, dated June 2010. The evaluation programme shall be carried out as soon as possible following the first increase of tyre chips over 6 tonnes per hour on the kiln, after allowing a short	Completed

	period to optimise process conditions and reach stability. The technical evaluation must be completed within six months from the first increased use of the fuel.	
IC7	On final completion of the technical evaluation detailed in IC6 above, the Operator shall submit a report demonstrating that the use of the Tyre Chips at increased rates does not cause any net environmental detriment, compared to existing fuel mixes. The demonstration shall include evidence that the Critical Success Factors, specified in the "10 Tonnes Per Hour Tyre Chip Technical Evaluation Programme " document have been met.	Completed
IC8	The Operator shall submit a report, on the recent trial of burning Climafuel up to 33 tonnes per hour (65% substitution rate), demonstrating that the use of the Climafuel at these higher rates does not cause any net environmental detriment, compared to existing fuel mixes. The demonstration shall include evidence that the following Critical Success Factors have been met: **Critical success factor 1**: there will be no breaches of existing emission limit values caused by using the substitute fuel in question, that indicate longer-term compliance with the limits will be a problem. **Critical success factor 2:** the amount of waste produced overall, as a result of burning Climafuel at increased rates, will not increase significantly and will be within normal variations. The waste in this case includes materials recycled and reworked clinker. **Critical success factor 3:** there will be no net environmental detriment (barring any material change in the economics of the sector) to the local environment, as a result of burning Climafuel at increased rates. This assessment will be based on the Environment Agency's H1 methodology and will take into account other benchmark criteria established to protect the environment. **Critical success factor 4:** inspections by Environment Agency Officers of the Climafuel burning operations will all receive acceptable assessments in line with current Environment Agency compliance assessment methodologies. **Critical success factor 5:** there will be no increase in abnormal operations caused by the burning of Climafuel at increased rates.	Completed
IC9	The operator shall produce and submit a project plan setting out how releases of particulates in the exhaust gases from the kiln will be minimised and at least reduced to <10 - 20 mg/m3 as a daily average by the target date of 30th June 2014. The project plan will be based on consideration of costs and benefits of all relevant options and using options appraisal methodology H1 or equivalent.	Completed
IC10	The operator shall produce and submit a project plan setting out how releases of particulates from all significant non-kiln sources will be minimised and at least reduced to <10 - 20 mg/m3 as a daily average by the target date of 30th June 2014. The plan will have a prioritised approach for reducing particulate releases from these sources. The project plan will be based on consideration of costs and benefits of all relevant options and using options appraisal methodology H1 or equivalent.	Completed

IC11	The operator shall produce and submit a project plan setting out how releases of NOx in the exhaust gases from the kiln(s) will be minimised and at least reduced to <450 mg/m3 as a daily average by the target date of 30th June 2014. The project plan will be based on consideration of costs and benefits of all relevant options and using options appraisal methodology H1 or equivalent.	Completed
IC12	The Operator shall assess and submit a report on the impacts of the ammonia emissions from the kiln stacks, in particular on non-statutory sites such as local wildlife sites, and SSSIs within 2km of the installation. The assessment shall cover both background ammonia emissions and the maximum ammonia slip when SNCR is optimised for NOx abatement.	Completed
IC13	The Operator shall review the performance of the Continuous Monitors on emission points A2, A4, A5 & A6 which are currently used for process monitoring, and submit a report to the Environment Agency. If it cannot be demonstrated that the monitors are as good as MCERTS accredited equipment, then the Operator shall submit a written plan to the Environment Agency for approval with proposals for the provision of MCERT accredited continuous monitoring on these emission points. The plan must contain dates for the installation of the new equipment if required.	Completed
IC14	The Operator shall carry out a technical evaluation of the burning of Climafuel as a waste derived fuel in the main kiln burner (up to 9 tonnes per hour, 15% substitution rate). The technical evaluation programme (Ref: TEP15% Climafuel, dated June 2011) shall be agreed in writing with the Environment Agency, and carried out as soon as possible following the first use of the fuel on the main kiln burner after allowing a short period to optimise process conditions and reach stability. The technical evaluation must be completed within six months from the first use of the fuel within the main kiln burner.	Completed
IC15	The Operator shall submit a written report for approval by the Environment Agency on the technical evaluation of the burning of Climafuel as a waste derived fuel in the main kiln burner . The report shall explain how the use of Climafuel on a permanent basis, at the levels used during the evaluation, represents the use of Best Available Techniques. It will also include an assessment of the environmental performance of the kiln while burning Climafuel and a comparison of emissions with and without using Climafuel. Data obtained during routine operation prior to the evaluation, or in previous technical evaluations of other waste derived fuels in the same kiln since December 2005 may be included for comparison.	Completed

New Improvement conditions:

IC016: Installing monitoring access for A8-A14. These are new emission points greater than 10,000Nm^3/hr flow. The operator provided some information that these point may not be suitable for monitoring and additional justification is required

IC16	The operator shall investigate the feasibility of installing monitoring access to and/or modifying the ductwork of dust emission points A8 –A14 to enable MCERTS monitoring of emissions to be carried out at each point. The operator shall assess each emission point and produce a risk-based plan of modifications with the aim of ensuring that	01/11/17

	MCERTS monitoring can be carried out. The plan shall prioritise the larger and more significant dust emission points. For any emission points where MCERTS monitoring is not proposed, the operator shall provide justification for why and propose an alternative means for demonstrating compliance with the limit of 10 mg/Nm^3. A report detailing the assessment of each dust emission, the plan for modifications, timescales and any alternative compliance assessments shall be submitted to the Environment Agency for written approval. The plan shall be implemented upon approval by the Environment Agency,	

IC17 SNCR is now being considered for use at the Rugby installation. To allow for optimisation an improvement condition has been introduced to establish the scale of emissions, understand potential impacts and place an appropriate ELV in the permit.

IC17	The operator shall submit a report to the Environment Agency proposing an Ammonia Emission Limit Value (ELV) for each kiln, for written approval by the Environment Agency. The report shall include the following, as a minimum: • Assessment of ambient (background) ammonia levels. • Assessments of ammonia slip emissions arising from the use of SNCR (selective non-catalytic reduction) operations and at varying operational conditions. • Assessment of impacts (Predicted Environmental Concentrations) at the proposed ELV. The assessment of impacts shall be undertaken using emission rates without confidence correction applied (IED ch IV), and shall be calculated at the maximum production capacity, or any future maximum capacity, if a further increase is planned (in order to ensure that worst case scenario is covered). The assessment shall consider the impacts at discrete receptors, including non-statutory sites such as Local Wildlife sites and SSSIs within 2km and European sites within 10km of the installation. Following the completion of this condition, the Environment Agency will set an ELV for inclusion within table S3.1.	1/12/2017

Annex 4: Advertising and Consultation on the draft decision

This section reports on the outcome of the public consultation on our draft decision carried out between <insert date> and <insert date>

The draft decision record and associated draft Consolidated Variation Notice was published and made available to view on .Gov website between the dates detailed above.

Summary of responses to consultation and the way in which we have taken these into account in the determination process.

Response received from
Brief summary of issues raised
Summary of actions taken or show how this has been covered

Annex 5: Review and assessment of changes that are not part of the BAT Conclusions derived permit review.

1. Introductory Note

The installation description has been updated to a consistent format applied across the cement and lime sector. We have included additional information such as the installation NGR, kiln production capacity, details of process wastes and emissions to air and water, and local sensitive receptors.

2. Permit conditions

Condition 2.3.16

This is a new standard template condition for all sites using waste.

Condition 3.5.5(a) Ammonia confidence levels

A confidence level of 40% for continuous monitoring of ammonia has been set based on guidance from EA monitoring teams. This value could be lower depending on the techniques employed. However, as we gather more information on the continuous monitoring of ammonia on cement works, the % uncertainty figure may be reduced.

Section 3.6 Fire Prevention conditions

Conditions 3.6.1 & 2 are now standard template conditions for all installations that store combustible wastes. New installations storing combustible wastes are required to have an FPP in place. For existing installations, there is no automatic requirement to submit an FPP when a permit is varied or as a result of a permit review, however an FPP will be required under certain conditions, eg if there is a fire at the installation, or a change on site which increases the risk of a fire.

3. Schedule 1 Changes to Table S1.1

We have reviewed Table S1.1 for all CLM sector permits, to ensure these accurately reflect the activities on each site.

We have reviewed and revised Hope cement works Table S1.1, specifically:

- Amended the kiln activity description to reflect EPR Sch 1 activity wording,
- Revised the listed activities, to include additional part A(2) and (B) activities,
- Added Directly Associated Activities (DAAs) to ensure that all activities (listed and non-listed) at the installation are included,
- Amended the Limits of Specified Activity for all activities to ensure they are clearly defined,
- Assigned Activity Reference numbers to listed and directly associated activities.

The amended Table S1.1 is reproduced below with new and revised text identified by shaded sections:

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
AR1	Section 3.1 Part A(1)(a)	Producing cement clinker in rotary kilns with a production capacity exceeding 500	Kiln K7. From the transport of raw materials and fuels from bulk

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
		tonnes per day or in other kilns with a production capacity exceeding 50 tonnes per day.	storage, the preparation (including blending of raw materials specified within table S2.1 in order to produce raw meal) and feeding of all materials into the kiln systems, through to discharge of cooled clinker to the clinker store. Includes emissions to air from the main stack and other process vents.
AR2	Section 3.1 Part A(2)(a)	Grinding cement clinker	The transport of clinker, including imported clinker, from clinker storage and handling of raw materials from bulk storage, through milling and blending to storage of cement, including emissions to air from the mill stacks and other process vents.
AR3	**Section 3.1 part B (a)**	Storing, loading or unloading cement or cement clinker in bulk prior to further transportation in bulk.	Storage and dispatch of cement clinker and cement in bulk by road or rail.
AR4	**Section 3.1 part B (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.	Blending of cement products
	Directly Associated Activity		
AR5	Raw materials storage and handling	Raw materials receipt, transport, preliminary preparation and bulk storage	From the receipt of raw materials via road and pipeline, and the receipt on site of other raw materials, including alternative raw materials, through to bulk storage.
AR6	Fuels storage and handling	Delivery and bulk storage of fuels	Offloading of waste-derived and fossil fuels, and transfer to bulk storage
AR7	Clinker import	Bulk import of cement clinker by road and rail	Offloading of cement clinker imported to site by road and rail and transfer to the clinker stores.

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
AR8	Waste storage and handling	Waste storage and handling	From waste generation, storage and monitoring through to dispatch off site.
AR9	Water discharge to controlled water	Management of site drainage and process water.	From collection of surface water drainage including reuse within site activities through to discharge to controlled waters

Listed Activities – producing clinker and grinding clinker:
Until this review, Cement and Lime permits listed the activity Section 3.1 Part A(1)(a) as ***producing and grinding cement clinker*** in accordance with the Environmental Permitting Regulations 2010, which stated the following:

Part A(1) *(a) Producing cement clinker or producing and 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) if the activity is likely to involve the heating in any 12-month period of 5,000 or more tonnes of calcium carbonate or calcium magnesium carbonate or both in aggregate.

Part A(2) *(a) Unless falling with Part A(1) of this Section, grinding cement clinker.*

(b) Unless falling within Part A(1) of Section 2.1 or 2.2, grinding metallurgical slag in plant with a grinding capacity of more than 250,000 tonnes in any 12-month period.

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.

Under the EPR 2010, the activity 3.1 **A(2)**(a) covers only the grinding of cement clinker where this is undertaken at a different location from that of clinker production. In 2013, the Regulations were amended and moved the activity of grinding cement clinker to Section 3.1 Part **A(2)(a)** regardless of where the grinding takes place; .

Part A(1) *(a) Producing cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other kilns with a production capacity exceeding 50 tonnes per day.*

(b) Producing lime or magnesium oxide in kilns with a production capacity of more than 50 tonnes per day.

Part A(2) *(a) Grinding cement clinker*

(b) Activities deleted by EPR amendment SI 2013 No. 390.

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.

In Cemex UK Limited previous permit, although cement milling was included on a separate row in table S1.1, it was still part of the listed activity S3.1 A(1)(a). Table S1.1 has been revised to reflect the legislative changes; the 3.1A(1)(a) activity

covers producing cement clinker only and an additional activity 3.1A(2)(a) has been included to cover all grinding activities.

We are assigning **one** A(2) activity (reference AR3), for clinker grinding at this installation, to cover all cement mills processing clinker manufactured on site and imported. The Regulations do not define capacity or aggregation rules for 3.1A(2)(a) and having consulted EA permitting guidance, including RGN2 Appendix 2, we consider that multiple cement mills do not operate entirely independently and we can therefore regard them as one activity, incurring one part A(2) fee. Regarding each mill as a separate A(2) activity would increase charges per site in a manner disproportionate with the regulatory effort required.

There is however, one 3.1A(1)(a) activity for each kiln with a production capacity above the listed threshold of 500 t/d.

An additional part B activity is now included (activity AR3) for Storing, loading or unloading cement in bulk following the Regulations' amendment. This covers bulk storage of clinker and cement and loading into road and rail tankers (bulk transport). This activity is not covered by any other activity (listed or directly associated) following amendments to the Regs and is listed as a part B in its own right.

Other changes to Table S1.1:
Previously Tbl S1.1 contained only two DAAs; for cement storage, blending, packing & loading (now a part B activity), and for waste storage and handling. In line with our RGN2 guidance, the following activities have been included as DAAs, in order to ensure all appropriate activities at the installation are covered:

- Raw materials storage and handling,
- Fuels storage and handling (fossil and Waste derived),
- Clinker import,
- Discharge to controlled waters, including drainage and ponds.

We have revised the Limits of Specified Activity descriptions, to ensure that the activities are clearly defined.

4. Schedule 3 Emissions

Table S3.1 TOC ELV:
The BAT conclusions do not include a BAT-AEL for TOC emissions, instead Annex VI of IED applies. This prescribes a limit of 10 mg/Nm^3 and allows for a derogation from this where TOC emissions do not result from the co-incineration of waste. Cemex UK Limited ELV has been 50 mg/Nm^3 since WID was implemented in November 2005. This has been retained.

Table 3.1 CO ELV:
The BAT conclusions do not include a BAT-AEL for CO emissions. Annex VI of IED applies and provides an option for the provision of a CO limit. The current limit of 700mg/Nm^3 reflects the generally low levels of CO being produced from the operation. As there has been good compliance with this value and the impact of CO emissions is likely to be insignificant this ELV has been removed from the permit. This removal is supported by the comparatively low levels of TOC from the process,.

Table S3.1 Requirement for ongoing monitoring of Dioxins, Dioxin like PCB and PAH.
Air Emission Limit Values - Article 7 (d) Dioxins. The WID requires dioxins to be reported using the I-TEQ reporting convention to assess compliance against an

emission limit of 0.1ng I-TEQ / Nm^3. The UK's independent health advisory committee, Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT), has adopted the World Health Authority (WHO) toxicity equivalence factors (TEF) for both dioxins and dioxin-like PCBs in their recent review of Tolerable Daily Intake (TDI) criteria.
The Government is of the opinion that, in addition to the requirements of the WID, the WHO-TEF values for both dioxins and dioxin-like PCBs should be specified for monitoring and reporting purposes. This will enable evaluation of exposure to dioxins and dioxin-like PCBs to be made using the revised TDI recommended by COT. Regulators will, therefore, set dioxin emission limits using on I-TEF (1990) values but with additional monitoring/reporting requirements for dioxins and dioxin-like PCBs using WHO-TEF (1997/98) factors as shown in the permit.

Article 7(5) (WID) allows Member States to set emission limits for other pollutants including polycyclic aromatic hydrocarbons (PAHs). There is lack of monitoring data on the release of PAHs from incinerators on which to base such limits or even to decide if a limit is required. The Waste Incineration directions thus require the regulators to impose monitoring requirements in the permits but not to set a limit. Once sufficient data is available, a decision can be made on the future of this requirement. The following PAHs should be monitored and results reported on the same frequency as for dioxins and dioxin-like PCBs.
Polycyclic Aromatic Hydrocarbons (PAHs) to be monitored:
Anthanthrene, Benzo[a]anthracene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo(b)naph(2,1-d)thiophene, Benzo(c)phenanthrene, Benzo[ghi]perylene, Benzo[a]pyrene, Cholanthrene, Chrysene, Cyclopenta(c,d)pyrene, Dibenzo[ah]anthracene, Dibenzo[a,i]pyrene, Fluoranthene, Indo[1,2,3-cd]pyrene, Napthalene.

This requirement for ongoing measurement of PAH will be reviewed in 2017.

5. Schedule 6 Interpretation

Schedule 6 has been revised to remove interpretations which are no longer relevant, amend existing and introduce new ones. The monitoring reference conditions are updated in line with the BAT conclusions (refer Key Issues section)

Chapter IV abnormal operating conditions: "abnormal operating conditions" has been prefixed with "chapter IV" to emphasise that these conditions relate to specific circumstances outlined in IED ch IV, for plants burning waste derived fuels. Prior to IED, this was termed "WID abnormal operating conditions".

Management System: the guidance previously referenced, the EA's Horizontal guidance Note H6, Environmental Management systems, has now been withdrawn. The .gov.uk website provides guidelines on what a management system should cover when operating a regulated industry. https://www.gov.uk/guidance/develop-a-management-system-environmental-permits It is no longer considered necessary to define management system in the interpretation section. The EMS system has also been reviewed as part of the BATC1.

Chipped tyres: included to clarify that this type of WDF includes shredded rubber conveyor belts.

Kiln shut down: this is revised to include an Operator-agreed feed rate in tonnes per hour.

Kiln start up: this is revised in line with current definition for start up, removing reference to use of WDFs to determine end of start up, and instead including an agreed threshold figure of raw meal feed into the kiln. We are now allowing an option to calculate the first daily average emission value using the 24 hour period after the end of kiln start up (ie when the kiln reaches a pre-determined feed rate). This is to avoid the anomaly which allowed for a daily average emission to be calculated from only a few hours of data if start up was achieved late in a 24 hour period, when emissions may still be higher than typical. Emissions may take a while to stabilise as feeding of WDFs can only commence after start up is complete. Higher emissions initially are compensated for over a 24 hour period, with lower emissions once kiln stability is established, however this cannot be the case if only a few hours are used to derive a 24 hour period, leading to possible compliance issues.