

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/BM0486IT
The Operator is: Castle Cement Limited
The Installation is: Ketton Cement Works
This Variation Notice number is: EPR/BM0486IT/V011

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 the 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 draft 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.

DRAFT

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(s) **17 and 18** as identified in the production of cement, lime and magnesium oxide BAT Conclusions document. The way we assessed the Operator's request(s) 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 29/04/2014 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 09/04/2017 which will then ensure that operations meet the revised standard, or
- justifies why standards will not be met by 09/04/2017, 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 08/01/2015.

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 22/05/2015. Suitable further information was received from the Operator on 03/07/2015 and 26/05/2016.

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 claimed that certain information was commercially confidential and should be withheld from the public register. We considered this request and determined that: specific cost data within the 'Cost Benefit Analysis' (CBA) assessment was considered sensitive. We have excluded the full CBA assessment from the public register as it is not possible to remove individual aspects. Apart from the issues and information just described, 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 consider that the operator will be able to comply with the techniques and standards described in the BAT Conclusions other than for those techniques and requirements described in BAT Conclusion 17 and 18.

Having carefully considered the Regulation 60 Notice response and all other relevant information, we are now putting our draft decision before the public and other interested parties in the form of a draft Consolidated Variation Notice, together with this explanatory document.

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 09/04/2013. There are 69 BAT conclusions; 1 and 2 are applicable to all sectors, 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 BAT conclusions publication) - 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

BATc No	Summary of BAT Conclusion requirement for the production of cement, lime and magnesium oxide.	Status NA / CC / FC / NC.	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
1	<p><u>All sectors</u></p> <p>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.</p>	CC	An EMS certified to ISO14001 is in place.
2	<p><u>All sectors</u></p> <p>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.</p>	CC	Castle Cement have provided details of a number of techniques which are employed in order to reduce / minimise noise emissions. Measures include the enclosure of noisy operations (such as the ball mills) within buildings, vibration insulation, noise barriers, and silencers.
3	<p><u>Cement sector</u></p> <p>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.</p>	CC	<p>The kiln is operated using a modern computer control system and solid fuel feed systems all use modern gravimetric techniques to ensure that the process is optimised, emissions are reduced and energy is used efficiently.</p> <p>Kiln operations are covered by site management systems and various parameters including temperature and pressure are monitored to maintain smooth and stable operations.</p>
4	<p><u>Cement sector</u></p> <p>In order to prevent and/or reduce emissions, BAT is to carry out a careful selection and control of all substances entering the kiln.</p>	CC	<p>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.</p> <p>A risk assessment processes that includes a mass balance 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).</p> <p>In addition quality management systems are implemented to manage kiln inputs.</p>

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5	<p><u>Cement sector</u></p> <p>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:</p> <ol style="list-style-type: none"> Continuous measurements of process parameters demonstrating the process stability, such as temperature, O₂ content, pressure and flowrate. Monitoring and stabilising critical process parameters, i.e. homogenous raw material mix and fuel feed, regular dosage and excess oxygen Continuous measurements of NH₃ emissions when SNCR is applied Continuous measurements of dust, NO_x, SO_x, and CO emissions Periodic measurements of PCDD/F and metal emissions Continuous or periodic measurements of HCl, HF and TOC emissions. Continuous or periodic measurements of dust 	CC	<ol style="list-style-type: none"> Ketton Works monitor and control the process via numerous in-process sensors including temperature, pressure, oxygen and flow rate, these are linked and provide continuous signals to digital control systems. In addition to this the plant information system provides and allows analysis of real-time data and historical events to control and deliver stability throughout the process. Primary and total airflows are also monitored and checked via internal balances/audits conducted by trained process engineers. Quality control procedures are applied to ensure homogenous raw material mix by the use of performance monitoring against targets for each process stage. Feed and fuels are controlled and delivered via calibrated feed devices. Castle Cement maintains a list of Raw Materials and fuels related specifications and perform sampling and testing to ensure materials and fuels meet the relevant standards. Excess oxygen is monitored and checked via internal mass balances/audits conducted by trained process engineers. Ammonia (NH₃) emissions are continuously monitored Continuous measurements of NO_x, SO_x, CO, HCL, TOC and Dust are measured utilizing certified analysers (MCERTs), these in turn are calibrated to the CEN standard BS EN14181, 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. PCDD/F and metal testing is performed by an accredited testing organisation, employing certified sampling teams in accordance with ISO17025, ongoing quality assurance is maintained with internal auditing and Proficiency Testing schemes. Continuous monitoring of HCl and TOC is in use. Continuous measurement of HF is not required (IED chapter VI annex VI part 6, paragraph 2.3) as there is HCl treatment in the kiln system. HF emissions are monitored twice per year as spot samples for at least 30 minutes. Castle Cement operates a planned preventative maintenance system which includes process checks on small filters such as monitoring pressure drop and bag life. We are

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		FC	changing some of the compliance monitoring requirements for dust from the cement and coal mills from continuous to periodic. Detail about this change is recorded in the Key Issues section, of this document.
6	<u>Cement sector</u> In order to reduce energy consumption, BAT is to use a dry process kiln with multistage preheating and pre-calcination.	N/A	This BATc is applicable to new plants and major upgrades. Kiln 8 at Ketton works was installed in 1986. It is a pre-calciner kiln with multistage cyclone preheater.
7	<u>Cement sector</u> In order to reduce/minimise thermal energy consumption, BAT is to use a combination of the listed techniques.	CC	Castle Cement utilise a number of the listed techniques to minimise energy consumption. The operation of kiln 8 is optimised (by operating the calciner at an appropriate temperature set point) to ensure the meal feed to the kiln from the preheater tower is calcined (without sintering reactions taking place prior to the kiln). Ketton works uses a modern programmable logic control (PLC) system to monitor and control kiln operations. All hot air from the kin cooling zone is used within the kiln. The preheater exhaust gas is used for raw material drying within the raw mill. Castle Cement specifies a minimum calorific value for fuels - at the point of use (kiln or calciner). Theoretical calculations have demonstrated that a CV of 4.5 MJ/kg is sufficient to have a positive contribution of energy to the process i.e. the heat released in the combustion of a fuel of CV greater than 4.5 MJ/kg is sufficient to heat more than just the products of combustion. The fuels used at Ketton works have been through a rigorous selection process to ensure that they are compatible with both the kin design and raw material chemistry.
8	<u>Cement sector</u> 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 <i>Cem I</i> cement in the production of ready mixed concrete. Minor additional constituents (MAC) are included in the production of <i>Cem I</i> cements at levels up to the 5% limit set in EN197.

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			Most packed cement produced at Ketton is <i>Cem 2</i> which has up to 20% clinker substitution. Increased levels of clinker substitution would not deliver the cement performance required by customers.
9	<p><u>Cement sector</u></p> <p>In order to reduce primary energy consumption, BAT is to consider cogeneration/combined heat and power plants.</p>	CC	<p>There has been some experience in the Heidelberg Cement Group of heat recovery to generate electricity at Slite in Sweden and Lengfurt in Germany. The installation at Slite was able to make use of an existing power generation plant adjacent to the cement plant. Published data shows that co-generation 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%. At Ketton, Kiln 8 produces 3,000 tonnes per day and the raw material moisture is over 7% in the winter and therefore this technique is not considered applicable at Ketton works.</p> <p>The Slite kiln capacity is approximately double that of kiln 8 (at Ketton), the raw material moisture less than half that at Ketton and a cooler exhaust temperature almost 100°C higher and a gas flow double that at Ketton. The size of the plant and low efficiency of steam generation and absence of an existing power plant make the application of steam based power generation impractical at Ribblesdale.</p> <p>Data provided by the operator showed that a heat recovery system for cogeneration required gas temperatures above 100°C for an organic Rankine cycle (ORC) system to be 10% efficient. Kiln 8 operates at an exhaust gas temperature of 120°C, and thus there is very little potential for heat recovery on the kiln exhaust to be efficient.</p> <p>The operator stated within their Cooler derogation request (received on 26/05/2016) that the proposed option (to which we grant the derogation) will involve the replacement of the current Cooler ESP with a fabric filter, to which a heat exchanger will also be required in order to protect the bags from high temperatures</p> <p>As part of modifications to the clinker cooler the operator is seeking to improve energy efficiency of the kiln and cooler, and in the case of the heat exchanger are considering options for electricity generate (from such heat recovery).</p> <p>We have included an improvement condition to further investigate this possibility.</p>

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10	<p><u>Cement sector</u> In order to reduce/minimise electrical energy consumption, BAT is to use one or a combination of the listed techniques.</p>	CC	<p>Ketton Works has installed sub metering of electricity throughout the works and this data is used to manage site power demand.</p> <p>Raw material grinding at Ketton works uses high efficiency vertical spindle mills. The main cement milling equipment at Ketton is fitted with separators to minimise energy consumption of the grinding process.</p> <p>Ketton works carry out false air surveys of the kiln line when necessary. The main measure of leak air is identified within the oxygen level at the main kiln stack, which is continuously monitored. Any major sources of false air are addressed through planned maintenance work during kiln shutdowns.</p> <p>The kiln system and mill processes are operated using a modern computer based control system to ensure the process is optimised, emissions are reduced and energy is used efficiently.</p>
11	<p><u>Cement sector</u> 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:</p> <ul style="list-style-type: none"> - 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	<p>Ketton Works is already implementing the risk assessment process in the MPA code of practice.</p> <p>The use of waste materials as fuels and/or raw materials within the cement manufacturing process is managed and controlled by procedure within the environmental management system operated by site. 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.</p> <p>The specification of the waste material will be agreed prior to acceptance and monitored regularly during use. Procedure for the use of waste materials will be implemented to control use as fuel or raw material. Compliance with the MPA Code of Practice for the use of waste materials will ensure that regulatory obligations are met.</p>

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12	<p><u>Cement sector</u></p> <p>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.</p>	CC	<p>Compliance with the requirements of the Waste Incineration Directive and the Environmental Permit will ensure that the techniques described are implemented.</p> <p>The feed of waste into the kiln is determined according to the characteristics of the material, process parameters and kiln operation.</p> <p>Process control techniques, procedure and training will ensure waste is fed into the kiln in appropriate locations to ensure residence times are achieved, temperatures are appropriate for its input and to ensure the organic elements of material can be volatilised before the calcining zones of the kiln. These procedures and process operating techniques are considered appropriate for co-incineration of all wastes, including hazardous materials.</p> <p>Local procedures are implemented to ensure waste materials are fed consistently and the kiln is operated in such a way that gases resulting from the use of wastes are managed and controlled even during unstable kiln conditions. Specific procedures are implemented covering actions to be taken for the start-up or shut-down of the feed of waste materials to the kiln in these conditions, during planned and unplanned kiln shut-downs and start-ups.</p>
13	<p><u>Cement sector</u></p> <p>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.</p>	CC	<p>The implementation of the MPA Code of Practice for the use of Waste Materials ensures a thorough, detailed risk assessment approach is applied to all wastes, both fuels and/or raw materials. This risk based approach ensures that controls identified and implemented are appropriate to the source and type of waste under consideration. The physical and chemical properties of the material determines how the material is stored, handled and fed; the methods for the labelling of stored hazardous materials, along with the sampling & testing requirements are detailed in written procedures, in compliance with obligations imposed by the Environment Permit and the Greenhouse Gas Permit. All such procedures are implemented through the environmental management system on site.</p> <p>The following hazardous wastes are used in the process at Ketton:</p> <ul style="list-style-type: none"> • Cemfuel, • PMSA (paper making sludge ash) and • Alumina Premix.

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			<p>The introduction of hazardous waste for use as kiln fuel such as Cemfuel is subject to hazard and operability (HAZOP) studies. Changes to the storage, handling and feeding equipment for these fuels are also require a review and updating of the HAZOP study. If the material is being used as a fuel it may also be subject to a DSEAR (dangerous substance explosive atmosphere regulation 2002) risk assessment. These processes identify SHEQ critical items which are subject to specific planned preventative maintenance requirements.</p> <p>The Cemfuel tank farm has the following specific safety management features in place, construction compliant with petroleum storage regulations, inert gas blanketing of storage tanks, fully bunded storage tanks and vehicle unloading bay to prevent spillages entering the works drainage system. Foam fire suppression in unloading area and tank farm is installed. The area is inspected twice daily for leaks. The feeding of Cemfuel to the kiln burner is only possible when a number of safety interlocks have been met these include the temperature and residence time requirements set out in the IED.</p> <p>The code of practice does not apply wastes generated on site.</p> <p>The handling and storage of CKD onsite is subject to environmental aspect assessment and task based risk assessments as required covering quality, health, safety and environmental impacts. CKD is analysed twice yearly for permit compliance purposes.</p>
14	<p><u>Cement sector</u></p> <p>In order to minimise/prevent diffuse dust emissions from dusty operations, BAT is to use one or a combination of the listed techniques.</p>	CC	<p>Castle Cement employ a number of BAT techniques in order to minimise and prevent emissions from dusty operations, including</p> <ul style="list-style-type: none"> - Significant operations are enclosed and filtration devices are used to minimise fugitive dust, - Conveyors and elevators carrying powders and dusty materials are enclosed, - Maintenance systems are employed to minimise spillage and air leaks. - Feed systems are linked to central control systems to ensure sequence operations which contain where appropriate level alarms. - Performance indicators are used to measure plant availability and efficiency and a continuous improvement process is implemented to increase reliability.

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			<ul style="list-style-type: none"> - Cleaning regimes are in place which includes the use of fixed and mobile vacuum systems, water dampening etc. - Dust filters are used on material storage systems where dust is likely to be present. - Small stockpiles of some raw materials are held in the quarry and quarry alternative raw material store. Raw materials are stored and blended in automated stores. The clinker store is enclosed during normal operation, it is occasionally necessary for the door to be open whilst a machine such as a loading shovel operates within the store. - Powder materials are loaded and dispatched from silos via flexible loading heads, enclosed systems preventing dust loss.
15	<p><u>Cement sector</u> In order to minimise/prevent diffuse dust emissions from bulk storage areas, BAT is to use one or a combination of the listed techniques.</p>	CC	<p>Castle Cement use a combination of BAT to minimise and prevent dust releases from bulk storage areas:</p> <ul style="list-style-type: none"> - Bulk materials are stored in buildings or in bays. Where this cannot be achieved they are stored away from view and if required dampened to prevent dust emissions. - Small stockpiles of raw materials are maintained in the quarry area. Coal is also stored on an open stockpile, however this material is usually wet and therefore the potential for generating fugitive dust is limited. - Water sprays are used at points where dust may be generated such as discharge to stockpiles or on haulage roads within unmade ground. - Where possible main roads are paved with regular cleaning and in dry conditions wetting, haul roads for heavy plant machinery in quarries etc. are visually monitored for dust and wetted as required. - Generally raw materials stored in the open are damp and humidification is not required.
16	<p><u>Cement sector</u> 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,</p>	CC	<p>Filters are applied to channelled dust emissions such as bag packers, powder silo's, large crushers, coal mills.</p> <p>Fabric filters are used and are subject to both inspection and maintenance systems, regular inspections are carried out on the external aspects of the filter with an at least annual inspection and performance report. These inspections are used to define maintenance plans to ensure satisfactory performance of the filtration system to external environments.</p>

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	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		Replacement filters are specified and designed to emit less than 10mg/m ³ . We are changing the compliance monitoring requirement for dust from the cement and coal mills from continuous to periodic. Detail about this change is recorded in the Key Issues section, of this document.
17	<u>Cement sector</u> 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)	NC	Kiln 8 is equipped with an electrostatic precipitator – the current performance of which does not meet the BATAEL, Castle Cement do not expect to achieve the BATAEL by April 2017 as stated within the regulation 60 response. Derogation requested – see Annex 2.
18	<u>Cement sector</u> 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)	NC NC FC	The clinker cooler is equipped within an electrostatic precipitator – the current performance of which does not meet the BATAEL, Castle Cement do not expect to achieve the BATAEL by April 2017 as requested by the regulation 60 notice. Derogation requested – see Annex 2. The coal mill is equipped with a fabric filter – the current performance of which does not meet the BATAEL, Castle Cement do not expect to achieve the BATAEL by April 2017 as stated within the regulation 60 response. Derogation requested – see Annex 2. Various cement mills are in operation within the Installation [no's 5,6,7,8,9 & 10]:- <ul style="list-style-type: none"> • Cement mills 5 -8 are currently non-operational. <i>These mills are equipped with fabric filters, and the operator has committed to meeting the BAT-AEL of 10 mg/Nm³ should these mills restart at some point in the future.</i> • Cement mills 9 and 10 (operational) currently do not meet the BAT-AEL. <i>The Operator has stated that their replacement (with fabric filters in order to meet the BATAEL of 10 mg/Nm³) will be carried out before the compliance date of 9th April 2017.</i>

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19	<p><u>Cement sector</u></p> <p>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.</p> <p>BAT-AEL (preheater kilns) <200-450 mg/Nm³ (daily average)</p>	CC	<p>Flame cooling has been tried at Castle Cement's Padeswood plant (Wales) for a short period of time and proved unsuccessful as the reduction in flame temperature resulted in under burnt clinker being produced; given this experience this technique is unlikely to be successful at Ketton.</p> <p>Kiln 8 is equipped with a low NOx multi-channel burner. The kiln is operated using a modern computer based control system and 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.</p> <p>Kiln 8 was built in the 1980's and the current precalciner is not designed for staged combustion, SRF and Profuel in the calciner has reduced NOx emissions compared with operation with coal only.</p> <p>SNCR has been in operation at Ketton since 2008.</p> <p>There is limited information on the initial NOx emission level for operation at the current alternative fuel usage rates as the historic data is at lower substitution rates.</p> <p>A trial is planned for early 2015 to establish the background level of ammonia emissions from the raw materials and ammonia slip. Data from this trial will be used to confirm the initial NOx level after the application of all primary measures. – The operator since confirmed (within additional information) that the NOx emissions from kiln 8 after the application of primary measures is below 1000 mg/Nm³ therefore an emission limit of 450mg/Nm³ will be applicable.</p> <p>Operation of kiln 8 to achieve the BATAEL will require the increased use of ammonia and may consequently result in increased ammonia slip this potential impact will be investigated before April 2017– we have included an improvement condition to cover this aspect.</p> <p>BAT Achieved through application of primary techniques II and V, and secondary techniques.</p>

BATc No	Summary of BAT Conclusion requirement for the production of cement, lime and magnesium oxide.	Status NA / CC / FC / NC.	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
20	<p><u>Cement sector</u></p> <p>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.</p> <p>Ammonia slip BAT-AEL <30-50 mg/Nm³ (daily average)</p>	CC	<p>The SNCR system used at Ketton has multiple injection points and PLC control to optimise NOx reduction and ammonia consumption.</p> <p><i>A short two week trial of operation of the kiln without using SNCR was carried out at the end of December 2014, the results of this trial showed the maximum half hourly average NH3 emission was 15 mg/Nm³ and the maximum daily average emission was 7 mg/Nm³. On the basis of this data Hanson Cement propose that an emission limit value of 60 mg/Nm³ (10 mg/Nm³ background raw material emission and 50 mg/Nm³ from ammonia slip) is acceptable.</i></p> <p>As the operation of kiln 8 to achieve the BATAEL for NOx will require the increased use of ammonia slip, we have included an improvement condition in relation to NOx emissions and ammonia slip considering changes to ELVs, for which SNCR can impact upon both parameters.</p>
21	<p><u>Cement sector</u></p> <p>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.</p> <p>BAT-AEL <50-400 mg/Nm³</p>	CC	<p>The raw materials at Ketton contain low levels of sulphides.</p> <p>The current emission performance level and emission limit value (200 mg/Nm³) is within the BATAEL range.</p>
22	<p><u>Cement sector</u></p> <p>In order to reduce SO₂ emissions from the kiln, BAT is to optimise the raw milling processes.</p> <p>(no BAT-AEL)</p>	CC	<p>The raw mill is optimised to produce the correct raw meal quality to ensure efficient kiln operation and consistent product quality. It is not necessary (or desirable) to vary the raw mill operating conditions to achieve the BATAEL at Ketton.</p>
23	<p><u>Cement sector</u></p> <p>In order to minimise the frequency of CO trips and keep their total duration to below 30 minutes annually, when using electrostatic</p>	CC	<p>The kiln 8 electrostatic precipitator is protected with continuous CO monitoring with a rapid response time which de-energises the precipitator when high levels of CO are detected.</p>

BATc No	Summary of BAT Conclusion requirement for the production of cement, lime and magnesium oxide.	Status NA / CC / FC / NC.	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	precipitators (ESPs) or hybrid filters, BAT is to use the listed techniques in combination. (no BAT-AEL)		The frequency of CO trips have been reduced to one or two per year each of less than 1 minutes duration.
24	<u>Cement sector</u> 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. (no BAT-AEL)	CC	A risk assessment processes that includes a mass balance approach is available for any new raw material to ensure emissions are reduced and managed, including TOC. This risk assessment approach is part of the site EMS and follows the principles of the MPA Code of Practice for the use of Waste Materials. This process would assess the organic compound content of a new raw alternative. In addition, quality management systems are implemented to manage kiln inputs.
25	<u>Cement sector</u> 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/Nm3	CC	There is very little chloride present in the raw materials used at Ketton. Typical coal used at Ketton contains less than 0.05% Cl, there is no limit set but coal chloride levels are monitored. Input limits are set in alternative fuel supply specifications for Cemfuel, SRF/Profuel and MBM as per the existing EPR permit. Each alternative raw material (ARM) is assessed using a risk assessment process and a chloride limit on the ARM maybe set depending upon the baseline level of chlorides present, the proposed usage rate and if the ARM supplier is able to control the chloride by blending the ARM. The BATAEL is achieved when the raw mill is operational. During Mill stops the HCl emission increases as there is no limestone scrubbing to ensure compliance with the emission limit value. HCl abatement has been installed. A small quantity of Lime (CaO) is blown into the electrostatic precipitator where it reacts with the HCl thus reducing the stack emission to below the BATAEL.
26	<u>Cement sector</u>	CC	HF emissions are inherently low in cement production. There is very little fluoride present in the raw materials and coal used at Ketton. Since the introduction of the waste incineration

BATc No	Summary of BAT Conclusion requirement for the production of cement, lime and magnesium oxide.	Status NA / CC / FC / NC.	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
	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.		<p>directive (now chapter IV of the IED) HF emissions have been at or around the limit of detection and no breach has occurred in the UK cement industry.</p> <p>HF is a highly reactive acidic gas any HF produced in the kiln or preheater will react with the calcium oxide or calcium carbonate present in the raw materials. Spot sample results for HF from 2002 onwards showed 44 results had a mean of 0.074 mg/Nm³ and a maximum of 0.44 mg/Nm³.</p> <p>limits are set in alternative fuel supply specifications to ensure there is no unexpected impact on process conditions. Input limits are set in alternative fuel supply specifications for Cemfuel, SRF/Profuel and MBM as per the existing EPR permit. Each alternative raw material is assessed using a risk assessment process and a fluoride limit on the alternative raw materials (ARM) maybe set depending upon the baseline level of fluorides present, the proposed usage rate and if the ARM supplier is able to control the fluoride by blending the ARM.</p> <p>HF emissions are monitored twice per year as spot samples for at least 30 minutes. IED chapter VI annex VI part 6 states that continuous measurement of HF is not required as there is HCl treatment in the kiln system.</p>
27	<p><u>Cement sector</u></p> <p>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.</p>	CC	<p>Emissions of PCCD/F are considered to be BAT in there prevention via the following approaches:</p> <ol style="list-style-type: none"> Inputs to the kiln system are monitored for inputs for quality and environmental reasons, internal limitations to the process balance are set. 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. Chlorinated organic compounds are highly unlikely to influence PCDD and PCDF emissions as when present in alternative fuels they are burned in the kiln at flame temperatures in excess of 2000°C. halogenated chlorine above 1% is only burnt via the main burner above 1,100° C.

BATc No	Summary of BAT Conclusion requirement for the production of cement, lime and magnesium oxide.	Status NA / CC / FC / NC.	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
			<p>e). Kiln gasses leaving the top of the preheater tower are quenched in line with PCDD/F control and process requirements.</p> <p>f). No waste is burnt on start up or shut down of the kiln system.</p> <p>Historic results show that the ELV of 0.1 ng/Nm³ TEQ has been consistently complied with since 2005 and since the implementation of the WID (now Chapter IV of the IED).</p>
28	<p><u>Cement sector</u></p> <p>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.</p>	CC	<p>Emissions of metals are controlled to meet the BATAEL by applying the following techniques:</p> <p>a). Inputs to the kiln system are monitored for quality and environmental reasons, where necessary input controls in terms of either composition or quantity are used.</p> <p>b). All waste materials used in the system are subject to screening and ongoing monitoring of trace elements.</p> <p>Emissions of metals are consistently below the current ELV and the BATAEL.</p>
29	<p><u>Cement sector</u></p> <p>In order to reduce solid waste from the cement manufacturing process along with raw material savings, BAT is to:</p> <ul style="list-style-type: none"> - reuse collected dusts within the process, wherever practicable - utilise these dusts in other commercial products, when possible 	CC	<p>Wherever possible and within quality control restraints, kiln filter dusts and bypass dust, are recovered at the site either by returning the dust to the kiln process thus minimising the quantity the needs to be recovered or disposed of.</p> <p>Where bypass dust is extracted from the process for quality control reasons the waste can be handled by external recovery companies for beneficial recovery purposes such as, soil stabilisation projects, as fertilisers and in construction products. MPA cement members have established beneficial recovery markets and continue to seek to optimise handling opportunities.</p> <p>The use of landfill for disposal is a 'last resort' in accordance with the waste hierarchy. As an indication, the MPA Cement Sector Plan average data has shown that 22.87kg CKD/BPD per tonne of cement was disposed to landfill in 1998 and this has been reduced to zero by 2012.</p>
30 – 54	<u>Lime sector</u>		

BATc No	Summary of BAT Conclusion requirement for the production of cement, lime and magnesium oxide.	Status NA / CC / FC / NC.	Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement
55 - 69	<u>Magnesium Oxide sector</u>		

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Key Issues (relating to the above detail about compliance with BATc)

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. 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 set under IED as a result of the BATC's being published on 9 April 2013.

Emissions & Monitoring

1. Additional emission points to comply with BATc

From the above table, the following BATc's have been determined as "future compliant", As a result of this we have made changes within the permit in order to account for such requirements.

BATc 5g : Castle Cement operates a planned preventative maintenance system which includes process checks on small filters such as monitoring pressure drop and bag life. **We are changing some of the compliance monitoring requirements for dust from the cement and coal mills from continuous to periodic. Detail about this change is recorded in the Key Issues section, of this document.**

BATc 16 : Filters are applied to channelled dust emissions such as bag packers, powder silo's, large crushers, coal mills.

Fabric filters are used and are subject to both inspection and maintenance systems, regular inspections are carried out on the external aspects of the filter with an at least annual inspection and performance report. These inspections are used to define maintenance plans to ensure satisfactory performance of the filtration system to external environments.

Replacement filters are specified and designed to emit less than 10mg/m³.

We are changing the compliance monitoring requirement for dust from the cement and coal mills from continuous to periodic. Detail about this change is recorded in the Key Issues section, of this document.

BATc 18 : Various cement mills are in operation within the Installation [no's 5,6,7,8,9 & 10]:-

- Cement mills 5 -8 are currently non-operational.
These mills are equipped with fabric filters, and the operator has committed to meeting the BAT-AEL of 10 mg/Nm³ should these mills restart at some point in the future.
- Cement mills 9 and 10 (operational) currently do not meet the BAT-AEL.

The Operator has stated that their replacement (with fabric filters in order to meet the BATAEL of 10 mg/Nm³) will be carried out before the compliance date of 9th April 2017.

In response to the request for further information, Castle Cement provided a list of channelled emissions (not presently listed within their permit) for sources both less than, and greater than 10,000 Nm³/hr.

Channelled dust emissions < 10,000 Nm³/hr

Gypsum Hoppers	Silo 11 Loading
Clinker Hoppers	Silo 10 Loading North
Dust Plant - NEW PALLETISER	Silo 13 Loading
Old Packer Dust Plant	Silo 14 Loading
Reversible Belt To Sample Station	No.9 Poldens
Between Reclaimers	No.10 Poldens
408/409 Belts (Change over)	Coal mill dust plants
Stone/Clay Reclaimer	Vacuum Cleaner S8M433 - Coal Plant
Stone Reclaimer	PF Hopper
Silo 15C Loading	Welding Bay - No.1 Clinker
Silo 16A Loading	Welding Bay - No.2 Clinker
Silo 17A Loading	Rail Silo 1 - Top
Rail Silo 1 - Bottom	Rail Silo 2 - Top
Rail Silo 2 - Bottom	Rail Silo 3 - Top
Rail Silo 3 - Bottom	Rail Silo Vacuum
Quarry Workshop Roof Extract Fans	Laboratory Dust Plant

These are deemed “small sources” by BATCs.

Channelled dust emissions > 10,000 Nm³/hr -

Crusher Building	PFA Silo bottom (lorry loading area)
Coal Crusher	By-pass filter (Raw meal area)
Silos 5 - 11	Ferrous Sulphate dosing (9 cement mill)
Silos 12- 17	Ferrous Sulphate dosing (10 cement mill)
Clinker Store (Top)	ECAT Silo 1 Filter
Dust Plant - NEW PACKER	ECAT Silo 2 Filter
8 Raw Mill Silo (Roof)	MAC Filter
Silo 17B Loading	MAC Filter
Clinker Extract Conveyors	MAC Filter
Sample Mill Vibro Filter	8 Raw Mill Precips
Sample Station	Silo 17C Loading
8 Besta Building	A Screw Dust Plant
Deep Bucket Conveyors	B Screw Dust Plant
Kiln Feed (Tower)	Reject Silo

We have made the following changes to the permit as a result of the above :-

- Channelled dust emissions < 10,000 Nm³/hr - These have been included within the permit as a grouped emission (within table S3.2). The BAT AEL for these sources is 10mg/Nm³ and due to the size of release, compliance is required to be demonstrated in accordance with a maintenance management system.
- Channelled dust emissions > 10,000 Nm³/hr - Individual (new) emission point references have been included within the permit (table S3.1) as – A11- A24. The BAT AEL for these sources is 10mg/Nm³ and this value will be included within table S3.2 as the limit value. As these are new emission points, we need to obtain additional information about these releases in order to determine the

monitoring that is required / can be undertaken. We have included an improvement condition within the permit to cover this. (See annex 3).

2. Changes to emission limits for existing emission points (non-kiln sources) to comply with BATc

Changes to existing emission point references (within the permit) in order to meet the requirements of BATc 5g, 16 and 18.

- Emission point A4 – A7 : relates to cement mills 5, 6, 7, and 8, which are currently not operational. The operator has confirmed within their response that the vents on these mills are fitted with fabric filters, and should either mill restart, will meet the emission limit value of 10 mg/Nm³.

*We have included a footnote to the table (for this emission) requiring the operator to write to the Environment Agency providing details of any monitoring that will be undertaken (at restart) in order to demonstrate that the emission limit value (as stated) will be met **in the event that either mill should be restarted**. This requirement will also provide direction to the site inspector of any start dates in consideration of monitoring requirements.*

- Emission point A8 – A9 : relates to cement mills 9 and 10. Currently particulates abatement is provided by ESP and this emission point has a limit of 50 mg/Nm³. The operator is replacing these ESP's with fabric filters prior to the BAT-AEL compliance date of 9 April 2017. As a result of this we have reduced the limit within the permit to 10 mg/Nm³ (to be complied with from 9th April 2017).

3. Changes to emission limits for existing emission points (kiln sources) to comply with BATc

[Changes to existing limits by derogation is detailed within annex 2].

We have made the following changes to Emission Limit Values (kiln sources)-

- We have reduced the ELV for Oxides of nitrogen (NO and NO₂ expressed as NO₂) from 800 mg/Nm³ to 450 mg/Nm³ in order to comply with BATc19.
The NO_x emissions from kiln 8 after the application of primary measures is below 1000 mg/Nm³ therefore an emission limit of 450 mg/Nm³ is applicable.

- We have set a limit of 50 mg/Nm³ for Ammonia Slip.

This value can be reported as 'Total Ammonia' by inclusion of background ammonia, for which a 'Total Ammonia' emission limit value of 60 mg/Nm³ is applicable (assuming a maximum ammonia slip value of 50 mg/Nm³).

BATc 20 sets a BAT-AEL for ammonia slip, when using SNCR, of <30 – 50mg/Nm³ (daily average). *A total ammonia limit will be derived using the ammonia slip BAT-AEL added to background ammonia levels.*

The operator undertook a two week trial of operations without SNCR in order to establish the "raw material ammonia background" emission. Detail supplied

within the response to our request for additional information confirms that the maximum daily average emission was 7 mg/Nm³, for which we agree that 10mg/Nm³ is an appropriate value for determining a total ammonia limit of 60 mg/Nm³.

The operator provided results from an impact assessment which has considered an environmental target value (for ammonia) of 3.0 µg/m³ by default, without justification for why value is appropriate. In order to use this higher value, the operator should justify that there are no lichens or bryophytes (including mosses, landworts and hornworts) present at the local sensitive receptors or use the more stringent default environmental target value if 1.0 µg/m³.

We consider that further investigation is required for the following reasons:-

- We have reduced the Oxides of Nitrogen emission limit value as described previously, which could result in changes to the amount of ammonia slip that is required during the SNCR process - in order to meet such reduced limit (from 800 to 450 mg/Nm³). The limit set for ammonia is based upon the max value of the range stated within the BATc.
- The impact assessment undertaken has considered an environmental target value (for ammonia) of 3.0 µg/m³ by default. Justification should be provided for use of such value, otherwise the default target value of 1.0 µg/m³ should be used which will change the reported impacts.

As a result of the above, we have set a limit of 50mg/Nm³ for ammonia slip, which when calculated as 'Total Ammonia' shall meet the limit of 60mg/Nm³.

We have also set an improvement condition in order to address the above issues.

Detail on improvement conditions is included within Annex 3.

Changes to existing limits by derogation is detailed within annex 2.

All other emission parameters are in line with BAT-AELs and therefore require no change within the permit so these limits are retained.

Monitoring

1. Changes to monitoring requirements (non kiln sources)

BAT conclusion 5g (measurement of particulate matter from non-kiln operations) allows either continuous or periodic monitoring methods in order to demonstrate compliance.

- Emission point A4 – A7 : Currently serving cement mills 5, 6, 7, and 8. These mills are currently non-operational, however the operator has stated that

should operations resume, then fabric filters will ensure that the BAT-AEL of 10mg/Nm³ is achieved.

We have changed the monitoring requirement for this emission point to be in line with the monitoring changes that we have made to emission point A5 (for operational cement mills) from continuous measurement, to quarterly periodic monitoring (as justified below).

We have also included a footnote to require the operator to provide written detail of any monitoring that will be undertaken at restart – in order to demonstrate that the emission limit value will be met. This confirmation will also provide notice to the site inspector on the instance of such mills restarting in order to determine subsequent monitoring requirements.

- Emission point A8 & A9 : Currently serving cement mills 9 and 10. Currently particulates abatement is provided by ESP, and the operator is replacing such ESP's with fabric filters prior to the BAT-AEL compliance date of 9 April 2017. The limit within the permit has been reduced from 50 mg/Nm³ to 10 mg/Nm³.
- Emission point A10 : Currently serving coal mill 8. Currently particulates abatement is provided by fabric filter, however upgrade of this filter (of 30 years age) is required in order to achieve that BAT-AEL of 10 mg/Nm³. (Detail about this is included within Annex 2).

For the above emission points (A4 – A9) we have changed the monitoring requirements from continuous monitoring to quarterly periodic monitoring (table S3.1) to measure compliance with the reduced emission limit value.

For emission point A6, the monitoring requirement will change from continuous monitoring to quarterly periodic monitoring upon compliance with the reduced ELV of 10 mg/Nm³ (at the end of the agreed derogation period).

Periodic monitoring is considered appropriate for such releases. *Continuous monitors employed for existing operations have an operating window to which they can successfully detect and measure emissions. As we are reducing these emissions, the performance may be compromised as the emission concentration approaches the limit of such operating window / level of detection, which renders use of such monitors less favourable.*

In light of this we are requiring the operator to continue using such continuous monitors for process control rather than ELV compliance. This method will allow the Operator to indicatively monitor the performance of their fabric filters – with early detection of any performance issues which can be promptly rectified. The requirement to monitor by these means is stated within table S3.5 of the permit.

We have included a footnote within table S3.2 which will allow the operator to request a reduction in quarterly monitoring (to 6 monthly) after a period of 12 months operation. *In order to do this the operator will need to seek written approval from the Environment Agency, to which compliance over such period should be assessed.*

2. Monitoring requirements (new emission points A11 – A24)

The Operator has provided evidence to show that extractive sampling cannot be undertaken for these emission points due to their location.

The BAT-AEL for these emission points is 10mg/Nm³.

The operator has proposed to demonstrate compliance by differential pressure testing, however we consider that further information is required to justify this, and therefore have included an improvement condition (see annex 3) to cover this.

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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 an Annex 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.

1) BATc17 – Particulate emissions from Kiln firing processes.

Currently ESP technology is employed for abatement of particulates from the kiln. The BAT-AEL for Kiln Firing (particulates) using ESP technology is 20mg/Nm³.

The operators current permit includes a limit (ELV) relevant to this abatement type of 30 mg/Nm³.

2) BATc18 – Particulate emissions from Clinker Cooling processes.

Currently ESP technology is employed for abatement of particulates from the clinker cooler. The BAT-AEL for cooling processes (particulates) using ESP technology is 20mg/Nm³.

The operators current permit includes a limit (ELV) relevant to this abatement type of 50 mg/Nm³.

3) BATc18 – Particulate emissions from Coal Milling processes.

Currently fabric filter technology is employed for abatement of particulates from the coal mill. This filter is 30 years old. The BAT-AEL for milling processes (particulates) using fabric filter technology is 10 mg/Nm³.

The operators current permit includes a limit (ELV) of 50 mg/Nm³ which we are reducing to 30 mg/Nm³ (as proposed by the operator) in order to remove excessive headroom during the period of the derogation.

The request for derogations for the above are time limited:

- BATc17 – Particulate emissions from Kiln firing processes, the derogation period is until 1st April 2018.
- BATc18 – Particulate emissions from Clinker Cooling processes, the derogation period is until 31st December 2020 (or during annual shutdown prior to this date).
- BATc18 – Particulate emissions from Coal Milling processes, the derogation period is until 31st December 2020 (or during annual shutdown prior to this date).

The derogation criteria are the Technical Characteristics of the plant relating to “the practicability of interrupting the activity”. *The Installation produces a bespoke clinker product (for sprayed applications - such as tunnelling) which is not available from any other Cement producing Installation within the UK.*

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:

Request for information (dated 22/05/2015) in response to the operators original Reg60 response.	Information received 03/07/2015 (further information relating to variation BATc's)
	Resubmission of derogation information (from operator) received 26/05/2016

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 17 and 18, but have included other Emission Limit Values in the Consolidated Variation Notice that will ensure suitable protection of the environment.

As part of their response they stated that the reason for their derogation request was:

Interrupting operations (in order to install new equipment) rather than carrying out such work during annual shutdowns will result in the operator having to import clinker (in order to meet customer demands) from outside the UK which adds significant cost to the operator. The operator is only able to make a limited number of changes during each shutdown, and therefore these have been scheduled over a sequence of shutdowns.

The way in which we have considered, assessed and determined the derogation request is detailed in the section below.

Overview of the site and installation

Ketton produces a unique type of cement that is suitable for sprayed concrete mixes (such as cross rail and tunnelling projects which require application by spraying).

- *Hanson UK has 20 years of experience in producing sprayed concrete through its Hanson Cement and Hanson Quarry Products divisions. From its Ketton plant Hanson Cement manufactures a unique quality of cement that is used in sprayed concrete mixes and has been proven in tunnelling projects worldwide.*
- Ketton is the only cement works within the UK producing this type of clinker.

Demand for this clinker currently exceeds production levels.

- The site only has limited storage capacity for stockpiling clinker (4 weeks production), and therefore ongoing operation is essential
- If production is interrupted / demand not met, clinker imports would be required from outside the UK.

The operator is unable to complete such improvement works (in order to meet all BAT-AELs) during clinker production periods, and therefore requires downtime of operations in order to complete such works. The scope of works involves means that not all changes can be made during one annual shutdown period.

- *Their proposal allows them to continue production whilst implementing proposed changes (which will reduce particulate emissions from the site) over a series of planned annual shutdowns through to 31st December 2020.*

Details		Date
No Derogation requested / required	Upgrade to cement mills 9 and 10 particulates abatement from ESP to Fabric Filter	<u>Before 9th April 2017 (BAT-AEL compliance date)</u> <i>2016/7 is the earliest opportunity that this can be achieved whilst avoiding the need for additional derogations.</i>
Derogation approved	Upgrade Kiln particulates abatement from ESP to Fabric Filter	1st April 2018 shutdown (proposed)
	Upgrade to Clinker Cooler particulates abatement from ESP to Fabric Filter	31st December 2020 (during 2020 shutdown or earlier date)
	Update Coal Mill particulates abatement filter to new filter : <i>Currently fabric filter (30 years old) cannot meet the BAT-AEL of 10 mg/Nm³.</i>	

The proposed options (as detailed above) will result in the following changes to emission limit values

Change	Existing Limit	Limit (post derogation period)
Upgrade to cement mills 9 and 10	50 mg/Nm ³	10 mg/Nm ³
Upgrade Kiln ESP to Fabric Filter	30 mg/Nm ³	10 mg/Nm ³
Upgrade Clinker Cooler ESP to Fabric Filter	50 mg/Nm ³	10 mg/Nm ³
Update Coal Mill fabric filter	50 mg/Nm ³ (to be reduced to 30 mg/Nm ³ at permit issue in order to remove headroom)	10 mg/Nm ³

Existing impacts from the above issues have previously been assessed by the Environment Agency (during previous application determinations), and as the above provides an improvement (by reducing site impacts), we have not had to investigate the impacts from the above changes.

Summary

The operator has supplied a valid derogation request against the BAT conclusions 17 and 18.

The derogation request is based on technical characteristics of the Installation - owing to the practicability of interrupting the activity. *“The Installation produces a bespoke clinker product (for sprayed applications - such as tunnelling) which is not available from any other Cement producing Installation within the UK”.*

The operator is unable to complete such improvement works (in order to meet all BAT-AELs) during one annual shutdown period and therefore requires a series of annual shutdowns in order to carry out such works to comply with BAT-AEL's.

The Operator provided a credible argument that the increased costs for achieving the BAT-AELs linked to the technical characteristics (of interrupting operations) are disproportionate for achieving the BAT AEL. We have high confidence that the costs net of benefits of meeting BAT on time at this site are higher than the costs net of benefits of the derogation option.

Impacts

There are no significant negative environmental impacts of delivering the alternative vs the impacts of achieving the BAT-AEL. We have deemed that this impact is acceptable.

We agree that by allowing all derogations, it would not lead to any significant pollution or prevent a high level of protection of the environment being achieved.

Improvement conditions associated to these derogation requests are detailed within annex 3 of this document.

Annex 3: Improvement Conditions

We have set improvement conditions during this review, in light of:

- Information provided by the Operator in response to the Reg60 Notice, and our own records of capability and performance in order for the outcomes of the techniques detailed within the BAT conclusions to be achieved,
- A permit review (whereby we have assessed the performance and capability of the Installation not in relation to compliance with BATc)

Within the consolidated permit, we have removed existing improvement conditions which have been signed off as complete. Additional improvement conditions (as shown below) will continue from current improvement condition numbering.

The following improvement conditions have been removed from the notice (Table S1.3), as deemed complete.

Ref	Requirement	Date
IC1	The Operator shall produce and submit a project plan setting out how release of NO _x in the exhaust gases from the kilns will be minimised and at least reduced to <500mg/m ³ as a daily average by the target date of 30 June 2014. The project plan will be based on considerations of costs and benefits of all relevant options and using options appraisal methodology H1 or equivalent.	Completed
IC2	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 and Natura 2000 and Ramsar habitat sites within 10km of the installation. The assessment shall cover both background NH ₃ emissions and the maximum ammonia slip when SNCR is optimised for NO _x abatement.	Completed
IC3	The operator shall produce and submit a project plan setting out how releases of particulates in exhaust gases from the kilns will be minimised and at least reduced to <10 – 20mg/m ³ as a daily average by the target date of 30 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
IC4	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 – 20mg/m ³ as a daily average by the target date of 30 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

Ref	Requirement	Date
IC5	The Operator shall carry out a technical evaluation of the burning of SRF as a waste derived fuel in kiln 8. The technical evaluation programme shall be carried out in accordance with “SRF Technical Evaluation Programme on Kiln 8 Ketton Works” dated 9 th August 2012 and carried out as soon as possible following the first use of the fuel on the kiln 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 fuel on the main burner.	Superseded
IC6	The Operator shall submit a written report for approval by the Environment Agency on the technical evaluation of the burning of SRF as a waste derived fuel in kiln 8. The report shall explain how the use of SRF 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 SRF and a comparison of emissions with and without using SRF on the main burner. Data obtained during routine operation prior to the evaluation, or in the previous technical evaluations of other waste derived fuels in the same kiln since December 2005 may be included for comparison.	Superseded

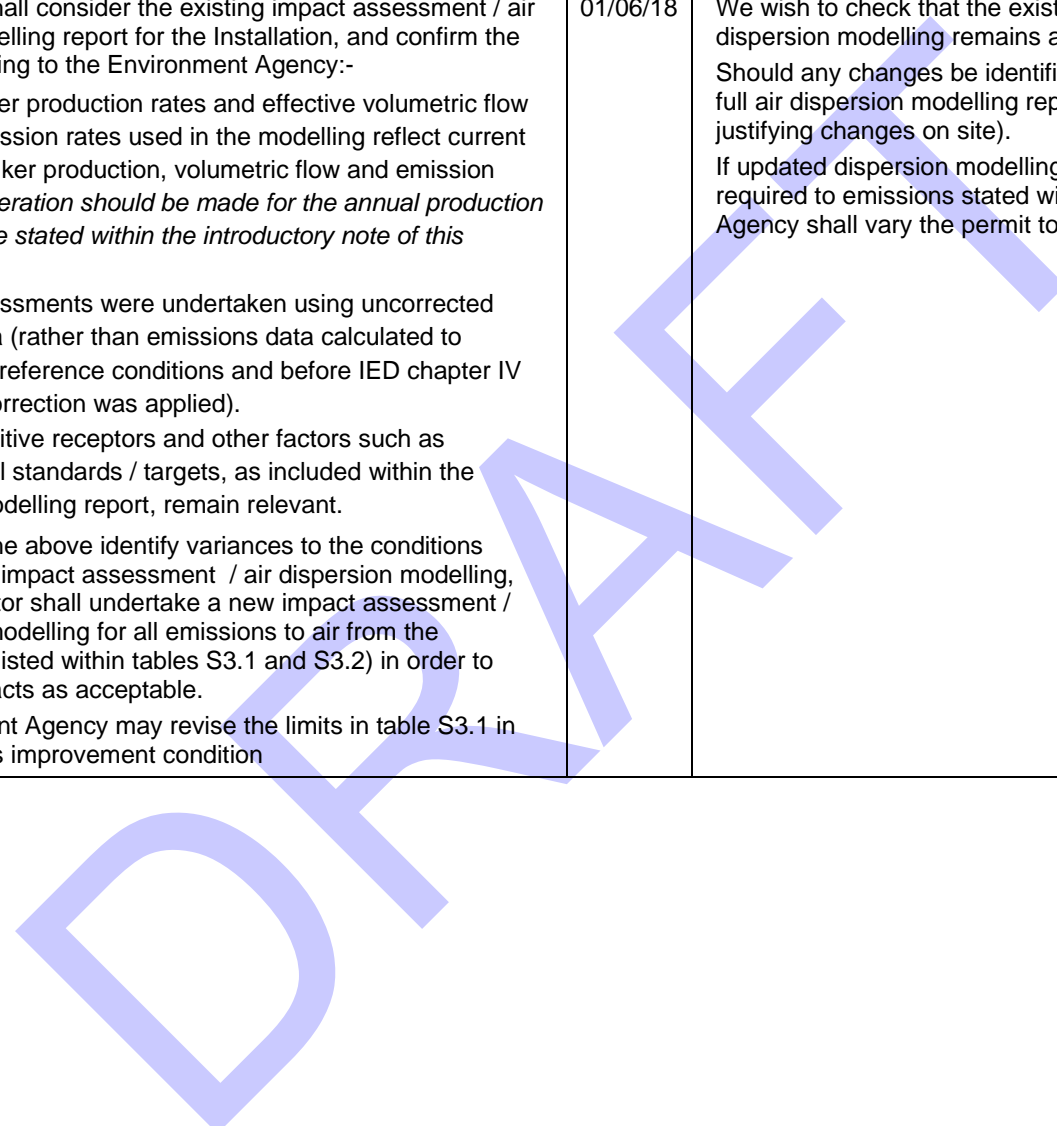
The following additional improvement conditions have been added to the permit (table S1.3) as new improvement conditions.
We have resumed the numerical sequence for new improvement conditions (IC7 – IC12) in order to remove any potential confusion by re-use of numbering.

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Ref	Requirement	Date	Justification for inclusion.
IC7	<p>The operator shall submit a report to the Environment Agency, for written approval detailing:-</p> <ul style="list-style-type: none"> • Confirmation of the completion of changes proposed within the regulation 60 response and additional information to cement mills 9 and 10 (emission points A8 & A9, table S3.1) in order to comply with BAT-AELs by the compliance date of 9th April 2017. • An update on any planned operations of cement mills 5, 6, 7 and 8 (emission points A4 – A7, table S3.1) together with confirmation that compliance with BAT-AELs will be achieved. • A progress update on planned upgrade works to particulate abatement plants serving Kiln 8, Kiln 8 clinker cooler and coal mill 8 (emission points A2, A3, and A10, table S3.1). <p>This improvement condition shall be deemed complete upon receipt of written approval from the Environment Agency.</p>	02/05/17	<p>The Operator is making a number of changes on site to particulate abatement on site.</p> <ul style="list-style-type: none"> • Cement Mills 9 and 10. For these mills the existing technology is ESP and is being changed to 'fabric filter'. The emission limit is reduced to 10mg/Nm³ to be met by the BAT-AEL compliance date of 09/04/2017. • Cement Mills 5, 6, 7, and 8. These mills are currently non-operational, however the operator has stated that should operations resume, then fabric filters will ensure that the BAT-AEL of 10mg/Nm³ is achieved. <i>An update should be provided as to the likelihood of re-start (where known), together with details of monitoring that will be undertaken.</i> • A progress update of planned works to emission points A2, A3, and A10 (where further information is available) will provide information in light of agreed derogation timescales. <p>We consider that it is necessary to obtain details on the above changes, as committed within the detail provided by the operator.</p>
IC8	<p>The operator shall investigate the feasibility of installing monitoring access to and/or modifying the ductwork of dust emission points A11 – to A24 (Table S3.2) to enable MCERTs monitoring of emissions to be carried out at each point.</p> <p>The operator shall assess each emission point and produce a risk-based plan of modifications with the aim of ensuring that MCERTs monitoring can be carried out. The plan shall prioritise the larger and more significant dust emission points.</p> <p>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/Nm³.</p> <p>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.</p>	30/11/17	<p>The operator has provided some detail of difficulties in undertaking extractive sampling for these emission points, some of which have been present on site for a number of years.</p> <p>The operator proposed to undertake differential pressure as surrogate monitoring method, however considering the scale of the releases (some upto 60,000m³/hr) we are unable to accept such proposal without sight of further detail. The operator has not provided any additional information to quantify impacts.</p>

<p>IC9</p>	<p>The operator shall submit an updated report on ammonia emissions from the Installation, in order to confirm that the current ELV for ammonia (stated within table S3.1) remains appropriate. The report shall include:-</p> <ul style="list-style-type: none"> • An assessment of usage rates following the ELV reduction for 'Oxides of Nitrogen' to 450 mg/Nm³ in order to demonstrate that ammonia dosing (through SNCR) is optimised, whilst complying with the Ammonia slip BAT-AEL of 50mg/Nm³, • An assessment of the criteria used within the existing impact assessment / air dispersion modelling report, in order to confirm that:- <ul style="list-style-type: none"> i) maximum ammonia emission rates (as worst case scenario) were assessed, ii) emission concentrations are uncorrected, and iii) the environmental standard value used of 3µg/m³ (for protected conservation areas) is appropriate (by providing justification for use of this target over that of the default target value of 1µg/m³). <p>Where any of the above criterions have not been assessed, the Operator shall provide an updated impact assessment / air dispersion modelling report, and confirm that impacts remain acceptable (for total ammonia).</p> <p>The report shall be submitted to the Environment Agency for written approval. The Environment Agency may change the total ammonia limit stated within table S3.1 of this permit upon completion of this improvement condition.</p>	<p>01/06/18</p>	<p>The operator has previously provided information in relation Ammonia emissions from the Installation.</p> <p>We have set a limit, but feel that further investigation is required, for the following reasons:-</p> <ul style="list-style-type: none"> • SNCR abatement utilises Ammonia (in order to reduce NOx emissions). As part of this Cement and Lime review we are reducing the NOx limit from 800mg/Nm³ to 450mg/Nm³ which will potentially alter ammonia dosage rates through the SNCR system. We therefore feel that further investigation is required. • The impact assessment that has been undertaken by the operator has utilised an environmental standard of 3µg/m³ by default. This is incorrect. The Operator should have used the default value of 1µg/m³ which is more stringent, or alternatively justified that 1µg/m³ is appropriate according to the features present within such sensitive receptor (e.g. Lichens and Bryophytes). <p>This improvement condition will provide an updated impact assessment in the even that any of the criteria identified requires amendment.</p>
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IC10	<p>The operator shall consider the existing impact assessment / air dispersion modelling report for the Installation, and confirm the following in writing to the Environment Agency:-</p> <ul style="list-style-type: none"> • That the clinker production rates and effective volumetric flow rates and emission rates used in the modelling reflect current maximum clinker production, volumetric flow and emission rates. <i>Consideration should be made for the annual production capacity value stated within the introductory note of this permit.</i> • That the assessments were undertaken using uncorrected emission data (rather than emissions data calculated to standardised reference conditions and before IED chapter IV confidence correction was applied). • That the sensitive receptors and other factors such as environmental standards / targets, as included within the dispersion modelling report, remain relevant. <p>Where any of the above identify variances to the conditions used within the impact assessment / air dispersion modelling, then the Operator shall undertake a new impact assessment / air dispersion modelling for all emissions to air from the Installation (as listed within tables S3.1 and S3.2) in order to confirm all impacts as acceptable.</p> <p>The Environment Agency may revise the limits in table S3.1 in response to this improvement condition</p>	01/06/18	<p>We wish to check that the existing impact assessment / air dispersion modelling remains appropriate / accurate.</p> <p>Should any changes be identified, the operator should undertake a full air dispersion modelling report (which they will use in future for justifying changes on site).</p> <p>If updated dispersion modelling indicates any amendments are required to emissions stated within table S3.1, the Environment Agency shall vary the permit to account for these.</p>
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IC11	<p>The operator shall undertake a review of “Baseline Report – Ketton Site” dated September 2014 (as provided in response to our Regulation 60 Notice issued on 29th April 2014), and submit a report to the Environment Agency for approval in writing.</p> <p>The review shall include justification for the following:-</p> <ul style="list-style-type: none"> • The exclusion of hydrocarbons (hazardous substances) testing from the analysis undertaken for ‘groundwater quality testing’ from the boreholes to the north of the site. • The locations tested within the baseline report, in consideration for their distance to operational areas containing the additional storage tanks -as identified within the report. <p>Where the review establishes that additional baseline data is required, the operator shall provide details of the data to be collected (to ensure that all areas containing potential hazardous substances are assessed) together with a proposed date for submission of an updated baseline report.</p> <p>Any updated baseline report shall include a monitoring plan (for the testing of soil every 10 years and groundwater every 5 years) in consideration of condition 3.1.5 of this permit unless demonstration can be made that this is not required.</p>	04/12/17	<p>Refer to “Ketton GWCL review 300915”</p> <p><i>None of the samples appear to have been tested for hydrocarbons (hazardous substances) and none of the samples are located near the operational areas that contain the storage tanks. Additionally, the text states that the landfill is up gradient of the operational areas, so any potential groundwater impact from the operation area may not have been identified.</i></p> <p>The baseline data collected to date is considered minimal given the number of potential sources of contamination on site.</p> <p>We recommend that additional baseline data is collected to include additional soil and groundwater samples.</p> <p>An improvement condition could be used to</p> <ul style="list-style-type: none"> •ensure a monitoring plan is produced for soil testing every 10 years and groundwater testing every 5 years unless it can be demonstrated why this is not necessary. This is in accordance with H5 guidance. Consideration should be given to using any additional monitoring points that may be installed for baseline data for ongoing monitoring purposes. •all activities using hazardous chemicals should be identified and those areas should be appropriately tested for these substances.
IC12	<p>The operator shall carry out a feasibility study for recovering waste heat from the clinker cooler <i>in consideration of condition 1.2.1 of this permit</i> and planned modifications to the clinker cooler - as referenced within ‘Ketton Kiln Clinker Cooler 8 Particulate Emission Limit Derogation Request’ <i>provided as further information on 26/05/2016.</i></p> <p>A report detailing the findings the study shall be submitted to the Environment Agency. Where improvements are identified, the Operator shall propose a timetable for their implementation.</p>	02/04/18	<p>The operator stated within their Cooler derogation request (received on 26/05/2016) that the proposed option (to which we grant the derogation) will involve the replacement of the current Cooler ESP with a fabric filter, to which a heat exchanger will also be required in order to protect the bags from high temperatures.</p> <p>As part of modifications to the clinker cooler the operator is seeking to improve energy efficiency of the kiln and cooler, and in the case of the heat exchanger is considering options for electricity generation (from such heat recovery).</p> <p>We are favourable to this approach and therefore have set this improvement condition to follow progress with this.</p>

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> and the public drop-in event held on <insert date> at <insert venue>.

Drafting Note: Delete second part if no public drop-in event was undertaken.

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

[Repeat/extend Table for each response]

Depending on the number, extent and nature of responses received to the 'draft decision consultation' it may be necessary to review how these responses are presented and how they are acknowledged and considered as part of our finalised decision.

- Don't reference individual members of the public by name.
- Group common issue responses together as one and provide a single acknowledgement response action conclusion.
- Reference earlier sections of the document if our position in respect to the issue has already been set out there.

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

1. **Change of Installation name**

The installation name has been changed from “Ketton Works” to “Ketton Cement Works” in line with other Environment Agency permits (by inclusion of process description).

2. **Introductory Note / Brief description of the process**

The brief description of the process has been updated to provide consistency within Environment Agency permits and within 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.

3. **Update to condition numbering**

We have updated permit numbering in line with our current standard permit template.

4. **Abnormal Operations (provision under Chapter IV of Industrial Emissions Directive)**

We have updated terms within the permit from “abnormal operation” to Chapter IV abnormal operating conditions” in line with changes to Directives.

5. **Condition 3.5.5 (confidence intervals for CEMs)**

We have included Ammonia (at 40%) within this condition in line with other permits within the sector, and in light of SNCR usage. *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.*

6. **Condition 3.6 “Fire Prevention”**

We have included Fire Prevention conditions which are appropriate for all installations that store combustible wastes. This condition is incorporated from our standard permit template.

New installations storing combustible wastes are required to have an FPP in place from start of operations. 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.

7. **Table S1.1 Activities**

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

- We have changed the reference to ‘grinding cement clinker’ to activity 3.1 Part A(2)(a) : *Previously this activity was listed under activity reference 3.1 A(1)a.*
- Included activity 3.1 Part B(a) [storing, loading and unloading] : *Previously this activity was incorporated within the main listed activity for ‘producing cement’ but has since been separated into a separate activity by amendment to the Environmental Permitting Regulations.*
- Included activity 3.1 Part B(b) [blending cement in bulk] : *Previously this activity was incorporated within the main listed activity for ‘producing cement’ but has since been separated into a separate activity by amendment to the Environmental Permitting Regulations.*

We have updated table S1.1 within the permit in order to reflect these changes.

We have also amended Directly Associated Activities (DAAs) in consideration of all activities which take place within the Installation (which are not covered within the scope of the listed activities detailed above).

8. **Table S1.3 Improvement Conditions**

We have removed completed improvement conditions (IC1 – IC6) from the permit. We have included new improvement conditions (IC7 – IC11) within the permit. *Details on these are included within Annex 3 of this document.*

9. **Emissions (schedule 3)**

Changes required by BATc are detailed within section “key issues” of this document.

We have included table S3.4 (annual limits) within the permit, but have not set any limits. This table is included within the permit with the ability to set limits in the future, such as following completion of IC9 - should it be determined that impacts have increased since submission of the previous impact assessment / air dispersion modelling report.

10. **Reporting (schedule 4)**

We have updated reporting requirements in line with the changes made to monitoring – as detailed within the “key issues” section of this document.

11. Interpretation (schedule 6)

Schedule 6 has been revised to remove interpretations which are no longer relevant, and introduce new ones, such as the Industrial Emissions Directive (IED).

Interpretations added – in order to align Cement sector permits / cover amendments to the permit including updated introductory note.

- “annual average” means the average of all daily averages in a calendar year.
- “CEM” means Continuous Emission Monitor.
- “chipped tyres” means both chipped and granulate tyre or rubber conveyor belt derived material.
- “Climate Change Agreement” means an agreement made between the Secretary of State and the operator, either directly or through the offices of any association of which he is a member, in which he agrees to secure energy efficiency improvements as set out in a plan agreed with the Secretary of State in that agreement in return for a discount from the amount he would otherwise pay as a Climate Change Levy.
- “COSHH Regulations 2002 (as amended)” means the Control of Substances Hazardous to Human Health Regulations 2002 (as amended) (SI 2002 No.2677).
- “commissioning” relates to the period after construction has been completed or when a modification has been made to the plant or the raw materials when the Permitted installation process is being tested and modified to operate according to its design.
- “CO trip” means a de-energisation of electrical precipitators following detection of carbon monoxide in the kiln gases above a pre-determined concentration. This is a safety system.
- “daily” means a 24 hour period commencing at 12:00 hrs (either midnight or midday as agreed in writing with the Environment Agency).
- “disposal” Means any of the operations provided for in Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.
- “ELV” means emission limit value.
- “EWC code” means the code number from the European Waste Catalogue.
- “group I metals” means mercury (Hg).
- “half-hour or half-hourly” means a 30 minute period commencing on the hour or at half past the hour.
- “hourly” means a 60 minute period commencing on the hour.
- “kiln flush” refers to kiln upset due to a surge of feed material into the kiln which passes through without reacting fully.
- “LWS” means Local Wildlife Site
- “Monitoring” includes the taking and analysis of samples, instrumental measurements (periodic and continual), calibrations, examinations, tests and surveys.
- “Oxides of Nitrogen (NO_x)” means nitric oxide (NO) plus nitrogen dioxide (NO₂) expressed as NO₂
- “PCP” means Pentachlorophenol,
- “permitted installation” means the activities and the limits to those activities described in Table S1.1 of this Permit.
- “PFA” means pulverised fuel ash and is the fine ash recovered from the gas stream from the combustion of pulverised coal in coal-fired power stations
- “recovery” means any of the operations provided for in Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.
- “SAC” means Special Area of Conservation
- “six monthly periodic monitoring” means periodic monitoring in each 6 month period (January-June & July –December) with at least 4 months between sampling dates.
- “SPA” means Special Protection Area

- “SSSI” means a site of special scientific interest designated under the Wildlife and Countryside Act 1981 being a site in the UK which is of particular importance because of its geology, topography, or ecology.
- “thermal input” refers to the combined pre-calciner and main kiln burner inputs. Maximum thermal substitution of hazardous waste shall not exceed 40% to comply with IED co-incineration requirements. Hazardous waste may be substituted only as a main kiln burner input due to IED minimum thermal operating requirements.
- “Waste Framework Directive” or “WFD” means Waste Framework Directive 2008/98/EC of the European Parliament and of the Council on waste

Interpretation amended – *in light of changes to the permit.*

Previous interpretation	Revised interpretation	Justification
<p>“abnormal operation” means any technically unavoidable stoppages, disturbances, or failures of the abatement plant or the measurement devices, during which the concentrations in the discharges into air or waste water of the regulated substances may exceed the normal emission limit values.</p>	<p>“Chapter IV abnormal operating conditions” means any technically unavoidable stoppages, disturbances, or failures of the abatement plant or the measurement devices, during which the concentrations in the discharges into air or waste water of the regulated substances may exceed the normal emission limit values.</p>	<p>“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”.</p>
<p>“daily average” for releases of substances to air means the average of valid half-hourly averages over a calendar day during normal operation.</p>	<p>“daily average” for releases of substances to air means the average of valid half-hourly averages over consecutive discrete period of 24 hours commencing at a time agreed in writing with the Environment Agency during normal operation.</p>	<p>We have amended this condition in light of changes to start-up and shutdown interpretation changes.</p>
<p>“shut down” or “shutting down” is any period where the plant is being returned to a non-operational state and there is no waste being burned.</p>	<p>“kiln shut down” is defined as when the plant is being returned to a non operational state and no waste is being burned. Emission limit values do not apply during shutdown once the feed rate is below 100 tonne per hour.</p>	<p>this is revised to include an Operator-agreed feed rate of 100 tonne per hour.</p>
<p>“start up” is any period, where the plant has been non-operational, after igniting the auxiliary burner until waste derived fuel has been fed to the kiln in sufficient quantity to initiate steady-state</p>	<p>‘Kiln Start Up’ means from the time when raw meal is introduced into the kiln to the time the feed rate has reached 100 tonne per hour and the kiln is stable or as otherwise agreed in writing by the Agency. On commencing kiln operation, the first continuous monitoring daily average can be calculated from the 24 hour period starting from the time that kiln start-up has completed. Subsequent daily averages will be based on a 24 hour period commencing 12 noon/midnight.</p>	<p>This is revised in line with current definition for start up, removing the reference to use of WDFs to determine end of start up, and instead including an agreed threshold figure (100 tph) 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.</p>

The standard tables for TEF Schemes for dioxins and furans has been retained as monitoring for PCDD/F is now required for lime works regardless of whether a waste-derived fuel is burned.

12. Site condition and IED compliance

Question 4 of the Regulation 60 Notice requested provision of information relating to site condition, to ensure that the requirements of IED article 22(2) are fulfilled.

The Operator provided a summary report (baseline report – Ketton site) as part of their response to the Reg 60 Notice, received on 08/01/2015 which referred to an original site condition report submitted to the EA in 2001 as part of the PPC application to provide a characterisation of site condition.

This summary report, along with the original data and reports, has been assessed by a technical expert in the Groundwater and Contaminated Land team. The report states:-

“The review of operational changes on site, pollution prevention measure and procedures, and notifiable incidents has identified that it is unlikely that there has been a measureable change in the risk to soil and groundwater from the release of relevant substances since the permit issue. The site has had no large scale notifiable spills and has complied with its permit in respect to notifications”.

Our technical expert provided the following conclusions :-

Three new storage facilities (since the production of the 2001 report) are identified.

These concern:-

- a liquid ammonia tank,
- a silo for meat and bone meal (waste derived fuel), and
- a solid recovered fuel container.

An updated tank inventory is also provided.

Groundwater quality data is presented for water taken from boreholes associated with the landfill operations to the north of the site. *None of the samples appear to have been tested for hydrocarbons (hazardous substances) and none of the samples are located near the operational areas that contain the storage tanks. Additionally, the text states that the landfill is up gradient of the operational areas, so any potential groundwater impact from the operation area may not have been identified.*

The baseline data collected to date is considered minimal given the number of potential sources of contamination on site.

We recommend that additional baseline data is collected to include additional soil and groundwater samples.

An improvement condition could be used to

- ensure a monitoring plan is produced for soil testing every 10 years and groundwater testing every 5 years unless it can be demonstrated why this is not necessary. This is in accordance with H5 guidance. Consideration should be given to using any additional monitoring points that may be installed for baseline data for ongoing monitoring purposes.
- all activities using hazardous chemicals should be identified and those areas should be appropriately tested for these substances.

We have included an improvement condition, as detailed within Annex 3 of this document.

End of Decision Document.