

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

The Permit number is: EPR/BL7272IB
The Operator is: Castle Cement Limited
The Installation is: Ribblesdale Cement Works
This Variation Notice number is: EPR/ BL7272IB/V010

Consultation commences on: 07/03/2017
Consultation ends/ended on: 04/04/2017

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. *We have also decided to grant an additional derogation (BATc21) which has been included as a consequence to the applied derogations from BATc 17 and 18.* 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 07/08/2014 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 provided by the Operator on 02/07/2015 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, 18 and 21.

2.3 Requests for Further Information during determination

Although we were able to consider the Regulation 60 Notice response generally satisfactory at receipt, we did in fact need more information in order to complete our permit review assessment. Further information was provided by the operator on 16/08/2016, 12/12/2016, and 16/12/2016. A copy of each response was placed on our public register.

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 to show that the operator is currently compliant with the BAT conclusion and have no reason to believe that 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 to show that the operator has suitable plans in place to ensure that they will be compliant with the BAT conclusion by the implementation date.
NC	Not Compliant

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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 (within buildings), vibration insulation, use of impact absorbent materials, sound proofed buildings, 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"> Ribblesdale 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. The Kiln at Ribblesdale works was installed in 1982. 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 7 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). Ribblesdale 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 Ribblesdale 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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			<p>Most packed cement produced at Ribblesdale is Cem 2 which has up to 20% clinker substitution, there is also up to 50% ground granulated blast furnace slag (GGBS) used in Cem3.</p> <p>Increased levels of clinker substitution would not deliver the cement performance required by customers, and would simply require additional investment in equipment to move the point of addition of GGBS and PFA from the concrete plant to the cement plant without actually reducing the clinker content of the binder in the finished concrete.</p>
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.</p> <p>The Slite kiln capacity is more than double that of kiln 7, the raw material moisture less than half that at Ribblesdale and a cooler exhaust temperature almost 100°C higher and a gas flow double that at Ribblesdale. 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 121°C for an organic Rankine cycle (ORC) system to be 10% efficient. Kiln 7 operates at an exhaust gas temperature of 60°C due to the wet scrubber, and at present there is no technology available that can recover heat from this low temperature stream to produce electricity. The temperature at the main stack after reheating with the clinker cooler excess air is around 102°C this is simply not hot enough for use in a heat recovery system to operate. The minimum temperature for an ORC system is 121°C the stack temperature is almost 20°C lower than this.</p> <p>The heat available in the clinker cooler excess air flow is used to reheat the plume to ensure good dispersion and prevent condensation and corrosion of the main stack, if a heat recovery system were added to the cooler there would be insufficient heat available to reheat the plume after the wet scrubber.</p>

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			Castle Cement have concluded that there are no suitable users for the waste heat generated by CHP in the vicinity of the plant.
10	<p><u>Cement sector</u></p> <p>In order to reduce/minimise electrical energy consumption, BAT is to use one or a combination of the listed techniques.</p>	CC	<p>Ribblesdale 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 Ribblesdale works uses high efficiency vertical spindle mills. The cement mills at Ribblesdale are fitted with separators to minimise energy consumption of the grinding process.</p> <p>Ribblesdale works carry out false air surveys of the kiln line when necessary. 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></p> <p>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 	CC	<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.</p>

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	- Apply QA systems for each waste load.		
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 introduction of hazardous wastes 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</p>

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			<p>explosive atmosphere regulation 2002) risk assessment. These processes will 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.</p> <p>The following hazardous wastes are used as raw materials at Ribblesdale hydrated lime and Quilligotti filter cake. Both are hazardous due to their lime content which is an irritant the same as cement, the same precautions are used when handling these waste as cement to minimise impacts on employees and the environment.</p> <p>These wastes were subject to the same pre acceptance steps of the code of practice, the risk assessment was completed using the environmental aspect assessment procedure that was in place at the time and similarly health and safety task based risk assessments have been completed for working with these wastes.</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 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. - Cleaning regimes are in place which includes the use of fixed and mobile vacuum systems, water dampening etc.

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			<ul style="list-style-type: none"> - 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 near the crushing plant. 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></p> <p>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></p> <p>In order to reduce channelled dust emissions, BAT is to apply a maintenance management system which especially addresses the performance of filters applied to dusty operations, other than those from kiln firing, cooling and main milling processes. Taking this</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. Replacement filters are specified and designed to emit less than 10mg/m3.</p>

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	management system into account, BAT is to use dry flue-gas cleaning with a filter. BAT-AEL <10 mg/Nm 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 7 is equipped with an electrostatic precipitator and wet scrubber the gas flow post scrubber is combined with the gas flow from the clinker cooler, the combined flow particulate emission does not meet the BATAEL, Castle Cement do not expect to achieve the BATAEL by April 2017 as stated their 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)	CC FC NC	Cement mills 9 and 10, and the coal mills are all equipped with fabric filters which achieve the BATAEL of 10 mg/Nm ³ as a spot measurement for at least 30 minutes. To demonstrate compliance with the BAT conclusions Castle Cement propose that an additional spot sample emission limit value is added the EPR permit at 10mg/Nm ³ to be carried out once per year. The operation of cement mills 7 and 8 and do not currently meet the BAT AEL on the basis of continuous emissions monitoring, both mills are equipped with electrostatic precipitators, these units will be replaced with Fabric filters during the 2015/16 and 2016/17 winter shutdowns. Therefore the BATAEL will be achieved by April 2017 as required. Kiln 7 clinker cooler is equipped with an electrostatic precipitator, on the basis of continuous emissions monitoring the current performance does not meet the BATAEL, Castle Cement do not expect to achieve the BATAEL by April 2017 on a continuous basis as stated in their regulation 60 response. Derogation requested – see Annex 2.
19	<u>Cement sector</u> In order to reduce the emissions of NO _x from the flue-gases of kiln firing and/or preheating/	CC	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 Ribblesdale.

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>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>	FC	<p>The use of Cemfuel at Ribblesdale works has reduced flame temperature as a result of the moisture content this has contributed to a reduction in NO_x emissions.</p> <p>Kiln 7 is equipped with a low NO_x 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 7 was built in the 1980's and the current precalciner is not designed for staged combustion, the use of tyre chips, SRF and MBM in the calciner has reduced NO_x emissions compared with operation with coal only.</p> <p>SNCR has been in operation at Ribblesdale for the past 6 months.</p> <p>The initial NO_x emission level for operation at the current alternative fuel usage rates complied with the 800 mg/Nm³ emission limit value. SNCR is currently in use to achieve compliance with the 500 mg/Nm³ limit, there is limited experience of operating with SNCR but the equipment has been sized to allow for increased use of ammonia. Operation of kiln 7 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>The NO_x emissions from kiln 7 after the application of primary measures is below 1000 mg/Nm³ therefore an emission limit of 450 mg/Nm³ will be applicable.</p> <p>BAT Achieved through application of primary techniques II and V, and secondary techniques.</p>
20	<p><u>Cement sector</u></p> <p>When SNCR is used, BAT is to achieve efficient NO_x reduction, while keeping the</p>	CC	<p>The SNCR system used at Ribblesdale has multiple injection points and PLC control to optimise NO_x reduction and ammonia consumption.</p> <p>There is a significant amount of ammonia or ammonia salts present in the limestone quarried from Lanehead and Bellman quarries.</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
	<p>ammonia slip as low as possible, by using the listed technique.</p> <p>Ammonia slip BAT-AEL <30-50 mg/Nm³ (daily average)</p>		<p>We have included an improvement condition in relation to NO_x emissions and ammonia slip in consideration of limit changes (in consideration that SNCR can impact both NO_x and Ammonia emissions).</p>
21	<p><u>Cement sector</u></p> <p>In order to reduce/minimise the emissions of SO_x 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>	NC	<p>The raw materials at Ribblesdale contain high levels of sulphides. Consequently a wet scrubber was installed in 1996, the current emission performance level and emission limit value is within the BATAEL range.</p> <p>In order to meet BATc 17 and 18, the operator has confirmed that significant improvement works are required for the scrubber, during which time the BAT-AEL for SO_x will not be met. Such upgrade works are limited to 6 months (by permit condition), after which point emissions will return to the BAT-AEL range.</p> <p>In order to account for the above, a derogation was made for this BATc in order to cover this period (as a consequence of the derogation from BATc17 and 18).</p> <p>Derogation detail – see Annex 2.</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 Ribblesdale.</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 precipitators (ESPs) or hybrid filters, BAT is to use the listed techniques in combination.</p> <p>(no BAT-AEL)</p>	CC	<p>The kiln 7 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> <p>The frequency of CO trips have been reduced to one or two per year each of less than 1 minutes duration. Furthermore in the event of a precipitator trip the wet scrubber reduces the potential impact of the dust emitted during trip conditions.</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
24	<p><u>Cement sector</u></p> <p>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.</p> <p>(no BAT-AEL)</p>	CC	<p>There is naturally occurring organic carbon within the quarried raw materials at Ribblesdale which can lead to TOC emissions.</p> <p>TOC entering the kiln system alongside the alternative raw materials used is managed to minimise emissions. A risk assessment processes that includes a mass balance is used to assess the potential impacts of any new raw material to ensure emissions are reduced and managed, including TOC.</p> <p>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. In addition, quality management systems are implemented to manage kiln inputs.</p>
25	<p><u>Cement sector</u></p> <p>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.</p> <p>BAT-AEL <10 mg/Nm³</p>	CC	<p>There is very little chloride present in the raw materials used at Ribblesdale.</p> <p>Typically coal used at Ribblesdale contains less than 0.05% Cl, therefore no limit is set. Input limits are set in alternative fuel supply specifications for Cemfuel, SRF/Profuel and MBM which are existing fuels that the operator is already permitted to use.</p> <p>Each alternative raw material is assessed using a risk assessment process and a chloride limit on the ARM (alternative raw material) 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 HCl emission is independent of the chloride input, the most significant factor affecting HCl emissions is the operation of the raw mill and scrubber.</p> <p>The operation of the wet scrubber abates HCl emissions thus ensuring compliance with the BATAEL.</p>
26	<p><u>Cement sector</u></p> <p>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>	CC	<p>HF emissions are inherently low in cement production. Since the introduction of the waste incineration 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>There is very little fluoride present in the quarried raw materials and coal used at Ribblesdale. Whilst it is unnecessary to set limits on fluorine input for emission reasons, 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</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
			<p>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 PCDD/F are considered to be BAT in there prevention via the following approaches:</p> <ul style="list-style-type: none"> a). Inputs to the kiln system are monitored for inputs for quality and environmental reasons, internal limitations to the process balance are set. b). Chlorine cycles are monitored within the process as these can cause significant production issues and as such chlorine input is internally regulated to prevent high levels. c). Chlorinated organic compounds are highly unlikely to influence PCDD and PCDF emissionsas when present in alternative fuels they are burned in the kiln at flame temperatures in excess of 2000°C. d). halogenated chlorine above 1% is only burnt via the main burner above 1,100° C. e). Kiln gasses leaving the top of the preheater tower are quenched in line with PCDD/F control and process requirements. f). No waste is burnt on start up or shut down of the kiln system. <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,</p>	CC	<p>Emissions of metals are controlled to meet the BATAEL by applying the following 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
	BAT is to use one or a combination of the listed techniques.		<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.</p> <p>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>		
55 - 69	<u>Magnesium Oxide sector</u>		

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.
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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 : The operation of cement mills 7 and 8 and do not currently meet the BAT AEL on the basis of continuous emissions monitoring, both mills are equipped with electrostatic precipitators, these units will be replaced with Fabric filters during the 2015/16 and 2016/17 winter shutdowns. Therefore the BATAEL will be achieved by April 2017 as required.

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

Plastic packer	Scrubber meal silo
Silo 13 (No.2 loading head)	W1P51
Silo 14 (No.1 loading head)	W1P61
Silo15	R1P32
Silo 16	R1P34
Silo 19	R1P36
Silo 20	A1P12
Silos 13 – 14 elevator	A1P14
Packer	A1P24
Silo B1	W1P41
Silo B2	W1P81
Silo B3	H1P21
Blender loading head	Belts 4/5 changeover
Blender direct loading head	Top of 14 belt

These are deemed “small sources” by BATCs.

Channelled dust emissions > 10,000 Nm³/hr -

Mill 7 Mikropulse filter	Raw meal silo H1P11	[14,580 m ³ /h]
Mill 8 Mikropulse filter	Crushing plant No. 1 Dust Collector	[60,000 m ³ /h]
Bottom of Pan 1	Crushing plant No. 2 Dust Collector	[58,000 m ³ /h]
Pan 2	Crushing plant No. 3 Dust Collector	[42,300 m ³ /h]
Climavent Pan 1	Crushing plant No. 4 Dust Collector	[35,500 m ³ /h]
Haver Rotopacker dust filter	Packing Plant	[28,000 m ³ /h]
Arodo packer dust filter	Packing Plant	[18,344 m ³ /h]

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 – A10, A11, A12, A13 A14, A15 and A16. 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).
- In addition to the additional emission points above, we are also including a new emission point (A7) which will replace existing emission points A5 and A6 – serving cement mills 7 and 8. Further detail is contained within section 3 below.

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 points A3 and A4 : Currently serving cement mills 9 and 10. Existing abatement is by fabric filter. The limit within the permit will be reduced to 10mg/Nm³ in order to meet BATc requirements.
- Emission points A5, A6 and A7 : A5 and A6 currently serve cement mills 7 and 8. These ESPs are being replaced with fabric filters with the work being completed by the compliance date of April 2017. The works will result in both Cement Mills 7 and 8 sharing a new emission point. We have included a new emission point (A7) to account for this. Following the compliance date emission points A5 and A6 will be no longer in use. A7 will be included within the permit with an ELV of 10mg/Nm³ in order to meet BATc requirements.
- Emission points A8 and A9 : Currently serving coal mills 4 and 5. Existing abatement is by fabric filter. The limit within the permit will be reduced to 10mg/Nm³ in order to meet BATc requirements.

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 500 mg/Nm³ to 450 mg/Nm³ in order to comply with BATc19. *The NOx emissions from kiln 7 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 200 mg/Nm³ is applicable (assuming a maximum ammonia slip value of 50 mg/Nm³).* We have also set an improvement condition in order undertake further assessment – detail is provided within annex 3.

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 has previously assessed the impacts from Ammonia emissions by improvement condition IC2. SNCR has been in operation at Ribblesdale since 2014.

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 NOx abatement.
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The regulation 60 response included a frequency distribution of background ammonia concentrations showing the maximum daily average ammonia concentration at 140mg/Nm³ (and mean at 28 mg/Nm³).

The Operator proposed (within their response) an emission limit value of 200mg/Nm³ for total ammonia (including background). This assumed a maximum ammonia slip value of 50 mg/Nm³ which effectively predicts that background ammonia can account for the remaining 150mg/Nm³. We have based our limit on this information as best data, but subject to change following completion of an improvement condition – requiring further assessment.

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

- We have reduced the Oxides of Nitrogen emission limit value as described above, which could result in changes to the amount of ammonia that is required during the SNCR process - in order to meet such reduced limit (of 450 mg/Nm³). The limit set for ammonia is based upon the max value of the range stated within the BATc.
- Background ammonia data (without SNCR in operation) is limited. More comprehensive data will allow us consider revising the limit that we have set.
- The impact assessment undertaken to date 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.*

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 200mg/Nm³. This has been set based upon best available data to date, however we recognise that further detailed information should be evaluated (by improvement condition) which may result in revision to the limit set.

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 points A3 and A4 : Currently serving cement mills 9 and 10. Existing abatement is by fabric filter. The abatement technology is not changing.

The limit has been reduced to 10mg/Nm³ in order to meet BATc requirements.

- Emission points A8 and A9 : Currently serving coal mills 4 and 5. Existing abatement is by fabric filter. The abatement technology is not changing. The limit has been reduced to 10mg/Nm³ in order to meet BATc requirements.

For the above emission points 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 (BAT-AEL of 10mg/Nm³) as stated within that table.

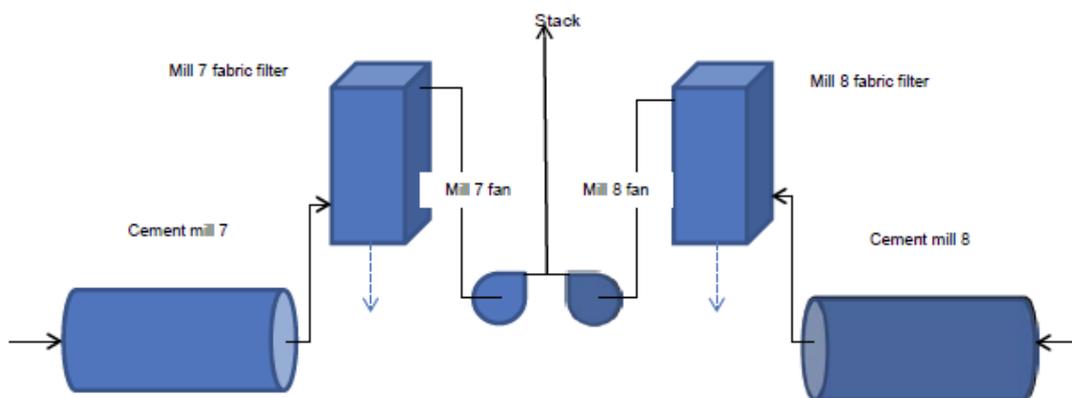
Periodic monitoring is considered appropriate for such releases. *Continuous monitors employed for existing operations have an operating window to which they can successfully detect and measure emissions. As we are reducing these emissions, the performance may be compromised as the emission concentration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

- Emission points A5 and A6 : Currently serving cement mills 7 and 8. Existing abatement is by ESP. The operator is changing the technology to fabric filter abatement technology. The limit has been reduced from 75mg/Nm³ to 10mg/Nm³

The operator has confirmed that these existing emission points (A5 and A6) will be replaced with a new emission point (which we refer to as A7 within table S3.2 of the permit). This is a single emission point through which both mills will vent to atmosphere between the existing mill stacks.



Following the approach which has been taken above, we have specified that monitoring shall follow the approach taken above - quarterly periodic monitoring (table S3.1) to measure compliance with the emission limit value (BAT-AEL of 10mg/Nm³), with continuous monitors for process control (according to table S3.5).

Existing emission points A5 and A6 will no longer be used as an emission point following the commissioning of the new emission point A7.

2. Monitoring requirements (new emission points A10 – A16)

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.

As a result of the above changes, we have updated tables S3.1, S3.2, and S3.5 within the permit.

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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 derogations 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) is 20mg/Nm³ (appropriate to Electro-Static Precipitator [ESP] technology) measured dry at 10 % oxygen by volume and at a temperature of 273 K, and pressure of 1 013 hPa.

The Operator’s current permit includes a limit (ELV) relevant to this parameter of 30mg/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 (particulates) is 20mg/Nm³ (appropriate to Electro-Static Precipitator [ESP] technology) measured dry at 10 % oxygen by volume and at a temperature of 273 K, and pressure of 1 013 hPa.

The Operator’s current permit includes a limit (ELV) relevant to this parameter of 40mg/Nm³.

The Operator did not request the following derogation, however we considered that such derogation was required 'as a consequence' to the derogation which is proposed to be granted for 1 and 2 above.

3) BATc21 – Sulphur Dioxide emissions from kiln processes.

The operator has not applied for a derogation from BATc21.

The BAT-AEL for SOx emissions is 50 – 400 mg/Nm³ measured dry at 10 % oxygen by volume and at a temperature of 273 K, and pressure of 1 013 hPa.

This derogation is considered as a consequence of the proposed option (in order to meet BATc17 and BATc18) which includes the refurbishment and improvement works to the wet scrubber abatement system (for a duration of 6 months) during which time increased emissions of sulphur dioxide will result meaning that BATc21 will not be met during such period.

For this reason we consider it relevant to include a third derogation from BATc21 in order to cover such period.

The request is time limited. For 1 and 2 above, the request is until 31st March 2019, two years beyond the compliance date. For number 3, we have included a derogation until 31st March 2018 (in order to cover the period when the scrubber will be offline). The derogation criteria are the Technical Characteristics (plant configuration) of the works:

The unique plant configuration at this Installation means that it is technically more difficult and costly to comply.

Although information was provided in their Reg 60 Response (received 8 January 2015) which allowed us to commence assessment of the derogation request it was deemed 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 02/07/2015 (further information relating to variation BATc's)
	Resubmission of derogation information (from operator) received 26/05/2016
Request for information during site visit 08/08/2016 (particular impact assessment information)	Information supplied by operator on 16/08/2016
	Information supplied by operator on 22/11/2016 relating to cement mill 7 and 8 (and associated emission points)
	Information supplied by operator on 16/12/2016 amending SO ₂ data supplied in order to cover temporary operation of scrubber offline.

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, 18 and 21, 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:

The existing equipment (ESP technology on both the Kiln and Clinker Cooler) are designed to meet the BAT-AEL of 20mg/Nm³ – AEL appropriate for ESP technology. The operator is not able to demonstrate compliance with such BAT-AELs on a permanent basis - for the following reasons:-

- Sampling for particulates is not undertaken at i) the kiln filter exit or ii) the clinker cooler filter exit. This is because ducting leaving such plants form part of an intricate network of ducting which render sampling locations unsuitable. Monitoring standards require sampling ports to be located at suitable locations which avoid bends, branches, twists, turns - all of which effect the cross sectional flow of particulates within the duct, and thus restrict accuracy of sampling.
- The only suitable location for sampling particulates from these sources is within the common stack (as a combined emissions monitoring point). At this point measurements will include exit gases from the kiln, the cooler, the bypass, and the scrubber, meaning a combination of co-incineration gases and ambient air (from the cooler and bypass) are measured.
- The scrubber utilises a limestone scrubbing medium which adds particulate content, and impacts upon the emission concentration as measured within the combined monitoring port.

The above reasons demonstrate that the wet scrubber has an impact upon the ability to demonstrate compliance with BATc17 and BATc18 (Particulate Emissions) despite its primary purpose being to abate sulphur emissions. And the combined effect of the 3 reasons above demonstrate that compliance by 2017 would be technically more difficult and costly to comply.

The option proposed by the operator (which has been accepted by the Environment Agency as part of this process) is to refurbish / make improvements to the scrubber. *The following is an excerpt taken from the operators derogation request received on 26th May 2016:*

Ribblesdale Kiln 7 Particulate Emission Limit Derogation Request

Preferred option 1

7) Replace scrubber in current location

For option 7, the preferred option, an engineering design study is already in progress and more detailed costings are available. The replacement scrubber is being designed to achieve better than the BATAEL emission level of 20 mg/Nm³ dry at 10% O₂ for ESPs. Improving scrubber performance to better than 10 mg/Nm³ would entail significantly greater capital expenditure as the diameter of the barrel and demisters would need to be increased to reduce the velocity through this part of the scrubber. It is unlikely that such a size increase could be accommodated in the space that is available. Furthermore, the higher particulate collection efficiency will have a higher power consumption as a result of increased pressure drop across the scrubber and high liquor circulation rates.

During this time sulphur dioxide abatement will not be available (which is why we have included an additional derogation from BATc21). Following completion of scrubber improvements, the Operator has committed to achieving compliance for BATc17 and BATc18.

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

A number of abatement plants provide exhaust gas treatment at differing stages of the process (prior to final discharge to atmosphere).

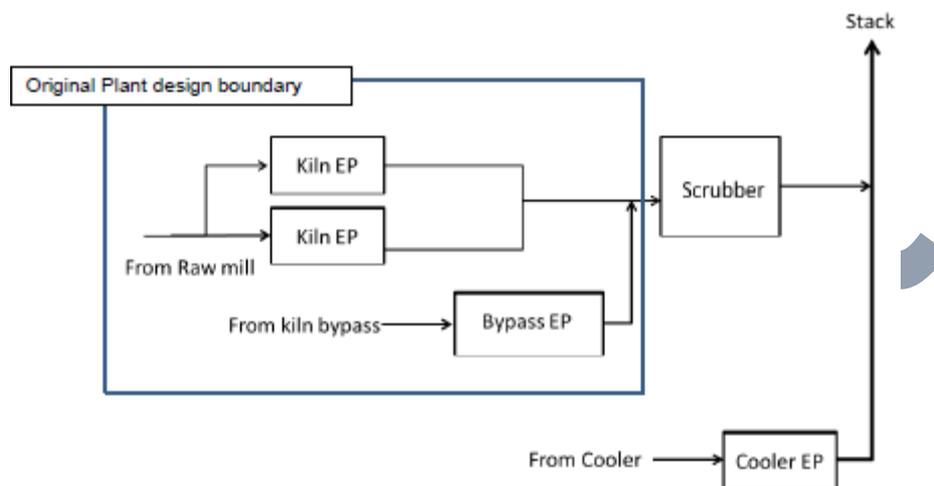


Figure 1 Ribblesdale kiln 7 gas cleaning systems

- Selective non-catalytic reduction (SNCR) system to control emissions of nitrogen oxides from the kiln stack.
- Electro-static precipitators (ESP's) for the abatement of **Particulate Matter** emissions.

<i>Kiln ESPs (2)</i>	<i>See below (Kiln and Bypass)</i>
<i>By-Pass ESP</i>	
<i>Clinker Cooler ESP</i>	<i>Currently achieving compliance with BATAEL.</i>
<i>Cement mills 7 & 8 (ESP's)</i>	<i>ESP's to be replaced by bag filters (Apr2017) and will achieve compliance with BATAEL.</i>

- A wet scrubber – for abatement of **sulphur dioxide** emissions.

As these derogations relate to **Particulates**, and **Sulphur Dioxide** (as a consequence), further information is contained below for both of these.

BATc17 and BATc18 – Particulate emissions from the Kiln and Cooler

The existing equipment (ESP technology on both the Kiln and Clinker Cooler) are designed to meet the BAT-AEL of 20mg/Nm³– appropriate for ESP technology.

Existing emissions (during the period of time limited derogation).

The Operator is currently not able to demonstrate compliance with this value despite ESPs being designed to operate and perform to such standards. *This does not mean that the equipment is not performing at the BAT-AEL*, but that the point of measurement cannot be undertaken until later within the emissions network, by which point other emission streams converge and thus alter such impacts:-

- Particulates sampling requires a specific location for sampling to be undertaken in order to ensure accuracy (i.e. an even cross sectional distribution of particulates across the sampling plane). Failure to meet such requirements can render sampling inaccurate e.g. impacts from duct geometry. The only suitable location (after the kiln and Cooler ESPs) is within the main stack as a combined emission point, which is situated closer to the point of discharge than location of abatement.
- Measurements at the combined emission point include exit gases from the kiln, the cooler, the bypass, and the scrubber, meaning a combination of co-incineration gases and ambient air (from the cooler and bypass) are measured at this point (and therefore not solely measuring emissions relating to BATc 17 and BATc18).
- The scrubber adds particulate content to the exhaust gases (by introduction of limestone based scrubbing solution) which has an impact upon the particulate content recorded at the combined monitoring point.

As a result of the above, the oxygen conditions (to which standardisation is required at 10% oxygen for Cement Installations) is significantly different to that of a normal cement works. This is because the combined emission point measures a number of sources which have differing oxygen conditions:

- The bypass plant outlet measures oxygen concentrations around 18.5% - *gases from here comprise a combination of co-incineration gases and ambient air.*
- The Clinker Cooler outlet measures oxygen concentrations around 21% - *comprising heated ambient air from cooling.*
- The wet scrubber outlet measures oxygen concentrations around 10.5%. - *gases from here comprise a combination of co-incineration gases and ambient air (from the cooler).*

As a result of this, the actual oxygen concentration measured at the combined emission point is typically 14% (as a result of such ambient air diluting the gas stream) which means that the operator is required to remove 4% oxygen prior to reporting their emissions for compliance.

The impact of such increased oxygen content (+ 4%) by influx of ambient air (or dilution air) is that when this is later “removed” (for reporting purposes) the effect is a relative reduction in the effective volume flow rate (by a ratio of 1.45) without altering the mass emission, so the concentration (within a reduced volume) appears higher.

The operator (within their response) indicated the problems associated to the above situation, and either requested i) a change to the reported oxygen reference condition for Ribblesdale, or ii) an increase to the current ELV (30mg/Nm³) to 32mg/Nm³ in order to account for such conditions.

The Environment Agency has assessed this request, which is required throughout the duration of this time limited derogation request (until 31st March 2019).

In terms of increasing the ELV to 32mg/Nm³, we agree that this appears as an increase to the permitted emission limit value, however conclude that this is not actually permitting an increase in particulate content given that the mass particulate emission is not increasing. *We do not consider it appropriate to change the reference conditions for this site alone, for which we require emission standardisation to be made in order to assess performance across the sector.*

Option proposed (for meeting compliance with BAT-AEL)

The proposed option for demonstrating compliance with the BAT-AEL (after time limited derogation) is:-

- Refurbishment and improvement works to the wet scrubber, which is now 20 years old and requires major overhaul (following increased maintenance costs). Improvements will include an extension to the scrubber vessel and increases to the diameter of the demisters (which will improve particulate removal at the scrubber exit).

The operator considers that such improvement works (to the wet scrubber) will allow BAT-AELs for both BATc17 and BATc18 to be complied upon at the combined emission point (with consideration for the other inputs into the combined monitoring point).

In order to achieve this proposed option, the scrubber will be required to be taken offline for a period of 6 months for re-furbishment to take place. During this period, abatement of sulphur dioxide will not be available which is why we have included an additional derogation from BATc21 to cover this period.

BATc21 – Sulphur Dioxide emissions from the Kiln

The existing equipment (sulphur dioxide abatement by wet scrubbing) allows the Installation to achieve the BAT-AEL of 200mg/Nm³.

As discussed previously, the configuration of the Installation creates issues in demonstrating compliance with BATc17 and BATc18 for which the wet scrubber is considered a contributing factor. The operator has concluded that refurbishment of the scrubber is a viable option for addressing this – by making improvements to collection capacity prior to converging with other emission streams before emission sampling.

In order to carry out such improvements, the operator will need to take the scrubber offline for a period of up to 6 months. This means that whilst the Installation continues to produce clinker, sulphur dioxide abatement will not be available. For this reason, compliance with BATc21 will not be achieved for such temporary period of time, which is why we have included an addition derogation on behalf of the operator.

The operator provided additional information in relation to sulphur dioxide emissions on 16th December 2016 (amending data previously supplied). We have assessed such impacts in consideration of allowing the Installation to continue producing clinker (for a period of up to 6 months) without the scrubber operating:-

Abnormal Operations (Scrubber non-operational).

SO ₂ Emission Concentration	Maximum Ground Level Concentration (µg/m ³)	% of ES
200 mg/Nm ³	4.9 (24 hours)	3.92 %
	10.4 (1 hour)	2.97 %
459 mg/Nm ³ Note 1	11.2 (24 hours)	8.96 %
	24.0 (1 hour)	6.86 %
699 mg/Nm ³ Note 2	17.1 (24 hours)	13.68%
	36.3 (1 hour)	10.37 %
1,000 mg/Nm ³ Note 3	24.5 (24 hours)	19.6%
	52.0 (1 hour)	14.8%

Note 1: 90th percentile 30 minute mean recording during operation with the scrubber off.

Note 2: maximum 30 minute mean recorded during operation with the scrubber off

Note 3: accounting for periods of operation when the mill is off (~ typically 1 day per week), and or any elevated sulphides arising from raw materials.

Conclusions:-

For 90% of emissions (during a period of operation without the scrubber), the maximum ground level impacts can be screened out as insignificant (by contributing less than 10% towards air directive levels). *Emissions up to 459 mg/Nm³ demonstrate this.*

For the remaining 10% of emissions (which have not been screened as insignificant) we have considered the impact of background concentration (by more detailed assessment) in order to assess the “Predicted Environmental Concentration” or ‘PEC’ and to ensure that this does not exceed Environmental Standards for Sulphur Dioxide.

SO ₂ Emission Concentration	Maximum Ground Level Concentration (µg/m ³)	Background	PEC (PC = (2x Bkdg))	% of ES
699 mg/Nm ³ Note 2	17.1 (24 hours)	2.87 µg/m ³	22.84	18.27 %
	36.3 (1 hour)		42.04	12.01 %
1,000 mg/Nm ³ Note 3	24.5 (24 hours)		30.24	24.19 %
	52.0 (1 hour)		57.74	16.50 %

The above emission concentrations (699 mg/Nm³ – 1,000 mg/Nm³) have been assessed as being unlikely to give rise to significant pollution in that the predicted environmental concentration is less than 100% of the relevant short term ES.

- Approximately 5 out of 7 days per week (according to raw material production demands) exhaust gases are directed via the roller mill - during which period an amount of SO₂ adsorption occurs, thus reducing Sulphur Dioxide levels. *The typical emission concentration during this scenario is around 459mg/Nm³ which is screened out as insignificant.*
- For the remaining 2 days per week (whilst the roller mill is non-operational) the typical emission will be around 690mg/Nm³ which is considered not likely to give rise to significant pollution, and does not breach the Environmental Standard for SO₂.

Within the additional information (16th December 2016) the operator confirmed that a value of 1,000mg/Nm³ would be a suitable emission limit value (whilst the scrubber is offline) covering variances to operations such as i) potential spikes which could result

from sulphur contained within the raw material, or ii) during periods when the raw mill is non-operational (approximately 2 days per week) whereby indirect sulphur adsorption is not occurring.

We agree that the impact from such operation (upto 1,000 mg/Nm³ for a maximum duration of 6 months) is considered acceptable in terms of environmental impacts. *We have concluded that at this concentration, the SO₂ emission is not likely to give rise to significant pollution, and does not breach the Environmental Standard for SO₂.*

Odour impacts

As part of the operating plan for the scrubber replacement project the operator has committed to developing their odour management plan in order to manage any potential increases to odour which could arise as a result of increased sulphur dioxide emissions.

Summary

The operator has supplied a valid derogation request against the BAT conclusions 17 and 18. We consider that a derogation is also required from BATc21 as a consequence of the option proposed by the operator (scrubber refurbishment) for the period that the scrubber will be offline.

The derogation request is based on technical characteristics of the Installation - owing to the configuration of the plant making it more technically difficult to comply with the BAT-AEL.

The Operator provided a credible argument that the increased costs for achieving the BAT-AELs are linked to the technical characteristics (plant configuration) of the Installation. From the options considered, no option provided a positive NPV compared to the proposed derogation option. The CBA therefore showed that the proposed derogation option has the best balance of costs and benefits. We therefore conclude that the operator has shown that alternative techniques would be inappropriate due to their implementation costs in comparison to the costs for the proposed option.

Impacts

The current impact of particulates associated to operations at an ELV of 32mg/Nm³ is 0.325% of AQ objective (annual mean) and 0.88% of AQ objective (24hour mean). We have deemed that this impact is acceptable.

The impact of sulphur dioxide associated to a period of 6 months “abnormal operation” – whilst the scrubber is offline (to an ELV of 1,000 mg/Nm³) has been assessed. 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 releases of NOx in the exhaust gases from the kiln will be minimised and at least reduced to <500 mg/m ³ as a daily average by the target date of 30 th 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.	Complete
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 NOx abatement.	Complete
IC3	The operator shall produce and submit a project plan setting out how releases of particulates in the exhaust gases from the kiln will be minimised and at least reduced to <10 - 20 mg/m ³ as a daily average by the target date of 30 th 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.	Complete
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 - 20 mg/m ³ as a daily average by the target date of 30 th June 2014. The plan will have a prioritised approach for reducing particulate releases from these sources. The project plan will be based on consideration of costs and benefits of all relevant options and using options appraisal methodology H1 or equivalent.	Complete
IC5	The Operator shall carry out a technical evaluation of the burning of Solid Recovered Fuel (SRF) as a waste derived fuel in kiln 7. The technical evaluation programme shall be agreed in writing with the Environment Agency, and carried out as soon as possible following the first use of the fuel on the 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 the fuel.	Complete

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 7. 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. Data obtained during routine operation prior to the evaluation, or in previous technical evaluations of other waste derived fuels in the same kiln since December 2005 may be included for comparison.	Complete
IC7	The Operator shall carry out a technical evaluation of the burning of Recovered Fuel Oil (RFO) as a waste derived fuel in kiln 7. The technical evaluation programme shall be agreed in writing with the Environment Agency, and carried out as soon as possible following the first use of the fuel on the 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 the fuel.	Complete
IC8	The Operator shall submit a written report for approval by the Environment Agency on the technical evaluation of the burning of RFO as a waste derived fuel in kiln 7. The report shall explain how the use of RFO 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 RFO and a comparison of emissions with and without using RFO. Data obtained during routine operation prior to the evaluation, or in previous technical evaluations of other waste derived fuels in the same kiln since December 2005 may be included for comparison.	Complete
IC9	The Operator shall carry out a technical evaluation of the burning of Meat and Bone Meal (MBM) as a waste derived fuel in kiln 7. The technical evaluation programme shall be agreed in writing with the Environment Agency, and carried out as soon as possible following the first use of the fuel on the 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 the fuel.	Complete
IC10	The Operator shall submit a written report for approval by the Environment Agency on the technical evaluation of the burning of MBM as a waste derived fuel in kiln 7. The report shall explain how the use of MBM 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 MBM and a comparison of emissions with and without using MBM. Data obtained during routine operation prior to the evaluation, or in previous technical evaluations of other waste derived fuels in the same kiln since December 2005 may be included for comparison.	Complete

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 (IC11 – IC15) in order to remove any potential confusion by re-using the numbering from completed conditions.

Ref	Requirement	Date	Justification for inclusion.
IC11	<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 that changes proposed within the regulation 60 response and additional information to emission points A3, A4, A5, A6, A7, A8 and A9 [table S3.1] in order to comply with BAT-AELs by the compliance date of 9th April 2017. A progress update on the installation of new indicative monitors for key plant including, but not limited to, the reheat duct, the outlet of the main ESP, and the outlet of the bypass ESP. <i>Where completion has not been achieved, the Operator shall provide a timetable for such completion, and provide written confirmation when completion is achieved.</i> A progress update on planned upgrade works to the wet scrubber, in order to achieve compliance for BATc 17, BATc18, and BATc21 (emission points A1 and A2 table S3.1). <p>This improvement condition shall be deemed complete upon confirmation of completion for all works.</p>	02/05/17	<p>The Operator is making a number of changes on site A3, A4, A5, A6, A7, A8 and A9.</p> <ul style="list-style-type: none"> A3 and A4 relate to Cement Mills 9 and 10. For these mills the existing technology is 'fabric filter'. The emission limit is reduced to 10mg/Nm³. A5 and A6 relate to Cement Mills 7 and 8. For these mills the existing technology is ESP which is being replaced by fabric filter technology. In order to achieve this a new emission point (A7) will serve Mills 7 and 8, with A5 and A6 becoming redundant from such point. A8 and A9 relate to Coal Mills 4 and 5. For these mills the existing technology is 'fabric filter'. This emission limit is reduced to 10mg/Nm³. <p>The operator stated within their re-submitted derogation request (received 26 May 2016) that they plan to install MCERTS instruments on the reheat duct, the outlet of the main ESP, and the outlet of the bypass ESP in order to gain a better understanding of how changes in the performance of each component of the particulate abatement systems influence the final measured emission on the kiln main stack.</p> <p>We considered it relevant to monitor progress in achieving compliance with BATc17, 18 and 21 during the period of the derogation (wet scrubber refurbishment).</p> <p>We consider that it is necessary to obtain details on the above changes, as committed within the detail provided by the operator.</p>
IC12	<p>The operator shall submit a report to the Environment Agency detailing:-</p> <ul style="list-style-type: none"> A progress update on the scrubber refurbishment works, including but not limited to:- <ul style="list-style-type: none"> i). a start date and end date for the refurbishment works (for a maximum duration of 6 months), and ii). actions to be taken during the 6 month period when the scrubber is not operational including, but not limited to, operating in accordance with an odour management plan. <p>The report shall be submitted to the Environment Agency for approval in writing.</p>	02/05/17	<p>The derogation (as approved) permits the site to continue producing clinker for a period of 6 months whilst the wet scrubber (SO₂) abatement is taken offline (for a maximum period of 6 months) in order for refurbishment to occur. <u><i>The operator is not authorised to go beyond 6 months (to which impact assessments have been justified together with the terms of the derogation).</i></u></p> <p>As a result of this (and ELVs stated within table S3.1, we require the operator to provide confirmation of the start and end dates for such scrubber refurbishment.</p> <p>During the period when the scrubber is taken offline, the ELV for SO is increased to 1000mg/Nm³ (for 6 months only). We recognise that such increase could also increase the potential for odour complaints. In light of this the operator has committed to developing an odour management plan (as part of the operating plan during scrubber refurbishment) – as confirmed within additional information provided on 16th August 2016.</p>

IC13	<p>The operator shall investigate the feasibility of installing monitoring access to and/or modifying the ductwork of dust emission points A10 – to A16 (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>	31/07/17	<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>
IC14	<p>The operator shall submit an updated report on ammonia emissions (quantifying both ammonia slip and background ammonia) 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 450mg/Nm³ in order to demonstrate that ammonia dosing (through SNCR) is optimised, whilst complying with the Ammonia slip BAT-AEL of 50mg/Nm³. • An updated impact assessment / dispersion modelling for Total Ammonia which: <ul style="list-style-type: none"> i) considers the maximum ammonia emission rate (as worst case), ii) considers uncorrected ammonia concentrations, and iii) considers the default environmental standard of 1µg/m³ <i>unless appropriate justification can be provided for using the less stringent value of 3µg/m³.</i> <p>The impact assessment shall confirm that impacts are acceptable (for total ammonia) for emissions at the proposed ammonia ELV. 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>	01/09/17	<p>The operator has previously provided information in relation to improvement condition IC2 (see above) for Ammonia emissions from the Installation.</p> <p>The ELV that has been set is required to account for background ammonia which is present within the emissions from the process, as an addition to ammonia slip which can result from the SNCR abatement process.</p> <p>We have set a limit, but feel that further investigation is required, which in turn may alter such limit (following the completion of this IC). Justification for this is:-</p> <ul style="list-style-type: none"> • SNCR abatement utilises Ammonia (for reductions to NOx). As part of this review we are reducing the NOx limit from 500mg/Nm³ to 450mg/Nm³ which will potentially alter ammonia dosage rates through the SNCR system. We therefore feel that further investigation is required. • The operator has stated within their response that background data for ammonia has been limited (as SNCR only started in 2014). Background ammonia is included within the assessment to calculate ammonia slip, for which the BAT-AEL is 30 - 50mg/Nm³. <i>We therefore feel that further information could be obtained (on background ammonia) to quantify the data provided / utilised within the ammonia assessment.</i> • 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>IC15</p>	<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>	<p>01/09/17</p>	<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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Draft

Annex 4: Advertising and Consultation on the draft decision

To be completed following advertising of minded too decision.

Draft

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 “Ribblesdale Works” to “Ribblesdale 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. Condition 2.3.3 (previously 2.3.1 c)

We have updated this condition in order to reduce the SO₂ concentration (in line with acceptable impacts) during such periods when wet scrubbing is not available (as detailed within the condition).

This reduction (from 4,000mg/Nm³ to 1,000mg/Nm³) has been carried out in accordance with Sulphur Dioxide impacts which have been assessed (whilst the wet scrubber is offline) as part of the Reg60 process / Derogation requested.

5. 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.

6. 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.*

7. 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.

8. 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.

- Included activity 3.1 Part A(2)(a) [grinding cement clinker] : *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(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).

9. **Table S1.2 Operating Techniques**

We asked the Operator (at to review the detail contained within table S1.2, in order to ensure that:-

- Any expired references (such as plant which has since been decommissioned) are removed.
- Expired references (which might have since been updated by later techniques) are removed (ensuring no contradictions).

As a result of detail provided by the operator on 09/02/2017 we have removed the following references:-

Description	Parts	Date received	Change	Justification
Application for variation to comply with the requirements of the WID.	The response given in section C2.3 Management, of the main WID variation application and additional information on CKD processing.	31/03/2005	Reference to CKD processing removed	CKD processing was a reference to a trial for washing dust on site which required an emission to sewer which was not obtained.
Letter confirming the mothballing of Kilns 5&6.	Notification from the operator.	18/01/2007	References removed	Kilns now demolished
Letter confirming the permanent cessation of the operation of Kilns 5&6 and ancillary plant.	Notification from the operator.	18/01/2007		

10. **Table S1.3 Improvement Conditions**

We have removed completed improvement conditions (IC1 – IC10) from the permit.

We have included new improvement conditions (IC11 – IC14) within the permit.

Details on these are included within Annex 3 of this document.

11. Schedule 2 – Waste Types, raw materials and fuels

We have added the following wastes to table S2.1.

06 Wastes from inorganic chemical processes	
06 02	wastes from the MFSU of bases
06 02 01*	calcium hydroxide

This relates to hydrated lime – which was previously approved for use on sites, but not included within the MPA Code of Practice list of wastes.

19 Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	
19 08	wastes from waste water treatment plants not otherwise specified
19 08 13*	sludges containing hazardous substances from other treatment of industrial waste water

This relates to a filter cake from industrial waste water treatment - which was previously approved for use on sites, but not included within the MPA Code of Practice list of wastes.

These materials have been previously authorised for use on site by site inspector, and therefore we are including these within table S2.1 of the permit.

12. 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 IC14 - should it be determined that impacts have increased since submission of the previous impact assessment / air dispersion modelling report.

13. 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.

14. 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).

Interpretation removed - as no longer referred to within the permit.

- “CEN” means Comité Européen de Normalisation.

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.
- “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.
- “*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.
- “*hazardous property*” has the meaning in Annex III of the Waste Framework Directive.
- “*hazardous waste*” has the meaning given in the Hazardous Waste (England and Wales) Regulations 2005 (as amended).
- “*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.
- “*List of Wastes*” means the list of wastes established by Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, as amended from time to time.
- “*LNR*” means Local Nature Reserve
- “*LWS*” means Local Wildlife Site
- “*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
- “*quarterly periodic monitoring*” for reporting/sampling means after/during each 3 month period, January to March; April to June; July to September and October to December and, when sampling, with at least 2 months between each sampling date.
- “*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.
- “*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
“ <i>abnormal operation</i> ” 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.	“ <i>Chapter IV abnormal operating conditions</i> ” 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.	“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”.
“ <i>daily average</i> ” for releases of substances to air means the average of valid half-hourly averages over a calendar day during normal operation.	“ <i>daily average</i> ” 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.	We have amended this condition in light of changes to start-up and shutdown interpretation changes.
“ <i>shut down</i> ” or “ <i>shutting down</i> ” is any period where the plant is being returned to a non-operational state and there is no waste being burned.	“ <i>kiln shut down</i> ” 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 130 tonne per hour.	this is revised to include an Operator-agreed feed rate of 130 tonne per hour.
“ <i>start up</i> ” 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	“ <i>Kiln Start Up</i> ” means from the time when raw meal is introduced into the kiln to the time the feed rate has reached 130 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.	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 (130 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.
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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.

15. 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 – Ribblesdale site) as part of their response to the Notice, submitted 1 July 2015 (and resubmitted 9 June 2016) which referred to an original site condition report submitted to the EA in October 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:-

- given the changes in operation at the site since 2001 (original assessment), the subsequent environmental risk assessment concurs with the original (2001) assessment in identifying potential for contamination, as a result of permitted activities.

Additional information was included within the report to show that the current state is in line with the baseline report. Our groundwater and contaminated land officer concluded agreement that there is potentially no change to the baseline as described in 2001/2.

As a result of this, no further action is required by improvement condition.

We have however noted some recommendations in relation to the site report (from our groundwater and contaminated land specialist) relating to previous records (investigations prior to 2001/2) and have highlighted these to the site inspector within a handover document.