

## **Environment Agency**

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

#### **Decision document recording our decision-making process following review of a permit**

The Permit number is:                   EPR/BJ9819IR  
The Operator is:                         Minteq UK Limited  
The Installation is:                     Specialty Minerals Lifford  
This Variation Notice number is:   EPR/BJ9819IR/V005

#### **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 Cement, Lime and Magnesium Oxide industry sector published on 9 April 2013 in the Official Journal of the European Union. In this decision document, we set out the reasoning for the consolidated variation notice that we have issued.

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 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.

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

## **How this document is structured**

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

# 1 Our decision

We have decided 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..

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 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 decision

## 2.1 Requesting information to demonstrate compliance with BAT Conclusion techniques

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

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

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

The Regulation 60 Notice response from the Operator was received on 2 January 2015.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review. During the determination process, a number of questions required clarification, requiring further information or detail in relation to the BAT conclusion. In total eleven (11) questions were compiled and sent to the Operator. The RFI request was sent to the Operator on 22 May 2015 requiring a response by 3 July 2015.

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

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

## 2.3 Requests for Further Information during determination

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

In addition to the response to our further information request, we received additional information during the determination from a site visit to Minteq Limited on 14 July 2015. We made a copy of this information available to the public in the same way as the responses to our information requests.

### 3 The legal framework

The Consolidated Variation Notice will be issued, 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, in issuing the Consolidated Variation Notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

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

## **Annex 1: decision checklist regarding relevant BAT Conclusions**

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

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

- NA Not Applicable
- CC Currently Compliant – We have reviewed the information available to us and considered that it provides sufficient evidence show the operator is currently complaint with the BAT conclusion and have no reason this will change before the implementation date.
- FC Compliant in the future (within 4 years of publication of BAT conclusions) - We have reviewed the information available to us and considered that it provides sufficient evidence show the operator has suitable plans in place to ensure they will be complaint with the BAT conclusion by the implementation date.
- NC Not Compliant

| BAT Conclusion No | Summary of BAT Conclusion requirement for production of Cement, Lime and Magnesium Oxide  | Status<br>NA/CC<br>/FC/NC | Assessment of the installation capability and any alternative techniques proposed by the operator to demonstrate compliance with the BAT Conclusion requirement  |
|-------------------|---|---------------------------|--|
| 3-29<br><br>55-69 | BAT Conclusions that are not applicable to this installation  | <b>NA</b>                 | BAT Conclusions 3 – 29 inclusive are not applicable as they apply to cement industry only.<br>BAT Conclusions 55 – 69 inclusive are not applicable as they apply to the magnesium oxide industry only.   |
| 1                 | In order to improve the overall environmental performance of the plants/installations producing cement, lime and magnesium oxide, production BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the listed features. | <b>CC</b>                 | Minteq Limited have been accredited to ISO 14001:2004 since October 2005. The scope of the approach is applicable to "Activities including and associated with the manufacture of precipitated calcium carbonate or calcium oxide". The requirements of this standard covers points 1 to 10 inclusive. The operator plans two days surveillance audits twice per annum and a recertification audit every 3 years. These audits are carried out by Lloyds Register of Quality Assurance (LRQA) who is the accreditation body for this EMS standard. <i>Minteq Limited</i> senior management state they are committed to maintaining the site ISO 14001 accreditation. |
| 2                 | In order to reduce/minimise noise emissions during the manufacturing processes for cement, lime and magnesium oxide, BAT is to use a combination of the listed techniques.  | <b>CC</b>                 | <i>Minteq Limited</i> carries out both occupational and environmental noise monitoring surveys. Data collected in these surveys is used to identify potential noise sources and an improvement programme is in place to minimise noise from these sources. Minteq Limited have been operating on this site since 1898 and as equipment such as compressors are replaced over time, more energy efficient and less noisy equipment is installed. Additionally, they have enclosed some of our noisier equipment into acoustic enclosures.   |
| 30                | In order to reduce all kiln emissions and use energy efficiently, BAT is to achieve a smooth and stable kiln process, operating   | CC                        | To ensure a smooth and stable kiln operation process, SM kiln is operated using modern bespoke PC control systems which monitor and manage safe and efficient control parameters. The kiln is fired on natural gas only and to confirm that the process remains in control, the gas and combustion air   |

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|-------------------------|---|---------------------------|---|
|                         | close to the process parameter set points by using the listed techniques.   |                           | manometers are manually checked and a temperature profile is taken every shift using Infra-Red camera. This identifies any potential hot spots which could cause the kiln to hold up and become unstable. Planned maintenance and oil/greasing routines ensure the kiln continues to operate in a stable manner with minimum disruption.  |
| 31                      | In order to prevent and/or reduce emissions, BAT is to carry out a careful selection and control of the raw materials entering the kiln.  | <b>CC</b>                 | Due to the markets Minteq Limited serve (food, Pharma, Healthcare) they use a single supplier for high purity limestone. This material is graded 75-125mm which after trials, has proved to be the optimum size to ensure a free flowing kiln. The limestone has a very high purity (98.5 - 100.5% assay) and consistently meets the requirements of the European, US and Japanese Pharmacopoeias. This limestone has a very low impurity profile (heavy metals) and has a typical Sulphur content of 0.02%. The limestone is also clean of organic matter.   |
| 32                      | <p>BAT is to carry out monitoring and measurements 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.</p> <p>Particulate matter (PM)</p> | <b>FC</b>                 | <p>Periodic measurement of NO<sub>x</sub>, SO<sub>x</sub> and CO is conducted, utilising certified instruments (MCERTs), which are in turn calibrated to the standard BS EN14181. Calibrations performed are by an accredited testing organisation, employing certified Engineers in accordance with ISO17025.</p> <p>BAT is in place for BAT conclusion 32 a – d, and 32 g</p> <ol style="list-style-type: none"> <li>all appropriate process parameters are measured and used for kiln control and to demonstrate kiln stability</li> <li>Critical process parameters are monitored; feed and fuel is delivered via calibrated feed devices.</li> <li>An annual periodic measurement has not been required by the permit. The permit review will now include these in line with the BATc. <b>Refer</b></li> </ol> |



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|-------------------------|---|---------------------------|---|
|                         | Oxides of Nitrogen (NO <sub>x</sub> )<br>Oxides of Sulphur (SO <sub>x</sub> )<br>Carbon monoxide (CO)<br>Hydrogen Chloride (HCl)<br>Hydrogen Fluoride (HF)<br>Total organic carbon (TOC)<br>Dioxins and Furans (PCDD/F) |                           | <p><b>Key Issues, section 2 below.</b> Periodic monitoring of NO<sub>x</sub>, SO<sub>x</sub> and CO is required. SNCR is not utilised so NH<sub>3</sub> monitoring is not required.</p> <p>d. Waste is not co-incinerated, so HCl and HF are not measured.</p> <p>g. Periodic measurements of non-kiln dust emissions are undertaken by an accredited testing organisation. Small dust sources are monitored as part of the on-site preventative maintenance regime. <b>We are changing the monitoring requirements for these dust emissions, refer to Key Issues section 2 below.</b></p> <p>BAT 32 e and f: Monitoring of TOC, PCDD/F and metals is not undertaken routinely. Routine monitoring of PCDD/F is introduced through this variation. Monitoring of TOC is not required as there is no TOC limit being set (refer BATC 50) <b>Refer to Key Issues section 2 below.</b></p> |
| 33                      | In order to reduce/minimise thermal energy consumption, BAT is to use a combination of the listed techniques.   | <b>CC</b>                 | Minteq Limited operates a single vertical multi-chamber kiln (rectangular cross section) which was manufactured by I.A.F GMBH. The kiln has 6 chambers with 6 burners. The best fit description for the kiln is stated in the BREF as "Other Kiln" (OK) BREF section 2.2.7.4.3 "multi-chamber shaft kiln". The theoretical thermal consumption of the kiln is stated as 5.49GJ/te. Minteq Limited have confirmed that they consistently achieve a thermal consumption between 5.7 – 5.9GJ/te which is within the range defined in the BATC of 3.5 – 7.0GJ/te.   |
| 34                      | In order to minimise electrical energy consumption, BAT is to use one or a combination of the listed techniques.  | <b>CC</b>                 | To minimise electrical energy usage Minteq Limited uses process optimisation and energy management techniques to ensure an efficient process. This includes: having a policy to purchase only high efficiency motors on the whole site. All larger motors used onsite are fitted with frequency inverters to prevent the large power requirement on start-up. They have also had capacitors   |

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|-------------------------|--|---------------------------|---|
|                         |  |                           | corrected to give a site electrical power factor of >96%. A contract is in place to have the capacitors managed to enable them to maintain this factor. The precipitation and compressed air systems are controlled by power management systems which automatically shuts down any equipment when the demand has fallen.  |
| 35                      | In order to minimise limestone consumption, BAT is to use one or a combination of the listed techniques                      | <b>CC</b>                 | Minteq Limited do not carry out quarrying operations, they purchase limestone from a single supplier. They operate one vertical shaft kiln and after trials, have determined that the optimum grain feed size is 75-125mm. Smaller limestone pebbles prevent the kiln from flowing and weld together causing blockages and stoppages. To ensure consistent grain size and to remove any organic matter going into the kiln, the limestone feedstock is screened as it exits from the holding silo. Any undersized material is returned to the quarry for other uses. They have a contract with the quarry stating that they will not supply more than 500 tonnes of "undersized" limestone per annum. |
| 36                      | In order to prevent/reduce emissions, BAT is to carry out a careful selection and control of fuels entering the kiln         | <b>CC</b>                 | Minteq Limited only use natural gas as a fuel for the kiln as other types of fuel have the potential to introduce impurities into products. This type of contamination would cause products to fail to meet the requirements of the European, US and Japanese Pharmacopoeias.   |
| 37                      | In order to guarantee the characteristics of waste to be used as fuel in a lime kiln, BAT is to apply the listed techniques: | <b>NA</b>                 | Not applicable as Minteq Limited do not use waste fuels in our lime kiln.   |

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|-------------------|--|---------------------------|--|
| 38                | In order to prevent/reduce emissions occurring from the use of waste fuels into the kiln, BAT is to use the listed techniques                              | <b>NA</b>                 | Not applicable as Minteq Limited do not use waste fuels in our lime kiln.  |
| 39                | In order to prevent accidental emissions, BAT is to use safety management for the storage, handling and feeding into the kiln of hazardous waste materials | <b>NA</b>                 | Not applicable as Minteq Limited do not use waste fuels in our lime kiln.  |
| 40                | In order to minimise/prevent diffuse dust emissions from dusty operations, BAT is to use one or a combination of the listed techniques                     | <b>CC</b>                 | Minteq Limited employ the principles outlined in the BATC40 (A-J) to minimise & prevent diffuse dust emissions. In the last 3 years they have purchased and installed 2 industrial vacuum systems. One of these systems has fixed 3" piping installed around the packing area. The piping is fitted with hose connectors where flexible vacuum hoses can be attached. All crushed lime and PCC conveying systems are fully enclosed and the silos incorporate fabric filters and either level controls or weigh cells. All conveying systems and filters are subject to regular planned maintenance. |
| 41                | In order to minimise/prevent diffuse dust emissions from bulk storage areas, BAT is to use one or a combination of the listed techniques                   | <b>CC</b>                 | In order to minimise/prevent diffuse dust emissions from bulk storage areas Minteq Limited use the following techniques:<br>All internal and external finished product silos are fitted with fabric filter abatement.<br>Limestone is stored in covered silos<br>Product silos and screws are all enclosed<br>Concrete and Tarmac apron areas for ease of housekeeping<br>Stationary vacuum cleaning systems installed<br>Damping down of roadway and regular road sweepings.  |

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|                   |   |                     | Wet and dry mobile vacuum purchased.  |
| 42                | In order to reduce channelled dust emissions from dusty operations other than those from kiln firing processes, BAT is to use one of the listed techniques and to use a maintenance management system which specifically addresses the performance of filters | CC                  | There are only 2 channelled non-kiln emission points which have a flow rate of 10,000m <sup>3</sup> or greater. A8 and A18. Other emission points were identified as below 10,000 Nm <sup>3</sup> and have been consolidated in the permit. Where an existing limit is in place this has been retained until 9 April 2017 when the new BAT-AEL limit will apply   |
| 43                | In order to reduce dust emissions from the flue-gases of kiln firing processes, BAT is to use flue-gas cleaning with a filter. One or a combination of the listed techniques can be used  | CC                  | <p>Minteq Limited utilise the waste gas from the Kiln for the precipitated calcium carbonate (PCC) production. The process is: limestone is calcined in a kiln to remove CO<sub>2</sub>. CaO is added to water at the slaker to form calcium hydroxide. The calcium hydroxide is then pumped to a precipitator. The waste kiln gas (removed at the calcination stage) goes through an air heat exchanger and a wet dust separator to cool and remove particulates. The waste kiln gas is then compressed and enters precipitators through a gas sparge where the waste CO<sub>2</sub> in the waste gas is re-absorbed into the calcium hydroxide slurry to form Calcium Carbonate.</p> <p>The particulate ELV on this source (A1) is currently 20mg/m<sup>3</sup> and Minteq Limited have met this requirement. Therefore the operator believes they achieve BAT standards for a wet dust separator. However to carry out emissions monitoring on this emission point is NOT appropriate as the waste gas does not go to atmosphere at this point, it goes through the precipitators (A7) where the CO<sub>2</sub> from the waste gas is absorbed into the calcium hydroxide slurry to form calcium carbonate. Therefore any particulates in the gas flow</p> |

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|                         |  |                           | would be removed at the precipitation process. The precipitators operate back to back and therefore the waste gas only goes to atmosphere through the emission stack for approximately 20 hours per annum when unplanned breakdowns occur. This argument has been accepted and the requirement to monitor for particulate monitoring of this emission point A1 is removed at the permit.   |
| 44                      | In order to reduce the emissions of gaseous compounds (i.e. NO <sub>x</sub> , SO <sub>x</sub> , HCl, CO, TOC/VOC, volatile metals) from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques | <b>CC</b>                 | Minteq Limited only use natural gas for kiln fuel and therefore no waste fuels are combusted. The limestone is very high purity >98.5 assay and is clean with no organic matter. Process control optimisation techniques are monitored and manual quality checks are routinely completed to ensure the process remains efficient and in control.   |
| 45                      | In order to reduce the emissions of NO <sub>x</sub> from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques  | <b>CC</b>                 | Due to the market Minteq Limited serve only use natural gas is used as a fuel for the kiln. To manufacture PCC products they need to hard burn lime at high temperature. These conditions are known to increase NO <sub>x</sub> and in the last 9 years they have been slightly above the BAT limit of 350mg/m <sup>3</sup> (based on designation as OSK) on 5 occasions (current limit is 400mg/m <sup>3</sup> ). Currently the emission monitoring for emission monitoring point A1 is before the precipitators. As stated previously, they do not release waste kiln gas to atmosphere, it is re-absorbed into the Calcium Hydroxide at the precipitation stage of the process. The operator has data to show that oxides of Nitrogen will combine with calcium hydroxide to form calcium nitrate or calcium nitrite. Therefore to obtain a more appropriate emission monitoring result for NO <sub>x</sub> and SO <sub>x</sub> , they propose to move emission monitoring point A1 to a position on the precipitator vents where the waste gas goes to atmosphere. It is believed that |

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|                   |   |                     | this would reduce the level of NOx and enable Minteq Limited to consistently achieve the BAT limit of <350mg/m <sup>3</sup> . This argument has been accepted and the relocation of the primary emission point has been moved to the precipitator vents.   |
| 46                | When SNCR is used, BAT is to achieve efficient NOx reduction, while keeping the ammonia slip as low as possible, by using the listed technique    | <b>NA</b>           | Not applicable as Minteq Limited do not use SNCR   |
| 47                | In order to reduce the emissions of SOx from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques | <b>CC</b>           | The kilns are fired on natural gas which has a low sulphur content. There was no existing permit ELV (V004). The BAT-AEL range of <50-200mg/m <sup>3</sup> . SOx emission results from the kiln have consistently been < 3 mg/m <sup>3</sup> . During the last permit review the requirement to monitor SOx was removed from the permit. The combination of natural gas, high purity raw materials combine to ensure compliance. There is a requirement to include an ELV as it is a BAT-AEL but the method of compliance will be via mass balance calculations. Refer to key Issues section                         |
| 48                | In order to reduce the emissions of CO from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques  | <b>CC</b>           | Minteq Limited use only natural gas fuel for the kiln. Limestone is very high purity >98.5 assay and is clean with no organic matter. Process control optimisation techniques are monitored and manual quality checks are routinely completed to ensure the process remains efficient and in control. All previous CO emission results from the kiln have been <370mg/m <sup>3</sup> and therefore meet BAT standards of 500mg/Nm <sup>3</sup> . There is no ELV in the current permit. There is a requirement to apply a BAT-AEL with monitoring and an ELV at 500 mg/Nm <sup>3</sup> has been added to the permit. |

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|-------------------|---|---------------------------|---|
| 49                | In order to minimise the frequency of CO trips when using electrostatic precipitators, BAT is to use the listed techniques                        | <b>NA</b>                 | Minteq Limited do not use ESPs and therefore this is not applicable.  |
| 50                | In order to reduce the emissions of TOC from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques | <b>CC</b>                 | <p>General primary techniques are applied; limestone feed to the kiln contains low levels of VOCs, as it is of very high quality and is crushed, washed and screened prior to use. As emissions have not been regularly monitored for TOC, there is limited available data. However based on input materials control TOC are likely to be very low. As there is no BAT-AEL for this type of kiln (OK), no ELV is being set. Monitoring is also not required as a demonstration of compliance with a limit is unnecessary</p> <p>Minteq Limited do not have any historical TOC data, as it has never been measured in the kiln. Therefore there was no data provided in the Reg60 response or the RFI request. The BAT conclusions lists 2 ELVs for TOC depending on the kiln type. The Minteq Limited kiln is a vertical multi chamber shaft kiln which is defined in the BREF as an "Other Kiln" (OK).</p> <p>Specific TOC limits are not defined in the BAT conclusion document for this type of kiln, and therefore the proposal was to not set an ELV for this kiln.</p> <p>BATC Table 12:</p> <ul style="list-style-type: none"> <li>• LRK / PRK &lt;10mg/m3 BAT-AEL</li> <li>• ASK /MFSK /PFRK &lt;30mg/m3 BAT-AEL</li> </ul> |
| 51                | In order to reduce the emissions of HCl and the emissions of HF from the flue-gas of kiln firing processes, when using waste,                     | <b>NA</b>                 | Minteq Limited only use natural gas for kiln fuel and do not burn waste. Therefore this is not applicable.  |

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|-------------------|---|---------------------|--|
|                   | BAT is to use the following primary techniques  |                     |  |
| 52                | In order to prevent or reduce the emissions of PCDD/F from the flue-gas of kiln firing processes, BAT is to use one or a combination of the listed primary techniques | <b>CC</b>           | The fuel used is natural gas, which has negligible chlorine and copper content, thereby minimising dioxin-formation conditions. The feedstock and fuel are of high quality and therefore inputs to the kiln will be limited in their capability of generating significant emissions of PCDD/F emissions. As PCDD/F emissions have not been regularly monitored, there is limited available data to assess compliance against the BAT-AEL, however a monitoring exercise was carried out in 2010 and was within the range of <0.05-0.1ng PCDD/F I-TEQ/Nm3. The permit will include a limit of 0.05 ng/Nm3 from 9 April 2017, with a requirement for annual compliance monitoring. Refer Key Issues section 1 below. |
| 53                | In order to minimise the emissions of metals from the flue-gases of kiln firing processes, BAT is to use one or a combination of the listed techniques                | <b>NA</b>           | BAT techniques are applied; the main fuel is natural gas, which has a low metal content. Filters provide effective dust removal. No limit for emissions of metals will be set in the permit as the relevant BAT-AELs apply only when using wastes.   |
| 54                | In order to reduce the solid wastes from the lime manufacturing processes and to save raw materials, BAT is to use the listed techniques                              |                     | Wherever possible and within quality control restraints, kiln dust is recovered at the site. The use of landfill for disposal is a 'last resort' in accordance with the waste hierarchy. The kiln dust is collected and is treated at the onsite effluent waste treatment plant where it is mixed with the calcium carbonate slurry waste to raise the pH. The mixed waste is pressed into a cake which is then used to modify/control the pH on agricultural land.  |



## Key Issues

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

We have reviewed the limits and monitoring requirements for all emissions at the installation to ensure that they are in accordance with the requirements of the BATCs. The review includes emission points, many fairly small, not currently listed in the permit. The Operator provided a comprehensive list of all channelled dust emissions together with an indication of volumetric flow rate to enable us to assess inclusion and appropriate monitoring.

The general approach is that dust emissions >10,000 Nm<sup>3</sup>/h are listed individually, have a dust limit applied (in accordance with the BAT-AEL for the type of abatement) with a monitoring requirement to demonstrate compliance. Dust emissions <10,000 Nm<sup>3</sup>/h, which are deemed “small sources” by the BATCs, are included as group.

Section 1 covers emission limits and section 2 covers monitoring.

### **1. Emission limit changes: BATc 42, 43, 50 and 52**

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

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

#### **Overview of changes to emission limit values:**

| Parameter   | ELVs (mg/m <sup>3</sup> )  |                                | BAT-AEL mg/Nm <sup>3</sup>               |
|---|--|--------------------------------|--|
|   | Previously:<br>Variation V004<br>(superseded by<br>this variation) | New Limit:<br>(Variation V005) |  |
| <b>Kiln emissions (permit table S3.1):</b>                        |  |                                |  |
| <b>Emission point (A1) – Particulate and NOx – Limits removed</b> | <b>20 (PM)<br/>400 (NOx)</b>                                       | <b>N/A</b>                     | N/A                                      |
| Dust (A7)   | 20   | <b>20 periodic</b>             | 20 (daily avg or avg over sample period) |
| NOx (A7)  | 400  | <b>350</b>                     | 100 – 350                                |
| SOx (A7)  | No previous limit  | <b>50</b>                      | <50 – 200                                |
| CO (A7)   | No previous limit  | <b>500</b>                     | <500                                     |
| Dioxin & furans PCDD/F (A7)                                       | No previous limit  | <b>0.1ng/Nm<sup>3</sup></b>    | <0.05-0.1 ng/Nm <sup>3</sup>             |

Due to process changes to has been accepted that the main emission release pint for the process should now be regarded as A7 as opposed to A1. A1 is now considered an emergency vent point

| <b>BATC 42 Non-kiln dust emissions (permit table S3.2):</b>                    |                   |           |     |
|--|-------------------|-----------|-----|
| <b>A8 Spin flash Drier</b>   | 50                | <b>10</b> | <10 |
| <b>A18 Plant E3A Drier</b>   | 30                | <b>10</b> | <10 |
| <b>A12, A13, A19, A20</b>  | 30                | <b>10</b> | 10  |
| <b>A9, A10, A11, A1, A15, A16, A17, A21</b>                                    | No previous limit | <b>10</b> | 10  |
| <b>All other abated channelled dust emissions (&lt;10,000Nm<sup>3</sup>hr)</b> | No previous limit | <b>10</b> | 10  |

Only A8 and A18 are above 10,000 Nm<sup>3</sup>/hr and have annual period sampling associated with them. All other points are below 10,000 Nm<sup>3</sup>/hr and will rely on a maintenance management system for compliance.

**a. TOC and PCDD/F:**

The BAT conclusions introduce BAT-AELs for TOC (BATC 50) for certain kiln types and dioxins/furans (BATC 52) in kiln emissions, despite the fact that we do not expect to find these parameters in significant quantities due to the nature of the process and fuel used. A limit is now included for dioxins and furans per kiln in line with the BAT-AEL, applied from the compliance date. As the TOC BAT-AEL does not apply to this type of kiln (Other Kilns (OK)), a limit is not required for TOC.

All other kiln parameters (SO<sub>x</sub> and CO) did not previously have an ELV but these are now required by the BATC. The NO<sub>x</sub> limit has been tightened from 400mg/Nm<sup>3</sup> to 350mg/Nm<sup>3</sup> in line with the BATC.

**b. Kiln Dust:**

The particulate ELV on this source (A1) is currently 20mg/m<sup>3</sup> and Minteq Limited have met this requirement. Therefore the operator believes they achieve BAT standards for a wet dust separator. However to carry out emissions monitoring on this emission point is NOT appropriate as the waste gas does not go to atmosphere at this point, it goes through the precipitators (A7) where the CO<sub>2</sub> from the waste gas is absorbed into the calcium hydroxide slurry to form calcium carbonate. Therefore any particulates in the gas flow would be removed at the precipitation process. The precipitators operate back to back and therefore the waste gas only goes to atmosphere through the emission stack for approximately 20 hours per annum when unplanned breakdowns occur. This argument has been accepted and the requirement to monitor for particulate monitoring of this emission point A1 is removed at the permit. The limit of 20mg/Nm<sup>3</sup> has been applied to point A7.

**c. Non-kiln dust:**

A8 (Spinflash dryer) bag filter unit has an Average volumetric air flow of 26,863m<sup>3</sup>/hr. Current ELV 50mg/m<sup>3</sup> (reduced to 10 mg/Nm<sup>3</sup>). A18 (E3A coated dryer) bag filter unit has an Average volumetric airflow of 9,759m<sup>3</sup>/hr. Current ELV 30mg/m<sup>3</sup>, reduced to 10mg/Nm<sup>3</sup>.

All others are below 10,000Nm<sup>3</sup>/hr and have an ELV applied of 10mg/Nm<sup>3</sup> in line with BATC.

## **2. BATC32 Frequency of monitoring**

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

Referring to BATC 32 c-g, there are no specific regulatory requirements defined in the BREF other than the statement “continuous or periodic” for the parameters dust, NO<sub>x</sub>, SO<sub>x</sub>, CO, TOC, HCl and HF. For PCDD/F and metals, it is periodic only. Each emission point has been assessed to decide if it should be monitored continuously or periodically, and if the latter, the frequency of sampling has been decided based upon risks posed. We have taken into account the history of compliance as well as the scale and impact of a potential release in setting the monitoring requirements.

### **a. Kiln dust, NO<sub>x</sub>, SO<sub>x</sub> and CO (BATC 32c) at A7**

From the compliance date (9 April 2017), we consider that periodic monitoring is proportionate to the scale and risk of releases.

The dust monitoring frequency is set at 6 monthly as we would like to be confident that the new lower limit of 10mg/Nm<sup>3</sup> is complied with. This frequency can be reviewed once compliance with the new lower limit is demonstrated.

The frequency of periodic monitoring for NO<sub>x</sub>, and CO is annually, however the reference period is increased from 30 minutes to 1 hour minimum, to enable more reliable, accurate results.

### **b. Kiln SO<sub>x</sub> monitoring**

The requirement to measure SO<sub>2</sub> from the kiln was removed at the last variation (EPR/BJ9819IR/V004). Prior to this the SO<sub>2</sub> emissions from the kiln were consistently <3mg/m<sup>3</sup>, and therefore well within the BAT-AEL limit of <50mg/m<sup>3</sup> – 200mg/m<sup>3</sup>. Annual monitoring seems proportionate for such low emissions from the gas-fired kiln. A technique to establish the emission concentration by mass balance has been proposed. Due to the very low levels of sulphur input to the process the operator is asked to show by calculation, on an annual basis, that the predicted levels of SO<sub>2</sub> emission are below the lower limit of the BAT-AEL range. In lieu of annual stack testing the operator is to supply a mass balance calculation and compliance process model process to demonstrate that the ELV has a very low likelihood of ever being breached.

### **c. Kiln Dioxins/Furans and metals (BATC 32e, f):**

The BATc description states that for periodic measurements of PCDD/F, TOC and metal emissions “*a frequency appropriate to the raw materials and fuels that are used in the process should be applied*”. Due to the nature of the raw material (high purity, washed limestone) and fuel (natural gas), we do not expect high levels of these pollutants to be emitted. This was confirmed for PCDD/F with a sampling exercise carried out after the last permit review.

IED article 14(d) requires a demonstration of compliance at least annually against permit conditions. As an ELV is being set for PCDD/F, an annual compliance check is required, so we are setting periodic monitoring at a minimum frequency – **annual**.

In the UK, dioxin monitoring trials have taken place at many different lime kilns and the highest concentration recorded was 0.017 ng I-TEQ/Nm<sup>3</sup>, which is only 17% of the relevant BAT AEL. Most results were much lower than this. UK plants use natural gas as a fuel and do not burn any waste materials, and so the chloride input

and the risk of high dioxin emissions is minimal. A risk-based approach would suggest that frequent dioxin monitoring is not required at lime kilns in the UK, unless there is a significant change in fuel, raw materials or residence time in the critical 300°C to 400°C temperature window.

An alternative protocol for dioxin monitoring, taking into account the known risk factors leading to dioxin formation has been adopted:

A dioxin and furans PCDD/F test by an approved MCERTS contractor will be carried out on one kiln of each type per site. Provided the result is well below the limit of 0.1 ng/Nm<sup>3</sup> and the fuel type (natural gas) does not change and the stone feed type does not change and there are no significant kiln process changes (e.g. new type of burner, change in physical configuration of the kiln which affects internal kiln gas flow) then that result will stand for a maximum of four years. A report will be written confirming the no change in operation and issued to the Environment Agency on an annual basis. Any changes will require a new baseline dioxin year to be established.

This protocol (a combination of a baseline measurement to prove that current emissions are well below the ELV and assessment of surrogate parameters to ensure that the risk of high dioxin concentrations remains minimal) would be adequate to demonstrate compliance with the ELV, without the cost burden of annual monitoring for each kiln

There is no limit for emissions of metals when not burning waste, so monitoring is not required. A TOC limit is not being applied so monitoring is also not required.

**d. Non-kiln dust (BATC 42):**

We have applied a periodic monitoring frequency appropriate to the scale of the release:

There are 9 channelled non-kiln dust emission points that are fitted with fabric filter abatement. All of these emission points were being monitored for particulates emissions twice per annum. From air emissions monitoring reports, taken over the last seven monitoring exercises, it is confirmed that 7 of these emission points have volumetric air flow less than 7500m<sup>3</sup>/hour which means they will now be monitored via a maintenance management system approach. A8 and A18 remain the only two “significant non kiln sources >10,000m<sup>3</sup>/hr” as defined in the BAT Conclusion 42.

A8 (Spinflash dryer) bag filter unit has an Average volumetric air flow of 26,863m<sup>3</sup>/hr. Current ELV 50mg/m<sup>3</sup> (reduced to 10 mg/Nm<sup>3</sup>) A18 (E3A coated dryer) bag filter unit has an Average volumetric airflow of 9,759m<sup>3</sup>/hr. Current ELV 30mg/m<sup>3</sup>, reduced to 10mg/Nm<sup>3</sup>.

In the Reg60 response Specialty Minerals have proposed to install a calibrated continuous particle measurement system on emission points A8 and A18. These instruments will be hard wired into the Control System and will trend the particle emissions in real time. The system will allow the trending of particulate emissions, and will allow for an alarm or trip to be installed, to assist with manual intervention should the BAT ELV of 10mg/m<sup>3</sup> be approached. Maintenance, repair, or bag replacement would be undertaken by the Operator should the alarm be activated. This system is proposed for 2015 well in advance of the BAT ELV coming into force in 2017.

For all emissions clearly <10,000 Nm<sup>3</sup>/h, no periodic monitoring is set as these are regarded as “small sources” by BATC 32 which states that “*for small sources, the*

frequency of the measurements should be based on a maintenance management system”.

The group “*all other non-channelled dust emissions*” do not have an ELV set, however the maintenance management system is also applied to ensure dust emissions are minimised.

Periodic dust monitoring has a reference period of 30 minutes (minimum) or 1 hour for A7. This is considered to be an appropriate period for these emissions.

**Summary of monitoring requirements:**

| Emission point   | Parameter    | Type of monitoring          | Frequency | Reference period |
|--|--------------|-----------------------------|-----------|------------------|
| A7 (kilns)   | Particulates | periodic                    | 6 monthly | Min 30 min       |
|  | NOx,         | periodic                    | 6 monthly | Min 30 min       |
|  | CO           | periodic                    | annually  | Min 30 min       |
|  | SO2          | by mass balance calculation | annually  | As agreed        |
|  | PCDD/F       | periodic                    | annually  | 6 – 8 hr         |
| A8, A18  | particulates | periodic                    | annually  | Min 30 min       |
| A2, A3, A4, A12, A13, A19, A20<br>Defined in permit as “channelled dust emissions abated by fabric filters | particulates | Maintenance schedule        |           |                  |
| All other non-channelled dust emissions  | particulates | Maintenance schedule        |           |                  |

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

**e. Table S3.5 Process Monitoring requirements**

This table has been updated. It now includes the indicative use of continuous monitor for dust on A8 and A18 and monitoring temperature and pressure of the kilns to demonstrate process stability, in line with BATC 32a.

**Monitoring - Reference conditions**

The reference conditions for reporting measured emissions from non-combustion sources has been changed by the BATCs from no correction required for temperature, pressure, oxygen or water vapour content, to reporting dry at STP with no correction for oxygen, and for lime hydrating plants, as emitted, in line with our interpretation of the BATC. The Schedule 6 interpretation has been updated for this change.

The length of sampling period can vary from ½ hour to 6-8 hours depending on the sampling strategy and standard used. For compliance purposes the selection of sampling period reflects the likelihood of variance, potential impacts and the frequency of sampling. In general terms smaller releases with limited potential for

impact have sampling frequencies as low as ½ hour. Larger releases, or where compliance is based on infrequent sampling, have a longer sampling period to allow it to be more representative.

**BAT Conclusion 52:**

The BAT Conclusion 52 sets a limit for PCDD/F I-TEQ/Nm<sup>3</sup> as an average over a 6 – 8 hour sampling period. There is no exclusion for non-waste burning kilns and therefore a limit must be set in the permit.

Prior to this BAT review, Minteq Limited did not have a dioxins monitoring requirement in their permit. At the last permit revision (EPR/BJ9819IR/V004) an improvement condition was included which required the operator to carry out “a sampling exercise to monitor dioxins and furans from the lime kiln.” The RFI requested information on this trial, and any other test data that was available. Data provided in the RFI response provided only the results of the 2010 test. Measured PCDD/F were 0.0152ng/m<sup>3</sup> (against a BAT-AEL <0.05 – 0.1ng/m<sup>3</sup>). Levels are in compliance with the BAT-AEL.

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.

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

The Operator did not request derogation from compliance with any AEL included within the BAT Conclusions as part of their Regulation 60 Notice response.

### **Annex 3: Improvement Conditions**

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

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

If the consolidated permit contains existing improvement conditions that are not yet complete or the opportunity has been taken to delete completed improvement conditions then the numbering in the table below will not be consecutive as these are only the improvement conditions arising from this permit variation.

#### **Completed improvement conditions**

The following table lists the improvement conditions contained within the previous permit. These have been deemed complete and are therefore being removed from the permit.



| Reference | Improvement Condition  | Completion date             |
|-----------|--|-----------------------------|
| IC1       | <p>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 &lt;10 - 20 mg/m<sup>3</sup> when using wet scrubbers, averaged over the sampling period (spot measurements for at least half an hour), by the target date of 30 June 2014.</p> <p>The plan will have a prioritised approach for reducing particulate releases from these sources, and will be based on consideration of costs and benefits of all relevant options and using options appraisal methodology H1 or equivalent.</p> | Deemed complete<br>13/11/13 |
| IC2       | The operator shall carry out a sampling exercise to monitor dioxins and furans from the lime kiln, and send the results of the monitoring to the Environment Agency. The results will be used to decide whether any future monitoring is required.   | Deemed complete<br>13/11/13 |

### New Improvement conditions

The following are improvement conditions set at this permit variation:

| Reference | Improvement Condition  | Completion date |
|-----------|--|-----------------|
| IC3       | <p>The operator shall review (and submit if changed) an updated site condition report to the Environment Agency, which provides a baseline report in line with the requirements of IED article 22(2).</p> <p>The revised report should:</p> <p>Include an updated Conceptual Site Model and Source Pathway Receptor assessment, provided within the PPC application site report;</p> <p>Ensure intrusive investigation and sampling includes all potential hazardous substances at the site;</p> <ul style="list-style-type: none"> <li>• Include information on the concentrations in soil and groundwater of the hazardous substances used, produced or released by the installation.</li> </ul> | 1/10/2017       |

Guidance from the local area team can be gained on the specific features missing existing site report.

#### **Annex 4: Advertising and Consultation on the draft decision**

No public consultation is required on this permit variation as the Operator has not requested a derogation.

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

### 1. Introductory Note

The installation description has been updated to provide consistency 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.

### 2. Table S1.1 Activities

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

We have reviewed and revised Minteq Limited Table S1.1, specifically:

- Amended the kiln activity description to reflect EPR Sch 1 activity wording,
- Amended the inorganic chemical description to reflect the EPR sch 1 activity wording
- Reviewed Directly Associated Activities (DAAs) to ensure that all activities (listed and non-listed) at the installation are included,
- Amended the Limits of Specified Activity for all activities to ensure they are clearly defined.

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

| <b>Table S1.1 activities</b> |  |  |   |
|------------------------------|--|--|---|
| <b>Activity reference</b>    | <b>Activity listed in Schedule 1 of the EP Regulations</b> | <b>Description of specified activity</b>   | <b>Limits of specified activity</b>   |
| AR1                          | Section 3.1 Part A(1)(b)                                   | Producing lime in a single vertical multi chamber shaft kiln with a production capacity of more than 50 tonnes per day | From limestone storage through screening and feed of feedstone into the kiln along with fuel, through to intermediate storage of quicklime product prior to further processing or despatch by road, and associated releases to air from stacks and process vents. |
| AR2                          | Section 3.1 Part B (c)                                     | Slaking lime for the purpose of making calcium hydroxide   | From lime silos through slaking of lime with water in a hydrator, to transfer of slaked lime to the precipitators. Also includes the slaking of waste lime from the crusher house.  |
| AR3                          | Section 4.2 Part A(1)(a) (iv)                              | Producing inorganic chemicals such as salts (calcium carbonate)  | From intermediate storage of slaked lime through the batch manufacture of pre calcium carbonate (PCC) in precipitators and the coating of CC with sodium stearate through to product storage, packing and dispatch via road. Includes the pre-preparation of      |

| <b>Table S1.1 activities</b>        |  |   |  |
|-------------------------------------|--|---|--|
| <b>Activity reference</b>           | <b>Activity listed in Schedule 1 of the EP Regulations</b> | <b>Description of specified activity</b>  | <b>Limits of specified activity</b>  |
|                                     |  |   | sodium stearate solution and all associated releases to air.   |
| <b>Directly Associated Activity</b> |  |   |  |
| AR4                                 | Raw material receipt and storage                           | Bulk Limestone receipt and storage in bunkers   | Receipt via road transport to delivery to kiln. Offloading of limestone from road transport, through to intermediate storage   |
| AR5                                 | Lime Processing  | Crushing, grading, storage and transfer of lime products.                                       | From intermediate storage of lime through crushing and grading to product storage in silos. Receipt of lime from kiln to transfer to lime silos.   |
| AR6                                 | Lime and PCC Storage and Tanker loading                    | Intermediate product storage and handling; product handling and despatch                        | Lime Silos, PCC Silos, Warehouse. From lime and PCC product storage through to despatch by road.   |
| AR7                                 | Fuel Oil Storage and Handling                              | Backup fuel for kiln and boiler house   | From delivery point to fuel oil tanks, to transfer to boiler and Kiln  |
| AR8                                 | Gas and Oil burning boilers                                | Burning fuel to raise steam for process   | Boiler House Area and associated pipelines   |
| AR9                                 | Discharge to controlled water and sewer.                   | Collection and treatment of process and site water then discharge to controlled water or sewer. | Collection from site and process followed by flocculant treatment and settlement in lagoon. pH adjustment if needed followed by discharge to controlled waters (River Rea) at discharge points W1 and W2 or diversion to Severn Trent Water sewer undertaker via discharge S1. |

AR7 fuel storage and handling: this covers handling and storage of gas oil, the standby fuel. Natural gas is not stored and its use (within the kilns) is covered by the limits of specified activity for AR1.

### **7. Schedule 6 Interpretation**

Schedule 6 has been revised to remove interpretations which are no longer relevant. The standard tables for TEF Schemes for dioxins and furans has been added as monitoring for PCDD/F is now required for lime works regardless of whether a waste-derived fuel is burned.

The interpretation section has been updated to ensure it covers relevant descriptions.

## **8. Other permit changes:**

**IED standard conditions:** this variation includes the latest IED permit template conditions: 1.4.1 (waste), 3.1.4 (soil and groundwater monitoring) and 4.3.1 (notifications)

**Removal of emission point W2.** The operator confirmed that emission point W2 (variation v004) does not exist. The storm water tank does not have a separate discharge into the river, water from the tank discharges into the settlement pond and discharge to the river is via emission point W1. Emission point W2 has been removed from the permit. Other sewer emission levels in accordance with sewer undertaken agreements.

**Table S2.1** includes a reference to fuel oil (with Sulphur content of 0.1% by weight.). The operator maintains a store of fuel oil for emergency use. This oil has been stored for some time and may need treatment before use.