

# Environment Agency Permitting decisions

## Bespoke Variation

We have decided to issue the variation for **Nestle Boiler Plant Tutbury operated by Nestle UK Limited**

The variation number is **EPR/BJ9576IZ/V005**

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

## Purpose of this document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

Unless the decision document specifies otherwise we have accepted the applicant’s proposals.

## Structure of this document

- Annex 1 the decision checklist and Key Issues
- Annex 2 the consultation responses

### Annex 1: decision checklist

Aspect considered	Justification / Detail	Criteria met Yes
<b>Receipt of submission</b>		
Confidential information	A claim for commercial or industrial confidentiality has not been made.	✓
<b>Consultation</b>		
Scope of consultation	The consultation requirements were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements. Though a normal variation there are specific historic potential concerns linked to public health leading to us consulting with the following: The application was sent for consultation to: 1. Public Health England/Director of public health 2. HSE 3. FSA 4. South Derby District Council Environmental Health and Planning Departments.	✓
Responses to consultation and web publicising	The consultation responses (Annex 2) were taken into account in the decision. <i>Two responses received.</i> The decision was taken in accordance with our guidance.	✓
<b>European Directives</b>		
Applicable Directives	All applicable European Directives have been considered in the determination of this application	✓
<b>The site</b>		
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary. The installation boundary has increased with this variation. The expansion includes the new combustion facilities and associated effluent treatment /secondary filtration facilities. The installation area now covers the following: 1. Existing Roaster Building 2. Existing Boiler House 3. Existing Egron ( Spray Dryer Pre-heater) Building 4. New Roasters	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
	<p>5. New Boilers 6. DAF Plant 7. Sludge /Clean Effluent Tanks 8. Divert Tanks 9. Secondary Filtration Facilities. 10. Ash Pit 11. Coffee Grounds Blow Out.</p> <p>The finalised installation site plan (Figure 2) was provided with the schedule 5 response; this is included within the permit variation. This plan includes emission points to water and sewer.</p> <p>The chance has been taken to include an additional site plan confirming emission point locations to air.</p>	
Site Condition Report	<p>The installation boundary has increased due to expanded combustion activities and introduction of existing and new dewatering and ETP facilities.</p> <p>Within their schedule 5 response the operator provided a final updated site condition report ( dated October 2013) covering</p> <ul style="list-style-type: none"> <li>• Final installation boundary plan – Figure 2 of final Site Condition Report</li> <li>• Final Site Condition Report basis with regard to intrusive sampling. The operator has decided not to provide baseline data.</li> </ul> <p>Their decision is based on</p> <ul style="list-style-type: none"> <li>- All additional facilities are constructed in line with indicative BAT measures for containment including bunding, kerbing and control measures (see fugitives' emissions in key issues for details).</li> <li>- An inspection and maintenance regime will be extended to include the new installation activities. This includes an annual facilities inspection; the details are discussed in key issues section under fugitives' emissions.</li> <li>- Emergency measures are in place to contain emissions in the event of incidents including sealed drainage system and usage of effluent buffer tank (key issues section provides more details).</li> </ul> <p>The operator has taken the view that the low risk of land and ground water contamination does not require formal intrusive sampling; this is a position allowed under our H5 guidance.</p> <p>The operator has presented some intrusive sampling (appendix H of application Ground Investigation Report April 2012) from their planning application as background data rather than formal baseline data.</p> <p>We have reviewed this data and accepted it being sufficient if required in future to be utilised as baseline data. The proposed new site area has historically remained undeveloped agricultural land.</p> <p>The above sampling report data includes 37 soil samples at 7 locations. In addition five Borehole locations were analysed for ground water contaminant concentrations.</p> <p>Overall no significantly elevated concentrations or contaminants were identified.</p> <p>The operator Site Condition report also covers.</p> <ul style="list-style-type: none"> <li>• Final list of all tankage and pipe work facilities within the installation boundary and the containment measures.</li> <li>• Provision of actual frequencies for infrastructure checks (including bunding and tankage)</li> </ul> <p>The operator has completed a H5 template within their SCR including changes to the activity. Specifically the storage of oil for existing boiler combustion activity has stopped; existing boiler A1 is now gas fired.</p> <p><b>Overall we accept the operator application site condition report as a representative report. The new Industrial Emissions Directive (IED) condition has been added for ground water and soil monitoring.</b></p>	
Biodiversity, Heritage, Landscape and Nature Conservation	<p>There are <b>no European</b> statutory sites within the relevant screening distances from the installation.</p> <p>There is one SSSI within the 2km screening distance. This is: Old River Dove Marston on Dove ; Designation Reference: 1002254. The site is only just within screening distance at 1.9 km from installation boundary to edge of SSSI; SSSI is to S.E of installation.</p> <p>The operator has performed an atmospheric modelling assessment of installation impacts against all the relevant ecological EQS's.</p> <p>The operator detailed modelling shows installation process contributions against relevant ecological EQS's to be insignificant impact at this SSSI.</p> <p>There are 3 local wildlife sites within the screening distances.</p> <ul style="list-style-type: none"> <li>• Site Name: Marston on Dove Church Oxbow</li> <li>• Site Name: River Dove</li> <li>• Site Name: Marston Crossing Oxbow.</li> </ul> <p>In addition the operator has nitrogen and acid deposition rate assessment.</p> <p>The environmental assessments are detailed in the key issues section of this document.</p> <p>An Appendix 4 has been created for our own internal records.</p>	✓

Aspect considered	Justification / Detail	Criteria met Yes
<b>Environmental Risk Assessment and operating techniques</b>		
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the installation.</p> <p>The operator's risk assessment is satisfactory after additional information received in response to the schedule 5 notice relating to H1 atmospheric emissions, effluent treatment controls and odour plus fugitive emissions controls, noise control improvements and accident management plan updates.</p> <p>H1 assessment plus detailed modelling assessment for air emissions and environmental assessment for discharges to sewer are provided in key issues section of this document</p>	✓
Operating techniques	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. The operator has performed a BAT review (discussed in more details in key issues section) linked to the following Environment Agency TGNs:</p> <ul style="list-style-type: none"> <li>• EPR 1.00 How to Comply</li> <li>• EPR 1.01 TGN for Combustion Activities</li> </ul> <p>In addition our assessment has also covered a review of Large Combustion Plant BREF 2006 and draft 2013 document.</p> <p>The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in the TGN's as listed above and we consider them to represent appropriate techniques for the facility. A more detailed BAT review is included in key issues section of this document.</p>	✓
<b>The permit conditions</b>		
Odour	<p>We consider that the activities carried out at the site have the potential to cause odour.</p> <p>The operations within the installation that will have the greatest potential to give rise to odour are:</p> <ul style="list-style-type: none"> <li>• Roasters</li> <li>• Egron pre heater</li> <li>• Fluidised bed boilers</li> <li>• DAF ( Dissolved Air Flotation) Unit</li> <li>• De-watering facility</li> <li>• Effluent Treatment tanks</li> <li>• Secondary filtration</li> </ul> <p>The operator has provided a review of odour potential for installation in section 5.4 of their supplementary application report plus an H1 annex A risk assessment for odour in appendix D. The risk assessment highlights fact that the installation boundary is surrounded by residential housing (eg .Mercia Close, Station Road and Hoon Hay Farm); other residential properties now listed in their risk assessment include houses of Dove Side. Mercia Close, Station Road and Dove Side housing are located within 100 metres of installation boundary.</p> <p>We have received no comments on odour in local council planning department formal consultation response.</p> <p>However the operator has presented data within their Odour Management Plan (OMP) clarifying there were three specific odour complaints linked to coffee smell.</p> <p>These are listed in OMP and the main route cause was found to be roaster operational failures combined with specific wind direction/ adverse weather conditions; these are covered in review below. There were three other separate general odour complaints not linked to specific installation activities.</p> <p><u>The OMP was submitted with their schedule 5 response. It is in line with our H4 guidance on OMP's covering:</u></p> <ul style="list-style-type: none"> <li>• Odour History of Complaints and improvement actions – section 1</li> <li>• Odour risk assessment –section 2 and 3 plus section 6.</li> </ul> <p>This covers both normal risk assessments including a full risk assessment in such activities in table 4. For each risk there is a control measure, action plan and overall responsible person.</p> <p>The same information exists for abnormal risks in Table 5.</p> <ul style="list-style-type: none"> <li>• Management set up and who is responsibility for execution of odour control actions/shutdown procedures – section 4.</li> <li>• Normal routine operations and odour control measures – section 5.</li> </ul> <p>The operator has summarised critical process design parameters for effective combustion, process monitoring and alarms plus general ventilation controls for fugitive emissions.</p> <ul style="list-style-type: none"> <li>• Abnormal operating conditions and control measures plus emergency procedures – section 6. For roasters, FBB's, coffee grounds dewatering, coffee ground handling and effluent treatment critical alarms, remedial actions and automatic shutdown details are provided. Section 7 gives emergency scenarios and actions with specific issues linked to odour including major material spillages, loss of process control and gas leakage plus fires.</li> <li>• Monitoring - section 8. This includes weekly site tours for sniff tests and recording of</li> </ul>	h

Aspect considered	Justification / Detail	Criteria met Yes
	<p>results. Stack odour monitoring is to completed post commissioning of new facilities</p> <p>Odour modelling has been completed. The results indicate that odour arising from the installation is detectable at the sensitive receptors but remains below the threshold of 6 oue/m3. The modelling input excludes fugitive emissions from the installation plus on site but outside installation coffee manufacturing facility</p> <p>The details of odour modelling are reviewed in more detail in section 5.4 of keys issues review below.</p> <p><b>Conclusions:</b></p> <p><i>Overall with improvements as below it is considered that effective odour control can be maintained on site to minimise odour pollution beyond installation boundary.</i></p> <p><b>After our review and requirements for further additions and improvements the OMP was approved in line with our H4 guidance conditional on the completion of following actions.</b></p> <ol style="list-style-type: none"> <li>Short term improvements – see section 8.2 to be completed end of <u>March 2014</u>. This covers coffee ground handing process improved trailer containment , existing effluent plant drum filter vent release move to back venting or abate current vent</li> <li>Odour stack commissioning monitoring data and submission of updated modelling based on actual monitoring data. This is subject to improvement program IC5. This improvement program will require a final update of OMP based on commissioning data results and conclusions.</li> </ol> <p>The improvement program IC5 further states that after completion we will review operator OMP for assessment of sufficiency of document for final approval</p> <p>The standard odour condition has been included in this permit with specific condition relating to an odour management plan ( see conditions 3.3.1 and 3.3.2)</p>	
Noise	<p>We consider that the activities carried out at the site have the potential to cause noise and/or vibration.</p> <p>As background information the installation is in within close proximity to residential properties. In particular the operator has highlighted the following sensitive receptors.</p> <ul style="list-style-type: none"> <li>Residential properties in Mercia Close and Hoon Road to the north west of the installation ; the operator has utilised 7 and 19 Mercia Close and 50 Hoon Road in their noise assessment on immediate edge of installation boundary.</li> <li>Residential properties at Dove Side to the south of the installation boundary (within 50 metres from installation boundary); the operator has utilised 1, 3, 5,7,11 and 15 Dove Side in their noise assessment on immediate installation boundary.</li> <li>Holly Cottage residential property to the east of the installation (approximately 400 metres to the east of the installation); the operator has utilised this in this as a sensitive receptor in the installation boundary.</li> </ul> <p>The council planning consultation response mentions noise complaints with respect to construction activities not normal operations; no complaints have been reviewed related to any specific installation facilities. On-going improvements as detailed below under 2013 plan have actioned remedial work for noise control.</p> <p>The new facilities added to the installation with this variation with the potential for noise include new Fluid Bed Boilers, new Roasters, effluent treatment DAF facilities and new auxiliary boilers. A BAT measures review has been included in Table 5.2.2 of the application supplementary information.</p> <p>The generic noise mitigation control measures include concrete building infrastructure for roasting facilities, noise attenuation on external input /exhaust vents and noise attenuation on the chimneys to reduce noise from the boiler house. More specific data on mitigation for new facilities are detailed in section 5.5.6 of supplementary application information; this includes noise ratings for building cladding, roof fans, boilers and associated stacks and cooling towers.</p> <p>In terms of the quantative noise assessment BS 4142 states if process noise exceeds background LA90 by over 5 dB this is of marginal significance and a rated noise level more than 10 dB, below the background noise level is regarded as a positive indication that complaints unlikely ie noise level insignificant.</p> <p>The operator has carried out background noise monitoring at three above sets of sensitive receptors and data is summarised within Table 5.19 of supplementary application information. Based on worst case scenario of installation facilities operating 24/7 the operator has modelled the cumulative noise levels of the combined new and existing facilities at these three sets of receptors (data displayed in Table 5.20). This is obviously a highly conservative approach existing facilities are liable to be double counted.</p> <p>Nonetheless the maximum plant noise rating levels (LA eq) are less than 10 dB. below the background levels ie. noise levels likely to have an insignificant impact.</p>	

Aspect considered	Justification / Detail	Criteria met
		Yes
	<p>The operator has an on-going timetable of improvements for noise abatement for the existing facility and actions for optimisation of new facility when installed</p> <p>The plans are detailed in question 8 of their schedule 5 response.</p> <p>Improvements 2010 - 2013 are outlined. These cover noise improvements linked to the installation and the on site but outside installation boundary coffee manufacturing facility.</p> <p>Future improvements are also listed for 2014 and commitment for noise monitoring once new facility fully commissioned (covered by over improvement program IC4).</p> <p>Of particular note are improvements to the Roasters for noise minimisation.</p> <p>We accept these controls as indicative BAT measures to minimise noise impact from the installation but with the provision of an improvement program to measure actual noise levels for day and night time operation in line with BS4142 to ensure noise monitoring is completed (IC 4). Hence the standard noise condition has been considered sufficient (3.4.1 and 3.4.2).</p>	
Raw materials	<p>The principal raw materials to be used within the installation are biomass and natural gas as a support fuel. Other raw materials to be used within installation boundary include lubricant oils, boiler water pre-treatment chemicals, and DAF unit chemicals, chemicals for use within the boiler and urea for NOx secondary abatement. The A1 existing auxiliary boiler was previously oil fired. This has been updated to a gas fired boiler. Oil usage and oil storage on site has now ceased.</p> <p>The indicative BAT measures utilised by the operator are detailed in Table 3.10 of the application supplementary information. These include close quality control of green beans fed to off installation but on site coffee manufacturing facility leading to control of waste coffee beans fed to the installation. The combustion activities to be undertaken within the installation will be purpose built and designed for the efficient operation of the facility. The facility will include automated process control and monitoring which ensure optimised energy, water and input raw materials usage</p> <p>A full list of raw materials and environmental impacts are provided in Table 3.11 of supplementary application information. This table includes raw material annual usage levels. For expanded facility the main raw material is the 30,000 tonnes per annum waste coffee bean biomass usage.</p> <p>The operator has committed to a water audit for the expanded installation.</p> <p>We accept these measures as BAT for the installation. The standard raw materials condition applied for on-going raw material efficiency ( condition 1.3.1)</p>	✓
Waste types	<p>The expanded facility will generate two new waste streams compared with existing permitted activities.</p> <ol style="list-style-type: none"> <li>1. Waste sludge from the Dissolved Aeration Filtration plant facility. This is stored in a bunded sludge tank as part of the effluent system. The sludge quantity is 2,400 tonnes per annum and is re-used by land spreading the material.</li> <li>2. Chemicals pre cleaning /boiler pre-treatment; 6 tonnes per annum. This is disposed of off-site by an accredited contractor.</li> </ol> <p>In addition Table 3.13 of the application summarises updated waste outputs with variation facilities in place.</p> <p>The off installation but on site coffee manufacturing facility is aiming for zero waste output via usage of all the waste coffee beans in the fluidised bed boilers. The operator has committed to a periodic waste minimisation review.</p> <p>We accept these measures as BAT for the installation. On-going compliance with waste minimisation will be ensured via permit conditions 1.4.1 and 1.4.2</p>	✓
Pre-operational conditions	Based on the information in the application, we consider that we need to impose one pre-operational condition for a commissioning protocol	
Improvement conditions	<p>Based on the information on the application, we consider that we need to impose improvement conditions. We have imposed 3 improvement conditions to cover:</p> <ul style="list-style-type: none"> <li>• IC3 Commissioning Report including atmospheric and effluent monitoring</li> <li>• IC4 Noise monitoring</li> <li>• IC 5 Odour monitoring, improvements and final OMP submission.</li> </ul>	✓
Emission limits	We have decided that new emission limits should be set for the parameters listed in the permit under Tables S3.1 and S3.3.	✓
Monitoring	<p>Monitoring changes as follows:</p> <ul style="list-style-type: none"> <li>• Table S3.1 listed monitoring requirements specifically for new FBB emission A5</li> <li>• Dioxin monitoring has been removed for existing and new FBB emission as facility was originally inaccurately assumed to be subject to former WID (new IED annex IV) and emissions are insignificant.</li> <li>• Carbon Monoxide continuous monitoring has been removed from S3.1 Table and reporting requirements as CO emissions as assessed as having insignificant environmental impacts. CO CEM's monitoring will continue to be utilised under S1.2 operating techniques without the requirement for reporting.</li> </ul> <p>The atmospheric monitoring techniques are in line with our M2 guidance</p> <p>The key issues section details a review of effluent monitoring techniques.</p>	✓
Reporting	We have decided that reporting of monitoring results should be carried out for the parameters listed in the permit as per table S4.1.	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Environment Management System	<p>There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.</p> <p>The operator has confirmed they operate an accredited ISO14001 EMS for the current site. The EMS for the existing site will be expanded to cover the additional activities to be undertaken with the proposed development.</p> <p>The duly making response confirmed that the EMS and relevant procedures will be updated for new activities in line with commissioning target dates as follows: The EMS is constructed of various procedures covering specific activities related to the environment. The individuals undertaking the project have all had Environmental Awareness training and so have been given details to operate the site EMS as part of design considerations for the permitted activities.</p> <p>The EMS procedures are audited annually and updated whenever necessary. Below is the planned timetable of EMS updates and reviewing criteria;</p> <ul style="list-style-type: none"> <li>• March 2014 – EMS procedures are reviewed and updated as necessary as per site standard.</li> <li>• April – October 2014 – Commissioning takes place on the permitted activities and other sectors of plant on Project Dove. EMS procedures are updated during this time and assessed against the relevant activities.</li> <li>• November to December 2014 – Final commissioning and operation of the plant is to take place. The updated EMS procedures will be checked for their effectiveness and updated where necessary.</li> </ul>	✓
Relevant Convictions	The National Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found.	✓

## Key issues of the decision.

### 1. Process description

The application is for a substantial variation to existing Permit EPR/BJ9576IZ for a combustion installation, operated by Nestle UK Ltd, at its coffee manufacturing facility in Hatton Derbyshire.

The driver for this change is the expansion of the coffee bean processing capacity with the centralising of coffee manufacture on this site and the closure of a separate Nestle facility. Nonetheless the coffee bean capacity remains below the relevant threshold for a food and drink scheduled activity (6.8 A (1) d (ii)).

The final installation boundary is detailed within schedule 7 of the permit. The site is located to the east of the residential area of Hatton. The original EPR/BJ9576IZ permit issued in 2003 was for scheduled activity 1.1 A (1) (b) (iii)

“Unless carried out as part of a part A (2) or Part B activity, burning any fuel manufactured from or compromising any other waste, in an appliance with a rated thermal input of 3 or more megawatts but less than 50 megawatts.”

The variation application includes the addition of the following combustion activities

- Two new gas fired coffee roasters – total 6.4 MW thermal input
- One new biomass burning Fluid Bed Boiler (FBB) – 10.8 MW thermal input
- Two new gas fired auxiliary boilers – total 14.4 MW thermal input.

Hence total installation thermal input capacity after this variation is **55 MW plus 18.6MW A1 emission** ; A1 existing auxiliary boiler is included but will operate only short term alongside new auxiliary boilers during 2014 before being de-commissioned.

**The installation hence has a total thermal input of > 50 MW.** The coffee bean waste is not under Industrial Emissions Directive (IED) Chapter IV (special provisions for waste incineration plants and waste co-incineration plants) and hence Sch 13A is not relevant. Also for this the Chapter III (Special Provisions for Combustion Plants) does not apply to this installation as combustion units do not all discharge through a common structure.

For this installation after a review the relevant scheduled activities is as follows:

**Section 1.1 A (1) (a)** – Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.

This covers the combination of gas fired boilers and usage of coffee beans as biomass within FBB boilers.

The overall philosophy is that depending on the steam demand of the coffee production process, additional steam to that generated by the biomass boilers would be supplied to the wider site mains from one of the auxiliary boilers. Under normal operating conditions the two fluidised bed boilers would provide approximately 75 % of the steam load for the off installation on site coffee manufacturing facility. One of the two new auxiliary boilers would have sufficient capacity to cover the remaining 25 % plus any additional peak demand. The other auxiliary boiler would generally be on cold stand by , in case of breakdown or maintenance of other combustion activities.

In addition the two auxiliary boilers will operate together to supply process steam to coffee process in the event that the biomass burning FBB boilers are not available for example during start ups of the coffee process until sufficient coffee grounds are available to switch over to the FBB's. In addition the associated activities linked to the combustion activities have been introduced into the installation activities with this variation to provide a full listing of all relevant activities

- Effluent Treatment facilities – primary and secondary (final filtration) effluent treatment for disposal. Consent to discharge for the whole site is to be raised to 1600 m3/day of which installation effluent estimated to be 200 m3/day after variation changes. This makes this a scheduled activities for non-hazardous physico-chemical treatment **5.4 A(1) (a) (ii)**

**Directly associated activities include:**

- Storage and handling of raw materials, including coffee grounds;

Area no.	Process overview	Process description
1	Existing Roaster Building	The roasters use a hot air stream to roast the raw green beans at the correct temperature and for the appropriate length of time to make the roasted coffee with the desired flavour profile.
2	Existing Boiler House	Existing FBB process including boiler water pre-treatment.
3	Existing Egron Building	The combustion process is an indirect fired air heater using a gas fired burner that heats the incoming air for use in a spray drying process, the incoming air is pre heated using an economiser and is heated by a series of spiral baffles to increase the surface area and heat transfer.  Also, included is the bag filter and multicyclone.
4	New Roasters	The roasters use a hot air stream to roast the raw green beans at the correct temperature and for the appropriate length of time to make the roasted coffee with the desired flavour profile.
5	New Boilers	To burn the biomass, which is predominantly coffee grounds, a fluidised bed boiler will be used in the new coffee manufacturing process for generating steam. Includes ash storage.  Two package boilers (2x7.209 MW) are being included to generate steam during peak demand periods and replace the existing set of gas fired boilers.
6	Existing DAF plant	The DAF unit is fed with effluent that has first been passed through the rotary drum filter. Correct operation of the DAF is achieved by adding air, coagulant and polymer to the effluent so that the solids form larger particles and float to the surface of the unit for removal.
7	Sludge and Clean Effluent Tanks	Bunded tanks for storage of sludge and clean effluent.
8	Divert Tanks	Tanks used to hold effluent prior to treatment or temporarily whilst DAF plant unavailable.
9	Filtration	Filtration equipment used for dewatering the coffee grounds and reducing COD in wastewater.  Includes tanks such as the effluent balance tank, coloured wastewater tank and high pH storage tank.
10	Ash skip	Ash skip for the existing FBB store in a lidded container within a gated enclosure.
11	Grounds Blowout	Blowout from grounds handling system to covered trailer

## **Environmental Risk Assessment Key Issues linked to this variation include:**

- BAT review of new combustion activities
- Installation NOx and VOC emissions minimisation for new A5 FBB.
- Fugitive emission controls
- Odour controls review
- Updating of monitoring techniques in line with latest Mcerts guidance.

### **As an overriding conclusion we are satisfied that the variation has included relevant BAT measures to minimise installation environmental impact.**

The reductions of the NOx and SO2 Atmospheric Emission Limit Values for A5 FBB are of particular note in installation environmental impacts minimisation. In addition the particulate and VOC ELV's for A5 FFBB have also been reduced. These changes have also been carried across to existing A2 FBB.

## **2. BAT REVIEW**

The following is a review for the new facilities of BAT measures compliance in light of relevant EPR 1.01 Environment Agency TGN plus 2006 BREF for large combustion facilities and EPR 6.10 Environment Agency TGN plus 2006 BREF for food and drink sectors respectively.

### **The main areas of specific interest for the new variation activities are as follows:**

New Combustion activities including two new roasters, two auxiliary boilers and one new Fluid Bed Boiler.

#### Roasters

The roasters use a hot air steam to roast the raw green beans at the correct temperature and for the appropriate length of time to make the roasted coffee with the desired flavour profile. The beans are then cooled with a second air stream to let them be stored for the downstream process.

The roasters operate in line with process flow diagram in Food and Drink BREF document and Figure 4.74.

There are two new roasters (main combustion emissions via A 10 and A11 emission points) have been designed in light of the Food and Drink 2006 BREF section 4.7.8 for coffee manufacturing.

The specific BAT measures included within roaster design include air recirculation and secondary abatement via catalytic oxidation for VOC and particulate abatement.

#### Air is recirculated in a circuit back to the roaster.

Achieved environmental benefits for such re-circulation include 25 % less energy and a lower volume of waste gas for treatment than non-recirculating roasters

#### Catalytic oxidation

Secondary abatement is an indicative BAT measure required where roaster primary controls cannot achieve VOC emissions < 50 mg/m<sup>3</sup> and particulates < 20 mg/m<sup>3</sup>. This is applicable for this roaster facility. A catalytic oxidiser has been integrated into final roaster hot air exhaust. The gas after burner maintains a temperature of approximately of 370 C to ensure VOC levels are <50 mg/m<sup>3</sup> and particulate levels are < 10 mg/m<sup>3</sup> at 3 % O<sub>2</sub> for combined A10 and A11 emissions.

#### Auxiliary boilers

The two new auxiliary boilers 2 x 7.2 MW will be natural gas fired. This is an indicative BAT technique in reducing combustion emissions relative to existing oil fired boiler which will be decommissioned. In the mean time the operator has ceased usage of oil on site and moved over to gas fired boilers temporarily before decommissioning in 2014.

The boilers will comply with NOx/CO emission limit value benchmarks as per ERP 1.01 combustion guidance for gas fired boilers less than 100 MW ( 100 mg/m<sup>3</sup> daily average NOx emission and 30 mg/m<sup>3</sup> emissions at 3 % O<sub>2</sub>).

#### Fluid Bed Boiler (FBB)

To burn the biomass, which is predominantly coffee grounds, a bubbling fluid bed (FBB) will be used in the expanded coffee manufacturing process for the firing system. Fluidised bed burn solid fuels in an air-suspended bed of particles. The fluidising process is induced by an upward flow of gas through a stack of solid particles (sand).

The combustion air is preheated by a water coil air heater as described below.

A gas fired burner is included to preheat the bed during boiler start up. The usage of fluid bed boilers for coffee manufacturing is not specifically mentioned in combustion EPR 1.01 TGN or EU BREF. The closest match is the burning of solid biomass. The BREF suggests that grate firing and fluidised bed combustion are appropriate measures for the combustion of biomass materials.

The operator decision to select FBB technology, as in original EPR/BJ9576IZ permit, is in line with BREF combustion guidance that most new solid fuel fired boilers > 5MW thermal input are FBB's giving stable state operating conditions, ease of operation and flexibility for a range of air to biomass flow rates plus lower NOx emissions relative to grate boilers. In addition the FBB can operate at a wider range of fuel moisture levels.

The FBB is complete with a SNCR secondary NOx abatement utilising urea prills.

The 2006 Large Combustion BREF for FBB states NOx benchmarks < 400 mg/m<sup>3</sup> at 6 % O<sub>2</sub> for combustion facilities < 100 MW Thermal input.

The existing FBB NOx monitoring gives a performance of 300-330 mg/m<sup>3</sup> for NOx emissions at 6 % O<sub>2</sub>.

The operator has designed the new FBB with various improvements to offset the lower biomass moisture content feed to the new FBB relative (51% moisture relative to 57 % moisture in current FBB feed). The benefits of a drier fuel are that the new FBB is capable of producing 14 tonnes/hour of steam compared to 12.7 tonnes/hour of steam currently. The greater steam production offsets part of the requirement at peak periods to utilise the natural gas fired boilers.



The basic BAT measures for NOx emission minimisation for the FBB are complied with as follows:

- The use of a FBB with lower bed temperature below the thermal NOx threshold;
- The control of oxygen in the primary combustion zone limiting the potential for NOx generation;
- Advanced combustion control system to manage air flow, temperature, fuel addition, oxygen content, reagent addition;
- Air pre-heat using a water coil air heater reducing the amount of fuel used in pre-heating combustion air;
- Use of low NOx burner;
- Two stages of over fire air to ensure adequate mixing and turbulence in the combustion zone; and
- The use of flue gas recycling to maintain bed temperature and minimise oxygen in the first draft air for the fluidised bed.

In the knowledge that the drier fuel would likely produce higher levels of NOx the operator has optimised the operation of the FBB over and above existing FBB design and these primary control measures are discussed below:

- Combustion control systems: new FBB incorporates an advanced computerised control system to manage air flow, temperatures, fuel addition, lower bed temperature, oxygen content – that helps to effectively manage the combustion efficiency and minimised emissions level;
- Combustion temperature reduction: new FBB will have a water coil air heater (WCAH) to preheat the combustion air (i.e. air is pre-heated without the need to burn additional fuel to reach the required temperature);
- Over fire air (OFA): new FBB OFA introducing air above the primary combustion zone in the furnace to achieve further NOx reduction by air staging to at least two divided combustion zones, a primary combustion zone with a lack of oxygen and a secondary combustion zone with excess oxygen in order to ensure complete burn-out;
- Flue/exhaust gas recycling (FGR): recirculation of flue-gas results in a reduction of available oxygen in the combustion zone and thermal NOx formation are reduced;
- Re-burn (fuel staging): creation of different combustion zones in the furnace to reduce back to nitrogen the nitrogen oxides that have already been formed;
- Automated control for Selective Non Catalytic Reduction (SNCR) system for NOx reduction (improvement on semi-automated SNCR for current FBB).

Overall the operator has given a design NOx Emission Limit Value guarantee of 400 mg/m<sup>3</sup> with expected average levels of 320 mg/m<sup>3</sup>

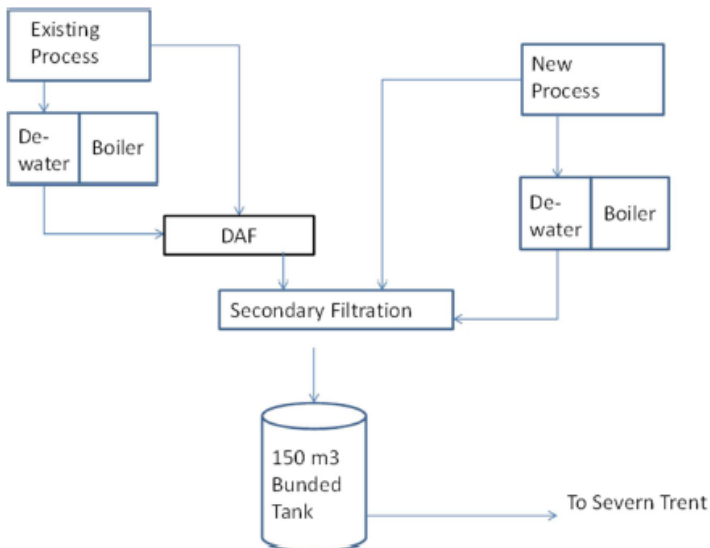
The permit allows for a review of the NOx daily average ELV after improvement program commissioning to allow lowering as possible based on actual data from initial 400 mg/m<sup>3</sup> level.

### **Conclusions**

The combustion facilities design is in line with indicative BAT requirements within the combination of our TGN EPR 1.01 and combustion activities EU BREF.

### **Effluent Treatment Plant (ETP) Facilities.**

Overview effluent treatment process block diagram including existing and new facilities is as below:



### **New Expansion Site including new combustion facilities and expanded off installation coffee manufacturing facilities:**

Effluent from the new development are separated into 2 main tanks,

1. Coloured waste water (CWW)
2. Uncoloured waste water (UCWW)

**CWW** is captured in tanks underground south of the extraction building to help with the gravity feed from the buildings.

The coloured waste water is then pumped across to the coffee grounds handling area in extraction building, where it passes through a screen filter to remove particulate and then to the CWW holding tank (150 Tonne capacity).

Any CWW with a high pH filters screen to remove particulate and then sent to a high pH. Holding tank (150 Tonne capacity)

All high pH solids removed are disposed of into a skip and sent for land spreading.

**UCWW** is all pumped for the initial storage tank positioned at the north west of package boiler building underground to a filtered

effluent storage tank where all treated effluent will be mixed with the uncoloured waste water.

**Press Water**

When the water has been pressed from the coffee grounds via the press the water is captured and reused to dilute the coffee grounds that still require pressing. This is required to suspend the coffee grounds in to slurry enabling it to flow into the press. All excess water not required as slurry make up is pumped to the coloured waste water tank.

**Existing Site Effluent**

The existing factory effluent is sent to the boiler house yard and is held in a metal sump pit. Any high pH effluent is diverted into two holding tanks and used to control the pH. of the effluent entering the DAF plant.

The effluent in the sump pit is pumped to the DAF plant but a pH monitor ensures pH of the feed to the DAF is kept below pH of 9 to enable the flocculent and polymer to suspend the solids and removed and storage in a sludge tank. This tank is then emptied by vacuum tanker and sent to land spread. All clean effluent is held in a storage tank and then pumped across to the high pH. storage tank in the new facility detailed above

Coffee grounds from the process are dewatered using mechanical screw presses, the water from the dewatering is then sent to a Decanter to remove the finer solids from the press and then sent to effluent sump pit.

**Final combined new and existing facilities effluent discharge**

The new facility high pH tank effluent and CWW are pumped to the clean effluent tank via a final secondary belt filter for further solid removal. Effluent mixed into the filtered effluent tank. The clean effluent tank (54,000 m3 volume) has a re-circulation loop to provide continuous monitoring of pH. and manage dosing for pH control (between pH range 6 to 12 which is in line with the site consent to discharge limits).

There is in addition pH monitoring in the final discharge line to sewer. In case of any emergency situation with pH. level of effluent in final discharge (ie out of consent defined range) the ETP discharge will be stopped and process corrections actioned and further pH neutralisation. There is a flow meter (having capacity for Mcerts accreditation) to monitor final effluent volume to sewer.

**Overall Design flow and emission consent to discharge limits**

Table 5.5: Emissions Data for Point Source Emissions to Water

Release Point Reference	Parameters	Anticipated Yearly Average Concentrations	Value (units) Full Consent	Basis
S1	Flow – total	1200m <sup>3</sup> in 24 hours	1600m <sup>3</sup> in 24 hours	Nestle UK Ltd trade effluent consent to be issued by Severn Trent in 2013. Estimated effluent volume from the regulated processes and directly associated activities within the installation boundary is expected to be approximately 72,000 m <sup>3</sup> . The total for the expanded operational site including those processes within the installation boundary is estimated to be 310,000m <sup>3</sup> .
	Flow – maximum instantaneous	14 litres/sec	22 litres/sec (max instantaneous)	
	Settled COD	5,900 mg/l	12,000 mg/l	
	Suspended solids	760 mg/l	3,000 mg/l	
	Temperature	40°C	Up to 43°C	
	Oil	-	Free from oil	
	pH	7.8	6- 12	
SW1	None proposed	-	-	-

Please note that the above anticipated levels are based on initial trials with existing factory effluent and are the expected levels that will be achieved for the combined site.

The suspended solids and COD levels should be lower than above figures with existing facilities undergoing secondary filtration in addition to current DAF.

**Indicative BAT measures**

Operator has complied with Indicative BAT measures for Point Source Emissions to Water from EPR 1.00 How to Comply. The measures applied are detailed in table 5.6. These measures include minimisation of emissions of harmful substances and water usage minimisation. A Sustainable Water Use and Drainage Strategy has been developed and is integral to the facility design.

The review of the steps for COD and suspended solids removal for new facility has shown new belt filter process will have enhanced performance than current DAF facility. Trials undertaken by Nestle have demonstrated effective solids removal for new solids removal facilities (1 -4 % greater solids removal than current DAF system).

*In addition the final secondary filtration belt filter process takes all the effluent both from new and existing facility further minimises COD and suspended solids levels.*

The existing process utilises screw presses for dewatering followed by a DAF plant.

For the new expansion the operator has reviewed all available technology for optimum COD and suspended solids reduction including following technology:

- Filter press
- Belt press
- Centrifugation
- Screw press

**The final operator choice is a belt filter** for reasons of optimising solid removal up to 35 % solids removal and potential for continuous process.

In addition the operator has complied with indicative BAT measures in EPR.1.01 Technical Guidance Note for Combustion activities for all relevant areas; these include de-ionisation effluent, ash handling. Cleaning liquids, site drainage, cleaning liquids, site drainage and waste water treatment

## Conclusions

IC3 contains requirement for the operator to submit actual effluent monitoring to confirm actual ETP performance.

### 3. Environmental Assessment

#### Below is a summary of the environmental assessment:

#### Atmospheric.

Overall there are 11 emission points for this installation to atmosphere. The variation introduces five out of these emission points

#### The changes linked to this variation are summarised as follows:

Emission point ref.	Source	Stack Height in metres	Parameters
A3.	New Auxiliary Boiler 1	30.7	NOx and CO
A4.	New Auxiliary Boiler 2	30.7	NOx and CO
A5.	New FBB	30.7	NOx, CO, Particulates , VOC's and SOx
A10.	New Roaster A combustion emissions	25.4	NOx, CO, Particulates , VOC's and SOx
A11.	New Roaster A cooler emissions	25.4	NOx, CO, Particulates , VOC's and SOx
A12	New Roaster B combustion emissions	25.4	NOx, CO, Particulates , VOC's and SOx
A13	New Roaster B combustion emissions	25.4	NOx, CO, Particulates , VOC's and SOx

The operator has carried out first a H1 assessment and then detailed modelling for the environmental impacts for the whole installation.

The basis for the initial H1 assessment is the data in Table 3 of the final November 2013 air quality modelling report submitted with the schedule 5 response.

#### H1 ASSESSMENT FOR ATMOSPHERIC EMISSIONS

##### Stage 1: Screen Out Insignificant Emissions

Once short-term and long-term PCs have been calculated, in this application via dispersion modelling, they are compared with Environmental Quality Standards (EQS) referred to as "benchmarks" in the H1 Guidance.

Where an EU EQS exists, the relevant standard is the EU EQS. Where an EU EQS does not exist, our guidance sets out a National EQS (also referred to as Environmental Assessment Level - EAL) which has been derived to provide a similar level of protection to Human Health and the Environment as the EU EQS levels.

PCs are considered **Insignificant** if:

- The **long-term** process contribution is less than **1%** of the relevant EQS; and
- The **short-term** process contribution is less than **10%** of the relevant EQS.
  
- The **long term** 1% process contribution insignificance threshold is based on the judgements that:
  - It is unlikely that an emission at this level will make a significant contribution to air quality;
  - The threshold provides a substantial safety margin to protect health and the environment.
  
- The **short term** 10% process contribution insignificance threshold is based on the judgements that: spatial and temporal conditions mean that short term process contributions are transient and limited in comparison with long term process contributions;
- The proposed threshold provides a substantial safety margin to protect health and the environment.

##### Stage 2: Decide Whether Detailed Modelling is needed

Where an emission cannot be screened out as insignificant as a PC through applying the first stage of our H1 Guidance, it does not mean it will necessarily be significant.

In these circumstances, the H1 Guidance justifies the need for detailed modelling of emissions, long-term, short-term or both, taking into account the state of the environment before the Installation operates, where:

- local receptors may be sensitive to emissions;
- released substances fall under an Air Quality Management Plan;
- the long term Predicted Environmental Concentration (PEC) exceeds 70% of the appropriate long term standard, (where the PEC is equal to the sum of the background concentration in the absence of the Installation and the process contribution);
- the short term Process Contribution exceeds 20% of the headroom, (where the headroom is the appropriate short term standard minus twice the long term background concentration).

#### Conclusions:

All the parameters do **not** screen out at either stage 1 or stage 2 for all of the relevant AQS's. The parameters include the following:

##### Human health AQS's:

- Carbon Monoxide
- PM 2.5
- Nitrogen Dioxide
- VOC's ( as benzene)
- Sulphur Dioxide.

- Dioxins and Furans.

Ecological EQS's

- Total oxides of nitrogen expressed as Nitrogen Dioxide (NOx)
- Sulphur Dioxide

**5.2 Air Quality Assessment**

The operator has completed a detailed air dispersion modelling assessment within Air Quality modelling report dated November 2013 provided with their schedule 5 response.

The assessment comprises:

- A study of the impact of emissions on nearby sensitive habitat sites.
- Dispersion modelling of emissions to air from the operation of the combustion facility for impacts on human health at nearby sensitive receptors.

The operator assessed the Installation's potential emissions to air against the relevant air quality standards, and potential impact upon local habitat sites and human health. These assessments predicted the potential effects on local air quality from the Installation's stack emissions using the ADMS 5.0 dispersion model, which are commonly used computer models for regulatory dispersion modelling. The models used 5 years of meteorological data collected from 2007 to 2011. The operator has researched background data and utilised worst case meteorological data from 2009 year in the modelling. In addition to the installation stacks the modelling utilised building location and dimensions data for the whole Nestle site as detailed in Table 1 of the air quality report.

The air impact assessments, and the dispersion modelling upon which they were based, employed the following assumptions.

- Table 3 of final air modelling report gives all the emissions data inputs
- Total particulate data has been utilised for PM10/PM2.5 assessments as a highly conservative approach.
- A2 existing Fluid Bed Boiler is the only emission with permitted ELV's within existing permit. The following ELV's have been utilised in the modelling:

Stacks	Pollutant	ELV in mg/Nm3 except where stated.
A2 /A5 FBB's	NOx	400 – Daily average 600 - Short Term
	Particulates	10 – Daily average 15 – Short Term
	SO2	350 – Short Term
	Carbon Monoxide	150 – Long Term 450 – Short Term
	VOC	30 – Long Term (1)
	Dioxins and Furans	0.15 ng/Nm3

**Notes**

- (1) Long term assessment utilised this short term ELV as a conservative approach
- (2) All ELV's corrected to 273 K, 101.3kpa, 6% O2,

**Utilising understanding of operational of facility in more detail the following further assumptions were utilised for the modelling:**

- The combustion plant is assumed to be operated 24 hours per day and 365 days per year.
- No emissions data was available for existing Egron pre heater A9 so as a conservative data estimates from existing boilers was utilised. Egron pre-heater utilises in-direct gas fired burners.
- A1 existing boilers to be decommissioned during 2014. The core modelling results as detailed below have excluded this emission. However further sensitivity analysis has been carried out for commissioning period and short term usage of A1 within results below.
- Table 4 of the air quality modelling report provides process emission data during start up and shut down for existing and new FBB's.
- No concentration data was available for start up and shut down operations for VOC'S and dioxins and furans. To ensure a worst case assessment, the concentrations of these pollutants during start up and shut down have been assumed to be twice permit ELV's for existing and new FBB's.
- The timings of start up and shut down operations included in the modelling are as follows; two weeks closure end July and beginning August ; ten day closure over the Christmas period ; one day shutdown every 20 days; and 15 shutdown /start up cycles ( of a maximum closure of 1 hour from complete cool down) each month.

**The operator has modelled installation process contributions at a total of 21 sensitive receptors beyond the site boundary.**

Human receptors include residential properties on Marston Old Road, Dove Side, Marston Lane, Station Road, Uttoxeter, Ash Cottages, Derby Road and Hoon Road.

Ecological receptors include Old River Dose SSSI plus following local wildlife sites within the screening distances.

- Site Name: Marston on Dove Church Oxbow
- Site Name: River Dove
- Site Name: Marston Crossing Oxbow.

A summary of our audit conclusions is provided at the end of the information on the operator's air quality assessment.

## Long term Modelling assessments:

The following table summarises the results (specifically for Environmental Standards relative to human receptors). The process contributions listed are the maximum levels at one of the sensitive receptors:

Note the modelling results are from Table 14 of the final operator modelling report with start up/shut down combustion operations as detailed above included:

Pollutant	EQS / EAL Long Term ( $\mu\text{g}/\text{m}^3$ )	Back-ground Conc ( $\mu\text{g}/\text{m}^3$ )	Maximum Process Contribution at a sensitive Receptor (PC) ( $\mu\text{g}/\text{m}^3$ )	PC as % of EQS / EAL	PC < 1 % of the EQS/EAL	Predicted Environ Conc (PEC)	PEC as % EQS / EAL
Nitrogen Dioxide (H)	40.00	15.9	12.6	31.5	No	28.5	71.2
Particles PM <sub>10</sub>	40.00	16.1	0.4	1.1	No	16.5	41.2
Dioxins and Furans (1)	0.00025	1.79 x E-9	1.94E-08	7.15E-04	Yes	-	-
VOC (Benzene)	5	0.2	3.3	3.5	No	3.5	70.2

Note 1 In absence of a relevant standard for dioxins and furans therefore the AQS for annual mean Benzo (a) pyrene has been utilised.

### Summary of conclusions

1. the installation environmental impact is assessed as **insignificant**, based on above H1 criteria, for the following parameters against long term EQS standards:

**Dioxins and Furans (based on human health risk assessment below).**

#### PM10's

In reality the PM10 PC long term is only marginally above 1 % (1.1 %) of the AQS long term. The high likelihood of not all dust emissions being below PM10 particle size means in practice PC will be < 1 % ie insignificant.

2. In terms of the following parameters not screened out as insignificant our assessment process then reviews whether the PEC's are < 70 % of the EQS/EAL:

#### NO2

The process contributions are elevated at 31.6 % of the AQS. The operator has applied measures which we consider BAT for the new FBB over and above those for the current FBB.

The current ELV for the new FBB is 400 mg/Nm<sup>3</sup> for NOx. The operator has provided data with their duly making response confirming estimates of actual performance to be on average in region of 320 mg/Nm<sup>3</sup> and a 7 % reduction in process contribution detailed above.

The permit ELV is set at 400 mg/Nm<sup>3</sup> with Table S3.1 allowing an update of this ELV on completion of commissioning validation monitoring improvement program

#### VOC's

The operator has supplied indicative BAT measures for VOC for the FBB's which is the major mass emission for VOC's. The combined mass emissions of VOC's for the new FBB is comparable with those for the existing FBB's.

The actual VOC emissions for the current FBB's are consistently less than 5 mg/Nm<sup>3</sup> @ 11 % O<sub>2</sub>; averaging 2 mg/Nm<sup>3</sup>. As such we have varied the permit with reduced Total VOC's ELV 20 mg/m<sup>3</sup> at 6 % O<sub>2</sub> giving reasonable headroom for consistent compliance with on-going periodic monitoring. In reality the VOC PC will be considerably lower than 70% of AQS

In addition the usage of benzene AQS is a highly conservative approach as the combustion facilities have a cocktail of VOC emissions with negligible presence of benzene.

### **Overall conclusion**

**On this basis there is no risk of an EAL/EQS exceedance for these parameters and the installation impacts are not significant and not requiring further modelling**

## Short term Modelling assessments:

The operator has **utilised IEC chapter IV** ½ hr average emissions limit values as model input with the following exceptions:

- Ammonia not specified under IED has been set at. 30 mg/m<sup>3</sup>.

The following table summarises the results (specifically for Environmental Standards relative to human receptors). The process contributions listed are the maximum levels at one of the sensitive receptors

Pollutant	EQS / EAL Short Term ( $\mu\text{g}/\text{m}^3$ )	Back-ground Conc ( $\mu\text{g}/\text{m}^3$ )	Maximum Process Contribution (PC) ( $\mu\text{g}/\text{m}^3$ )	PC as % of EQS / EAL	PC < 10 % of the EQS/EAL	Predicted Environ Conc (PEC)	PEC as % EQS / EAL
Nitrogen Dioxide 99.979 <sup>th</sup> Percentile of 1 hour	200	31.8	51.4	25.7	No	83.2	41.6
Sulphur Dioxide 99.9 percentile of 15 minute means	266	11.1	27.8	10.4	No	38.9	14.6 * inside site
Sulphur Dioxide 99.73 percentile of hourly means	350	11.1	22.3	6.4	Yes	-	-
Sulphur Dioxide 99.18 percentile of Daily mean	125	11.1	8.0	6.4	Yes	-	-
Carbon Monoxide 1 hour mean	30000	259.9	35.5	0.1	Yes		
Carbon Monoxide 8 hour mean	10000	259.9	34.7	0.3	Yes		
PM10 90.4 th Percentile of 34 hour mean	50	16.7	1.4	2.7	Yes		

#### Conclusion

Based on above table and H1 criteria the installation impacts against all the short term EQS's are **insignificant** except Sulphur Dioxide against 15 minute EQS and short term NO2 EQS.

#### Sulphur Dioxide

The PC is only marginally designated as not insignificant (10.4 %). Based on actual performance of existing FBB system operating below ELV for SO2 of 350 mg/m3 it is highly likely that actual process contributions will be insignificant.

#### Nitrogen Dioxide

The PEC is well below the EQS (PEC 41.6 % of the EQS). In addition the new FBB is likely to operate at lower peak levels than current FBB leading to lower process contributions.

#### Overall

The improvement IC3 will provide validation monitoring to confirm facility compliance with application ELV's and ensure validation of the

#### Commissioning period modelling:

- Table 16 (Page 32) of the operator final detailed modelling report gives a summary of timescale for 2014 commissioning of new combustion facilities.
- Further modelling was undertaken for short term environmental impacts linked to worst case com
- All process contributions were not increased except for carbon monoxide.
- Carbon monoxide short term process contribution against 1 hour and 8 hour mean AQS's are assessed as marginally increased to 0.3 and 0.5 % respectively of the relevant standards. However the impacts are still assessed as insignificant.

#### Conclusion

The conclusion is that the commissioning period leads to negligible increased environmental impacts

#### Habitat Assessment

There is one SSSI within the relevant screening distance of the installation, Old River Dove SSSI.

There are 3 local wildlife sites (LWS) within the screening distances.

- Site Name: Marston on Dove Church Oxbow
- Site Name: River Dove
- Site Name: Marston Crossing Oxbow.

#### The impacts assessment is as follows:

##### Annual mean NOx impacts

Receptor Name	EQS	Background	Process Contribution	PC as % of EQS	PC < 1% of EQS	Predicted Environmental Concentration (PEC)	PEC as % EQS/EAL
Old River Dove SSSI	30 $\mu\text{g}/\text{m}^3$	17.8	0.3	0.9	Yes	-	-
Marston on Dove Church Oxbow LWS		16.6	0.9	3.1	No	19.7	65.5

River Dove LWS		17.8	0.3	1.1	No	18.1	60.4
Marston Crossing Oxbow LWS		16.0	0.6	1.9	No	18.6	62.1

#### Daily mean NOx impacts

Receptor Name	EQS	Background	Process Contribution	PC as % of EQS	PC < 10% of EQS	Predicted Environmental Concentration (PEC)	PEC as % EQS/EAL
Old River Dove SSSI	75 µg/m3	35.6	5.3	7.0	Yes	-	-
Marston on Dove Church Oxbow LWS		37.5	10.2	13.6	No	47.7	63.5
River Dove LWS		35.6	5.5	7.3	Yes	-	-
Marston Crossing Oxbow LWS		36.2	9.9	13.2	No	46.1	61.4

#### Annual Mean SO2 impacts

Receptor Name	EQS	Background	Process Contribution	PC as % of EQS	PC < 1% of EQS	Predicted Environmental Concentration (PEC)	PEC as % EQS/EAL
Old River Dove SSSI	20 µg/m3	4.7	0.1	0.5	Yes	-	-
Marston on Dove Church Oxbow LWS		4.9	0.3	1.3	No	5.2	25.8
River Dove LWS		4.7	0.1	0.5	Yes	-	-
Marston Crossing Oxbow LWS		4.7	0.14	0.7	Yes	4.9	24.4

#### Habitat Assessment review of above data:

- The installation environmental impacts as compared against all three EQS's at the SSSI are insignificant.
- For all three LWS's the impacts
  - Annual Mean NOx impacts. For all three LWS's the impacts are not insignificant. However the process contributions are < 100 % of the EQS and the PEC 's < 100 % of the EQS and as such the variation changes are assessed as not having significant impact
  - Daily Mean NOx impacts. River Dove LWS impacts are insignificant. For other two LWS's the impacts are not insignificant. However the process contributions are < 100 % of the EQS and the PEC 's < 100 % of the EQS and as such the variation changes are assessed as not having significant impact
  - SO2 annual mean impacts. For all sites except Marston on Dove Church Oxbow LWS the impacts are insignificant. For this other LWS the impacts are not insignificant. However the process contributions are < 100 % of the EQS and the PEC 's < 100 % of the EQS and as such the variation changes are assessed as not having significant impact

#### Nitrogen Deposition

The operator has carried out a nitrogen deposition assessment utilising critical loads from APIS web site [www.apis.ac.uk](http://www.apis.ac.uk)

The critical loads are detailed in Table 8 of the Air Quality Modelling Report as below:

Habitat	Criteria in kg /N/hectare/year
Valley mires, poor fens and transition mires	10-15
Rich Fen	15-30
Broad leaved deciduous woodland	10-20

Results obtained from the dispersion modelling are presented in Table 16 (Page 35) of the modelling report.

The applicant predicts the process contribution (PC) of nutrient nitrogen deposition rates at all ecological receptors arising from the installation are considerably lower than the relevant critical loads as shown in Table 16 of the applicants report.

For the SSSI the PC is 1 % of upper nitrogen critical load of 30 kg/N/hectare/year and 3 % of lower nitrogen critical load of 10 kg/N/hectare/year.

The actual PC is likely to considerably lower as compared to Critical Load for following reasons:

1. The 2<sup>nd</sup> auxiliary boiler would not operate normally and would normally only run when one of FBB's are non-operational
2. FBB performance: This is based on NOx levels for new FBB of 400 mg/Nm3 and indicative BAT measures as discussed above. The new FBB is likely to have enhanced performance beyond this ELV; initial supplier estimates leads to potential NOx emissions of 320 mg/Nm3.  
The proposed improvement program IC3 ensures validation monitoring and review of NOx emission limit value for new FBB to allow further reduction as appropriate.
3. Existing FBB actual performance from current monitoring data is approximately in range of 300 - 325 mg/Nm3, lower than 400 mg/Nm3 ELV utilised in modelling.
4. Egron heater assumptions on NOx emissions: these are highly conservative based on usage of auxiliary boiler data. As system is a pre-heater with an indirect fired gas burner the NOx emissions are likely to be considerably lower compared to direct fired gas fired boiler.

As such the impact of the installation variation is considered to have **negligible environmental impact** on this SSSI.

An appendix 4 has been completed on this basis, assessed as not having significant impact and therefore not sent to Natural England.

For the Local Wildlife sites the PC are all < 100 % of the upper and lower nitrogen deposition rates and therefore considered to have negligible environmental impact.

### **Acid Deposition**

Critical loads have also been developed to assess the impact of acidification on key habitat features as detailed below from Table 9 within operator air quality modelling report based on APIS website data.

There are no critical loads for acid deposition for the SSSI. The only one site with acid deposition critical loads is the Marston Crossing Oxbow Lake LWS

The key acidifying pollutants are oxides of sulphur and nitrogen. To incorporate both sulphur and nitrogen compounds, critical loads are expressed in kilo equivalents of hydrogen ions per hectare per year.

Receptor	Habitat	Criteria (keq/hectare/year)
Marston Crossing Oxbow Lake LWS	Broadleaved deciduous woodland	3.29

The Marston LWS predicted acid deposition rate process contribution is assessed as approximately 2 % of the critical load as detailed above. This is well below PC < 100 % criteria for negligible environmental impact.

### **5.3 Human health risk assessment.**

Within current permit there is a dioxin emission limit value for the existing A2 emission FBB of 0.1 ng/Nm3 at 11 % (equivalent to 0.15 ng/Nm3 at 6 % O2). However there appears to be no clear reasoning for the addition of this ELV during initial permit determination (2001); rather this appears to be a pre-cautionary measure with uncertainty of whether former WID directive (2000) would apply. As stated above the nature of the biomass means the former WID and now IED directive chapter IV does not apply.

The principal means of dioxin emission control is through control at the fuel source. From the coffee grounds analysis included within Appendix G of the permit application EPR/BJ9576IZ/V005 we can see that the coffee grounds are low in chlorine <0.1%.

In addition the combustion process is well regulated through automated control systems and incorporates effective temperature control to minimise combustion gases being within the de novo temperature range of 200-450 C.

Further to this, as detailed within section 4 of the main application the economiser unit is of plain tube construction and is fitted with a soot blower system to maintain performance. The soot blowers operate on saturated steam. Through the economiser the gas flow path takes a 180° turn upwards at which point the larger particles in the flue gas will drop out.

Further as detailed within EPR 5.01 NOx reduction techniques may also help to minimise dioxin emissions ie. SNCR abatement a further dioxin minimisation.

Also EPR 5.01 adds that "*dioxins tend to adhere to particulate matter and therefore efficient particulate abatement will remove dioxin/furans from the gas phase*". The new fluidised bed boiler will be fitted with a Pulsejet Bag house filter.

The operator carried out some initial monitoring for A2 dioxin emissions. The periodic testing undertaken has shown that the results are several orders of magnitude below the ELV. The results were 0.0012-0.0015ng/m3 in April 2012 and 0.005ng/m3 in May 2013.

**As such the operator considered dioxin human health impact is negligible and does not require a detailed human risk assessment.**

### **Conclusion**

We carried out sensitivity to dioxin and furans compared to the tolerable daily intake 2pg/kg body weight per day. We found that the risk is small and we agreed with operator conclusion that a detailed human risk assessment was not required.

### **5.4 Odour modelling:**

The operator has carried out odour modelling based on 2012 odour emission data for installation combustion activities as per table 4 of the application main document. Data is in terms of odour units ( oue/m3).



It is noted that the existing and new Fluid Bed Boiler data is based on estimated rather than actual odour monitoring. The operator has utilised odour level at installation boundary of 6 oue/m<sup>3</sup> from our H4 guidance. This is based on identifying odour as less offensive and we agree is in line with the coffee bean inherent odour.

Table 14 of the air quality modelling report gives the odour modelling data for 16 residential sensitive receptors.

The predicted odour concentration (oue/m<sup>3</sup>) presented as the 98<sup>th</sup> of hourly mean concentrations

#### **Conclusions:**

The results indicate that odour arising from the installation is detectable at the sensitive receptors but remains below the threshold of 6 oue/m<sup>3</sup>. The modelling input excludes fugitive emissions from the installation plus on site but outside installation coffee manufacturing facility.

Overall there is potential for odour pollution beyond the installation boundary and as such a robust Odour Management Plan has been required within the schedule 5 for clear basis of appropriate measures for odour pollution minimisation.

The OMP has been submitted and is reviewed in relevant section of main table above.

#### **Our Audit Conclusions on all assessments: human, habitat and odour modelling plus human health risk assessment.**

- *The operators' conclusions and predictions with respect to air quality and ecological impacts from the proposed expansions of the installation facility can be utilised for permit determination.*
- *The operator concludes there will be no exceedances of air quality Environmental Quality Standards (EQS) at receptors for all pollutants under normal and commissioning operating scenarios.*
- *Our check modelling and sensitivity analysis agrees with these conclusions based on emission limit values provided for all pollutants.*
- *No human health risk assessment was carried out; however our check modelling indicates that the risk remains low.*
- *Habitat assessment*
- *The operators' odour predictions can be used for permit determination*
- *The assessment relates to emission from the existing and proposed fluidised bed boiler and roasters representing the installation and not from any other odorous substance that may arise from the on-site but off installation facility or from any fugitive sources from both the installation and off installation facility. The application of this is the requirement as discussed below for a robust Odour Management Plan to apply appropriate measures to minimise odour pollution beyond the installation boundary.*

#### **Effluent Emissions**

##### **H1 assessment**

There is one effluent discharge from the installation S1. This discharges effluent from installation combustion activities plus effluent from on site but outside installation coffee manufacturing facility.

*The total effluent flow for the expanded facility will be in region of 310,000 m<sup>3</sup> per annum of which installation effluent is approximately estimated at 72,000 m<sup>3</sup> per annum.*

The expansion is still well within 1600 m<sup>3</sup> flow maximum consent limit within any 24 hour period. The operator has modified their Reverse Osmosis boiler water pre-treatment to discharge to sewer. The quantity is negligible being approximately 220 m<sup>3</sup>/week.

Effluent discharged to sewer is delivered to the local Severn Trent Clay Mills Sewage Treatment Works with final discharge into the River Trent at Burton-upon-Trent.

The key parameters for effluent discharge are as follows:

- Flow
- pH.
- Suspended solids
- COD

*Current consent to discharge parameter limits is as per BAT assessment section above.*

*In terms of a H1 assessment none of the above parameters have EQS's for emissions to water.*

As per the review of BAT indicative measures utilised above the actual suspended solid and hence COD levels are likely to be further reduced with the filtration improvements brought out within this application.

#### **Conclusion**

The variation introduces the ETP into the permit. The effluent contains no parameters with specific EQS's.

The BAT measures have minimised emissions; the facility will operate in compliance with consent to discharge with 24 hour composite sampling of COD and suspended solids.

The IC3 includes a requirement for commissioning effluent monitoring to confirm compliance with application emission data.

#### **Monitoring**

##### **Mcerts M18 compliance review:**

1. **pH** – Calibration of continuous monitoring equipment to be compliant with M18 Mcerts standard BS ISO 10523.
2. **Flow** – Flow meter to measure final effluent discharge is capable of Mcerts certification and the operator is to pursue third party Mcerts certification as per our guidance "Performance Standards and Test Procedures for Continuous Water Monitoring Equipment Part 3: Performance standards and test procedures for water flow meters.
3. **Composite Sampler:** a 24 hour composite sampler is to be installed at final effluent discharge.
  - Suspended solids
  - COD

The details of the methods are provided in the schedule 5 response. The methods are based on those utilised by Severn Trent. The methods are not Mcerts methods. We have reviewed the methods and they are in general in line with standard methods. The methods were initially light on detail and with limited quality control checks against known reference methods. These methods will be utilised for Process optimisation and consent compliance and as such have been included in S1.2 operating techniques.

#### **4. Fugitive Emissions**

A risk assessment was submitted with the application supplementary document including a BAT measures review. This is covered in section 5.3 of supplementary document.

In addition with Appendix D of the supplementary application information a H1 annex A) assessment has been completed for all fugitive emissions risks for variation activities. This covers air and water potential emissions plus control measures in place to minimise risk.

Fugitive emissions to water are reviewed under the following four headings:

- Sub-surface structures and sumps; risk assessment in Table 5.8 and BAT measures Table 5.9. BAT measures include new design plant with routing of all process effluent to effluent treatment facility and Figure 4 provides updated installation drainage plan. There will be no subsurface storage vessels in the installation boundary. The subsurface pipe work will be included in the installation plant checks; annual checks detailed in section 5.0 of the updated site condition report.
- Surfacing; risk assessment in Table 5.10 and BAT measures Table 5.11. The main control measure is concrete hard standing.
- Bunds/Secondary Containment. The operator has detailed all the relevant tanks, process equipment and silos with primary and secondary containment measures in the updated site condition report Table 3.1. In the main all such equipment is bunded with volumes > 110 % of individual tank volume and > 25 % of total tankage volumes. There are two exceptions as follows:  
DAF effluent treatment system 16,000 litre tank. The plant is not an enclosed tank and weirs over with the excess clean water going to the clean effluent tank with the solids held back by the scraper. Sealed drainage system – the drains go to final discharge effluent and would have sufficient capacity to contain any tank failure.  
The polymer tank is also not bunded but the sealed drainage system will contain any spillage.
- Storage areas for IBC's/drums; BAT measures review Table 5.13. All raw materials storage areas are located in buildings away from water courses. Containers are stored securely with lids/caps.

Fugitive emissions to air:

- Such general fugitive emissions likely to be minimal as combustion activities housed within dedicated buildings. Table 5.14 provides a risk assessment and control measures review.

#### **Conclusion**

The standard fugitive emissions permit conditions have been included in this permit (conditions 3.2.1 and 3.2.2).

Fugitive management controls has been accepted as satisfactory after additional information received.

The Environment Agency considers that the fugitive emissions controls are satisfactory.

#### **5. Accident Management Risk Assessment**

An accident management review for the variation is covered within section 3 of the supplementary application information.

The operator has also completed a H1 annex A) accident management plan assessment in appendix D of their supplementary application information. Sixteen risks are listed under the Accidents risk section. These cover the following areas:

- Bulk Storage and Delivery of Raw Materials
- Fluidised Bed Boiler and effluent treatment activities
- Fire risks
- Miscellaneous items

The risks and control measures to minimise risks are listed for all these risks. All are assessed as low or not significant risks. In particular fire alarm systems and emergency procedures are summarised.

#### **Flood risk**

The Environment Agency Flood Zone Map locates the Site within Flood Zone 3 (high risk, although this designation does not take into account the presence of any defences).

The operator has completed a Flood Risk Management Plan in 2012 and this is included in the technical appendixes of the application. The construction of the Lower Dove Flood Risk Management Scheme to minimise flood risk is ongoing. This will provide fluvial flood defence to a 1 in 100 years plus climate level for the Site.

Following completion of the Lower Dove Flood Risk Management Scheme the site will still be designated as Flood Zone 3, but the likelihood of fluvial flooding will be low. Based on the available information, it is considered that the flood risk to the proposed development from all other sources following implementation of mitigation measures will be low.

Surface water run-off from the Proposed Development will be restricted to the equivalent greenfield run-off rate and flows retained on site for up to the 1 in 100 year plus climate change event. Sustainable drainage techniques, swales and attenuation basins, will be used to provide a management train to treat run-off and provide the attenuation storage.

The operator is in the process of completing procedures to minimise accident management including

- Manage and control of raw materials and wastes.
- Controlled operations including specific start up procedures
- Non-conformance (including emergencies) follow up and corrective action procedures
- Incident management procedures.

The design of the variation facilities has undergone a through HAZOP review.

A summary of HAZOP outcomes is provided in their question 1 schedule 5 response:

- The operator confirmed their accident management plan will be updated prior to new facilities commissioning start up in light of HAZOP findings.

- Examples of Hazop finding with potential environmental impacts listed in schedule 5 include Fuel (coffee grounds) supply to FBB including deviations as follows: high flow, high pressure and moisture level fluctuations. Controls and further actions to minimise risk of consequence are listed.
- A summary of key commissioning steps is provided

#### Conclusion

The standard management condition covering accidents has been included in this permit (1.1.1)

The Environment Agency considers that the accident management controls are satisfactory with the submission of the additional information on fire water management.

### 7. Improvement Programs:

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
IC3	<p>The Operator shall submit a written report to the Environment Agency on the commissioning of the new facilities introduced with this variation EPR/BJ9576IZ/V005. The report shall summarise the environmental performance of the facilities as installed against the design parameters set out in the Application. The commissioning report shall include as a minimum :</p> <ul style="list-style-type: none"> <li>• Actual atmospheric emissions from the new emissions against assumptions utilised in application air dispersion modelling. Atmospheric emission monitoring shall reflect both normal and start/shutdown operating conditions for all relevant parameters (monitoring shall have regard of Environment Agency MCERTS guidance M2 monitoring of stack emissions to air). Monitoring to include continuous and extractive sampling. Each relevant parameter to have extractive monitoring to be completed a minimum of three times.</li> <li>• Actual Effluent monitoring and assessment of flow rate linked to installation activities for S1 discharge to show compliance with application design standards. Monitoring shall cover a minimum of one month with all new facilities operational</li> <li>• Summary of optimisation of operating techniques based on commissioning experience to minimise environmental impacts.</li> </ul> <p>The oxides of nitrogen daily average Emission Limit Value for new A5 Fluid Bed Boiler is to be confirmed in writing by the Environment Agency after review of operator IC3 submission.</p>	30/06/15
IC4	<p>The Operator shall carry out a noise assessment for complete facilities linked to variation changes in accordance with the requirements of BS4142: 1997 – Method for Rating Industrial Noise affecting mixed Residential and Industrial Areas. The assessment shall include impact of operations during daytime and night-time periods, in comparison with estimated noise impact within application EPR/BJ9576IZ/V005. This shall include a review of noise levels at two closest receptors detailed in variation before and after variation changes. A report summarising the outcome of the assessment plus the updating of the application noise management plan and including a timetable for the implementation of any improvements identified shall be submitted to the Environment Agency.</p>	30/06/15
IC5	<p>The Operator shall undertake commissioning stack odour monitoring to ensure odour levels are in line with those as submitted in their application odour modelling. The report to include as a minimum:</p> <ul style="list-style-type: none"> <li>•Monitoring – the scope shall as a minimum be in line with section 8.4 of application Odour Management Plan (OMP) covering all new facilities and existing FBB and effluent drum filter vent. The monitoring techniques shall have regard of Environment Agency MCERTS guidance M2 monitoring of stack emissions to air. Each stack to have a minimum of three extractive samples.</li> <li>•Modelling – A modelling report shall be presented based on actual monitoring data to show installation activities odour levels at installation boundary are below 6 oue/m<sup>3</sup> threshold taken from our H4 guidance</li> <li>•Improvements –The report shall provide an update OMP including improvements from commissioning experience and any further improvements with timescales. The OMP shall provide a proposal for the scope and frequency of regular odour stack monitoring.</li> </ul> <p>On submission of this improvement program the final Odour Management Plan shall be reviewed by the Environment Agency and our position on approval confirmed in writing.</p>	30/06/15

#### Annex 2: Consultation

Summary of responses to consultation and the way in which we have taken these into account in the determination process. **Two responses were received as follows:**

<b>1. Response received from Public Health England dated 14/11/13</b>
<b>Brief summary of issues raised:</b> Odour raised as potential concern.
<b>Summary of actions taken or show how this has been covered – linked to issues raised above</b> Our response is based on operator to implement an Odour Management Plan and include all improvements and controls since 2009 last odour monitoring review. We are satisfied that this will control odour

<b>2. Response received from South Derbyshire Planning Department 10/01/14</b>
<b>Brief summary of issues raised:</b> No specific concerns about installation activities. Construction and one off abnormal activity noise concerns.
<b>Summary of actions taken or show how this has been covered – linked to issues raised above</b> Construction impacts are outside the remit of Environmental Permitting. The Environmental Permit controls operational noise only. Our response is that noise modelling shows additional facilities will have an insignificant noise impact. In addition on-going noise improvements are actioned IC4 noise monitoring improvement program will ensure evidence to ensure actual plant performance in line with noise modelling.