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Consulting Engineers Limited

Chirk Particleboard Factor

Kronospan Ltd

BAT Review

ENGINEERING CONSULTING

Document approval

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Contents

1 Introduction

1.1 Background

This document has been prepared to support the EP variation application to make a number of changes to the Facility as permitted. These include:

1. Installation of an Oriented Strand Board (OSB) manufacturing process/plant.
2. Storge and use of additional chemicals associated with the OSB process.
3. Storage and use of hydrogen peroxide within WESP 21 and WESP 32 to oxidise TVOCs (if needed).
4. Minor EWC code additions.
5. Amendments to the rail unloading and biomass handling and storage arrangements.
6. Additional raw material storage areas, including the installation of hardstanding to some additional storage areas within the Log Yard.
7. A new site access point and new lorry parking facility.
8. Additional surface water run-off lagoons/wetlands, including discharge of uncontaminated surface water run-off from the lagoons/wetlands.
9. Additional land to be incorporated into the installation boundary to accommodate items 7, 8, and 9.

The existing activities will continue to operate as permitted, in compliance with the BAT conclusions as demonstrated in previous EP applications.

The relevant BREF for the proposed changes is the BREF for the Production of Wood-based Panels. This document provides a review of the BAT requirement relevant for the changes proposed as part of this EP variation application.

#	BAT Requirement	How met or reference
1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the features as set out in the BREF.	Kronospan has an Environmental Management System (EMS) in place which is in compliance with ISO 14001 standard. This incorporates all of the features as set out in the BREF, as accepted by NRW for the existing operations. The EMS is firmly established throughout the site and will be updated to allow for the changes to the operations proposed as part of this EP variation application.
2	In order to minimise the environmental impact of the production process, BAT is to apply good housekeeping principles using all of the techniques given below:	
	a) Careful selection and control of chemicals and additives;	Changes made to chemicals / additives are assessed through the Chemical Purchasing Procedure (KC/PURC/PRO/0003). Significant changes are also assessed through the site's Management of Change Procedure (KC/EHS/PRO/008). Chemicals and additives at the Site are selected, stored and managed in accordance with industry good practice, guidance (e.g. MSDS) and in compliance with any conditions or requirements of the Environmental Permit (EP). Each chemical is assessed and will have an associated COSHH assessment where applicable for use in the workplace. This includes the additional chemicals being proposed as part of this EP variation application.
	b) Application of a programme for the quality control of recovered wood used as raw material and/or as fuel, in particular to control pollutants such as As, Pb, Cd, Cr, Cu, Hg, Zn, chlorine, fluorine and PAH;	All recycled timber is currently purchased for Particleboard production and undergoes quality control upon arrival at Site. The following documents within the EMS detail the control measures in place for recycled timber receipt: • KC/LOGY/PRO/0003 – Procedure for Recycled Timber Control • KC/LOGY/WI/0001 – Moisture Content of Timber Raw Materials • KC/LOGY/WI/0006 – Visual Inspection of Recycled Wood • KC/PURC/DOC/0008 – RCT Suppliers Specification • KC/PURC/DOC/0021 – Pre-Crushed RCT Specification

#	BAT Requirement	How met or reference
		The OSB process uses roundwood and hacker chips and recycled timber similar to that used for Particleboard. No additional quality control measures for recovered wood are required to supplement those currently implemented at the Site.
	c) Careful handling and storage of raw materials and waste;	<u>Raw Materials - Wood</u> The wood related products produced on Site rely on adequate stocks of raw materials, these include; recycled wood fibre (RCF), virgin chips, sawdust, bark, and roundwood. The Log Yard has dedicated storage areas for the different timber products. Full details of the storage and handling of raw materials is provided within the Proposed Operating Techniques contained in Annex A of the EP variation application pack. Within the Log Yard, two additional storage silos, and a crane and loading facility will be installed to store additional timber required for the OSB production process, and a new flaker building. <u>Raw Materials – Chemicals</u> For the existing operations, resins are produced on-site rather than being tankered in. A mixture of storage tanks and IBCs are used to store chemicals. Full details of the storage and handling of chemicals is provided within the Proposed Operating Techniques contained in Annex A to the EP variation application pack. There is minimal handling for personnel safety and where appropriate material is offloaded directly between silo and vehicle. The EP variation application includes additional storage tanks and IBCs, and additional chemicals to be installed at the Site. The storage tanks and IBCs are the same as existing ones. The only new chemical to be used on Site is PMDI and Phenolic. However, Kronospan will go through a Management of Change process to review the material storage and handling procedures and arrangements before it is used to ensure the effects on safety are understood and allowed for.

#	BAT Requirement	How met or reference
		Waste All waste onsite is segregated and stored in designated areas around Site. Individual departments have their own local waste storage facilities that are audited during weekly departmental environment audits. These are emptied into the main Site amenities. All areas are regularly inspected to ensure that they are kept tidy and that wastes are being disposed of in the appropriate storage areas. This ensures that the waste hierarchy can be applied effectively. Any spillages are cleared up immediately.
	d) Regular maintenance and cleaning of equipment, transport routes and raw material storage areas;	Good housekeeping practices are employed to reduce the risk of fire across the Site and provide a safe and healthy workplace. Cleaning schedules are in place in all production areas through two processes to ensure equipment is operated safely, these include the Operational Protection Scheme (OPS) checks performed by all Operators and routine shutdown maintenance programmes. Operator OPS checks are completed during each shift and reviewed by their relevant Management Teams to ensure that housekeeping standards are maintained. Some cleaning activities require plant shutdown to be performed safely and are therefore carried out on a periodic basis. These two avenues ensure that housekeeping is maintained on a continual basis. Transportation routes are kept clean by use of a road sweeper. It is the responsibility of the EHS Manager to ensure a suitable frequency is maintained within the contract and that the external service provided is to a satisfactory level. This is usually a minimum of 3 days per week during winter and may be increased to 5 days per week during summer months. During periods of dry, warm weather the site employs a water bowser to dampen the site transport routes down to prevent the generation of dust from vehicle movements. This is performed by employees within the Site Services Team that are under the supervision of the EHS Manager. The existing maintenance and cleaning regime will be extended to cover the additional process being proposed as part of this EP variation application.

#	BAT Requirement	How met or reference
	e) Review options for the reuse of process water and the use of secondary water sources.	The main sources of water around site are: • Towns water, • Borehole water, • Canal water, • Surface water drainage. <u>Borehole water & canal water</u> Borehole water is abstracted from a number of points around site and can be used as process water or as a make-up water for cooling towers used on the Formalin and Resin plants. Borehole water and treated canal water is used as a process water or boiler feed water. Prior to use it is deoxygenated in a hot well and then chemically treated in the boiler to prevent corrosion. Blow down waters from the boiler are discharged to the sites foul water drainage system via discharge consents. The water consumption rate for the Facility is expected to increase by approximately 5% as a result of the proposed EP variation this will be sourced from the existing water supplies. <u>Surface water drainage</u> Surface waters from the existing site drain into one of three holding lagoons on site. A new wetland will take surface water from the additional land to be included in the Installation boundary. Waters stored in Lagoon 3, which is mainly rainwater, is used as firewater in our Log Yard rail siding area. In the event of fire, the lagoon waters can be used as a secondary source of water for the onsite or off-site fire services. The new wetland included for within this EP variation application will take surface water from the additional land to be included in the Installation boundary. In the event of fire, the wetland waters can be used as a secondary source of water for the onsite or off-site fire services. <u>Water reuse</u>

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		Process water can be cleaned and reused in various parts of the process, including MDF and resin. Dust suppression systems utilise recycled water wherever possible and are not utilised during wet weather in order to minimise water use. Kronospan is investigating the use of harvested rainwater within the manufacturing process.
3	In order to reduce emissions to air, BAT is to operate the waste gas treatment systems with a high availability and at optimal capacity during normal operating conditions. Special procedures can be defined for other than normal operating conditions, in particular:	
	i) During start-up and shut-down operations;	Plant start-up and shut down operations are controlled by individual plant areas following plant specific procedures. Proactive maintenance is carried out following a plant maintenance shutdown plan. Operational and maintenance staffs liaise to ensure that there is no adverse effect on the environment, people or plant. To ensure no environmental impact the process shutdown / start-up will take into account management of any abatement system in place, waste water discharge and waste collection and disposal. This EP variation application is seeking to use the existing WESP 32 for waste gas treatment for the OSB driers. During start up and shut of the WESP 32 emissions can still emit to atmosphere via the WESP 32 but there would be no abatement. However, the WESP 32 has a high level of availability and is operated continually. Currently proactive maintenance is carried out once a quarter on the WESP 32. This is scheduled for when the plant requiring the WESP 32 for abatement are shut-down. This will continue to occur.
	ii) During other special circumstances which could affect the proper functioning of the systems (e.g. regular and extraordinary	Reactive or extraordinary maintenance is carried out in a controlled way to ensure that all abatement systems, and potential wastes generated (to air,

#	BAT Requirement	How met or reference
	maintenance work and cleaning operations of the combustion plant and/or of the waste gas treatment system).	water or solid) are managed in compliance with our EP, management systems and all relevant legislation, regulation and guidance.
4	In order to prevent or, where that is not practicable, to reduce noise and vibrations, BAT is to use one or a combination of the techniques given below (prevention / point source reduction / site level reduction):	
	a) Strategic planning of the plant layout in order to accommodate the noisiest operations, e.g. so that on-site buildings act as insulation (generally applicable in new plants – layout of a site may limit applicability on existing plants);	When installing new plant, noise is taken into consideration and plant is designed in order to minimise noise off-site. Noise surveys are carried out as part of planning applications prior to installation to assess the impact of any new plant to the surrounding areas. With regard the changes proposed as part of this EP variation application all pre-production will occur in the same area as currently – i.e. away from Chirk along the western boundary of the Facility. Along this boundary there is natural screening for receptors to the west, and the buildings screen the receptors to the east. The new pre-production processes being applied for are located in this same area. The OSB plant is located within the building. This EP variation application also includes for the additional land to the north. Whilst this does not contain any plant, layout configurations have been considered including a new bund along the eastern boundary to minimise any noise impacts within Chirk. This layout allows HGVs to access via the north of the site rather than through the village of Chirk minimising noise.
	b) Applying a noise reduction programme which includes noise source mapping, determination of off-site receptors, modelling of noise propagation and evaluation of the most cost-effective measures and their implementation;	Various noise surveys have been carried out over the years, in 2012 an extensive survey was carried out by RSK to identify noise sources on-site and sensitive receptors off-site. This report was issued to the regulator for consideration and as a result the most significant sources that contributed to off-site noise were examined with a view to noise reduction measures. The hierarchy of control was applied. In some cases hardware was required in the form of silencers, acoustic booths / panelling, or lagging. These improvements were documented by the regulator in the environmental permit. On

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		completion of the high-priority sources, additional work was agreed to further reduce the site impact. The Site is currently undergoing major plant improvements, part of which is to reduce the noise impact both on and off-site. Individual projects, as part of the planning application process, require a noise assessment. In most cases, and where possible, a standard of 75 dbA at 1 meter from the exterior of any building is applied. When the plant improvement programme has been completed, a full on and off-site survey will be carried out to assess the improvement and establish a new noise reduction programme. This programme will be extended to include the new processes being applied for as part of this EP variation application.
	c) Performing regular noise surveys with monitoring of noise levels outside the site boundaries;	Qualitative noise monitoring is carried out at least twice per month at various locations within the local area. These points take into account sensitive receptors, as identified during previous extensive noise surveys, being located where noise from the plant has the potential to cause a nuisance (e.g. areas with a large residential population, or sensitive receptors e.g. schools), or where previous complaints have been received. Currently there are twelve locations that are assessed each month, however additional areas may be included following any complaints or to ensure that any issues found have been resolved effectively. Monitoring takes place at random times throughout the day as well as at night / early morning / weekends. Noise levels are also measured during surveys carried out by third parties. Procedure KC/EHS/PRO/017 describes the monitoring process and outcomes in more detail. This does not change as a result of this EP variation application and will continue to be carried out.
	d) Enclosing noisy equipment in housing or by encapsulation and by soundproofing buildings;	For plant and equipment outside of buildings, the aim is to reduce noise levels to as reasonably practicable. This is carried out by careful selection of plant and

#	BAT Requirement	How met or reference
		equipment, for example a band conveyor may be chosen as opposed to a bucket conveyor. Plant that is identified by a noise survey as having a high noise impact, may be enclosed via acoustic booths or panelling as part of the noise reduction programme. The changes being proposed as part of this EP variation application have been subjected to a detailed noise assessment which is contained within Annex E of the EP application. This also sets out the mitigation measures being applied. This demonstrates that noise equipment will be housed in sound proofed buildings with acoustic doors.
	e) Decoupling individual equipment to pre-empt and limit propagation of vibrations and resonance noise;	Monthly condition monitoring is carried out on large plant assets (e.g. ID fans) to inform planned preventative maintenance work and minimise noise emitted from motors, fans or blowers. Large plant assets are also fitted with continuous vibration monitoring that causes plant shutdown should vibrational set points be exceeded. Details of the plant fitted with continuous vibration monitoring is contained in the Noise Register which forms part of the Noise Management Plan. The Noise Management Plan has been updated to allow for the changes proposed as part of this EP variation this is included within Annex G of the application pack.
	f) Point source insulation using silencer, damping, attenuators on noise sources, e.g. fans, acoustic vents, mufflers, and acoustic enclosures of filters;	The new processes which form this EP variation application include silencers where appropriate. Full details of the point source insulation of the new equipment being proposed as part of this EP variation application is contained within Annex E of the EP application.
	g) Keeping gates and doors closed at all times when not in use. Minimising the fall height when unloading roundwood;	Most factory doors are self-closing to reduce noise impact. Where this is not the case, employees are reminded to ensure that doors are closed from 7pm until 7am as a minimum. There are notices on doors to remind on site personnel. Any complaints arising from local residents due to noise from open doorways are responded to immediately and any remedial action taken.

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		At all times, and as part of routine operations, the fall height when unloading roundwood is minimised from both the rail off-loading facility and road deliveries. These measures will not change as a result of the proposed EP variation and any new buildings will also have self-closing doors.
	h) Reducing noise from traffic by limiting the speed of internal traffic and for trucks entering the site;	The on-site speed limit is set at 10 mph. Speed limiters are installed on certain vehicles, all vehicles entering the site must obey local signage. A speed gun is used occasionally in various areas of the site as a check on compliance, and near miss reporting is used as a tool to identify any vehicles that may be exceeding the speed limits. Any issues with external hauliers would be dealt with by the Despatch / Timber Buying Departments contacting the specific haulier with complaints. These measures will not change as a result of the proposed EP variation.
	i) Limiting outdoor activities during the night;	Outdoor activities that may have an impact off-site are prohibited between the hours of 7pm and 7am. This is mainly the use of the main site skips which are located on the eastern boundary of the site, parallel with the main road through the local neighbourhood. These measures will not change as a result of the proposed EP variation.
	j) Regular maintenance of all equipment;	Equipment on site is maintained following a proactive maintenance schedule the frequency of maintenance of plant is set out within the department aspect register which forms part of the EMS. The preventative maintenance schedule will be updated to allow for the changes to the operations proposed as part of this EP variation application.
	k) Using noise protection walls, natural barriers or embankments to screen noise sources.	Along the length of the eastern boundary of the site with Holyhead Road is a large tree-lined embankment which acts as a screen to reflect the noise on-site. This will be extended to the north to screen the new area of land to be used as the lorry park and log storage area.
5	In order to prevent emissions to soil and groundwater, BAT is to use the techniques given below:	

#	BAT Requirement	How met or reference
	I. Load and unload resins and other auxiliary materials only in designated areas that are protected against leakage run-off;	All resins used for production are produced on-site and therefore very little loading / unloading takes place. The resins are piped directly from the reactors into storage silos before being transferred to the relevant production department. The only occasion for requiring road tanker deliveries would be in the event of insufficient production from the internal Resin Department. In this instance, all resin storage silos are fully bunded to prevent spillages to ground and are within a fully concreted tank farm area that also has tertiary containment (Middle Road). The Middle Road drains are concreted and sleeping policemen provide a barrier to prevent any spillage going to drain. Other auxiliary materials that are delivered via tanker (e.g. methanol, caustic, or acids) are also received into fully bunded storage silos or tank farms, either within the Resin or Formalin Department or on the Middle Road; again, all have tertiary containment in addition to bunding. The new chemicals proposed as part of this EP variation application will be unloaded in the same way.
	II. Whilst awaiting disposal, collect all material and store in designated areas protected against leakage run-off;	Bulk liquid wastes are either collected directly from source via a road tanker for disposal or stored in intermediate bulk containers (IBCs or drums) before removal from Site. All waste IBCs are held in a designated waste compound of concrete construction that is bunded to prevent spillage to ground. There are no changes to this proposed as part of this EP variation application.
	III. Equip all pump sumps or other intermediary storage facilities from which spillages may occur with alarms activated by high levels of liquid;	The majority of sump pumps are level-activated with the sump being within secondary containment, in some cases where tertiary containment is in place the sump pumps may be manually operated. Tertiary containment in all cases would prevent spillages from entering either surface water or foul sewer systems. In some instances, sump pumps will have a high-level trip but these tend to be for critical sumps where overflow may result in release to drain or flooding of a plant area / roadway. All new pump sumps and storage facilities proposed as part of this EP variation application will be fitted with the same equipment.

#	BAT Requirement	How met or reference
	IV. Establish and implement a programme for the testing and inspection of tanks and pipelines carrying resins, additives and resin mixes;	Storage tanks for hazardous materials are inspected in accordance with a written scheme of inspection, by Allianz Risk Services. The standard inspection frequency is every 5 years. Storage tanks that store hazardous materials are situated in bunds, which are inspected. Storage tanks that store non-hazardous materials are situated within spill containment areas. Bunds and spill containment areas are monitored weekly, as part on Environmental Audit, for any signs of spillage or leakage. Pipelines that convey hazardous materials are inspected in accordance with a written scheme of inspection, by Allianz Risk Services. Thorough inspection period is 5 years. Pipelines that convey non-hazardous materials are primarily situated within spill containment areas. Bunds and spill containment areas are monitored weekly, as part on Environmental Audit, for any signs of spillage or leakage. The written scheme of inspections will be updated to include for the additional tanks and pipelines proposed as part of this EP variation application.
	V. Carry out inspections for leaks on all flanges and valves on pipes used to transport materials other than water and wood; maintain a log of these inspections;	Flanges and valves are inspected as part of the respective pipelines described above.
	VI. Provide a containment system to collect any leaks from flanges and valves on pipes used to transport materials other than water and wood, except when the construction of flanges or valves is technically tight;	All areas with pipework, flanges, valves and storage vessels for material other than wood and water are on hardstanding with appropriate bunds and arrangements in place to prevent any leaks to soil or groundwater. This is also the case for all new flanges and valves proposed as part of this EP variation application.
	VII. Provide an adequate supply of containment booms and suitable absorbent material;	Emergency spill kits are available across the Site in designated areas that were assessed as being those with the greatest risk of spill. Careful consideration has been given in each area to the type of spill that might occur (i.e. oil or chemical) and each spill kit will contain the most suitable materials in the form of booms, mats, pillows etc. Additional absorbent material is available in the company stores and wood chip / shavings can also be used if the spill is in the vicinity of

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		the Log Yard / Sawmill. Spill kits are checked and replenished if necessary every two weeks or after use. All materials used to manage a spill would be disposed of in a suitable manner. Additional spill kits will be provided to the new processes and areas included within this EP variation application.
	VIII. Avoid underground piping for transporting substances other than water and wood;	All additional piping associated with the EP variation application will be above-ground.
	IX. Collect and safely dispose of all water from fire-fighting;	Fire-fighting water is contained within the plant / plant bund before being appropriately disposed of. If water breaches this and enters the surface water drainage system, it would be contained by isolating one of the surface water lagoons and ensuring swift closure of Penstock A as a further precautionary measure. This would prevent water from entering the local watercourse and allow for suitable disposal procedures to be implemented. All foul sewer drains have close-fitting manhole covers, except for the Middle Road Pit. The Middle Road Pit has a sump pump which in the event of a fire within the Preproduction area, would be isolated to prevent any discharge to sewer. Fire-fighting water on the new land would go through an oil interceptor prior to flows entering the new wetland area. This will be subject to regular inspection and maintenance. The outlet from the wetland areas will be controlled via a penstock valve and will include a facility to shut-off discharge from the wetland in the event that this is contaminated, this could then be removed as part of remediation works.
	X. Construct impermeable bottoms in retention basins for surface run-off water from outdoor wood storage areas.	The new wetland area will take surface water run-off from the new land to be incorporated into the Installation boundary. This will include outdoor storage areas for roundwood. As this will not include any recovered wood storage areas the wetlands will not have impermeable bottoms.
6	In order to reduce energy consumption, BAT is to adopt an energy management plan, which includes all of the techniques given below: I. Use a system to track energy usage and costs;	All the listed techniques are used to reduce energy consumption. The energy consumption from all major energy consumers is collated and analysed daily. This data is used to make decisions on when to renew or upgrade equipment.

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	II. Carry out energy efficiency audits of major operations; III. Use a systematic approach to continuously upgrade equipment in order to increase energy efficiency; IV. Upgrade controls of energy usage; V. Apply in-house energy management training for operators	Energy management training is given to operators of energy intensive plant with a focus on saving energy whenever possible. For example, shutting down plant during periods of downtime. Every four years a third party energy auditor assesses the Site's energy producing and consuming plant. The auditor analyses trends in the consumption data and outlines improvement opportunities. This audit provides compliance with the Energy Saving Opportunities Scheme (ESOS). This energy consumption review will be expanded to include the new processes proposed as part of this EP variation application.
7	In order to increase the energy efficiency, BAT is to optimise the operation of the combustion plant by monitoring and controlling key combustion parameters (e.g. O2, CO, NOX) and applying one or a combination of the techniques given below: a) Dewater wood sludge before it is used as a fuel; b) Recover heat from hot waste gases in wet abatement systems using a heat exchanger; c) Recirculate hot waste gases from different processes to the combustion plant or to preheat hot gases for the dryer.	This EP variation application is not seeking any new combustion plant. Therefore, this BAT requirement is not relevant to this EP variation application.
8	In order to use energy efficiently in the preparation of wet fibres for fibreboard production, BAT is to use one or a combination of the techniques given below: a) Cleaning and softening of chips (Mechanical cleaning and washing of raw chips); b) Vacuum evaporation (Recovering hot water for steam generation); c) Heat recovery from steam during refining (Heat exchangers to produce hot water for steam generation and chip washing).	This EP variation application is not seeking a new process using wet fibres. Therefore, this BAT requirement is not relevant to this EP variation application.

#	BAT Requirement	How met or reference
9	In order to prevent or, where that is not practicable, to reduce odour from the installation, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements: A protocol containing actions and timelines; II. A protocol for conducting odour monitoring; III. A protocol for response to identified odour events; IV. An odour prevention and reduction programme designed to identify the source(s); to measure/estimate odour exposure; to characterise the contributions of the sources; and to implement prevention and/or reduction measures.	Kronospan has an OMP which forms part of the EMS as required by BAT 1. This includes all of the elements listed required. This OMP has been updated for to allow for the changes proposed as part of the EP variation application. The updated OMP is provided in Annex G of the application pack.
10	In order to prevent and reduce odour, BAT is to treat waste gas from the dryer and the press, according to BAT 17 and 19.	See BAT 17 and 19.
11	In order to prevent or, where that is not practicable, to reduce the quantity of waste being sent for disposal, BAT is to adopt and implement a waste management plan as part of the environmental management system (see BAT 1) that, in order of priority, ensures that waste is prevented, prepared for reuse, recycled or otherwise recovered.	All wood residues collected from the OSB manufacturing process will be, wherever possible, reused as raw materials elsewhere within the Facility. The biomass plants use only wastes from the process as fuel, i.e. no material is purchased as boiler fuel for use in the biomass. Bag filters and cyclones are used throughout the site for various parts of the process and all residues are collected and stored in silos before being either re-used in the process or burnt as fuel in the two biomass boilers on-site. Material is transported between the bag filter, cyclones, and relevant silos by blow lines. Storage silos also have their own bag filters and / or cyclones to prevent emissions to atmosphere. All bag filters and cyclones are detailed as abatement systems and potential release points within the environmental permit. They are also contained within the environmental management system aspects registers (area specific) that documents relevant control measures to reduce any potential impact to the environment. For example, the particleboard and MDF sander dust which is burnt as a fuel in the biomass boilers.

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		Kronospan's waste management procedure (KC/EHS/PRO/015) sets out the details to which waste produced on-site is handled. This is reviewed at least annually to ensure that the waste hierarchy is applied to all waste streams in the light of any new options for prevention, reduction, or reuse. Waste is segregated at source to ensure that the appropriate route can be applied. Where waste wood from production is unavoidable, Kronospan utilises this as raw material or as a fuel source (e.g. sander dust for the particleboard direct heating driers). The residues from the new processes being proposed as part of this EP variation application will be used within the Facility. These will be stored in silos before either being re-used in the process of burnt as fuel in the biomass boilers onsite. For instance, fines from the additional flaking will be used in the MDF process, and process residues from sanding or cutting of OSB will be used in either the OSB driers, K7 or K8. Noting that OSB and K7 will only take clean residues.
12	In order to reduce the quantity of solid waste being sent for disposal, BAT is to use one or a combination of the techniques given below: a) Reuse internally collected wood residues, such as trimmings and rejected panels, as a raw material; b) Use internally collected wood residues, such as wood fines and dust collected in a dust abatement system and wood sludge from waste water filtration, as fuel (in appropriately equipped on-site combustion plants) or as a raw material; c) Use ring collection systems with one central filtration unit to optimise the collection of residues, e.g. bag filter, cyclofilter, or high efficiency cyclones.	All wood residues collected from the OSB manufacturing process will be, wherever possible, reused as raw materials elsewhere within the Facility. The biomass plants use only wastes from the process as fuel, i.e. no material is purchased as boiler fuel for use in the biomass. Bag filters and cyclones are used throughout the site for various parts of the process and all residues are collected and stored in silos before being either re-used in the process or burnt as fuel in the two biomass boilers on-site. Material is transported between the bag filter, cyclones, and relevant silos by blow lines. Storage silos also have their own bag filters and / or cyclones to prevent emissions to atmosphere. All bag filters and cyclones are detailed as abatement systems and potential release points within the environmental permit. They are also contained within the EMS aspects registers (area specific) that documents relevant control measures to reduce any potential impact to the environment. For example, the particleboard and MDF sander dust which is burnt as a fuel in the biomass boilers.

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		The additional residues produced associated with this EP variation application will be re-used in the process or burnt as fuel in the biomass boilers as detailed in response to BAT 11. Bag filters will be used on all dust filtration systems to optimise the collection of residues.
13	In order to ensure the safe management and reuse of bottom ash and slag from biomass-firing, BAT is to use all of the techniques given below: a) Continuously review options for off-site and on-site reuse of bottom ash and slag; b) An efficient combustion process which lowers the residual carbon content; c) Safe handling and transport of bottom ash and slag in closed conveyers and containers, or by humidification; d) Safe storage of bottom ash and slag in a designated impermeable area with leachate collection.	The proposed EP variation does not seek any changes to the biomass-firing processes. Therefore, this BAT requirement is not relevant to this EP variation application.
14	BAT is to monitor emissions to air and water and to monitor process flue-gases in accordance with EN standards with at least the frequency given. If EN standards are not available, BAT is to use ISO, national, or other international standards that ensure the provision of data of an equivalent scientific quality.	The new sources proposed as part of this EP variation application will comply with the BAT requirements. For emissions from the new press abatement system periodic measurements will be taken quarterly (combined with the other presses) to the following standards: Dust – EN13284-1. TVOC – EN 12619 Formaldehyde – EN 17638 For emissions from OSB periodic measurements will be taken quarterly to the following standards: Dust – EN13284-1. TVOC – EN 12619 Formaldehyde – EN 17638

#	BAT Requirement	How met or reference
15	In order to ensure the stability and efficiency of techniques used to prevent and reduce emissions, BAT is to monitor appropriate surrogate parameters. *The surrogate parameters monitored may include: waste gas airflow; waste gas temperature; visual appearance of emissions; water flow and water temperature for scrubbers; voltage drop for electrostatic precipitators; fan speed and pressure drop across bag filters. The selection of surrogate parameters depends on the techniques implemented for the prevention and reduction of emissions.*	There are various abatement systems on-site whereby the emissions to atmosphere are monitored at a frequency agreed in the EP. All abatement systems, in some way, have other techniques which are used to monitor the efficiency of the system. Three examples are given below: • The WESP (wet electrostatic precipitator) – in-line with manufacturer's guidelines, a number of parameters are monitored by the operating team. • Dust filtration systems – differential pressure measurements, some of which are direct readings and some remote, can indicate either a split or blocked bag(s) or blocked blow line. • Press abatement system for Particleboard and MDF processes (wet venturi scrubber) – providing adequate water flow to the scrubber in relation to the process gas flow which will ensure optimum abatement system performance. The above measures will continue to be applied for the new processes proposed as part of this EP variation application.
16	BAT is to monitor key process parameters relevant for emissions to water from the production process, including waste water flow, pH and temperature.	There are no changes to the process emissions to water proposed as part of this EP variation application. Therefore, this BAT requirement is not relevant to this EP variation application.
17	In order to prevent or reduce emissions to air from the dryer, BAT is to achieve and manage a balanced operation of the drying process and to use one or a combination of the techniques given below: a) Dust abatement of inlet hot gas to a directly heated dryer in combination with one or a combination of the other techniques listed below (dust); b) Bag filter (dust); c) Cyclone (dust); d) UTWS dryer and combustion with heat exchanger and thermal treatment of discharged dryer waste gas (dust, VOCs);	There are no changes to the existing driers as part of this EP variation application. However, new OSB driers are proposed. These are directly heated driers and comply with the BAT requirement as they vent to atmosphere via a cyclone and WESP. The emission limits proposed for the OSB driers are as below (expressed at 273K, 101.3kPa, 18% reference oxygen content) noting that the limits proposed are more stringent than the upper end of the BAT-AEL range: • Dust – 20 mg/Nm^3 • TVOC – 200 mg/Nm^3 • Formaldehyde – 10 mg/Nm^3

#	BAT Requirement	How met or reference
	e) Wet electrostatic precipitator (dust, VOCs); f) Wet scrubber (dust, VOCs); g) Bioscrubber (dust, VOCs); h) Chemical degradation or capture of formaldehyde with chemicals in combination with a wet scrubbing system (formaldehyde).	• NOx - 200 mg/Nm^3
18	In order to prevent or reduce NOX emissions to air from directly heated dryers, BAT is to use technique (a) or technique (a) in combination with technique (b): a) Efficient operation of the combustion process using air- and fuel-staged combustion, while applying pulverised combustion, fluidised bed boilers or moving grate firing; b) Selective non-catalytic reduction (SNCR) by injection and reaction with urea or liquid ammonia.	There are no changes to the existing driers as part of this EP variation application. The OSB driers proposed as part of this EP variation application will also include combustion control systems to ensure an efficient operation. SNCR is not proposed on any of the driers.
19	In order to prevent or reduce emissions to air from the press, BAT is to use in-duct quenching of collected press waste gas and an appropriate combination of the techniques given below: a) Select resins with a low formaldehyde content (VOCs); b) Controlled operation of the press with balanced press temperature, applied pressure and press speed (VOCs); c) Wet scrubbing of collected press waste gases using Venturi scrubbers or hydrocyclones, etc. (dust, VOCs); d) Wet electrostatic precipitator (dust, VOCs); e) Bioscrubber (dust, VOCs); f) Post-combustion as the last treatment step after application of a wet scrubber (dust, VOCs).	No changes to the existing presses are proposed as part of this EP variation application. However, a new press for the OSB line is being proposed. This will include in duct quenching, control of the press, and waste gases collected will go through a scrubber and a WESP. The OSB process will use PMDI which does not contain formaldehyde.

#	BAT Requirement	How met or reference
20	In order to reduce dust emissions to air from upstream and downstream wood processing, conveying of wood materials and mat forming, BAT is to use either a bag filter or a cyclofilter. *Due to safety concerns, a bag filter or a cyclofilter may not be applicable when recovered wood is used as a raw material. In that case a wet abatement technique (e.g. scrubber) may be used.*	Emissions to air from upstream and downstream wood process, conveying and mat forming are captured and go through dust filtration systems which consist of bag filters. The emissions from the additional processes being proposed as part of this EP variation application will also be treated using the same methods.
21	In order to reduce emissions of volatile organic compounds to air from the drying ovens for the impregnation of paper, BAT is to use one or a combination of the techniques given below: a) Select and use resins with a low formaldehyde content; b) Controlled operation of ovens with balanced temperature and speed; c) Thermal oxidation of waste gas in a regenerative thermal oxidiser or a catalytic thermal oxidiser; d) Post-combustion or incineration of waste gas in a combustion plant; e) Wet scrubbing of waste gas followed by treatment in a biofilter.	No additional drying ovens are proposed as part of this EP variation application. Therefore, this BAT requirement is not relevant to this EP variation application.
22	In order to prevent or, where that is not practicable, to reduce diffuse emissions to air from the press, BAT is to optimise the efficiency of the off-gas collection and to channel the off-gases for treatment (see BAT 19). *Effective collection and treatment of waste gases (see BAT 19) both at the press exit and along the press line for continuous presses. For existing multi-opening presses the applicability of enclosing the press may be restricted due to safety reasons.*	The emissions from the additional processes being proposed as part of this EP variation application will also be treated using the same methods.
23	In order to reduce diffuse dust emissions to air from the transport, handling, and storage of wood materials, BAT is to set up and implement a dust management plan, as part of the environmental management system (see BAT 1) and to apply one or a combination of the techniques given below.	Roadway debris is cleared regularly by a road sweeper or by use of the site's bucket loaders or bobcat. A water bowser is used to ensure that roadways and storage areas are watered in dry weather in order to reduce diffuse emissions from vehicular movements.

#	BAT Requirement	How met or reference
		The Dust Management Plan has been updated to allow for the changes proposed as part of this EP variation this is included within Annex G of the application pack.
	a) Regularly clean transport routes, storage areas and vehicles;	Transportation routes are kept clean by use of a road sweeper. It is the responsibility of the EHS Manager to ensure a suitable frequency is maintained within the contract and that the external service provided is to a satisfactory level. During periods of dry, warm weather the site employs a water bowser to dampen the site transport routes down to prevent the generation of dust from vehicle movements. This is performed by employees within the Site Services Team that are under the supervision of the EHS Manager. Vehicles are cleaned by Operators on each shift and a record of this is maintained within the site OPS checks. The existing OPS checks will be extended to cover the additional areas to be covered in the Installation boundary as part of this EP variation application.
	b) Unload sawdust using covered drive-through unloading areas;	There are no changes to the unloading arrangements for sawdust proposed as part of this EP variation application.
	c) Store sawdust dust-prone material in silos, containers, roofed piles, etc. or enclose bulk storage areas;	There are no changes to the storage arrangements for sawdust dust-prone material proposed as part of this EP variation application.
	d) Suppress dust emissions by water sprinkling.	Water suppression systems are utilised across site at various locations, details of these are provided in the Dust Management Plan included within Annex G of the application pack.
24	In order to reduce the pollution load of the collected waste water, BAT is to use both of the techniques given below: a) Collect, and treat separately, surface run-off water and process waste water; b) Store any wood except roundwood and slabs on a hard-surfaced area.	Surface run-off water and process water will continue to be collected and treated separately. The new area to be included in the Installation boundary as part of this EP variation application includes storage areas for roundwood only. This will be fully impermeable.

#	BAT Requirement	How met or reference
25	In order to reduce emissions to water from surface run-off water, BAT is to use a combination of the techniques given below: a) Mechanical separation of coarse materials by screens and sieves as preliminary treatment; b) Oil-water separation; c) Removal of solids by sedimentation in retention basins or settlement tanks.	The surface run-off water from the new area to be included in the Installation boundary will go through an oil interceptor before going to the wetlands for retention. Water from the wetlands will be released to the Afron Bradley via a Penstock valve to control the flow rate.
26	In order to prevent or reduce the generation of process waste water from wood fibre production, BAT is to maximise process water recycling. *Recycle process water from chip washing, cooking and/or refining in closed or open loops by treating it at the refiner plant level by mechanical removal of solids, in the most appropriate manner, or by evaporation.*	The proposed EP variation does not change any existing for wood fibre production. Therefore, this BAT requirement is not relevant to this EP variation application.
27	In order to reduce emissions to water from wood fibre production, BAT is to use a combination of the techniques given below: a) Mechanical separation of coarse materials by screens and sieves; b) Physico-chemical separation, e.g. using sand filters, dissolved air flotation, coagulation and flocculation; c) Biological treatment.	The proposed EP variation does not change any existing for wood fibre production. Therefore, this BAT requirement is not relevant to this EP variation application.

2 Conclusions

This analysis demonstrates that the proposed changes align with the BAT requirements.

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