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Chirk Particleboard Facility



Kronospan

Odour Management Plan

Document approval

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Contents

1	Introduction.....	5
1.1	Report structure.....	5
2	Site location and description.....	6
2.1	The site.....	6
2.2	Site address.....	6
2.3	Summary of operations.....	6
3	Review of sources, pathways and receptors.....	7
3.1	Odour.....	7
3.2	Types of odours identified.....	7
3.3	Potential sources.....	7
3.4	Pathways.....	8
3.4.1	Meteorological conditions.....	8
3.5	Receptors.....	9
4	Odour management.....	11
4.1	Responsibility for implementation of this plan.....	11
4.2	Control of odour.....	12
4.2.1	Permit requirements.....	12
4.2.2	Planning requirements.....	13
4.2.3	Appropriate measures and best available techniques (BAT).....	13
4.2.3.1	EU BAT 'Reference Document for the Production of Wood-based Panels'.....	13
4.2.3.2	EU BAT Reference Document for the Production of Large Volume Organic Chemicals.....	18
4.2.3.3	EU BAT Reference Document for the Common Waste Water and Waste Gas Treatment / Management Systems in the Chemical Sector'.....	18
4.3	Odour Risk Assessment and mitigation.....	19
4.3.1	Department specific source receptor pathway routes and risk assessment.....	20
4.3.2	General measures.....	27
4.3.3	Specific odour prevention equipment.....	29
4.3.4	Odour Risk Assessment Summary.....	29
4.4	Abnormal operations.....	29
4.5	Management of change.....	30
5	Monitoring.....	31
5.1	ISO accredited EMS.....	31
5.2	Olfactory monitoring.....	31
5.2.1	Competent individuals.....	31
5.2.2	Monitoring locations.....	31
5.2.3	Monitoring frequency.....	31
5.2.4	Data collection and recording.....	32
5.2.5	Action limits.....	32
5.3	Weather monitoring.....	33
5.4	QA/QC and record keeping.....	33
5.5	Reporting of data.....	33

5.6 Odour monitoring33

6 Reporting and complaints response34

6.1 Engagement with the community.....34

7 Actions.....35

8 Improvements36

9 Summary37

A Plans and drawings.....38

B Resident complaint form.....43

C Odour assessment report.....44

D Odour Registry.....46

E Extractive Odour Monitoring Results47

1 Introduction

Kronospan is the UK's leading manufacturer of high quality wood-based panels and associated products and has been operating in the UK since 1970. The main products manufactured by Kronospan at the Chirk site (the Facility) are particleboard, medium density fibreboard (MDF) and laminate flooring.

Following issue of the consolidated Environmental Permit (EP) (Ref: EPR/BW9999IG) by Natural Resources Wales (NRW) the Facility is required to produce a standalone odour management plan (OMP) as part of Improvement Condition (IC) 39. The IC requires that the OMP is in accordance with *"How to Comply with Your Environmental Permit: H4 Odour Management"* and shall also address the delivery of all relevant Production of Wood-based Panels BAT Conclusions.

The purpose of the OMP is to demonstrate that the control of odour has been taken into account in the operation of the Facility.

This OMP is a working document and is updated and refined as required throughout the operation of the Facility. The OMP forms an integral part of the site Environmental Management System (EMS) and makes reference to other procedures within the EMS. Operational staff have easy access to the document via the site internal computer systems. Further to this the OMP sets out operational procedures to control and mitigate odour from the Facility, made available to all operational staff working at the Facility.

In developing this OMP, Kronospan understands its responsibilities for controlling odour generated by the Facility, and is committed to ensuring that its operations do not result in unacceptable odour impacts at off-site receptors. Kronospan is committed to ensuring that all odour control equipment and measures are designed, operated and maintained appropriately to ensure that odour is effectively controlled at all times.

As explained within, Kronospan will undertake regular and periodic review of the OMP to ensure that it is effective at controlling odour and mitigating the impact of odour generated by the Facility.

This has been updated to include for the activities arising as a result of the proposed EP variation. Full details of the EP variation can be found in the Supporting Information for the EP application.

1.1 Report structure

This report has the following structure broadly in line with the template OMP guidance provided by the Environment Agency (EA) and in accordance with EA guidance, as referred to in the IC by NRW:

- Details of the site location including site address are presented in section 2.
- Review of sources, pathways and receptors, including meteorological data are presented in section 3.
- An odour risk assessment including measures for odour management at the Facility are outlined in section 4.
- Proposals for monitoring at the site are described in section 5.
- Further details on the reporting and complaints procedures to be implemented at the Facility are provided in section 6.
- Actions in the case that unacceptable odours have been identified (via monitoring or complaints) are included within section 7.
- Improvements are included in section 8.

2 Site location and description

2.1 The site

The current Facility extends to around 40 hectares and comprises a number of large industrial process buildings housing the main manufacturing processes, storage areas for raw materials, warehouse buildings for manufactured products, together with other facilities associated with a discrete manufacturing business.

The western perimeter of the Kronospan site is formed by the Shrewsbury to Chester railway. Improved railway siding facilities have been constructed within the Kronospan site to enable an increased volume of timber to be imported by rail and the new rail sidings are now operational. The Shropshire Union Canal is located to the west of the railway line. Water is abstracted from the canal for use in the manufacturing process. The eastern perimeter of the site is formed by Holyhead Road (B5070). An earth bund, planted with trees, has been developed along the eastern perimeter of the site in order to reduce the visibility, noise and dust impacts of the site operations from neighbouring properties on Holyhead Road

A sewerage pumping station (not owned by Kronospan), training centre and one property (owned by Maesgwyn Estate), are located to the immediate north of the site. To the immediate south of the site is the Mondelez factory and the Chirk recreational ground.

The main residential area of Chirk is located to the east of the site with residential properties lining the majority of the eastern side of Holyhead Road. Chirk town centre is located approximately 500 m to the south east of the site.

The wider area beyond the urban settlement of Chirk is dominated by agricultural fields and woodland. Chirk Castle and its grounds are located to the west of the site, beyond the Llangollen Canal.

The Facility location in the context of the wider area is displayed in Figure 1 of Appendix A.

2.2 Site address

The site address is as follows:

Kronospan Ltd,
Maesgwyn Farm, Chirk,
Wrexham,
LL14 5NT,
United Kingdom

2.3 Summary of operations

The panel board manufacturing process incorporates a detailed multi-step set of operations including creation of sawdust and wood chips, drying processes, pressing, resin manufacture, resin impregnation, packing and storage. The Facility is operated in accordance with the extant varied and consolidated EP (Ref: EPR/BW9999IG), which was granted by NRW on 4th October 2022. A full summary of operations is detailed within the EP, and further details are provided within section 3.3 (potential emissions sources) and section 4.2 (control of odour).

3 Review of sources, pathways and receptors

3.1 Odour

An odour is the organoleptic attribute perceptible by the olfactory organ on sniffing certain volatile substances. Odorous substances have a property which makes them perceptible to our sense of smell. The chemical compound (i.e. the 'odorant') is volatilised in air and acts as a stimulus which the receptor interprets as an odour.

Typically, odours are detected at very low concentrations of chemicals and compounds in air. The human nose is very sensitive with on average over 5 million scent receptors. Humans can detect concentrations as low as a few parts per billion (ppb).

Odours may be perceived as pleasant or unpleasant. The main concern with odour is its ability to cause a response in individuals that is considered to be objectionable or offensive. Whilst there is often agreement about what constitutes pleasant and unpleasant odours, there is a wide variation between individuals as to what is deemed unacceptable and what affects our quality of life.

3.2 Types of odours identified

Odours at the Facility have been identified as falling into the following categories:

- Chemical – those originating from the formalin and resin within the process.
- Old wood – those originating from incoming recycled wood.
- Fresh wood – those originating from the roundwood and associated residues.

3.3 Potential sources

The management of the Facility is split into departments. Table 1 identifies the potential sources of odour within each department. This includes potential emissions from raw materials, the production process, maintenance, abnormal activities and waste management for each department.

Table 1: Potential sources

Department	Potential odour sources
Logyard	<ul style="list-style-type: none">• Wood storage
Paper Impregnation	<ul style="list-style-type: none">• Fume emissions to atmosphere from pipe rupture
Particleboard	<ul style="list-style-type: none">• Board stuck in press• Press abatement system – wet scrubbers serving MDF and particle board presses• WESP – abatement equipment for particleboard dryers
Biomass Boilers	<i>No specific odorous sources identified.</i>
Finishing Lines	<i>No specific odorous sources identified.</i>
Formalin	<ul style="list-style-type: none">• Steam release with entrained heat transfer oil• Release of chemical from storage tanks and process plant
MDF	<ul style="list-style-type: none">• Board stuck in press

Department	Potential odour sources
	<ul style="list-style-type: none"> Press abatement system – wet scrubbers serving MDF and particle board presses
Melamine Facing (MFC)	<i>No specific odorous sources identified.</i>
Resin	<ul style="list-style-type: none"> Fume emissions to atmosphere from pipe rupture Charge formaldehyde, urea, melamine and other process fumes
Sawmill	<ul style="list-style-type: none"> Wood storage
Kronoplus	<i>No specific odorous sources identified.</i>
OSB	<ul style="list-style-type: none"> Board stuck in press Press abatement system – wet scrubbers serving OSB press WESP – abatement equipment for OSB dryers

3.4 Pathways

Odours released from the sources identified are released to air and have the potential to be conveyed to nearby receptors via transfer through the air. The extent to which odour is detectable is dependent upon the following factors, all of which can exhibit substantial variation over time:

- the nature and magnitude of odour emission released from the Facility;
- the wind direction and wind speed; and
- atmospheric turbulence (vertical and horizontal) and the level of dilution and dispersion odours undergo as they travel downwind.

For example, an odour is much less likely to be perceived when stood upwind of the source, compared to downwind. This is also altered by the strength of the wind and other air turbulence, which can be constantly changing. Therefore, it is unusual for a pathway to be constant, hence the often intermittent nature of odours.

3.4.1 Meteorological conditions

The nearest World Meteorological Organisation (WMO) meteorological station representative of conditions at the Chirk site is at RAF Shawbury, located approximately 30 km south east of the Facility. Wind roses for the years 2018 to 2022 (See Figure 2 of Appendix A) show that the predominant wind direction is from the south west, so receptors to the north east of the Facility are at greater risk of nuisance from odour.

In addition, the air quality monitoring sites in Chirk (Chirk Green and Chirk Hospital) operated by Wrexham County Borough Council (WCBC) includes a monitor for wind speed and direction, temperature and humidity. This is reported on the AirQWebsite (<https://www.airqweb.co.uk>) and is regularly accessed to provide immediate data it required.

The site also operates a weather station located at the Weighbridge, close to the site entrance. This provides weather data (rainfall, wind direction, wind speed, temperature, barometric pressure) and can be accessed 24/7 by the Weighbridge Operators should an incident or complaint occur.

3.5 Receptors

A human sensitive receptor is any location where a person may experience the annoyance effects of odour. Sensitive human receptors can include:

- Residential dwellings;
- Schools;
- Hospitals;
- Care homes;
- Childcare facilities;
- Hotels;
- Gardens (where relevant public exposure is likely i.e. excluding extremities of gardens or front gardens);
- Sensitive commercial premises including; vehicle showrooms, food manufactures; and electronics manufactures.

In addition to the above, amenity impacts odour and other emissions must be considered. These impacts could arise on neighbouring 'clean' industry and manufacturing processes, such as paint shops, offices, food manufacturing and food outlets, agricultural land, areas of car parking, etc. Cumulative impacts should also be considered in relation to neighbouring generators, busy roads, power stations, etc.

There is no specific distance for choosing receptors identified in the H4 guidance, other than the nearest receptors to the site boundary. Commonly, a buffer distance of 500m is used to identify potential odour receptors. For the Facility, there are several receptors located within the village of Chirk to the east. A selection of these has been chosen as to be representative of receptors within each wind direction. The receptors used within this OMP are consistent with the receptors used within air quality assessments associated with the EP. It is recognised that they are not an exhaustive list and that consideration of impacts across the area should also be considered.

The sensitive receptors are tabulated in Table 2 and shown in Figure 3 of Appendix A. As shown in Figure 3, the closest sensitive receptors to the Facility are to the east along the B5070.

Table 2: Selected representative receptor locations

Ref	Name	Type	Distance from Installation Boundary (m)	Direction from Facility
R1	Afron Bradley Farm	Residential/farm	550	NW
R2	Lodge Farm	Residential/farm	670	NE
R3	Lodgevale Park	Residential/farm	360	NE
R4	Rhosywaun	Residential	85	E
R5	Chirk Community Hospital	Hospital	460	NE
R6	Chirk Infant School	School	160	E
R7	Highfield Farm	Residential/farm	760	E
R8	Maes-y-Waun	Residential	53	E
R9	Colliery Road	Residential	290	SE
R10	St Mary's Church	Community	1,300	SE

Ref	Name	Type	Distance from Installation Boundary (m)	Direction from Facility
R11	Station Avenue	Residential	390	S
R12	Llwyn-y-cil	Residential	430	SW
R13	New Hall	Residential	890	W
R14	Chirk Court	Residential (care home)	30	E

4 Odour management

4.1 Responsibility for implementation of this plan

This OMP is working document. Initially, it is intended to demonstrate that the control of odour has been considered as part of the day to day operation of the Facility.

Kronospan has responsibility for the implementation, reviewing and updating of the OMP. Reviews are undertaken on an annual basis, and whenever new equipment or mitigation measures are implemented at the Facility, or following the receipt of complaints.

Kronospan aims to ensure that any persons performing tasks for it, or on its behalf, which have the potential to cause significant environmental impact, are competent on the basis of appropriate education and training or experience. Key management roles at the Facility include the Senior Management Team, Environment, Health & Safety (EHS) Department and the Departmental Managers. The EHS Department Management are responsible for ensuring that procedures are in place for dust, noise and odour management on site and responsible for responding to and investigating off-site environmental complaints. The Departmental Managers are responsible for ensuring that dust, noise and odour control measures are in place in their department, and for investigating any justified environmental complaints that have been caused by dust, noise or odours originating in their department. The managers are responsible for ensuring that all employees are fully trained on odour control, with all employees at the Facility responsible for following procedures.

Systems to assess competence and provide training for relevant staff are provided. Skills, competencies and training requirements for staff (such as understanding and implementation of the OMP) are documented and recorded as part of the internal management systems at the Facility. The EMS contains an archiving procedure to ensure all training (including refresher training) is recorded and all associated records are retained.

The Facility is split into the following departments, for which the Departmental Manager is responsible.

1. Logyard
2. Paper Impregnation
3. Particleboard
4. Biomass Boilers
5. Finishing Lines
6. Formalin
7. MDF
8. OSB
9. Melamine Macing (MF)
10. Resin
11. Sawmill
12. Kronoplus

The EMS includes procedures for the control of contractors. This includes providing contractors details of the health and safety risks on site and the procedures which need to be complied with. This includes procedures to minimise odour emissions. Contractors are required to confirm that they will adhere to the site rules and pass the site induction prior to working on site. Where a

contractor has been found not to comply with the site rules, fines can be issued and repeat offenders refused access to the site (as set out within section 4.3.2).

4.2 Control of odour

The sources of emissions have been listed in section 3.3. Control of the impact of odour involves breaking the source-pathway-receptor links. Therefore, for each of these sources, a breakdown of the source-pathway-receptor model is presented within the Tables within section 4.3.1 with the final column in the table setting out details of where relationship can be interrupted. Table 11 provides general mitigation/control measures that are in place at the Facility. The tables have included abnormal emissions such as emergency emissions, for example. Should control measures fail and pose a significant risk of odour, operations at the Facility will be ceased and the NRW will be informed. These tables are reviewed by management as part of periodic reviews of the OMP. This ensures that sources, pathways and receptors of odour are regularly examined, so that there are no 'gaps' in abating the sources of odour at the Facility, and as part of Kronospan's aim for continual improvement of management systems.

4.2.1 Permit requirements

The Facility has an EP to operate.

Section 2.3 refers to operating techniques and 2.3.1 states that:

- (a) *"The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by Natural Resources Wales.*
- (b) *If notified by Natural Resources Wales that the activities are giving rise to pollution, the operator shall submit to Natural Resources Wales for approval within the period specified, a revision of any plan or other documentation ("plan") specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by Natural Resources Wales."*

Section 3.3 of the EP includes conditions regarding the emissions of odour, this condition states:

"Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

The operator shall:

- (c) *if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to odour, submit to Natural Resources Wales for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;*
- (d) *implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales*

Therefore, the EP controls emissions of odours from all activities on-site. The measures should prevent, and where that is not practicable minimise, odour. As such, to comply with the requirements of the EP, there are a number of odour control measures in place at the Facility, including both physical measures and management techniques. These are detailed further in the tables below.

4.2.2 Planning requirements

A review of the planning consents for the site has not identified any conditions relating to odour from operational activities, with the planning permissions noting that this would be controlled via the permitting regime.

4.2.3 Appropriate measures and best available techniques (BAT)

The following section details the requirements from the following BAT conclusions which are appropriate for the Facility and how Kronospan demonstrate compliance with the requirements:

4.2.3.1 EU BAT 'Reference Document for the Production of Wood-based Panels'

BAT 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 following features (I to XIV with XII being an odour management plan).

Kronospan operations adhere to the EMS which has been accredited to ISO 14001 standard and includes all the features listed under BAT 1. This OMP has been produced to satisfy requirement XII.

The management team, including senior management have made a commitment to ensure that the EMS is adhered to, and this includes a sustainability policy (KC/SHEQ/POL/0002) which includes a commitment to improving environmental performance by employing best available techniques for the measurement and control of emissions and wastes. In addition, a commitment is made to being a good neighbour to the local community and reducing the environmental impacts from business operations.

BAT 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 of 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).

(b). Application of a programme for the quality control of recovered wood used as a raw material and/or as fuel (EN 14961 -1:2010 can be used for the classification of solid biofuels), in particular to control pollutants such as As, Pb, Cd, Cr, Cu, Hg, Zn, chlorine, fluorine and PAH.

All recycled timber is 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

(c). Careful handling and storage of raw materials and waste.

Storage of raw materials is maintained as described in Section 3.2. Material that does not meet specification is rejected upon receipt at the Log Yard and returned to the supplier. The Timber Complaint / Reject Advice Form (KC/LOGY/TEM/0016) is completed for all rejected loads.

BAT 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:

(I). 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 contribution of the sources; and to implement prevention and/or reduction measures.

This OMP has been produced to satisfy BAT 9 and is part of the EMS (BAT 1). This OMP sets out the protocol for conducting odour monitoring within Section 5 (element II), and a protocol for response to identified odour events within Section 6 (element III). A protocol setting out the actions and timelines (element I) is set out in within Sections 6 and 7.

BAT 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 BAT 19.

BAT 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:

Dust abatement of the inlet hot gas to a directly heated dryer in combination with one or a combination of the other techniques listed below:

- a) Bag filter
- b) Cyclone
- c) UTWS dryer and combustion with heat exchanged and thermal treatment of discharged dryer waste gas
- d) Wet electrostatic precipitator
- e) Wet scrubber
- f) Bio scrubber
- g) Chemical degradation or capture of formaldehyde with chemicals in combination with a wet scrubbing system

The Facility includes 3 dryers (Dryer 4, MDF dryer 1 and MDF dryer 2). A review of each dryer against the techniques listed in BAT 17 is provided below.

Dryer 4

Dryer 4 is utilised in the manufacture of particleboard. It is a directly heat dryer fuelled from wood dust and gas. The emissions from the dryer pass through a series of cyclones (b) before venting to atmosphere via WESP 21. This is a wet electrostatic precipitator (e). The emission limits for the WESP 21 are provided in Table 3 along with the appropriate BAT-AELs (i.e. those for a directly heated particleboard dryer), and the maximum monitored concentration over the last 12 months.

Table 3: Dryer 4 – BAT 17

Substance	BAT-AEL (mg/Nm ³)	ELV in EP (mg/Nm ³)	Average monitored (mg/Nm ³)	Max monitored (mg/Nm ³)
Dust	3-30	20	3.1	5.1
TVOC	<20-200	200	147.5	173.0
Formaldehyde	<5-10 (15 if utilising recovered wood)	10	6.6	9.2

As shown, dryer 4 includes dust abatement of the inlet hot gas to a directly heated dryer in combination with methods (b) and (e). In addition, ELVs in the existing EP comply with the BAT-AELs. Indeed the ELV for dust is more stringent than the upper end of the BAT-AEL range and the ELV for formaldehyde is also more stringent than the BAT-AEL as recovered wood is almost exclusively utilised in this dryer. Monitoring results have demonstrated compliance with the ELVs.

MDF 1 and 2 dryers

MDF dryer 1 and 2 are utilised to dry wood fibres for MDF production. These are directly heated dryers fuelled from gas. However, the exhaust emissions from combustion sources on site are also fed to these dryers to utilise the heat within the drying process. The K7 biomass plant includes an electrostatic precipitator (dry) to capture particulates before these emissions enter the dryer, whilst the K8 biomass plant includes bag filters for this purpose. Emissions from the gas engines do not include any additional filtration prior to the dryer, as these are not a significant source of either dust or odour.

The emission limits for the MDF Cyclones are provided in Table 4 along with the BAT-AELs appropriate (i.e. those for a directly heated fibre dryer), and the maximum monitored concentration over the last 12 months.

Table 4: MDF Driers – BAT 17

Substance	BAT-AEL	ELV in EP	Average monitored (mg/Nm ³) – MDF 1	Max monitored (mg/Nm ³) – MDF 1	Average monitored (mg/Nm ³) – MDF 2	Max monitored (mg/Nm ³) – MDF 2
Dust	3-20	20	6.8	7.8	8.0	11.1
TVOC	<20-120	120	32.9	37.9	62.7	118.7
Formaldehyde	<5-15	15	6.4	13.7	8.9	10.0

As shown the ELVs in the existing EP comply with the BAT-AELs, and monitoring results demonstrates compliance with the ELVs.

OSB dryers

The proposed OSB driers 1 and 2 will be utilised in the manufacture of OSB. These are directly heated driers fuelled from wood dust and gas. The emissions from the driers pass through a series of cyclones (b) before venting to atmosphere via WESP 32. This is a wet electrostatic precipitator (e). The emission limits being proposed for emissions from the OSB driers from the WESP 32 are provided in Table 3 along with the appropriate BAT-AELs (i.e. those for a directly heated OSB dryer).

Table 5: OSB Dryer 1 and 2 – BAT 17

Substance	BAT-AEL (mg/Nm ³)	Proposed ELV in EP (mg/Nm ³)	Average monitored (mg/Nm ³)	Max monitored (mg/Nm ³)
Dust	3-30	20	-	-
TVOC	<10-400	400	-	-
Formaldehyde	<5-20	20	-	-

As shown, the proposed ELVs comply with the BAT-AEL. Indeed, the ELV proposed for dust is more stringent than the upper end of the BAT-AEL range.

BAT 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:

- Select resins with a low formaldehyde content.
- Controlled operation of the press with balanced press temperature, applied pressure and press speed.
- Wet scrubbing of collected press waste gases using Venturi scrubbers or hydrocyclones, etc.
- Wet electrostatic precipitator.
- Bioscrubber.
- Post-combustion as the last treatment step after application of a wet scrubber.

Emissions from the presses are extracted within quenched ducting to Venturi scrubbers (one per line: PB, MDF1 & MDF2) (c). From here, the emissions then pass over to WESP 32 (a wet electrostatic precipitator) (d) before release to atmosphere.

MDF and particleboard is manufactured to EN 13986 class E1 for formaldehyde emissions, meaning that the mass emission of formaldehyde from finished boards is limited to 0.1ppm (0.124mg/m³). In order to achieve this low level, the formaldehyde-based resins utilised during manufacture must contain low levels of free-formaldehyde (a). The levels of formaldehyde are therefore closely controlled and kept as low as possible to reduce the emission around the presses.

Press operations are closely monitored by competent technicians to ensure consistent quality is achieved. Technicians control the temperature, pressure, and speed of the presses to set standards, contained within the recipe manager, depending on the product being manufactured at the time (c). The recipe manager automatically sets these parameters with technicians being able to modify these within set limits in order to achieve the necessary product quality.

Table 6: Presses – BAT 19

Substance	BAT-AEL (mg/Nm ³)	ELV in EP (mg/Nm ³)	Average monitored (mg/Nm ³)	Max monitored (mg/Nm ³)
Dust	3-15	15	3.1	3.2
TVOC	10-100	30	9.8	12.4
Formaldehyde	2-15	5	2.7	4.9

As shown the ELVs in the existing EP comply with the BAT-AELs, and in fact are more stringent than the upper end of the BAT-AEL range, and monitoring has demonstrated compliance with the ELVs.

EU BAT Reference Document for Waste Incineration

These BAT conclusions are applicable to the K8 biomass boiler.

BAT 1. In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates all of the following features:

...

xxvii. an odour management plan where an odour nuisance at sensitive receptors is expected and/or has been substantiated (see Section 5.2.4)

Section 5.2.4 states:

The odour management plan is part of the EMS (see BAT 1) and includes:

- a. a protocol for conducting odour monitoring in accordance with EN standards (e.g. dynamic olfactometry according to EN 13725 to determine the odour concentration); it may be complemented by measurement/estimation of odour exposure (e.g. according to EN 16841-1 or EN 16841-2) or estimation of odour impact;**
- b. a protocol for response to identified odour incidents, e.g. complaints;**
- c. an odour prevention and reduction programme designed to identify the source(s), to characterise the contributions of the sources, and to implement prevention and/or reduction measures.**

This OMP has been produced to satisfy BAT 1 (part xxvii) and is part of the EMS. This OMP sets out the protocol for conducting odour monitoring within Section 5 (element a) and a protocol for response to identified odour events within Section 6 (element b). Odour improvements (element c) is contained within Section 8.

BAT 21. In order to prevent or reduce diffuse emissions from the incineration plant, including odour emissions, BAT is to:

- store solid and bulk pasty wastes that are odorous and/or prone to releasing volatile substances in enclosed buildings under controlled subatmospheric pressure and use the extracted air as combustion air for incineration or send it to another suitable abatement system in the case of a risk of explosion;**
- store liquid wastes in tanks under appropriate controlled pressure and duct the tank vents to the combustion air feed or to another suitable abatement system;**
- control the risk of odour during complete shutdown periods when no incineration capacity is available, e.g. by:**
 - sending the vented or extracted air to an alternative abatement system, e.g. a wet scrubber, a fixed adsorption bed;**
 - minimising the amount of waste in storage, e.g. by interrupting, reducing or transferring waste deliveries, as a part of waste stream management (see BAT 9);**
 - storing waste in properly sealed bales.**

Fuel for the boiler is contained within a silo and conveyed in enclosed systems to the furnace chamber.

No biomass is bought into site specifically to be utilised as fuel as such, boiler fuel is generated by on-site production processes enabling control of stock levels. Planned shutdowns usually coincide with outages on MDF due to the heat and steam requirements of the MDF manufacturing process, this then reduces the amount of boiler fuel generated on site. Should an unplanned stoppage occur for a prolonged period, residues can be discharged into trailers and disposed of off-site.

BAT 22. In order to prevent diffuse emissions of volatile compounds from the handling of gaseous and liquid wastes that are odorous and/or prone to releasing volatile substances at incineration plants, BAT is to feed them to the furnace by direct feeding.

No gaseous / liquid wastes are utilised on the biomass boilers as such, this BAT conclusion is not applicable.

4.2.3.2 [EU BAT Reference Document for the Production of Large Volume Organic Chemicals](#)

No applicable BAT conclusions, refer to Common Waste Water and Waste Gas Treatment / Management Systems in the Chemical Sector BREF.

4.2.3.3 [EU BAT Reference Document for the Common Waste Water and Waste Gas Treatment / Management Systems in the Chemical Sector'](#)

These BAT conclusions apply to the Formalin and Resin manufacturing processes.

BAT 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 following features: ...

XIII. odour management plan (see BAT 20)

This OMP has been produced to satisfy BAT 1 (XIII).

BAT 6. BAT is to periodically monitor odour emissions from relevant sources in accordance with EN standards.

Applicability is restricted to cases where odour nuisance can be expected or has been substantiated.

Extractive sampling and analysis to EN 13725 has been carried out on the Formalin and Resin plants, results are contained within Appendix E, that shows much lower odour concentrations evident than the wood-panel production processes. Subjective monitoring and site history / knowledge also supports that the wood-panel processes are more likely to cause odour nuisance.

Formaldehyde has a strong, pungent even at low concentration levels. However, the storage tanks and associated pipework are located approximately 200 m from any off-site receptor and are all vented through the emissions control system (ECS). In addition, the low odour detection level and acute toxicity classification means containment is crucial for on-site personnel to maintain a working environment and strict control measures are in place to prevent persons from exposure.

BAT 20. In order to prevent or, where that is not practicable, to reduce odour emissions, 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:

- I. a protocol containing appropriate actions and timelines;**
- II. a protocol for conducting odour monitoring;**
- III. a protocol for response to identified odour incidents;**
- 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.**

This OMP has been produced to satisfy BAT 20 and is part of the EMS. This OMP sets out the protocol for conducting odour monitoring within Section 5 and a protocol for response to identified odour events within Section 6. Odour improvements, prevention and reduction arrangements are contained within Section 8.

BAT 21. In order to prevent or, where that is not practicable, to reduce odour emissions from waste water collection and treatment and from sludge treatment, BAT is to use one or a combination of the techniques given below.

- a. Minimise residence times**
- b. Chemical treatment**
- c. Optimise aerobic treatment**
- d. Enclosure**
- e. End-of-pipe treatment**

There are no odorous process waste waters generated from the Formalin and Resin plants.

4.3 Odour Risk Assessment and mitigation

Table 3 to Table 6 provide detail of each of the odour sources within each department and the potential impact they could have on local receptors. The tables include measures used to manage the risk and the overall perceived risk. The perceived overall risk is 'insignificant', 'not significant' or 'significant' in line with the EA's H1 guidance.

Table 7 provides further general measures which are practiced across Site.

4.3.1 Department specific source receptor pathway routes and risk assessment

Table 7: Source-Pathway-Receptor routes – Particleboard and MDF and OSB

Source of odour impact			Managing the risk	Assessing the risk		
Source	Receptor	Pathway	Risk management	Possibility of exposure	Consequence	What is the overall risk? (balance of probability and consequence)
Board stuck in press	All receptors	Atmospheric dispersion – source located within plant buildings	Press maintained to reduce likelihood of incident, alarms to indication potential problem to operator. Extraction system may aid in odour abatement.	Low	Annoyance and resident complaints	Not significant
Press abatement system – wet scrubbers serving MDF, OSB, and Particleboard presses	All receptors. Adverse weather conditions may result in grounding over residential properties, educational and leisure facilities. Due to predominant wind direction,	Atmospheric dispersion – stack height 65.5m	Emission ducted to highest stack to assist with dispersion and reduce grounding events. Alarms on low flow for scrubbers direct to press technician. Interlock to stop process on failure of water flow. Abnormal emission is recorded as environmental incident.	Low	Annoyance and resident complaints	Not significant

Source of odour impact			Managing the risk	Assessing the risk		
	most likely to be detected by the receptors to the east of the site					
WESP 21 – wet electrostatic precipitator for Particleboard Dryer 4	All receptors. Adverse weather conditions may result in grounding over residential properties, educational and leisure facilities. Due to predominant wind direction, most likely to be detected by the receptors to the east of the site	Atmospheric dispersion.	WESP technology is considered BAT for particleboard dryer abatement. Regular monitoring and maintenance of abatement equipment. Process stopped within 60 minutes if fault in WESP 21 is identified. Any fault is reported as an environmental incident.	Low	Annoyance and resident complaints	Not significant
WESP 32 – wet electrostatic precipitator for OSB Dryer 1 and 2	All receptors. Adverse weather conditions	Atmospheric dispersion.	WESP technology is considered BAT for OSB dryer abatement. Regular monitoring and maintenance of abatement equipment.	Low	Annoyance and resident complaints	Not significant

Source of odour impact			Managing the risk	Assessing the risk		
	may result in grounding over residential properties, educational and leisure facilities. Due to predominant wind direction, most likely to be detected by the receptors to the east of the site		Process stopped will be within 60 minutes if fault in WESP 32 is identified. Any fault is reported as an environmental incident.			

Table 8: Source-Pathway-Receptor routes -Formalin

Source of odour impact			Managing the risk	Assessing the risk		
Source	Receptor	Pathway	Risk management	Possibility of exposure	Consequence	What is the overall risk? (balance of probability and consequence)
Steam release with entrained heat transfer oil	All receptors	Atmospheric dispersion – Formalin Plant is located >600m from the site boundary	Safety system, only activates on rare occasions.	Low	Annoyance and resident complaints	Not significant
Storage tanks and process plant	All receptors	Atmospheric dispersion – Formalin Plant is located >600m from the site boundary	Weekly process audit designed to identify abnormal odorous emissions. Technicians are required to be on the plant at least every 4 hours. Formalin is fully contained with emissions vented to an Emissions Control System (ECS). Monthly offsite odour assessment. Spillage or leakage recorded as environmental incident.	Low	Annoyance and resident complaints	Not significant

Table 9: Source-Pathway-Receptor routes – Logyard

Source of odour impact			Managing the risk	Assessing the risk		
Source	Receptor	Pathway	Risk management	Possibility of exposure	Consequence	What is the overall risk? (balance of probability and consequence)
Storage of virgin wood – normally considered a pleasant, inoffensive odour.	All receptors – due to the location of external stockpiles, most likely to be detected by receptors to the west of the site	Atmospheric dispersion	Stock rotation and planning	Low	Annoyance and resident complaints unlikely	Not significant
Storage of recycled wood	All receptors	Atmospheric dispersion	<p>Stockpile is located in the middle of the log yard the furthest away from the site boundary.</p> <p>Quality control checks on incoming deliveries would prevent any particularly odourous deliveries being accepted. These would be returned and not accepted at site.</p> <p>Stockpile management to ensure that any particular odorous feedstock is used first as per procedure KC/LOGY/WI/0052.</p> <p>Control of stock levels through timber buying linked to the process.</p> <p>Note that the rotation of the stock pile to prevent fires would potentially release odours.</p>	Low	Annoyance and resident complaints unlikely	Not significant

Source of odour impact			Managing the risk	Assessing the risk		
Storage of boiler fuel	All receptors	Atmospheric dispersion	Stockpile is located in the middle of the log yard the furthest away from the site boundary. Stockpile management to ensure that any particular odorous feedstock is used first as per procedure KC/LOGY/WI/0052. Control of stock levels if the boiler is offline the dust residues will be transferred to trucks for offsite disposal rather than to the silos.	Low	Annoyance and resident complaints unlikely	Not significant

Table 10: Source-Pathway-Receptor routes – Resin

Source of odour impact			Managing the risk	Assessing the risk		
Source	Receptor	Pathway	Risk management	Possibility of exposure	Consequence	What is the overall risk? (balance of probability and consequence)
Fume emissions to atmosphere from pipe rupture	All receptors	Atmospheric dispersion	Pipeline has been installed to design codes: fully welded. Inspected (internally and externally) and maintained regularly.	Low	Annoyance and resident complaints	Not significant
Charge formaldehyde, urea, melamine and other process fumes	All receptors	Atmospheric dispersion	All fumes from reactor vented via the wet scrubber system.	Low	Annoyance and resident complaints	Not significant

4.3.2 General measures

Table 11: General measures that used on site to control odour

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Preventative measures			
Various fire procedures – no smoking on site, fire audits, fire team, sprinkler units, prevention of fires through stock rotation and log yard procedures, all operators are aware of the procedures for raising the fire alarm / internal fire team to contain the fire.	Systems in place to prevent fires and to control fires should they occur. Prevention and control of any dust and particulates – causing odour -caused by fire.	Implemented at the site irrespective of dust release.	N/A – this is a continuous measure.
Regular preventative maintenance	Regular preventative maintenance can help to maintain the integrity of plant and equipment, and as such reduce the generation of odours	Regular preventative maintenance is undertaken for all plant and equipment (including abatement plant, processing equipment, mobile plant).	Preventative maintenance is undertaken on a periodic basis in accordance with documented procedures.
Control of contractors	<p>Kronospan are responsible for ensuring that contractors adhere to measures and practices to minimise odour emissions. Construction and maintenance activities that could generate odour may be performed by contractors.</p> <p>Prior to the commencement of any large construction projects, a risk assessment is undertaken to ensure that odour control and mitigation measures are identified and implemented.</p>	<p>Only personnel who have passed the site induction are permitted to work on site.</p> <p>Kronospan supervise all work undertaken by external contractors. Unsatisfactory environmental performance may incur financial penalties or result in individuals / companies being removed from site.</p>	Control of contractors activities is undertaken on a daily basis. Should any complaints be received that may be due to contractor activities, these will be ceased until suitable control measures can be implemented.

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Sheeting/covering of vehicles	This prevents the escape of odours from vehicles as they travel to/from the site.	This is a requirement for vehicles entering/exiting the site and is identified in the site management systems. Visual inspections of vehicles before they leave the site ensure that sheeting is sufficiently fitted, reducing the potential for fugitive emissions during travel.	This is a continuous requirement for vehicles entering/exiting the site. This may not apply to vehicles moving around the site.
Remedial measures			
Spill kits/cleaning equipment	The provision of easily accessible spill kits and cleaning equipment can ensure that spills are readily mitigated, hence reducing the quantity of time available for odours to be further dispersed off-site.	Equipment is readily available on site to clean any spillages (including wet cleaning methods) as soon as reasonably practicable after the event. The EMS includes procedures to follow in the event of a significant spillage.	Spill kits/cleaning equipment are available at the site at all times. The equipment is also used in the event of a spill.

4.3.3 Specific odour prevention equipment

An Odour Registry is provided in Appendix D. This includes:

- quantities of odorous materials / chemicals;
- their hedonic tone and concentration;
- details of segregation, storage and control mechanisms in place to prevent release to atmosphere of the odorous materials / chemicals.
- Details of all equipment for the prevention and minimisation of odour and the planned maintenance measures.

The Odour Registry will be updated regularly to ensure that all dust sources are identified and included within the ongoing assessment process that drives the continual improvement programme for the site.

4.3.4 Odour Risk Assessment Summary

The risk assessment and management measures have shown that the perceived risk of odour from the Facility is 'not significant' or 'insignificant'. Should the monitoring (see section 5) or complaints procedure (see section 6) prove otherwise, appropriate action will be taken to identify and stop the source of the odour. Following this, the risk assessment and OMP will be reviewed and updated accordingly to ensure its effectiveness.

4.4 Abnormal operations

The above sections consider normal operations. It is possible that abnormal operations (equipment failure, weather, emergencies), such as those listed in Table 12 could increase the risk of odour impacts. Management for the following abnormal situations is as follows:

Table 12: Abnormal Events and Response Measures

Event	Location	Likely Effect	Response Measures	Timescales for Response
Fire	Site-wide	Potentially odorous products of combustion released to atmosphere	Fire prevention and mitigation plan in place. Emergency plans are implemented to ensure situation is brought under control as efficiently as possible.	Immediate
Catastrophic failure of WESP 21	Particleboard Preproduction	Potentially odorous emissions released via emergency stack	Dust abatement via dryer cyclones, procedures in place to ensure safe shut down of	Immediate, lasting no longer than 1 hour

Event	Location	Likely Effect	Response Measures	Timescales for Response
			process (KC/CHIP/WI/115). Notification to NRW.	
Catastrophic failure of WESP 32	Particleboard and OSB Preproduction	Potentially odorous emissions released via emergency stack	Safe shut down of resin, paper impregnation, Rawboard pressing processes as per KC/EHS/PRO/045. Notification to NRW.	Immediate, lasting no longer than 30 minutes
Utilisation of K7 emergency stack	K7 biomass boiler	Potentially odorous emissions released via emergency stack	Operational procedures in place to modulate boiler output in the event of prolonged, unplanned stoppages in MDF production (KC/BOI/WI/003)	Immediate
Major Accident involving release / LOC of formalin (MAH 8, 9, 16, 17, 18 & 19)	Formalin & Resin	Formaldehyde odour detected within local community, potential for acute health impacts	Activation of WCBC External Emergency Plan, including sounding of COMAH alarm to inform local community to go indoors and keep windows shut, internal emergency response as per KC/EHS/DOC/011	Immediate

4.5 Management of change

When equipment is to be replaced a decision is made as to whether to replace like-for-like or whether different equipment is more appropriate. As part of this decision-making process consideration is made of odour impacts of the equipment and whether an alternative option could be used which would reduce off-site odour impacts.

5 Monitoring

5.1 ISO accredited EMS

An EMS is in operation which includes a range of monitoring and recording procedures. This OMP forms part of the EMS and is reviewed and updated accordingly. The EMS includes procedures for managing external complaints. Further detail on the complaints procedures at the Facility are presented within section 6.

5.2 Olfactory monitoring

An EMS is in operation which includes a range of monitoring and recording procedures. This OMP forms part of the EMS and is reviewed and updated accordingly.

Olfactory (sniff) monitoring is undertaken at strategic locations around the installation boundary on a regular basis. Where odours at the perimeter are identified, this is reported to Facility's management team. An investigation to determine the source and cause of the odour is undertaken in accordance with the systems as set out in section 6.

The Departmental Managers undertake inspections of the site on a daily basis, to monitor compliance with air quality and dust control procedures, although these are not formally recorded. During these inspections, the departmental managers will also look put for any adverse or unusual odours.

Recorded environmental audits and checklists are implemented weekly. The procedure is detailed in the EMS.

5.2.1 Competent individuals

In order to ensure repeatability of the odour monitoring results, more than one competent odour assessor/member of staff will be on-site at all times. This will ensure that odour monitoring will continue if one individual is away or unavailable. Furthermore, as colds, sinusitis or sore throats can affect the sense of smell, having more than one trained individual will allow the monitoring to continue in the event of illness. However, if all individuals are suffering from illness then this fact will be recorded on the odour monitoring forms. It is important for the individuals undertaking the monitoring to avoid strong foods or drinks (including coffee) for at least half an hour before conducting the monitoring. Furthermore, strongly scented toiletries and the use of deodorisers within vehicles is avoided.

5.2.2 Monitoring locations

The locations for odour monitoring are presented in Figure 4 of Appendix A.

5.2.3 Monitoring frequency

In order to generate a detailed odour record for the Facility, regular monitoring at the site boundary is undertaken. This ensures a detailed data set can be maintained throughout the year.

Monitoring is also undertaken upon receipt of an odour complaint to identify and record the odours present at the time of the complaint – refer to section 6 and enable investigation into potential sources.

Monitoring is not conducted at a set time of day, in order to maintain flexibility and relevance in the monitoring strategy. Instead, the monitoring is conducted at random or at times when there is a high risk of odour generation.

5.2.4 Data collection and recording

Before commencing any odour monitoring, the operative records pertinent details such as date, time, weather conditions and the nature of the activities being undertaken. This is summarised within a proposed monitoring template, contained within Appendix C.

The EHS Department also maintain a daily plume observations log which records weather conditions and plume dispersion directions from WESP 32 (press abatement emission point).

In order to quantify odour at a specific level, the 'intensity' and the 'offensiveness' are recorded. These are based on a scale of 1 to 5 for 'intensity' and 1 to 4 for 'offensiveness'. The levels for the two scales are shown in Table 13 and Table 14 below.

Table 13: Odour Intensity

Scale	Intensity Rating
0	No odour
1	Very faint odour (barely detectable, need to stand still and inhale facing into the wind)
2	Faint odour
3	Distinct odour (odour easily detectable while walking and breathing normally)
4	Strong odour
5	Very strong odour
6	Extremely strong odour (probably causing nausea)

Table 14: Odour Offensiveness

Scale	Offensiveness Rating
1	No detectable odour
2	Potentially Offensive
3	Moderately Offensive
4	Very Offensive

As well as recording the odour intensity and offensiveness, general comments on the nature of the odour is also be recorded, such as persistence, transience and potential source etc.

5.2.5 Action limits

If a score of 1 is recorded for intensity and offensiveness at a monitoring location, it is concluded that odour from the Facility cannot be detected and no action is required.

If a score of 2 or higher for intensity or 2 or higher for offensiveness is recorded, then a more detailed investigation is undertaken into the activities being undertaken and the root cause of the odour. This approach aims to identify the source of the odour and suggest possible ways to improve operations at the Facility to prevent odour being generated.

If further investigation is needed, all adjacent facilities to Kronospan are notified of the event and the corrective actions that are to be undertaken to mitigate off site impacts.

5.3 Weather monitoring

As detailed within section 3.4, the site management is responsible for monitoring weather forecasts and observations to provide data to inform any investigations into any odour complaints which are received.

5.4 QA/QC and record keeping

As detailed within section 5.2, records of monitoring are kept in a logbook in accordance with procedures documented in the site EMS. Monitoring records are regularly reviewed with the aim of improving odour management measures at the site.

5.5 Reporting of data

Reporting of data to NRW is undertaken as required in accordance with the conditions of the EP for the Facility. Any complaints received are reported to NRW in accordance with the reporting and complaints procedure for the site – refer to section 6 for further details.

5.6 Odour monitoring

Monitoring of odour from the point sources on site has been carried out. Extractive sampling and analysis to EN 13725 was conducted by a UKAS accredited laboratory.

The results of the monitoring is provided in Appendix E. This demonstrates that although WESP 21 has the highest odour concentration, the largest source of odour on site from a mass release rate is the MDF 2 cyclones.

6 Reporting and complaints response

The measures outlined in this OMP are aimed at preventing odour to the extent where complaints may be made at nearby sensitive receptors. Nevertheless, it is considered that having an established complaints procedure is an essential part of implementing a successful OMP.

As such, the EMS (see document KC/EHS/PRO/016) includes procedures for managing external complaints. This includes for complaints in relation to odour from the Facility. The procedures include those for the recording of the initial complaint, the approach to investigation of the possible cause, and determination of actions to prevent recurrence. This aligns with the requirements of the EP.

The EHS Department and Departmental Managers are responsible for handling any complaints that are received and for logging any complaints received in the site's incident reporting system. Complaints may be received directly by the site or through the NRW Incident Communications Centre. They are also responsible for investigating potential sources of the complaints and providing detail to NRW on the outcome of the investigation and whether any remedial actions have been implemented.

Public comments, complaints and concerns could be received by email, telephone or letter, either directly to the site or via the relevant authorities (such as the Local Planning Authority or NRW). Kronospan aims to respond to complaints within 2 working days of receipt, with a maximum time of 7 days implemented to respond to a complaint. An example resident complaint form is included within Appendix B.

6.1 Engagement with the community

Kronospan hosts quarterly Kronospan Liaison Group meetings with WCBC, NRW, Chirk Town Councillors and Unite the Union. Minutes are issued following these meetings along with a summary note that can be used by Chirk Town Councillors for onward communication into the local community. Some of these meetings are also followed by drop in sessions at the Parish Hall which are open to all.

Other contact to Kronospan should be made via the main site contact number or via NRW incident Communication Centre.

7 Actions

Should there be any unacceptable emissions of odour identified by the monitoring, a complaint, or departmental managers, the source and reason for the odour will be investigated and any relevant mitigation arranged. Under certain abnormal operations direction will be sought from Senior Management Team. This may involve the shut-down of operations causing the odour until a suitable mitigation measure can be put into place. However, a judgement will need to be made to ensure that any equipment can be safely shut-down.

The source and mitigation measures will be monitored by the departmental managers for as long as necessary to ensure that the mitigation measures have been successful and the unacceptable odour has been halted.

8 Improvements

This OMP is reviewed periodically to identify potential improvements and generate an odour reduction programme that enables continual improvement and reduction in odour, in line with the company's EMS.

Kronospan have recently submitted a permit variation to NRW to enable trials of chemical dosing within the wet abatement systems on site. These trials will utilise an oxidising agent, such as hydrogen peroxide, within the abatement systems to remediate the processed wood odour that is evident from the site emission points.

9 Summary

This OMP has been prepared to set out operational procedures to control and mitigate odour from the Facility. It is to be refined and updated on an annual basis as part of periodic reviews of the documented management systems at the Facility. Reviews will serve to confirm the identification of any new sensitive receptors, sources of odour, monitoring equipment or changes to relevant procedures (such as complaints handling and reporting).

A Plans and drawings



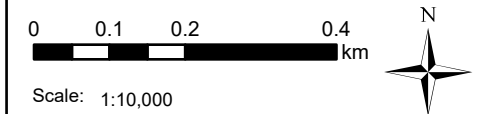
Legend

Installation Boundary

Client:	Kronospan
Site:	Chirk
Project:	2376_Kronospan_Management_Plans
Title:	

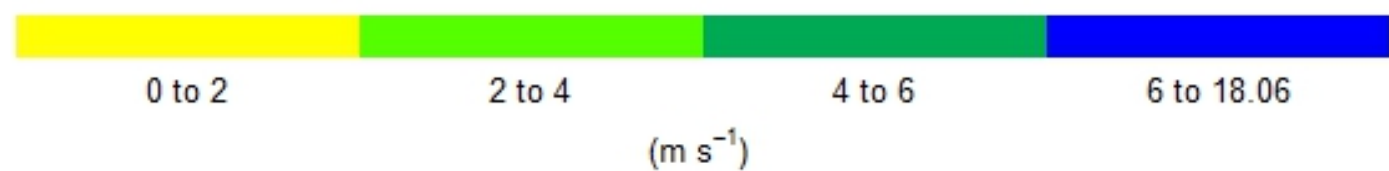
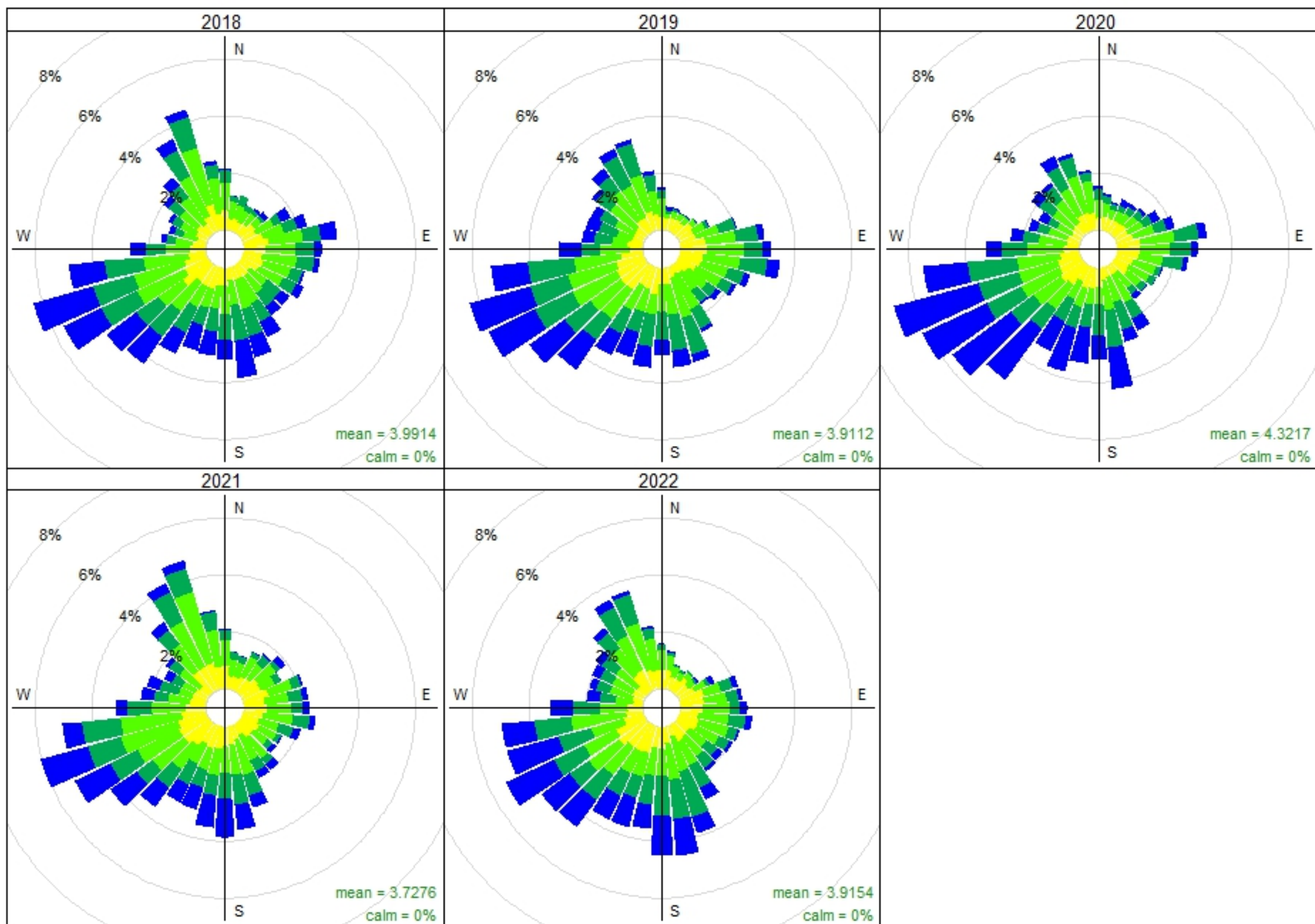
Figure 1 - Site Location

Drawn by: RSF	Date: 03/04/2023
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FICHTNER
Consulting Engineers Limited

Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618



Frequency of counts by wind direction (%)

Title:
Figure 2 - Shawbury met data wind roses

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Scale:

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Stockport, Cheshire, SK4 1LW
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Fax: 0161 474 0618

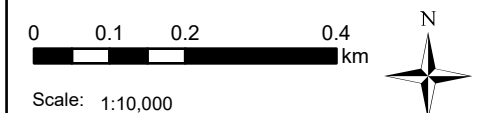


- Legend**
-  Installation Boundary
 -  Sensitive Receptors

Client:	Kronospan
Site:	Chirk
Project:	2376_Kronospan_Management_Plans
Title:	

Figure 3 - Sensitive Receptors

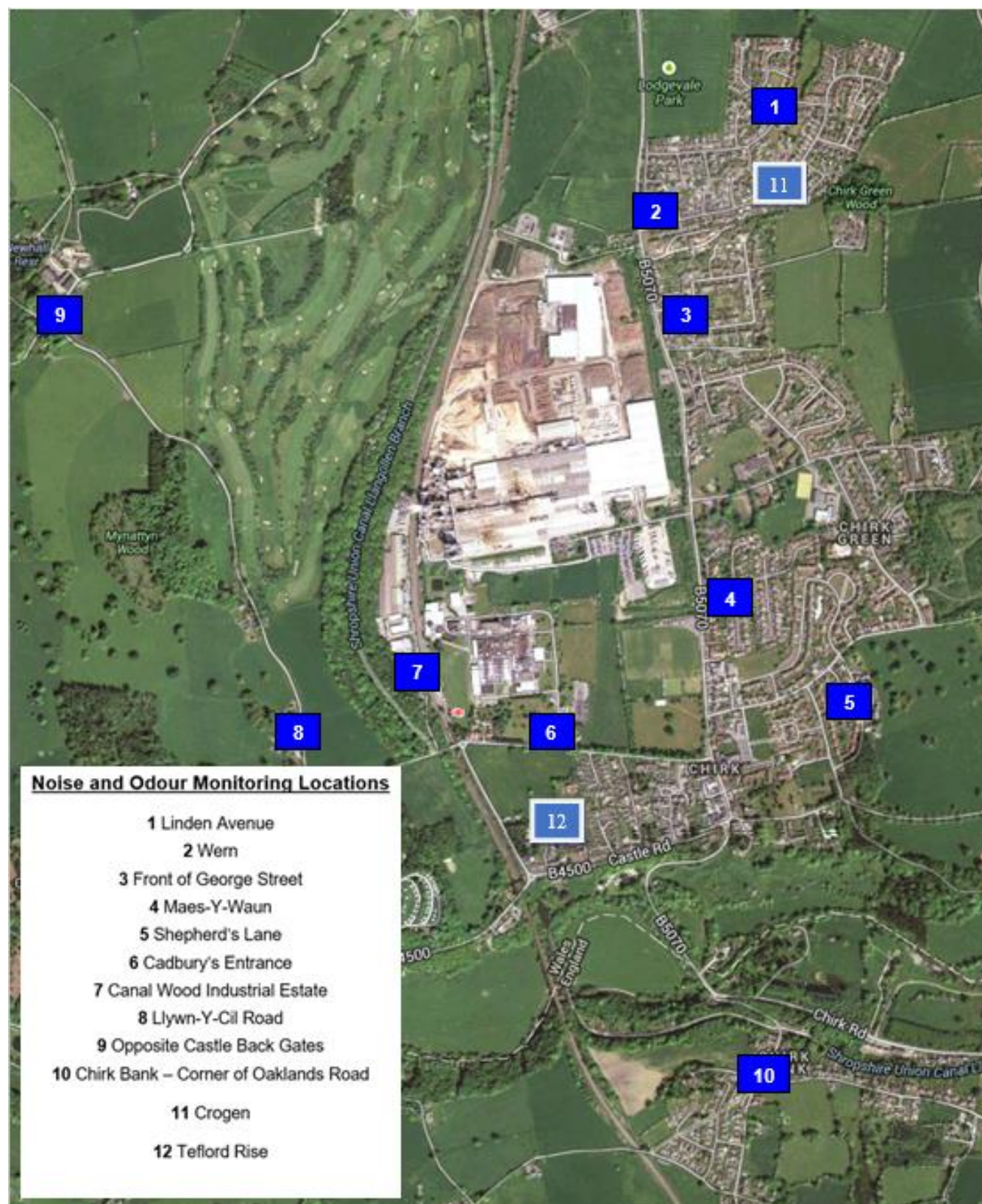
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Figure 4: Monitoring Sites



B Resident complaint form

DATE		TIME		Record fully at time of call
CALLER'S NAME		ADDRESS		
TELEPHONE		CAR REG.		
CALL TAKEN BY		INVESTIGATED BY		
WEATHER CONDITIONS				
COMPLAINT				Complete within 7 days
INVESTIGATION & CORRECTIVE ACTION (what was investigated; and what actions were taken)				
ROOT CAUSE				
PREVENTIVE ACTION (agreed process changes or management controls)				
RESPONSE TO CALLER				
DATE CLOSED		REF NO.		
Circulate immediately to: B Spruce M Jones C Barker, K Baker, C Prystaz, J Morris, C Emery, J Ewing, J Greenhalgh, D Speed, & V Smith				

C Odour assessment report

Time Start		Temperature	
Time End		Wind (Directions / Speed)	
Date		Cloud coverage	
Person Monitoring		Precipitation	

Location	Odour	Intensity	Offensiveness
1. Linden Avenue			
<i>Time:</i>			
2. Wern			
<i>Time:</i>			
11. Crogen			
<i>Time:</i>			
3. George Street (Co-op)			
<i>Time:</i>			
4. Maes-Y-Waun			
<i>Time:</i>			
5. Shepherd's Lane			
<i>Time:</i>			
12. Telford Rise			
<i>Time:</i>			
6. Cadbury's			
<i>Time:</i>			

7. Canal Wood Industrial Estate			
Time:			
8. Llywn-Y-Cil			
Time:			
9. Castle Gates			
Time:			
10. Chirk Bank			
Time:			

D Odour Registry

Supplied as a separate excel document

E Extractive Odour Monitoring Results

ALDERLEY CONSULTING GROUP

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ODOUR EMISSION TESTING

All Processes

KRONOSPAN Limited [CHIRK]

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Technical Director - ACG

Project No. 50279
October 2022

1.0 INTRODUCTION

In order to further assess the impact on local air quality associated with all aspects of production at the KRONOSPAN installation at Chirk the Environmental Regulator has requested that the principal outlet stacks be tested for odour release.

This was a one-off exercise undertaken by the *Alderley Consulting Group* during October 2022.

2.0 SAMPLING AND ANALYSIS METHODOLOGY

Odour sampling/analysis and test procedures employed conformed to procedures set out in reference method EN 13725 [in-house technical procedure TP-27]. Sampling was conducted by MCERTS Test House 10706 and sample analyses to determine odour concentrations were conducted by UKAS accredited Laboratory 8283 adopting in-house analytical procedure OL-012.

Volume flow determinations, to determine the mass release rates of odour, conformed to procedures set out in reference method EN 6911-1/TR 17078.

In accordance with the above standards all odour tests were repeated in triplicate and sample analyses were completed within 24-hours of actual sample collection.

3.0 RESULTS & NARRATIVE

Production status at site during the period of testing has been reported separately and full records are retained at site for inspection by the Environmental Regulator. Summary emission to atmosphere result data is presented in TABLE ONE overleaf while the accompanying series of 50279-DOSSIERS detail the respective relevant site data and result calculations in full MCERTS format.

As shown, most of the odour concentrations were very low, four of the eight outlets tested (ECS, A5 VITS, A6 VITS and K8) had values less than 1,000 odour units m^{-3} which, in concentration terms, means they are inconsequential.

The other four outlets (MDF1, MDF2, ceATec and SEKA 21) had slightly higher values, but still very low.

When what is described as a “*smelly*” stack is tested, values of over 100,000 odour units m^{-3} are encountered. Therefore, by comparison, the outlets at the KRONOSPAN(Chirk) installation are all low.

However, some of the associated air volumes are quite large and therefore the mass emissions do give substantial numbers; dispersion modelling is therefore necessary to quantify the likely impact on local air quality.

TABLE ONE

KRONOSPAN – Odour Emission Testing				
FULL REPORTING DOSSIER	PROCESS	INDIVIDUAL ODOUR CONCENTRATION ouE m ⁻³	MEAN ODOUR CONCENTRATION ouE m ⁻³	MEAN ODOUR MASS RELEASE RATE ouE s ⁻¹
50279-ONE	ECS	451 388 151	298	709
50279-TWO	A5 VITS	152 175 155	160	4,313
50279-THREE	A6 VITS	261 360 337	316	2,032
50279-FOUR	ceATec	1,818 1,680 1,517	1,667	75,554
50279-FIVE	K8	989 508 474	620	14,278
50279-SIX	MDF1	2,138 1,781 1,489	1,783	65,445*
50279-SEVEN	MDF2	3,887 4,126 4,042	4,017	307,639**
50279-EIGHT	SEKA 21	6,464 8,576 6,006	6,931	464,789

* NOTE – MDF1 has two cyclones and therefore the mass release rate must be doubled for dispersion modelling purposes

** NOTE – MDF2 has four cyclones and therefore the mass release rate must be quadrupled for dispersion modelling purposes

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