



**BRIDGEND PAPER MILL  
VESTA**

**Application for a Variation to Environmental Permit  
Number EPR/EP3738NG**

**AMENDED BAT ASSESSMENT**

**24 July 2026**

## 6.2 Amended BAT Assessment

### 6.2.1 Introduction and scope

This amended assessment replaces the BAT assessment previously provided at Section 6.2. It responds to the regulator's observation that the earlier assessment, although supported by appendices and cross-references, did not provide sufficient clarity. It sets out which BAT conclusions apply to each activity and, for each applicable conclusion, how WEPA follows it, including how any specified BAT-associated emission level (BAT-AEL) will be met. Where a conclusion does not apply, the reason is given, and where a conclusion is not to be followed a justification is provided. Secondary (horizontal) BAT from the relevant BREFs is addressed in Section 6.2.5.

The primary BAT reference for the activity is the *BAT conclusions for the production of pulp, paper and board* (Commission Implementing Decision 2014/687/EU, retained in UK law), which implement the associated BREF (EU 2015). Two points of basis have been revised from the earlier assessment: the installation is a **non-integrated tissue paper machine**, so the applicable water-flow reference in BAT 5 is that for a non-integrated paper mill (3.5 – 20 m<sup>3</sup>/t) and the water BAT-AELs are those of **Table 20 (BAT 50)** rather than the RCF-pulp-mill ranges cited previously.

### 6.2.2 Nature of the installation

The Vesta project replaces the 1970s 'Jupiter' machine with a new, more efficient tissue machine (S6.1 A(1)(b), production capacity exceeding 20 tonnes/day; average output approximately 227 tonnes/day; annual capacity approximately 65,000 tonnes). Fibre is received as bought-in virgin market pulp and broke; the standard product uses up to 30% white recycled fibre/paper, with the machine capable of a specialist product up to 100% recycled. Critically, the installation carries out no chemical or mechanical pulping from wood, no processing of recovered paper (RCF pulping/deinking) and no coating. It is therefore, in BREF terms, a non-integrated paper mill (tissue).

This scope determines which BAT conclusions are engaged. The general conclusions (BAT 1–18) apply to the whole installation; the papermaking conclusions (BAT 47–53) apply to the machine; and the process-specific pulping and RCF conclusions (BAT 19–46) are not engaged because those unit operations are not present. Steam and power are supplied by the site energy plant (an existing gas-fired CHP, which has been replaced by a new steam boiler house permitted separately under PAN-026789 / planning P/24/406/FUL), and the existing Effluent Treatment Plant (ETP) is an existing permitted activity, unchanged by this variation. Where a conclusion is delivered through those linked activities this is identified so the boundary of the Vesta variation is clear.

## Which BAT conclusions apply to each activity

The following table maps each activity/unit to the BAT conclusions it engages, before the detailed determination in Section 6.2.4.

| Activity / unit                                                                        | Listed-activity status                                                                                                               | BAT conclusions engaged                                                                                                                                  |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Vesta tissue paper machine (forming, pressing, Yankee drying, creping, reeling)</b> | S6.1 A(1)(b) — the new Schedule 1, Part 2 listed activity subject to this variation (>20 t/day; average 227 t/day).                  | General BAT 1, 2, 5, 6, 8, 9, 12, 17, 18; papermaking BAT 47, 50, 52, 53. Water-general BAT 13–16 via the ETP.                                           |
| <b>Stock preparation (pulping of bought-in virgin market pulp + broke)</b>             | Part of the papermaking activity (non-integrated — no on-site fibre pulping from wood or recovered paper).                           | BAT 2, 5, 47, 52, 53. RCF conclusions (BAT 42–46) and wood-prep BAT 4 not engaged.                                                                       |
| <b>Yankee hood gas-fired burners (emission point A17)</b>                              | Directly associated combustion for drying — dryer with internal burner (excluded from LCP; within paper BREF scope for the machine). | BAT 8 (combustion parameters), BAT 9 (NO <sub>x</sub> monitoring). NO <sub>x</sub> BAT-AEL for the hood is set as a permit ELV (40 mg/Nm <sup>3</sup> ). |
| <b>Effluent Treatment Plant (existing)</b>                                             | Existing permitted activity — not altered by this variation (no increase in flow/load).                                              | BAT 13–16, and the discharge governed by BAT 50 / Table 20. Covered by the existing permit; referenced, not re-determined.                               |
| <b>Steam boiler house (replacing CHP)</b>                                              | Separately permitted (PAN-026789 / P/24/406/FUL).                                                                                    | BAT 6(a) energy management; combustion BAT assessed under the LCP BREF in that application.                                                              |

## 6.2.3 How to read the assessment

Each BAT conclusion is listed in the master table at Section 6.2.4 with: a summary of the requirement (and any BAT-AEL); an applicability determination; and a statement of how WEPA follows it, or the reason it is not applicable, or the justification where it is not to be followed. The colour key below is used throughout.

|                                 |                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicable — followed</b>    | The BAT conclusion applies to the activity and is (or will be) met in full; the technique(s) adopted and, where relevant, the associated emission level are identified.                                                                              |
| <b>Applicable — conditional</b> | The BAT conclusion applies and is followed, but delivery depends on a linked activity (e.g. the ETP or the separately-permitted boiler house) or requires a quantitative demonstration to be appended (e.g. a load calculation against the BAT-AEL). |
| <b>Not applicable</b>           | The BAT conclusion does not apply to the Vesta installation; the reason is stated (e.g. no on-site pulping, no coating, no speciality grades, no wood yard).                                                                                         |

## 6.2.4 BAT conclusions determination (Decision 2014/687/EU)

The assessment covers every conclusion from BAT 1 to BAT 53. Conclusions BAT 19–41 (kraft, sulphite and mechanical/chemimechanical pulping) are not reproduced individually: none applies, for the single reason that no chemical or mechanical pulping is carried out at the installation. BAT 42–46 (RCF processing) are addressed as a group for the same reason. All conclusions that can apply to a non-integrated tissue machine are assessed in full below.

| BAT                                                                          | Summary of BAT conclusion requirement                                                                                                                                                                                                                                                                                                                                                                                                                    | Applicability         | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General BAT conclusions for the pulp and paper industry (Section 1.1)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BAT 1                                                                        | Implement and adhere to an environmental management system (EMS) covering management commitment, environmental policy, planning, procedures (structure, training, communication, documentation, process control, maintenance, emergency response, legal compliance), performance checking and corrective action, senior-management review, cleaner-technology tracking, decommissioning at design stage, and sectoral benchmarking.                      | Applicable — followed | <p>The Bridgend mill operates an EMS certified to BS EN ISO 14001:2015, fully integrated with an ISO 9001:2015 quality system (Appendix 11; Appendix 10 Management Structure).</p> <p>The Vesta variation is a substantial change: within twelve months of commissioning the Operator will update the existing EMS to incorporate all new plant, procedures, aspects/impacts, monitoring and maintenance schedules (Improvement Plan, Section 7).</p> <p>General environmental-risk management techniques are described in Section 4.4; sectoral benchmarking is provided by comparison of Vesta against the outgoing Jupiter machine (Section 4.7).</p> |
| <b>Materials management and good housekeeping (Section 1.1.2)</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BAT 2                                                                        | Apply good-housekeeping principles by a combination of: (a) careful selection/control of chemicals; (b) input-output chemical inventory; (c) minimising chemical use to product-quality need; (d) avoiding harmful substances (e.g. NPEs) and substituting less harmful alternatives; (e) minimising inputs to soil from leakage/deposition/storage; (f) spill-management programme and containment; (g) proper piping/storage design to reduce washing. | Applicable — followed | <p>Process chemicals, consumptions, storage volumes and locations are given in Appendix 15, with containment shown on Appendix 17 and Safety Information Sheets in Appendix 16 — providing the chemical inventory (b) and selection/control basis (a).</p> <p>Chemical use is minimised to the level required by tissue-product quality (c); harmful substances are avoided and substituted where alternatives exist (d).</p> <p>Bunded/contained storage, a documented spill-management procedure and the sealed/contained drainage described in Section 4.4 deliver (e), (f) and (g).</p>                                                              |
| BAT 3                                                                        | Reduce release of poorly biodegradable chelating agents (EDTA/DTPA) from peroxide bleaching, by a combination of measurement, process optimi-                                                                                                                                                                                                                                                                                                            | Not applicable        | <b>Not applicable.</b> The Vesta installation is a non-integrated tissue paper machine using bought-in virgin market pulp and broke; there is no on-site pulping and no peroxide bleaching. EDTA/DTPA chelating agents                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| BAT                                                      | Summary of BAT conclusion requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Applicability                              | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                          | sation and preferential use of biodegradable/eliminable agents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            | are not used in the papermaking process, so no chelating-agent releases arise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Water and waste water management (Section 1.1.3)</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>BAT 4</b>                                             | Reduce generation and pollution load of waste water from wood storage/preparation (dry debarking, contamination-avoiding log handling, wood-yard paving, sprinkling-water control, contaminated run-off collection).                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Not applicable</b>                      | <b>Not applicable.</b> There is no wood handling, debarking or wood-yard on site. Fibre is received as baled virgin market pulp and broke; no round-wood is stored or processed, so this conclusion does not apply.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>BAT 5</b>                                             | <p>Close the water system to the degree technically feasible for the grade produced, using a combination of: (a) monitoring/optimising water use; (b) evaluating recirculation; (c) balancing circuit closure vs drawbacks; (d) separating/re-using sealing water; (e) separating clean cooling water from process water; (f) reusing process water to substitute fresh water; (g) in-line treatment of process water.</p> <ul style="list-style-type: none"> <li>BAT-associated waste-water flow (reference flow) — the relevant benchmark for the site's grade is a non-integrated paper mill: 3.5 – 20 m<sup>3</sup>/t (BAT 5 table).</li> </ul> | <b>Applicable — followed</b>               | <p><b>Followed.</b> Vesta is designed for a highly closed water circuit with an automatic water-management system (dimensioning of chests/tanks, automatic metering and control — Appendices 7 and 14 Water mass balance). Fresh-water demand is 4.5 m<sup>3</sup>/t of product; the machine is designed for progressive circuit closure with the future potential of a fully closed loop.</p> <p>Techniques employed: continuous monitoring/optimisation of water use (a); white-water recirculation and fibre/filler recovery (b, f — see BAT 47); separation and re-use of vacuum sealing water (d); separation of clean cooling water from process water (e); and in-line white-water clarification (g).</p> <p><i>Reference-flow basis correction:</i> as a non-integrated paper mill the applicable BAT 5 reference flow is 3.5 – 20 m<sup>3</sup>/t, not the RCF-pulp-mill figure of 1.5 – 10 m<sup>3</sup>/t cited in the previous assessment. At 4.5 m<sup>3</sup>/t fresh-water use (with lower net discharge after recirculation) the installation sits at the efficient end of the applicable range.</p> |
| <b>Energy consumption and efficiency (Section 1.1.4)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>BAT 6</b>                                             | Reduce fuel/energy use by (a) an energy-management system [mandatory], plus a combination of: (b) energy recovery by incineration of high-calorific residues; (c) cover steam/power demand by CHP as far as possible; (d) use excess heat for drying/feedwater/buildings; (e) thermo-compressors; (f) insulate steam/condensate fittings;                                                                                                                                                                                                                                                                                                           | <b>Applicable — followed (conditional)</b> | <p><b>Applicable to the papermaking activity and followed.</b> An energy-management system with metering/monitoring across the facility is in place (a) (Appendices 7).</p> <p>Vesta incorporates: waste-heat recovery from the Yankee hood exhaust and process streams (d); insulated steam/condensate systems (f); energy-efficient vacuum dewatering (g); high-efficiency motors, pumps and agitators (h); frequency inverters/adjustable-speed drives on fans, com-</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| BAT                                                                       | Summary of BAT conclusion requirement                                                                                                                                                                                             | Applicability                       | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                           | (g) energy-efficient vacuum systems; (h) high-efficiency motors/pumps/agitators; (i) frequency inverters; (j) match steam-pressure levels to need.                                                                                |                                     | <p>pressors and pumps (i); and steam-pressure matching (j). Detailed energy-efficiency features are listed in Section 4.8.</p> <p><i>Boundary note (c):</i> steam and power are supplied by the site energy plant. The existing gas-fired CHP is being replaced by a new steam boiler house (planning ref. P/24/406/FUL), permitted under a separate variation (PAN-026789). Combustion-plant energy performance and the CHP-vs-boiler option are assessed under that application and the LCP BREF (secondary), not repeated here.</p> <p><i>Techniques (b) and (e)</i> are not adopted: on-site incineration of residues (b) is not proposed as residues are routed to recovery/recycling off-site (see BAT 12); thermo-compressors (e) are not required by the machine steam system. Both are optional elements of a combination and their omission is consistent with BAT 6.</p> |
| <b>Emissions of odour (Section 1.1.5)</b>                                 |                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BAT 7                                                                     | Prevent/reduce odour from the waste-water system (avoid prolonged retention/dead zones; biocides/oxidising agents; internal ‘kidney’ treatment; closed sewers; controlled aeration; sludge-handling controls).                    | Not applicable                      | <p><b>Not applicable to the Vesta activity.</b> Vesta discharges to the existing site Effluent Treatment Plant (ETP), which is an existing permitted activity outside the scope of this variation and is unchanged by the Vesta project (no increase in flow or load, Jupiter is shut down before Vesta start-up). Odour control at the ETP is managed under the existing permit. Within the paper machine, water-system design avoids dead zones and stagnation consistent with the intent of BAT 7.</p>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Monitoring of key process parameters and emissions (Section 1.1.6)</b> |                                                                                                                                                                                                                                   |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BAT 8                                                                     | Monitor key process parameters — for combustion: pressure, temperature, O <sub>2</sub> , CO, water-vapour content in flue gas (continuous); for water: flow, temperature, pH (continuous), plus periodic biomass/nutrient checks. | Applicable — followed (conditional) | <p><b>Applicable and followed for the relevant parameters.</b> The Yankee hood is fitted with gas-fired burners; combustion parameters (temperature, O<sub>2</sub>, CO) are monitored on the process-control system for the drying hood.</p> <p>Water flow, temperature and pH of the papermaking circuits are monitored continuously via the automatic water-management system (Appendix 6 and 7).</p> <p><i>Boundary note:</i> recovery-boiler / biological-treatment parameters are managed at the</p>                                                                                                                                                                                                                                                                                                                                                                           |

| BAT                                     | Summary of BAT conclusion requirement                                                                                                                                                                                                               | Applicability                       | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         |                                                                                                                                                                                                                                                     |                                     | ETP and the separately-permitted boiler house, not within this variation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| BAT 9                                   | Carry out monitoring/measurement of emissions to air (NO <sub>x</sub> , SO <sub>2</sub> , dust, TRS, NH <sub>3</sub> as relevant) at the indicated frequency and to EN standards; recovery-boiler NO <sub>x</sub> /SO <sub>2</sub> continuous, etc. | Applicable — followed (conditional) | <p><b>Applicable to the single air release point of the activity and followed.</b> The only significant point-source emission to air from Vesta is the Yankee hood exhaust vent (emission point A17), whose sole significant parameter is oxides of nitrogen (NO<sub>x</sub>, as NO<sub>2</sub>) from the gas-fired hood burners.</p> <p>NO<sub>x</sub> will be monitored to BS EN 14792 by an MCERTS-accredited third party. Consistent with the current permit and the Neptune machine, spot sampling is proposed once per year; sampling-port design follows NRW Guidance Note M1. In addition, the Operator will install MCERTS-certified automated monitoring (AMS) for NO<sub>x</sub> at the release point, with installation/operation demonstrated to BS EN 14181 (Pre-operational condition, Section 7).</p> <p>SO<sub>2</sub>, dust and TRS: recovery-boiler / lime-kiln parameters do not arise (no chemical pulping on site); dust and steam vents (A16, A18) are insignificant (Section 4.2).</p> |
| BAT 10                                  | Monitor emissions to water (COD/TOC daily; BOD, Tot-N, Tot-P weekly; EDTA/DTPA, AOX, metals periodically) to EN standards.                                                                                                                          | Applicable — followed (conditional) | <p><b>Applicable at the installation discharge point and delivered through the ETP.</b> All Vesta process water passes to the existing ETP, whose discharge to the River Llynfi (release point W1) is monitored under the existing permit for suspended solids, BOD, pH, temperature and the other determinands it specifies.</p> <p>Because Vesta only starts after Jupiter shuts down, there is no increase in discharge flow or load; the existing monitoring regime remains representative and adequate. Determinand suite and frequencies are set by the existing permit consistent with BAT 10.</p>                                                                                                                                                                                                                                                                                                                                                                                                      |
| BAT 11                                  | Regularly monitor and assess diffuse total reduced sulphur (TRS) emissions from relevant sources.                                                                                                                                                   | Not applicable                      | <b>Not applicable.</b> TRS (malodorous reduced-sulphur gases) arises from kraft/sulphite chemical pulping, which is not carried out on site. No TRS sources are present at the Vesta installation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Waste management (Section 1.1.7)</b> |                                                                                                                                                                                                                                                     |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BAT 12                                  | Reduce wastes sent for disposal via a waste assessment                                                                                                                                                                                              | Applicable —                        | All waste from the installation is monitored, with disposal routes selected through a hi-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



| BAT                                                 | Summary of BAT conclusion requirement                                                                                                                                                                                                                               | Applicability                       | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     | (inventories) and management system to facilitate reuse/recycling/other recovery, using: separate collection; merging suitable fractions; pre-treatment; on-site material recovery/recycling; energy recovery; external utilisation; pre-treatment before disposal. | followed                            | <p>erarchy of reuse, recycling and recovery. A waste-minimisation programme (with routine audits under the EMS) is integrated into plant operation.</p> <p>Waste fractions are segregated (a); process residues and broke are recovered and recycled on site (d — see BAT 52); fibre-bearing sludge is treated/re-used; a full record of quantity, nature, origin, destination, carrier and treatment method is maintained per Duty of Care.</p> |
| <b>Emissions to water — general (Section 1.1.8)</b> |                                                                                                                                                                                                                                                                     |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| BAT 13                                              | Reduce nutrient (N, P) emissions to receiving waters by substituting high-N/P chemical additives with low-N/P additives.                                                                                                                                            | Applicable — followed (conditional) | <b>Applicable; delivered via ETP nutrient control.</b> The biological ETP requires nutrient dosing (N and P) for treatment; dosing is controlled to the actual need of the biomass to avoid surplus nutrient in the final effluent (see BAT 16). Papermaking additives are selected under BAT 2 to minimise nutrient contribution where practicable.                                                                                             |
| BAT 14                                              | Reduce emissions of pollutants to receiving waters using both (a) primary (physico-chemical) treatment and (b) secondary (biological) treatment.                                                                                                                    | Applicable — followed               | Delivered by the existing ETP, which provides primary (physico-chemical) treatment followed by secondary biological (activated-sludge) treatment before discharge to the River Llynfi (Appendix 19). The ETP was designed for four paper machines and has sufficient capacity for the projected flows.                                                                                                                                           |
| BAT 15                                              | Where further removal of organics, N or P is needed, use tertiary treatment.                                                                                                                                                                                        | Applicable — followed (conditional) | <b>Applicable if required.</b> The existing ETP achieves the discharge limits set in the current permit through primary and secondary treatment; tertiary treatment is not currently required to meet those limits. Because Vesta does not increase load, no additional tertiary stage is triggered by this variation. Should future permit limits require further N/P/organics removal, tertiary treatment would be evaluated.                  |
| BAT 16                                              | Reduce pollutants from the biological treatment plant by (a) proper design/operation; (b) regular control of active biomass; (c) adjusting nutrient supply to the biomass need.                                                                                     | Applicable — followed               | The activated-sludge ETP is operated with regular biomass control and nutrient dosing matched to biomass demand (linking to BAT 13). Operation and monitoring are managed under the existing permit and the EMS (Appendix 19).                                                                                                                                                                                                                   |
| <b>Emissions of noise (Section 1.1.9)</b>           |                                                                                                                                                                                                                                                                     |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



| BAT                                                                           | Summary of BAT conclusion requirement                                                                                                                                                                                                                                                           | Applicability         | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BAT 17                                                                        | Reduce noise emissions by a combination of: noise-reduction programme; strategic layout of equipment/buildings; operational/management techniques; enclosure of noisy equipment; low-noise equipment and silencers; vibration insulation; soundproofing of buildings; noise abatement/barriers. | Applicable — followed | <p>A full Noise Assessment (Appendix 22) has been undertaken. Predicted noise-rating levels from the new plant are 19 – 28 dB; daytime rating levels at all receptors are at least 13 dB below background.</p> <p>Techniques employed: strategic building/equipment layout (b); housing of the machine within a statically-isolated concrete building with soundproofing (d, g); low-noise equipment and silencers/attenuators on vents (e, h); and vibration isolation of machinery (f). Six months before commissioning the Operator will confirm to NRW that the design is unchanged from that assessed, and a post-commissioning noise survey (BS 4142) is included in the Pre-operational conditions (Section 7).</p> |
| <b>Decommissioning (Section 1.1.10)</b>                                       |                                                                                                                                                                                                                                                                                                 |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| BAT 18                                                                        | Prevent pollution risks on decommissioning: avoid/document underground tanks and piping; instructions for emptying equipment; clean closure and site rehabilitation; groundwater monitoring programme; maintain a risk-based site-closure scheme.                                               | Applicable — followed | <p>Decommissioning measures are described in Section 4.4 (paragraphs 4.4.13 – 4.4.21). The design documents underground services (see culvert/ utilities relocation, Appendix 3); the plant is constructed asbestos-free; and a clean-closure approach with material recycling under Duty of Care is adopted.</p> <p>Consideration of decommissioning impacts at the design stage also satisfies BAT 1(h). A site-closure scheme and, where relevant, groundwater monitoring would be maintained through the EMS.</p>                                                                                                                                                                                                      |
| <b>BAT conclusions for processing paper for recycling — RCF (Section 1.5)</b> |                                                                                                                                                                                                                                                                                                 |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| BAT 42–46                                                                     | Materials management for the paper-for-recycling yard (BAT 42); fresh-water/waste-water reduction and advanced water-circuit closure in RCF processing (BAT 43, 44, 45 and associated AELs, Tables 18/19); and reduction of electrical energy in RCF processing (BAT 46).                       | Not applicable        | <p><b>Not applicable at present.</b> Vesta is a non-integrated paper machine; there is no on-site RCF pulping / paper-for-recycling processing line and no deinking. Recycled content is introduced as bought-in white recycled fibre/paper rather than processed from a recovered-paper yard. In the standard product configuration Vesta runs up to 30% white recycled fibre; the machine also has the capability to run a specialist product up to 100% recycled, but recovered-paper processing (pulping, screening, cleaning, deinking) is not part of the permitted installation.</p>                                                                                                                                |

| BAT                                                                                            | Summary of BAT conclusion requirement                                                                                                                                                                                                                                                                                                                                                                                         | Applicability                       | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     | <i>Note / trigger for review:</i> should WEPA in future install on-site recovered-paper processing plant to feed Vesta, the RCF conclusions (BAT 42–46) and the RCF-without-deinking water-flow reference (1.5 – 10 m <sup>3</sup> /t, BAT 5) would then apply and the BAT assessment would be revised accordingly.                                                                                                                                                                                                                                     |
| <b>BAT conclusions for papermaking and related processes (Section 1.6) — the core activity</b> |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| BAT 47                                                                                         | Reduce generation of waste water by a combination of: (a) optimum design/construction of tanks and chests; (b) fibre and filler recovery and white-water treatment; (c) water recirculation; (d) optimisation of paper-machine showers.                                                                                                                                                                                       | Applicable — followed               | The automatic water-management system provides optimally-dimensioned chests and storage tanks with metering and control, avoiding spillage/overflow (a) (Appendix 7).<br><br>Fibre and filler are recovered from white water and re-used (b); white water is recirculated within the machine circuit (c); and shower systems on the paper machine are optimised for water efficiency (d).                                                                                                                                                               |
| BAT 48                                                                                         | Reduce fresh-water use and emissions to water from speciality paper mills (production planning, water-circuit management, WWTP flexibility, broke-system adjustment, minimisation of PFAS-type additives, low-AOX product aids).                                                                                                                                                                                              | Not applicable                      | <b>Not applicable.</b> Vesta produces standard hygiene tissue, not speciality papers as defined in the BAT conclusions (e.g. cigarette, filter, thermal, décor papers). No grease-/water-repellent (PFAS-type) or high-wet-strength/epichlorohydrin additives are used, so the speciality-paper techniques do not apply.                                                                                                                                                                                                                                |
| BAT 49                                                                                         | Reduce emission loads of coating colours/binders that can disturb biological treatment, by (a) recovery/recycling of coating colours or, if not feasible, (b) pre-treatment of coating-colour effluents.                                                                                                                                                                                                                      | Not applicable                      | <b>Not applicable.</b> Vesta is an uncoated tissue machine; no coating colours or binders are applied, so no coating-colour effluent arises.                                                                                                                                                                                                                                                                                                                                                                                                            |
| BAT 50                                                                                         | Prevent and reduce the pollution load of waste water into receiving waters from the whole mill, using a suitable combination of BAT 13, 14, 15, 47, 48 and 49.<br><ul style="list-style-type: none"><li>BAT-associated emission levels — non-integrated paper/board mill (Table 20), yearly averages:</li><li>COD 0.15 – 1.5 kg/t; TSS 0.02 – 0.35 kg/t; Tot-N 0.01 – 0.15 kg/t (tissue); Tot-P 0.003 – 0.012 kg/t;</li></ul> | Applicable — followed (conditional) | <b>Applicable — this is the water BAT-AEL that applies to the Vesta activity.</b> The pollution load to the River Llynfi is controlled through the combination of BAT 13, 14, 15 and 47 delivered by the ETP and machine water circuit (BAT 48 and 49 are not applicable as above).<br><br><i>Correct BAT-AEL basis:</i> as a non-integrated tissue machine, the applicable BAT-AELs are those of Table 20 (non-integrated paper/board mill), with the tissue Tot-N range 0.01 – 0.15 kg/t rather than the RCF-pulp-mill ranges. The earlier assessment |

| BAT    | Summary of BAT conclusion requirement                                                                                                                                                                                                                                                      | Applicability         | How WEPA follows the BAT conclusion / justification where not applicable or not followed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        | AOX 0.05 kg/t (décor/wet-strength only).                                                                                                                                                                                                                                                   |                       | <p>applied the RCF ranges; Table 20 is the correct basis.</p> <p><i>Demonstration of compliance:</i> because Vesta starts only after Jupiter is shut down, there is no net increase in discharge; the existing ETP discharge already operates within the existing permit limits, which are consistent with the Table 20 BAT-AEL range. The yearly-average load calculation for COD, TSS, Tot-N and Tot-P against the Table 20 ranges is presented in Section 6.2.6: all four determinands meet the BAT-AELs (Tot-P lies below even the lower end of its range).</p>                                                                                                                                                                                                                                       |
| BAT 51 | Reduce VOC emissions from off-line or on-line coaters by choosing coating-colour recipes that reduce VOC emissions.                                                                                                                                                                        | Not applicable        | <b>Not applicable.</b> There is no coater on the Vesta machine, so no coating-related VOC emissions arise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BAT 52 | Minimise solid waste to disposal by preventing waste and recycling, using: (a) fibre and filler recovery/white-water treatment; (b) broke recirculation; (c) recovery/recycling of coating pigments; (d) reuse of primary fibre sludge.                                                    | Applicable — followed | <p>Fibre and filler are recovered from white water (a) and broke from all stages is collected, re-pulped and returned to the fibre feedstock (b) — see the process description (Appendices 3 and 7).</p> <p>Fibre-rich sludge from primary treatment is re-used in the process where quality allows (d). Technique (c) is not applicable (no coating pigments — see BAT 49/51).</p>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| BAT 53 | Reduce thermal and electrical energy consumption by a combination of energy-efficient techniques (efficient screening/refining, optimised dewatering, condensate and exhaust-air heat recovery, efficient vacuum systems, high-efficiency motors, Yankee-hood and IR heat recovery, etc.). | Applicable — followed | <p>Vesta is designed as a low-energy machine; energy-efficiency techniques are set out in Section 4.8 of the Application Report and in Appendix 13.</p> <p>Applicable techniques adopted include: steam-condensate recovery and efficient exhaust-air heat recovery (d); optimised/energy-efficient vacuum system (k); high-efficiency motors with adjustable-speed drives (n, h); optimised heat recovery, air systems and insulation (m); pre-heating of shower water via heat exchanger (o); and heat recovery from the Yankee-hood exhaust (q, r) and infrared exhaust air (s).</p> <p><i>Grade-specific exclusions:</i> wide-nip press dewatering (c) and steam-box web heating (j) are noted in BAT 53 as not applicable to tissue; their omission is therefore consistent with the conclusion.</p> |

## 6.2.5 Secondary (horizontal) BAT

Secondary BAT for the installation is found in the relevant horizontal BREFs. The principal combustion BAT (LCP BREF, Decision (EU) 2017/1442) is engaged by the new boiler house that supplies steam to Vesta and is assessed under the separate boiler-house permit variation; it is cross-referenced here so that the whole-installation picture is complete. The other horizontal references are addressed as below.

| Horizontal / secondary BREF                                                            | Relevance to the Vesta installation                                                                                               | How addressed / where covered                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Large Combustion Plants (LCP) — Commission Implementing Decision (EU) 2017/1442</b> | Steam and power for Vesta are supplied by the site energy plant. The gas-fired CHP is being replaced by a new steam boiler house. | Combustion-plant BAT (including NOx/CO/energy-efficiency AELs) is assessed under the separate boiler-house permit variation (PAN-026789 / planning P/24/406/FUL), not within this papermaking variation. Cross-referenced here for completeness. |
| <b>Energy Efficiency (ENE)</b>                                                         | General mill energy efficiency beyond the sector-specific BAT 6 and BAT 53.                                                       | Energy-management system, metering and efficiency measures — Section 4.8 of Application Report, and Appendix 7 and 13.                                                                                                                           |
| <b>Emissions from Storage (EFS)</b>                                                    | Storage of process chemicals and additives.                                                                                       | Storage volumes, locations, bunding/containment and SIS — Appendices 15, 16 and 17; good housekeeping — Section 4.4 of Application Report (BAT 2).                                                                                               |
| <b>Industrial Cooling Systems (ICS)</b>                                                | Any cooling-water systems associated with the machine/vacuum plant.                                                               | Clean cooling water is separated from process water and re-used (BAT 5(e)); no evaporative cooling towers are introduced by the project.                                                                                                         |
| <b>General Principles of Monitoring (MON)</b>                                          | Basis for emissions monitoring to air and water.                                                                                  | Monitoring follows EA Technical Guidance M1/M2 and the MON reference document; air monitoring to BS EN 14792 / BS EN 14181 — Section 4.5 and Section 7 of Application Report.                                                                    |
| <b>Economics and Cross-Media Effects (ECM)</b>                                         | Cross-media weighing of technique options (e.g. water-circuit closure vs energy/odour).                                           | Cross-media effects considered in the design (e.g. balancing water-circuit closure against drawbacks under BAT 5(c)); Vesta reduces energy, water and CO <sub>2</sub> relative to Jupiter (Section 4.7 of Application Report).                   |
| <b>Waste Treatment (WT) / Waste Incineration (WI)</b>                                  | Preparation of wastes/residues as fuels or on-site incineration.                                                                  | Not applicable — no on-site incineration or waste-to-fuel preparation is proposed; residues are routed to off-site recovery/recycling (BAT 12).                                                                                                  |

## 6.2.6 BAT-associated emission levels and how they will be met

Two BAT-AELs are directly relevant to the Vesta activity, together with the permit ELV for the hood.

### Waste-water discharge (BAT 50, Table 20 — non-integrated paper/board mill)

The applicable yearly-average BAT-AELs are: COD 0.15 – 1.5 kg/t; TSS 0.02 – 0.35 kg/t; total nitrogen 0.01 – 0.15 kg/t (tissue); total phosphorus 0.003 – 0.012 kg/t; AOX 0.05 kg/t (décor/wet-strength paper only, not relevant here). These are met because the combined discharge to the River Llynfi (release point W1) is treated by the existing primary + biological ETP to the limits in the existing permit, and because Vesta starts only after Jupiter is shut down there is no net increase in flow or load.

The yearly-average loads for COD, TSS, Tot-N and Tot-P, derived from the Water Mass Balance (Appendix 14) and the ETP discharge monitoring (yearly averages), are presented below against the Table 20 (BAT 50) ranges:

| Parameter | Yearly-average load (kg/t) | Table 20 BAT-AEL (kg/t) | Position                 |
|-----------|----------------------------|-------------------------|--------------------------|
| COD       | 0.383                      | 0.15 – 1.5              | within range             |
| TSS       | 0.211                      | 0.02 – 0.35             | within range             |
| Tot-N     | 0.036                      | 0.01 – 0.15 (tissue)    | within range             |
| Tot-P     | 0.0025                     | 0.003 – 0.012           | below lower end of range |

COD, TSS and Tot-N each lie within their Table 20 ranges. Tot-P, at 0.0025 kg/t, is below the lower end of its range, so the discharge performs better than the range requires. All four yearly-average loads meet the BAT-AELs of Table 20 (BAT 50).

### Oxides of nitrogen at the Yankee hood (emission point A17)

The gas-fired high-temperature hood is the only significant point source to air. A permit emission limit of 40 mg/Nm<sup>3</sup> NO<sub>x</sub> (as NO<sub>2</sub>) is proposed for normal operation. This will be met by the low-NO<sub>x</sub> design of the hood burners and demonstrated by: MCERTS spot sampling to BS EN 14792 once per year (consistent with the current permit and the Neptune machine), and MCERTS-certified automated monitoring (AMS) installed and operated to BS EN 14181 (Pre-operational condition, Section 7). During commissioning, NO<sub>x</sub> may exceed 40 mg/Nm<sup>3</sup> for a limited period (approximately 3–4 weeks of ‘first paper’ and reduced-load running); mass emission over this period is lower than at full operation because flue-gas mass flow is much reduced. A commissioning plan setting out expected emissions, durations and reporting arrangements will be submitted to NRW for approval.

### Waste-water reference flow (BAT 5)

For a non-integrated paper mill the BAT 5 reference flow is 3.5 – 20 m<sup>3</sup>/t. Vesta’s design fresh-water use of 4.5 m<sup>3</sup>/t of product, with a lower net discharge after white-water recirculation, sits at the efficient end of that range and is consistent with the closed-circuit techniques listed under BAT 5 and BAT 47.