Intended for
MEG Derby Limited

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MEG DERBY LIMITED

FOOD, DRINK & MILK INDUSTRIES BREF REVIEW

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1. INTRODUCTION

This document has been prepared to support the MEG Derby Limited ("MEG Derby") Environmental Permit application in relation to the proposed operation of a soft drinks manufacturing plant at Dove Valley Park, Park Avenue, Foston, Derbyshire, DE65 5BG ("the site") against the Best Available Techniques (BAT) Reference Document (BRef) for the Food, Drink and Milk Industries, published by the European Commission in December 2019.

1.1 Background

MEG Derby is applying for a Part A(1) Environmental Permit, for:

- Section 6.8 A(1)(d)(ii) - Treating and processing materials intended for the production of food products from vegetable raw materials at a plant with a finished product production capacity of more than 300 tonnes per day (average value on a quarterly basis)
- Directly Associated Activity (DAA) - Section 5.4 Part A(1)(a)(ii) Disposal of non-hazardous waste in a facility with a capacity exceeding 50 tonnes per day by physico-chemical treatment.

In 2019, the Best Available Techniques (BAT) Reference Document for the Food, Drink and Milk Industries was reviewed by the European Commission, with the final BRef document and associated BAT Conclusions published in December 2019. New Installations are required to comply with the new BAT Conclusions at the point of operation.

This document identifies the sections of the BRef document relevant to MEG Derby, and sets out how the Installation will be compliant with BAT. Relevant sections of the BRef for Waste Treatment[1] (applied in relation to the effluent treatment plant) have also been reviewed.

[1] Best Available Techniques (BAT) Reference Document for Waste Treatment 2018 (EUR 29362 EN)

2. BAT 1- ENVIRONMENTAL MANAGEMENT SYSTEMS

2.1 How MEG Derby is compliant with BAT

MEG Derby, as part of the Schwarz Group, will have an effective Environmental Management System (EMS), for which it intends to gain ISO 14001:2015 certification once the Installation is operational. The EMS will include a site-level Environmental Policy, agreed and signed with site leadership, which commits the Facility to continuous improvement of its environmental performance through a Plan, Do, Check, Act (PDCA) cycle and to the reduction of potential environmental risk arising from the commissioning and operation of the Facility.

The EMS PDCA cycle shall include the following elements:

Plan

- Undertaking (or reviewing) an analysis of the context of the organisation to determine external and internal issues, such as politics and climate change, that may affect the effectiveness of the EMS and its controls.
- Implementation of an environmental policy.
- Determination of the structures, roles and responsibilities in relation to environmental aspects and objectives and identification of the financial and human resources needed.
- Identification of the needs and expectations of interested parties relating to the environment.
- Identification of applicable legal requirements relating to the environment and implementing compliance action plans.
- Carrying out an environmental risk assessment to determine environmental aspects and the significance of relevant environmental impacts and identifying control measures to reduce risk.
- Setting of targets and objectives to monitor improvements in environmental performance, including those relating to significant environmental aspects and legal requirements. Targets will be SMART (specific, measurable, achievable, relevant and time restricted).
- Identification of training and competency requirements for Facility personnel and contractors.
- Implementation of an Emergency Response Procedure, including the prevention and/or mitigation of the adverse (environmental) impacts of emergency situations.
- Maintaining a procedure for the management of change, to ensure that environmental impacts are taken into consideration during the planning stages, and environmental risk minimised throughout the lifecycle of any planned change, including construction, maintenance, operation and decommissioning.
- Maintenance of an energy efficiency plan (see BAT 6a).
- Maintenance of inventories of water, energy and raw materials consumption as well as of wastewater and waste gas streams (see BAT 2).

Do

- Implementation of written environmental procedures/ controls to reduce environmental risk, to meet the needs and expectations of interested parties, to achieve environmental objectives and to comply with environmental legislation, including the environmental permit.

- Measuring and monitoring of environmental Key Performance Indicators (KPIs).
- Maintaining records required by the EMS.
- Provision of the financial and human resources needed to effectively operate the EMS.
- Communication of relevant environmental information, including the environmental policy, environmental objectives, relevant environmental controls and procedures to staff, contractors and external parties (as applicable).
- Involvement of employees in good environmental management practices, including encouragement for the identification of potential improvements.
- Training of Facility personnel to ensure competency.
- Establishment of a Planned Preventative Maintenance Schedule based on the manufacturer's recommendations and the environmental criticality of the equipment.
- Documentation and retention of necessary records.

Check

- Undertaking documented internal, and where relevant external, audits to monitor the effectiveness of environmental procedures and controls.
- Undertaking documented evaluations of compliance with applicable environmental legislation.
- Investigating and documenting the root cause of any incidents, near misses, non-conformances or complaints.
- Monitoring of environmental KPIs to establish progress towards environmental targets and objectives.
- Applying sectoral benchmarking on a regular basis.
- Following and taking into account the development of cleaner techniques
- Undertaking drills of environmental emergency situations.
- Undertaking external verification and/or certification (through ISO 14001).
- Carrying out a management review of the environmental performance of the Facility to assess the effectiveness of the EMS.

Act

- Review and update environmental procedures and controls if improvements, or corrective and preventative actions have been identified through any of the 'check' activities.
- Update the environmental targets and objectives if required to ensure they remain relevant and achievable.

The overall outcome of the management system will be that the Facility will be effectively managed, operated and maintained to minimise the risk of pollution.

3. BAT 2- EFFICIENCY

3.1 How MEG Derby is compliant with BAT

MEG Derby will have inventories of calculated (or where relevant, estimated) energy, water and raw materials consumption expected for the site, as well as of waste water and waste gas streams, which will be maintained and regularly reviewed (including when a significant change occurs) as part of the environmental management system (see BAT 1).

Sankey diagrams will be produced to show the planned flow of energy through the facility, which is monitored through KPIs for consumption of gas (in kWh), electricity (in kWh), high pressure air and cooling demand from chillers, per 1,000 bottles. Electricity consumption will be sub-metered by each production line. Any deviation in use or efficiency would be identified and investigated immediately. Energy efficiency will be taken into consideration during the design stages for the facility (see BAT 6).

The main ingredient to be used at the Facility is water. Other ingredients will include sugar and citric acid (see table 5 in C3 of Form B3 and spreadsheet Rohstoffe). The incoming water volume is to be measured for each line, and KPIs of water use, sugar consumption and citric acid consumption per litre of finished product are to be monitored. The process has been designed to maximise resource efficiency. Through the batch tank process, the lines for all mixing phases are flushed with water into the product; minimising waste product in addition to the volume of energy, water and chemicals required for cleaning.

It is proposed that there are to be two discharges of effluent from the Facility: EP1- a discharge of unpolluted wastewater from the reverse osmosis and water pre-treatment processes to surface water, via an attenuation pond, and EP2- a discharge of treated effluent to public sewer. For the EP1 discharge, the pH, temperature and flow are to be continuously monitored prior to release to the attenuation pond, whilst the same parameters are to be monitored both in the Balance Tank, and prior to being combined with domestic foul waste from the Facility before being discharged to sewer. The monitoring data is tracked via the Facility's SCADA system, which allows for analysis of variability. Other relevant parameters to be monitored and tracked are identified in Section 5.1.

Waste gas streams from the Facility will be limited to emissions from the small (2.2 MWth) boiler, which is only to be used to support the generation of hot water when the existing hot water on site is not sufficient (e.g. in the winter). Emissions of NO_x from the boiler shall be monitored at least every 3 years, to meet the monitoring requirements of the Medium Combustion Plant Directive, and any variability identified. Average values and variability of flow and temperature shall also be measured, and information about the presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, water vapour, dust) is not yet retained.

Actions for continuous improvement of resource efficiency shall be identified and implemented through the EMS (see BAT 1).

This section also covers BAT 23 of the BAT Conclusions for Waste Treatment.

4. BAT 3- MONITORING

4.1 How MEG Derby is compliant with BAT

The Facility is to use a SCADA system to continuously monitor the effluent at key locations. The pH and 'Brix' which is a measure of the sugar content of the influent are to be continuously monitored at the inlets to the Balance Tank and the drainage sumps. Should either of these parameters be outside the normal range, the effluent would be transferred to the Divert Tank. Additionally, the pH and temperature shall be continuously monitored at Drainage Sump B for EP1 and Drainage Sump A, the Balance Tank and prior to release to sewer for EP2. The flow of effluent from Drainage Sump B to the attenuation pond and between the Balance Tank and EP2 is to be continuously measured. Additionally, sampling points are to be installed before the attenuation and before both final discharge points for any additional sampling that may be required.

BAT 6 of the BAT Conclusions for Waste Treatment is also covered in this section.

5. BAT 4- MONITORING- EMISSIONS TO WATER

5.1 How MEG Derby is compliant with BAT

MEG Derby shall discharge wastewater from the Facility at two emission points: EP1; a discharge of ‘clean’ process water from the reverse osmosis process to a surface water course via an attenuation pond which will also handle rainwater; and EP2; a discharge of effluent treated at the Facility’s effluent treatment plant to sewer, under a trade effluent discharge consent issued by Severn Trent Water.

Table 5.1 below shows the wastewater parameters that are to be monitored by MEG Derby and confirms that the conditions of the BAT Conclusions shall be met. The table also includes parameters required to be monitored for physico-chemical treatment of waste activities under BAT 7 of the Waste Treatment BRef.

Table 5.1: Wastewater monitoring

Substance/ Parameter	Standard (BAT)	BAT minimum monitoring frequency	MEG Derby planned monitoring frequency	
			EP1	EP2
Chemical Oxygen Demand (COD)	No EN standard available	Once every day	Flow proportional sampling to obtain daily sample	Not applicable as not direct discharge.
Total Nitrogen (TN)	Various EN standards available		Not applicable as not anticipated to be present within the discharge	Not applicable as not direct discharge.
Total Organic Carbon (TOC)	EN1484			Not applicable as not direct discharge.
Total Phosphorous (TP)	Various EN standards available		TSS monitored daily	Not applicable as not direct discharge.
Total Suspended Solids (TSS)	EN 872			Not applicable as not direct discharge.
Adsorbable organically bound halogens (AOX)	EN ISO 9562		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory
Free cyanide (CN^-)	Various EN standards available		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory

Substance/ Parameter	Standard (BAT)	BAT minimum monitoring frequency	MEG Derby planned monitoring frequency	
			EP1	EP2
Hydrocarbon oil index (HOI)	EN ISO 9377-2		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory
Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Zinc (Zn)	Various EN standards available		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory
Manganese (Mn)	Various EN standards available		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable as EP1 not subject to waste treatment BRef.
Hexavalent chromium (Cr(VI))	Various EN standards available		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory
Mercury (Hg)	Various EN standards available		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory
Phenol index	EN ISO 14402		Not applicable as EP1 not subject to waste treatment BRef.	Not applicable as not direct discharge.
Benzene, toluene, ethylbenzene, xylene (BTEX)	EN ISO 15680	Once every month	Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory
Biochemical Oxygen Demand (BOD)	EN 1899-1		Not applicable as not anticipated to be present within the discharge	Not applicable as not direct discharge.
Chloride (Cl)	Various EN standards available		Not applicable as not anticipated to be present within the discharge	Not applicable as not anticipated to be present within the discharge

Substance/ Parameter	Standard (BAT)	BAT minimum monitoring frequency	MEG Derby planned monitoring frequency	
			EP1	EP2
PFOA (Perfluorooctanoic acid)	No EN standard available	Once every six months	Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory
PFOS (Perfluorooctanesulphonic acid)	No EN standard available	Once every six months	Not applicable as EP1 not subject to waste treatment BRef.	Not applicable – not identified in wastewater inventory

6. BAT 5- MONITORING- EMISSIONS TO AIR

6.1 How MEG Derby is compliant with BAT

N/A- BAT 5 is not applicable to the manufacture of soft drinks.

7. BAT 6- ENERGY EFFICIENCY

7.1 How MEG Derby is compliant with BAT

Table 7.1 below identifies the techniques used by MEG Derby to maximise energy efficiency at the Installation. This section also covers BAT 23 of the Waste Treatment BAT Conclusions.

Table 7.1: Techniques for maximising energy efficiency

Technique		Description of BAT	How MEG Derby meets BAT requirements
(a)	Energy efficiency plan	An energy efficiency plan, as part of the environmental management system (see BAT 1), entails defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (for example for the specific energy consumption) and planning periodic improvement targets and related actions. The plan is adapted to the specificities of the installation.	The Facility will establish an energy efficiency plan which includes a Sankey diagram to show energy flows through the processes, use of equipment which enables measuring and monitoring in line with ISO 50001, and tracking through KPIs and efficiency targets. Improvement actions and targets are identified and implemented through the EMS.
(b)	Use of common techniques, such as:	Burner regulation and control	The installation applies a small (2.2MWth) boiler with limited potential for burner regulation & control
		Cogeneration	Not applicable- boiler is small (2.2 MWh).
		Energy-efficient motors	Only IE3 and IE4 (premium efficiency and super premium efficiency) motors are to be installed.
		Heat recovery with heat exchangers and/ or heat pumps (including mechanical vapour recompression)	The high-pressure compressors are equipped with hot water recovery at 90°C. The recovered hot water is used to heat the Facility. Additionally, hot

			water from a recuperation tank is used for all processes e.g. sugar dissolver, powder dissolver, CIP.
		Lighting	The Facility design includes LED lighting on automatic sensors.
		Minimising blowdown from the boiler	Boiler is small (2.2 MWth) and meets current design & operational expectations to minimise boiler blowdown
		Optimising steam distribution systems	Not applicable to Facility.
		Preheating feed water (including the use of economisers)	The high-pressure compressors are equipped with hot water recovery at 90°C. The recovered hot water is used to heat the Facility. Additionally, hot water from a recuperation tank is used for all processes e.g. sugar dissolver, powder dissolver, CIP.
		Process control systems	All main consumers of electricity (e.g. high-pressure compressors, blow moulders), are blocked against simultaneous machine start-up to minimise electricity peaks to minimise electricity consumption.
		Reducing compressed air system leaks	New piping is to be installed, which will be subject to planned preventative maintenance and inspections.

		Reducing heat losses by insulation	All pipes for steam, hot water and cold water will be insulated.
		Variable speed drives	To be applied where appropriate within the systems
		Multiple-effect evaporation	Not applicable- evaporation will be limited
		Use of solar energy	Not applied at site
(b) (Waste Treatment BRef)	Energy Balance Record	An energy balance record provides a breakdown of the energy consumption and generation (including exportation) by the type of source (i.e. electricity, gas, conventional liquid fuels, conventional solid fuels, and waste). This includes: (i) information on energy consumption in terms of delivered energy; (ii) information on energy exported from the installation; (iii) energy flow information (e.g. Sankey diagrams or energy balances) showing how the energy is used throughout the process. The energy balance record is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc.	Information on energy consumption is retained by MEG Derby. A Sankey diagram will be developed to show how energy is used throughout the process.

8. BAT 7- WATER CONSUMPTION AND WASTEWATER DISCHARGE

8.1 How MEG Derby is compliant with BAT

Table 8.1 below identifies the techniques used by MEG Derby to reduce water consumption and the volume of wastewater discharged from the Facility.

Table 8.1: Techniques to reduce water consumption and wastewater production

Technique		Description	How MEG Derby meets BAT requirements
Common techniques			
(a)	Water recycling and/or reuse	Recycling and/or reuse of water streams (preceded or not by water treatment), e.g. for cleaning, washing, cooling or for the process itself.	The high-pressure compressors are equipped with hot water recovery at 90°C. The recovered hot water is used to heat the Facility. Additionally, hot water from a recuperation tank is used for all processes e.g. sugar dissolver, powder dissolver, CIP. Through the batch tank process, the lines for all mixing phases are flushed with water into the product syrup; minimising waste product in addition to the volume of water, energy and chemicals required for cleaning. The backwash water from cleaning processes will be reused for the first rinse of the next cleaning cycle.
(b)	Optimisation of water flow	Use of control devices, e.g. photocells, flow valves, thermostatic valves, to automatically adjust the water flow.	Yes
(c)	Optimisation of water nozzles and hoses	Use of correct number and position of nozzles; adjustment of water pressure.	Yes
(d)	Segregation of water streams	Water streams that do not need treatment (e.g. uncontaminated cooling water or uncontaminated	Certain effluent streams have been identified as 'high quality', and it is proposed that these

		run-off water) are segregated from wastewater that has to undergo treatment, thus enabling uncontaminated water recycling.	streams are monitored (for pH and temperature) and discharged into the site attenuation pond to be discharged with surface water runoff rather than passing through the effluent treatment system.
Techniques related to cleaning operations			
(e)	Dry cleaning	Removal of as much residual material as possible from raw materials and equipment before they are cleaned with liquids, e.g. by using compressed air, vacuum systems or catchpots with a mesh cover.	N/A- not applicable to Facility operations.
(f)	Pigging system for pipes	Use of a system made of launchers, catchers, compressed air equipment, and a projectile (also referred to as a ‘pig’, e.g. made of plastic or ice slurry) to clean out pipes. In-line valves are in place to allow the pig to pass through the pipeline system and to separate the product and the rinsing water.	Not proposed for MEG Derby – less effective for liquid-only transfer systems.
(g)	High-pressure cleaning	Spraying of water onto the surface to be cleaned at pressures ranging from 15 bar to 150 bar.	Yes
(h)	Optimisation of chemical dosing and water use in cleaning-in-place (CIP)	Optimising the design of CIP and measuring turbidity, conductivity, temperature and/or pH to dose hot water and chemicals in optimised quantities.	Yes- CIP is to be carried out in accordance with MEG Quality procedures.
(i)	Low-pressure foam and/or gel cleaning	Use of low-pressure foam and/or gel to clean walls, floors and/or equipment surfaces.	Yes
(j)	Optimised design and	The equipment and process areas are designed and constructed in a	Yes

	construction of equipment and process areas	way that facilitates cleaning. When optimising the design and construction, hygiene requirements are taken into account.	
(k)	Cleaning of equipment as soon as possible	Cleaning is applied as soon as possible after use of equipment to prevent wastes hardening.	Yes

9. BAT 8- HARMFUL SUBSTANCES

9.1 How MEG Derby is compliant with BAT

Table 9.1 below identifies the techniques used by MEG Derby to prevent or reduce the use of harmful substances, e.g. in cleaning and disinfection at the Installation.

Table 9.1: Techniques for the prevention or reduction of use of harmful substances

Technique		Description	How MEG Derby meets BAT requirements
(a)	Proper selection of cleaning chemicals and/or disinfectants	Avoidance or minimisation of the use of cleaning chemicals and/or disinfectants that are harmful to the aquatic environment, in particular priority substances considered under the Water Framework Directive 2000/60/EC of the European Parliament and of the Council When selecting the substances, hygiene and food safety requirements are taken into account.	CIP is to be carried out in accordance with MEG Quality procedures, which includes appropriate selection of cleaning chemicals based on food hygiene standards.
(b)	Reuse of cleaning chemicals in cleaning-in-place (CIP)	Collection and reuse of cleaning chemicals in CIP. When reusing cleaning chemicals, hygiene and food safety requirements are taken into account.	The backwash water from cleaning processes will be reused for the first rinse of the next cleaning cycle.
(c)	Dry cleaning	See BAT 7e.	N/A- chemicals used are based on food hygiene standards
(d)	Optimised design and construction of equipment and process areas	See BAT 7j.	Yes

10. BAT 9- OZONE DEPLETING SUBSTANCES

10.1 How MEG Derby is compliant with BAT

MEG Derby plans to use the refrigerant R-1234ze, which has an Ozone Depletion Potential (ODP) equal to zero (0) and a low Global Warming Potential (GWP) of 7.

11. BAT 10- RESOURCE EFFICIENCY

11.1 How MEG Derby is compliant with BAT

Table 11.1 below identifies the techniques used by MEG Derby to maximise resource efficiency at the Facility.

Table 11.1: Techniques to maximise resource efficiency

Technique		Description	How does MEG Derby meet BAT requirements?
(a)	Anaerobic digestion	Treatment of biodegradable residues by microorganisms in the absence of oxygen, resulting in biogas and digestate. The biogas is used as a fuel, e.g. in a gas engine or in a boiler. The digestate may be used, e.g. as a soil improver.	Not appropriate – low effluent volume generated means AD plant is not viable. Intention is for biological treatment to be undertaken at the municipal works
(b)	Use of residues	Residues are used, e.g. as animal feed.	N/A- residues from the process are minimal.
(c)	Separation of residues	Separation of residues, e.g. using accurately positioned splash protectors, screens, flaps, catchpots, drip trays and troughs.	N/A as manufacture of soft drinks is a wet process. Spilled product is not able to be used, to comply with food hygiene standards.
(d)	Recovery and reuse of residues from the pasteuriser	Residues from the pasteuriser are fed back to the blending unit and are thereby reused as raw materials.	N/A
(e)	Phosphorus recovery as struvite	See BAT 12g. Only applicable to wastewater streams with a high total phosphorus content (e.g. above 50 mg/l) and a significant flow.	Not applicable- phosphorous content of the wastewater expected to be minimal.
(f)	Use of waste water for land spreading	After appropriate treatment, wastewater is used for land spreading in order to take advantage of the nutrient content and/or to use the water.	N/A - there are expected to be minimal nutrients in the wastewater (e.g. N and P) and therefore the effluent is of minimal beneficial use to agriculture.

12. BAT 11- EMISSIONS TO WATER- PREVENTION

12.1 How MEG Derby is compliant with BAT

The design of the wastewater treatment process includes an appropriate buffer storage capacity to prevent uncontrolled emissions to water in the event that any part of the treatment plant failed or is forced to stop. The estimated average daily volume of effluent discharged to sewer is 172 m^3 per day. The Balance Tank has a capacity of 1,500 m^3, and an additional capacity of 300 m^3 is provided by the Divert Tank. Combined, the Balance Tank and Divert Tank provide the capacity to contain in excess of 10 days' worth of effluent. Alternatively, should the discharge to surface water be ceased (estimated to be an average of 216 m^3 per day), then effluent could be diverted to the Divert Tank for off-site disposal by tanker, or fed into the Balance Tank for discharge to sewer.

13. BAT 12- EMISSIONS TO WATER- REDUCTION

13.1 How MEG Derby is compliant with BAT

Table 13.1 below identifies the techniques used by MEG Derby to reduce emissions to water from the Facility. This section also covers BAT 20 of the Waste Treatment BAT Conclusions.

Table 13.1: Techniques to reduce emissions to water

	Technique	Typical pollutants targeted	How MEG Derby meets BAT requirements?
Preliminary, primary and general treatment			
(a)	Equalisation	All pollutants	The effluent is directed to the Balance Tank, via a coarse screen (Duplex filter system), where balancing/ pH correction is carried out.
(b)	Neutralisation	Acids, alkalis	
(c)	Physical separation, e.g. screens, sieves, grit separators, oil/fat separators, or primary settlement tanks	Gross solids, suspended solids, oil/grease	
Aerobic and/or anaerobic treatment (secondary treatment)			
(d)	Aerobic and/or anaerobic treatment (secondary treatment), e.g. activated sludge process, aerobic lagoon, upflow anaerobic sludge blanket (UASB) process, anaerobic contact process, membrane bioreactor	Biodegradable organic compounds	N/A - Effluent is suitable for treatment at municipal treatment works.
Nitrogen removal			
(e)	Nitrification and/or denitrification	Total nitrogen, ammonium/ammonia. Nitrification may not be applicable in the case of high chloride	N/A- there is expected to be insufficient nitrogen material within the effluent to merit nitrogen removal.

(f)	Partial nitrification — Anaerobic ammonium oxidation	concentrations (e.g. above 10 g/l).	N/A- there is expected to be insufficient nitrogen material within the effluent to merit nitrogen removal.
Phosphorus recovery and/or removal			
(g)	Phosphorus recovery as struvite (Only applicable to waste water streams with a high total phosphorus content (e.g. above 50 mg/l) and a significant flow.)	Total phosphorus	N/A- there is expected to be insufficient phosphorous material within the effluent to merit phosphorous removal.
(h)	Precipitation		
(i)	Enhanced biological phosphorus removal		
Final solids removal			
(j)	Coagulation and flocculation	Suspended solids	N/A- discharge directed to municipal wastewater treatment where solids removal will be applied.
(k)	Sedimentation		
(l)	Filtration (e.g. sand filtration, microfiltration, ultrafiltration)		
(m)	Flotation		

Table 13.2 below identifies BAT-associated emission levels (BAT-AELs) for emissions to water applicable to the manufacture of food and drink and confirms that those applicable to MEG Derby shall be met. The BAT-AELs applicable to the treatment of water-based liquid waste are not applicable to MEG Derby, as the effluent treated by the effluent treatment plant is discharged to sewer. The BAT-AELs are applicable to EP1, as a direct discharge to a receiving water body; however, are not applicable to EP2 as a discharge to sewer.

Table 13.2: BAT-associated emission levels (BAT-AELs) for direct emissions to a receiving water body

Parameter	BAT-AEL (daily average)	Expected discharge concentration for EP1
Chemical oxygen demand (COD)	25-100 mg/l	<20 mg/l
Total suspended solids (TSS)	4-50 mg/l	<5 mg/l
Total nitrogen (TN)	2-20 mg/l	<20 mg/l
Total phosphorus (TP)	0,2-2 mg/l	<2 mg/l

14. BAT 13- NOISE- MANAGEMENT PLAN

14.1 How MEG Derby is compliant with BAT

During the planning stages for the Facility, a Noise Impact Assessment was submitted, outlining the proposed noise control measures to be included in the Facility design. A Noise Impact Statement from Derby Environmental Health Services concluded that 'based on the noise report submitted to support the application the development should be capable of causing no significant impact on local noise sensitive receptors provided that it is designed and constructed in a manner of controlling noise'.

The proposed noise control measures set out in Section 15.1 are therefore considered to be adequate and a Noise Management Plan is not required for the operation of the Facility. Emissions of noise, and the need for a management plan, will routinely be considered through the EMS (see Section 2).

This assessment also covers BAT 17 of the Waste Treatment BAT Conclusions.

15. BAT 14- NOISE REDUCTION

15.1 How MEG Derby is compliant with BAT

Table 15.1 below identifies the techniques used by MEG Derby to reduce noise emissions from the Installation. This section also covers BAT 18 of the Waste Treatment BAT Conclusions.

Table 15.1: Techniques to reduce noise emissions

Technique		Description	How does MEG Derby meet BAT requirements?
(a)	Appropriate location of equipment and buildings	Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating buildings' exits or entrances. For existing plants, the relocation of equipment and buildings' exits or entrances may not be applicable due to lack of space and/or excessive costs.	The boiler house, AHUs and the majority of noise emissions from HGV movements are to be located in the south eastern area of the site. The nearest off-site sensitive receptors are located adjacent to the western corner of the northern site boundary. Other production processes are to be carried out in internal areas, with noise control measures implemented into the Facility design as necessary.
(b)	Operational measures	These include: (i)improved inspection and maintenance of equipment; (ii)closing of doors and windows of enclosed areas, if possible; (iii)equipment operation by experienced staff; (iv)avoidance of noisy activities at night, if possible; (v)provisions for noise control, e.g. during maintenance activities.	The Facility has a PPM schedule which reduces the risk of noise from faulty equipment. Windows and doors are kept closed where possible and equipment is operated by experienced and competent staff. The movement of HGVs to the north of the site is to be limited to between the hours of 0700 and 1900, and the movement of HGVs to the south of the site limited to between the hours of 0600 and 2200.

(c)	Low-noise equipment	This includes low-noise compressors, pumps and fans.	Yes
(d)	Noise control equipment	This includes: (i) noise reducers; (ii) insulation of equipment; (iii) enclosure of noisy equipment; (iv) soundproofing of buildings.	Yes, for example, the mixer is to be enclosed, and the buildings have been designed to include sound proofing.
(e)	Noise abatement	Inserting obstacles between emitters and receivers (e.g. protection walls, embankments and buildings).	The site has been designed with an embankment to separate the Facility from the neighbours.

16. BAT 15- ODOUR

16.1 How MEG Derby is compliant with BAT

The potential for fugitive emissions of odour is considered to be low, therefore, an odour management plan is not required. The potential for odorous emissions shall be reviewed routinely through the EMS (see Section 2).

BAT 13 of the Waste Treatment BAT Conclusions specifies techniques to be used to minimise the occurrence of odour from the treatment of waste. These conclusions are presented in Table 16.1, along with an assessment of how the requirements of BAT are met by MEG Derby.

Table 16.1: Techniques to minimise odour from the treatment of waste

Technique		Description	How does MEG Derby meet BAT requirements?
a.	Minimising residence times	Minimising the residence time of (potentially) odorous waste in storage or in handling systems (e.g. pipes, tanks, containers), in particular under anaerobic conditions. When relevant, adequate provisions are made for the acceptance of seasonal peak volumes of waste.	The wastewater treatment plant shall have a consistent flow, so residence time shall be low. Balance Tank & Divert tank mixed & aerated to prevent anaerobic conditions & odour.
b.	Using chemical treatment	Using chemicals to destroy or to reduce the formation of odorous compounds (e.g. to oxidise or to precipitate hydrogen sulphide).	N/A- emissions of odour from the treatment of effluent from the Facility shall be minimal.
c.	Optimising aerobic treatment	In the case of aerobic treatment of water-based liquid waste, it may include: - use of pure oxygen; - removal of scum in tanks; - frequent maintenance of the aeration system.	N/A- the wastewater is not subject to aerobic treatment.

17. BAT 33 – SOFT DRINKS: ENERGY EFFICIENCY

17.1 How MEG Derby is compliant with BAT

Table 17.1 below identifies the soft drinks-specific techniques used by MEG Derby to improve energy efficiency at the Installation.

Table 17.1: Techniques to increase energy efficiency at a soft drinks manufacturing facility

Technique		Description	Does MEG Derby meet BAT requirements?
(a)	Single pasteuriser for nectar/ juice production	Use of one pasteuriser for both the juice and the pulp instead of using two separate pasteurisers.	Pasteurisers are included in the Facility's Energy and Media Concept and are designed to be as energy efficient as possible. The process is soft drinks production and not nectar/juice.
(b)	Hydraulic sugar transportation	Sugar is transported to the production process with water. As some of the sugar is already dissolved during the transportation, less energy is needed in the process for dissolving sugar.	Through the batch tank process, the lines for all mixing phases are flushed with water into the product syrup; minimising waste product in addition to the volume of water, energy and chemicals required for cleaning.
(c)	Energy-efficient homogeniser for nectar/juice production	The homogeniser's working pressure is reduced through optimised design and thus the associated electrical energy needed to drive the system is also reduced.	Not applicable to the process.

Tables 17.2 and 17.3 below present the indicative environmental performance levels for specific energy consumption and wastewater discharges per hectolitre of product, and identify the estimated performance levels for MEG Derby.

Table 17.2: Indicative environmental performance level for specific energy consumption

Unit	Specific energy consumption (yearly average)	Estimated energy consumption for MEG Derby
MWh/hl of products	0.01-0.035	0.002 - 0.003

Table 17.3: Indicative environmental performance level for specific waste water discharge

Unit	Specific waste water discharge (yearly average)	Estimated waste water discharge for MEG Derby
m^3/hl of products	0.08-0.20	0.03

18. WASTE TREATMENT- BAT 14, 15 & 16 - EMISSONS TO AIR

18.1 How MEG Derby is compliant with BAT

Specifically for the treatment of wastewater, MEG Derby uses a combination of techniques, as identified in Table 20.1 below, to reduce diffuse emissions to air.

In order to reduce emissions to air and improve the overall environmental performance, a SCADA system is used to automatically monitor parameters such as pH and temperature to ensure a stable operation and to provide an early warning of system failures.

This section covers BAT 14, 15, 16, 34 and 38 of the BAT Conclusions for the Treatment of Waste.

Table 18.1: Techniques to reduce emissions to air from the treatment of wastewater

Technique		Description	How does MEG Derby meet BAT requirements?
a	Minimising the number of potential diffuse emission sources	This includes techniques such as: - Appropriate design of piping layout (e.g. minimising pipe length, reducing the number of flanges and valves, using welded fittings and pipes); - favouring the use of gravity transfer rather than using pumps; - limiting the drop height of material; - limiting traffic speed; - using wind barriers.	Gravity drains are to be used where possible, including for the transfer of wastewater from the Balance Tank to the sewer, and waste water is only to be transported off-site for disposal in the event that it is out of spec and unable to be treated on-site.
b	Selection and use of high-integrity equipment	This includes techniques such as: - valves with double packing seals or equally efficient equipment; - high-integrity gaskets (such as spiral wound, ring joints) for critical applications; - pumps/compressors/agitators fitted with mechanical seals instead of packing; - magnetically driven pumps/compressors/agitators; - appropriate service hose access ports, piercing pliers, drill heads,	N/A- diffuse emissions to air from the treatment of wastewater are expected to be minimal.

		e.g. when degassing WEEE containing VFCs and/or VHCs.	
c	Corrosion prevention	This includes techniques such as: - appropriate selection of construction materials; - lining or coating of equipment and painting of pipes with corrosion inhibitors.	Pipes are to be either plastic or stainless steel and tanks either plastic or glass coated steel.
d	Containment, collection and treatment of diffuse emissions	This includes techniques such as; - storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g. conveyor belts); - maintaining the enclosed equipment or buildings under an adequate pressure; - collecting and directing the emissions to an appropriate abatement system (see Section 6.1) via an air extraction system and/or air suction systems close to the emission sources.	N/A- diffuse emissions to air from the treatment of wastewater are expected to be minimal.
e	Dampening	Dampening potential sources of diffuse dust emissions (e.g. waste storage, traffic areas, and open handling processes) with water or fog.	N/A
f	Maintenance	This includes techniques such as: - ensuring access to potentially leaky equipment; - regularly controlling protective equipment such as lamellar curtains, fast acting doors	A Planned Preventative Maintenance schedule is to be applied at the site.
g	Cleaning of waste treatment and storage areas	This includes techniques such as regularly cleaning the whole waste treatment area (halls, traffic areas, storage areas, etc.), conveyor belts, equipment and containers	Waste treatment process is fully enclosed (as wastewater treatment plant) with no external

			aspects requiring cleaning.
h	Leak detection and repair (LDAR) programme	When emissions of organic compounds are expected, a LDAR programme is set up and implemented using a risk-based approach, considering in particular the design of the plant and the amount and nature of the organic compounds concerned.	N/A- the wastewater treated is biodegradable with low levels of odorous / recalcitrant organic compounds.

Table 20.2 identifies techniques to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including H_2S and NH_3, and provides an assessment of whether these techniques are to be used by MEG Derby.

Table 18.2: Techniques to reduce channelled emissions to air of dust, organic compounds and odorous compounds

	Technique	Description	How does MEG Derby meet BAT requirements?
a	Adsorption	Adsorption is a heterogeneous reaction in which gas molecules are retained on a solid or liquid surface that prefers specific compounds to others and thus removes them from effluent streams. When the surface has adsorbed as much as it can, the adsorbent is replaced or the adsorbed content is desorbed as part of the regeneration of the adsorbent. When desorbed, the contaminants are usually at a higher concentration and can either be recovered or disposed of. The most common adsorbent is granular activated carbon.	N/A- diffuse emissions to air from the treatment of wastewater are expected to be minimal.
b	Biofilter	The waste gas stream is passed through a bed of organic material (such as peat, heather, compost, root, tree bark, softwood and different combinations) or some inert material (such as clay, activated carbon, and polyurethane), where it is biologically oxidised by naturally occurring microorganisms into carbon dioxide, water, inorganic salts and biomass.	N/A- diffuse emissions to air from the treatment of wastewater are expected to be minimal.

c	Fabric Filter	Fabric filters, often referred to as bag filters, are constructed from porous woven or felted fabric through which gases are passed to remove particles. The use of a fabric filter requires the selection of a fabric suitable for the characteristics of the waste gas and the maximum operating temperature.	N/A- no dust emissions from process.
e	Wet Scrubbing	The removal of gaseous or particulate pollutants from a gas stream via mass transfer to a liquid solvent, often water or an aqueous solution. It may involve a chemical reaction (e.g. in an acid or alkaline scrubber). In some cases, the compounds may be recovered from the solvent.	N/A – treatment chemicals stored in IBCs with no requirement for fume scrubbing.

19. WASTE TREATMENT- BAT 19 - EMISSONS TO WATER

19.1 How MEG Derby is compliant with BAT

MEG Derby uses a number of techniques to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water. Table 21.1 identifies the techniques specified by BAT 19 of the BAT Conclusions for Waste Treatment, and includes an assessment of whether or not these techniques are used by MEG Derby.

Table 19.1: Techniques to reduce the volume of waste water generated, and to reduce emissions to soil and water

Technique		Description	How does MEG Derby meet BAT requirements?
a	Water management	Water consumption is optimised by using measures which may include: —water-saving plans (e.g. establishment of water efficiency objectives, flow diagrams and water mass balances); —optimising the use of washing water (e.g. dry cleaning instead of hosing down, using trigger control on all washing equipment); —reducing the use of water for vacuum generation (e.g. use of liquid ring pumps with high boiling point liquids).	Trigger hoses and water management plans applied at the installation.
b	Water recirculation	Water streams are recirculated within the plant, if necessary after treatment. The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content).	N/A- no requirement for recirculation within the wastewater treatment process.
c	Impermeable surface	Depending on the risks posed by the waste in terms of soil and/or water contamination, the surface of the whole waste treatment area (e.g. waste reception, handling, storage, treatment and dispatch areas) is made impermeable to the liquids concerned.	Wastewater is piped directly to the plant with no reception or handling requirements. Wastewater is contained within pipes, sumps and tanks throughout the process. Risk is considered to be low and surfacing not applied.
d	Techniques to reduce the likelihood and impact of overflows and	Depending on the risks posed by the liquids contained in tanks and vessels in terms of soil and/or water contamination, this includes techniques such as: - Overflow detectors;	A SCADA system is to be used to monitor the effluent, which includes the fill levels of tanks throughout the

	failures from tanks and vessels	- overflow pipes that are directed to a contained drainage system (i.e. the relevant secondary containment or another vessel); - tanks for liquids that are located in a suitable secondary containment; the volume is normally sized to accommodate the loss of containment of the largest tank within the secondary containment; - isolation of tanks, vessels and secondary containment (e.g. closing of valves).	process. An overflow of Drainage Sump B or the Divert Tank would be diverted to Drainage Sump A, to be directed to the Balance Tank. If the level of the Balance Tank reaches a pre-determined high-level, then production at the Facility would cease. A shut-off valve is also in place on the attenuation pond.
e	Roofing of waste storage and treatment areas	Depending on the risks posed by the waste in terms of soil and/or water contamination, waste is stored and treated in covered areas to prevent contact with rainwater and thus minimise the volume of contaminated run-off water.	N/A – runoff from the effluent treatment area (and main waste storage area) is directed back through the effluent treatment process.
f	Segregation of water streams	Each water stream (e.g. surface run-off water, process water) is collected and treated separately, based on the pollutant content and on the combination of treatment techniques. In particular, uncontaminated waste water streams are segregated from waste water streams that require treatment.	Surface water from all site areas other than those determined to be ‘high-risk’, for example, the tanker unloading and wastewater treatment areas is directed to the attenuation pond from where it is discharged to surface water via EP1. Surface water from ‘high-risk’ areas is directed to the Balance Tank where it is combined with process effluent for treatment. Certain ‘high quality’ sources of process effluent are to be directed to the attenuation pond for discharge to surface water.
g	Adequate drainage infrastructure	The waste treatment area is connected to drainage infrastructure. Rainwater falling on the treatment and storage areas is collected in the drainage infrastructure along with washing water,	Yes – see above

		occasional spillages, etc. and, depending on the pollutant content, recirculated or sent for further treatment.	
h	Design and maintenance provisions to allow detection and repair of leaks	Regular monitoring for potential leakages is risk-based, and, when necessary, equipment is repaired. The use of underground components is minimised. When underground components are used, and depending on the risks posed by the waste contained in those components in terms of soil and/or water contamination, secondary containment of underground components is put in place.	As above
i	Appropriate buffer storage capacity	Appropriate buffer storage capacity is provided for waste water generated during other than normal operating conditions using a risk-based approach (e.g. taking into account the nature of the pollutants, the effects of downstream waste water treatment, and the receiving environment). The discharge of waste water from this buffer storage is only possible after appropriate measures are taken (e.g. monitor, treat, reuse).	Yes- see Section 12.1

20. WASTE TREATMENT- BAT 21 - EMISSONS FROM ACCIDENTS AND INCIDENTS

20.1 How MEG Derby is compliant with BAT

MEG Derby uses a number of techniques to prevent or limit the environmental consequences of accidents and incidents at the wastewater treatment plant. Table 22.1 identifies the techniques specified by BAT 21 of the BAT Conclusions for Waste Treatment, and includes an assessment of how the requirements are met by MEG Derby.

Table 22.1: Techniques to prevent or limit the environmental consequences of accidents and incidents at the wastewater treatment plant

Technique		Description	How does MEG Derby meet BAT requirements?
a	Protection measures	These include measures such as: —protection of the plant against malevolent acts; —fire and explosion protection system, containing equipment for prevention, detection, and extinction; —accessibility and operability of relevant control equipment in emergency situations.	The site applies a high level of security to prevent access to unauthorised persons.
b	Management of incidental/accidental emissions	Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves.	The Facility's EMS will include procedures and operational controls to manage emissions from accidents and incidents. A shut-off valve will be installed at the attenuation pond discharge point
c	Incident/accident registration and assessment system	This includes techniques such as: —a log/diary to record all accidents, incidents, changes to procedures and the findings of inspections; —procedures to identify, respond to and learn from such incidents and accidents.	A record is to be kept of environmental incidents and will include details of investigations carried out and the corrective actions implemented. These are to be retained and reviewed in accordance with the EMS (see Section 2).